RESILIENT MUNCY PENNSYLVANIA

THE GREATER MUNCY RESILIENCY PLAN

March 31, 2021

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The Muncy School District

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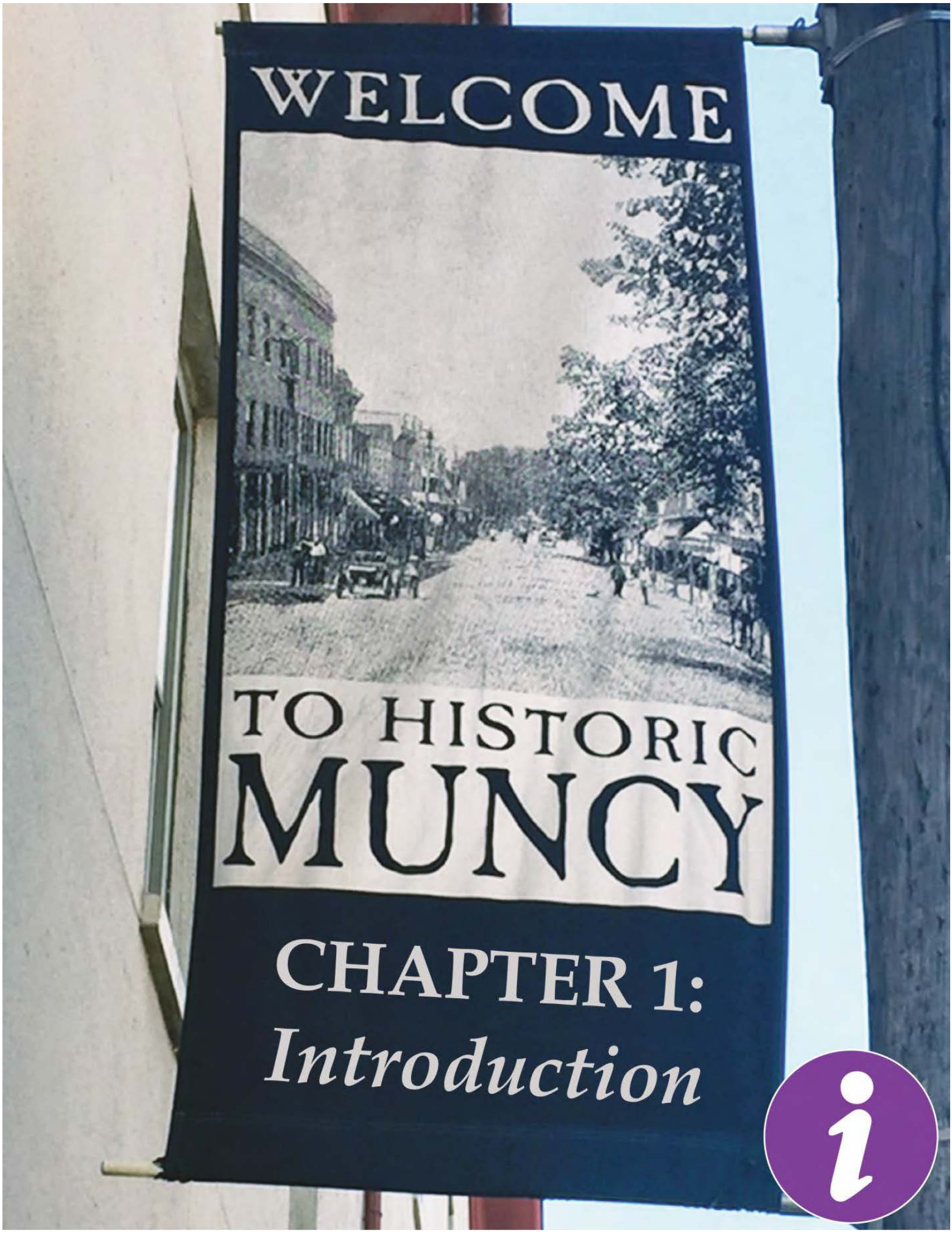
Appendices

List of Acronyms/ Abbreviations

ALS	Advanced Life Support
BFE	Base Flood Elevation
BLS	Basic Life Support
BMP	Best Management Practices
BUILD	Better Utilizing Investments to Leverage Development
C2P2	Community Conservation Partnerships Program
CAP	Countywide Action Plan
CDBG	Community Development Block Grant
CLOMR	FEMA Conditional Letter of Map Revision
CMS	Centers for Medicaid and Medicare Services
CSVT	Central Susquehanna Valley Transportation Project
DCED	PA Department of Community and Economic Development
DCNR	PA Department of Conservation and Natural Resources
DEP	PA Department of Environmental Protection
DER	Distributed Energy Resources
DPS	Public Safety
DPW	Department of Public Works
EMA	Emergency Management Agency
EMC	Emergency Management Coordinator
EMS	Emergency Medical Services
EOC	Emergency Operations Center
ESRI	Environmental Systems Research Institute (GIS software)
EWPP-FPE	USDA - Emergency Watershed Protection - Floodplain Easement
FCFP	First Community Foundation Partnerships
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GI	Green infrastructure
GIS	Geographic Information System
GMA	Greater Muncy Area
GMRP	Greater Muncy Resiliency Plan
GPS	Global Positioning System
H&H	Hydrologic and Hydraulic Study
HEC-RAS	Hydrologic Engineering Center's (CEIWR-HEC) River Analysis System
HMP	Hazard Mitigation Plan
I & I	Inflow and Infiltration
ICP	Incident Command Post
ICU	Intensive Care Unit
IS	Lycoming County Department of Information Services
LAC	Local Advisory Committee on Resiliency
LBS	Pounds (weight)
LED	Light-emitting diode
LERTA	Local Economic Revitalization Tax Assistance Act (Act 76)

LID	Low Impact Development
LMI	Low-to-Moderate Income
LOMR	Letter of Map Revision
MAFD	Muncy Area Fire Department
MBMA	Muncy Borough Municipal Authority
MPD	Muncy Police Department
MPO	Metropolitan Planning Organization
MS4	Municipal Separate Storm Sewer System
MTVFD	Muncy Township Volunteer Fire Department
NFIP	National Flood Insurance Program
NFWF	National Fish and Wildlife Foundation
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service (USDA)
PCD	Lycoming County Department of Planning & Community Development
PEMA	Pennsylvania Emergency Management Agency
PennDOT	PA Department of Transportation
PennVEST	Pennsylvania Infrastructure Investment Authority
PHARE	Pennsylvania Housing Affordability and Rehabilitation Enhancement Fund
PHFA	Pennsylvania Housing Finance Agency
PPL	PPL Electric Utilities Corporation (electric provider)
PSP	Pennsylvania State Police
PV	photovoltaic (solar energy collection)
PVC	Polyvinyl chloride (pipe material)
RC&D	Endless Mountains Resource Conservation and Development Council
RESTORE	Regional Equipment Sharing for Transmission Outage Restoration
SEDA-COG	Susquehanna Economic Development Association - Council of Governments
SFHA	Special Flood Hazard Area (floodplain)
SPI	Spending Potential Index
SR	State Route
SRBC	Susquehanna River Basin Commission
TAP	Transportation Alternatives Program
TIP	Transportation Improvement Program
UMPC	University of Pittsburgh Medical Center
USACE	US Army Corps of Engineers
USDA	US Department of Agriculture
USDOT	United States Department of Transportation
USFWS	U.S. Fish and Wildlife Service
WATS	Williamsport Area Transportation Study
WBRA	West Branch Regional Authority
WIP	Watershed Implementation Plan



CHAPTER 1:
Introduction

Chapter 1: Introduction

The Greater Muncy Area, like many of Pennsylvania's established communities, meets most of the criteria of a livable community, i.e., pedestrian-friendly, higher density of housing, businesses, and institutional uses, identifiable community core, public spaces, sense of place, affordable housing, etc. Like many of these established communities, it is at a crossroads and its future resilience and sustainability is uncertain. There are many challenging issues, including a sizable number of properties being located within the 100-year floodplain and affected by spiking flood insurance premiums, threatened historic district, decreasing population, growing elderly population, lack of employment opportunities, aging housing stock, abandoned and environmentally-challenged properties, increased traffic volumes and congestion, and Marcellus Shale drilling impacts.

These economic and societal issues are factors in the growth and health of all municipalities, but riverine communities have the additional stressor of flooding. Climate change has forced a reevaluation of the relationship that these communities have with their streams and rivers and their attitudes about flood prevention and flood resilience. This Resiliency Plan is not strictly a flood-only plan; it acknowledges that all the stressors that affect these communities have, at their core, a flooding-based component.

Flooding is the preeminent natural disaster threatening Pennsylvania's rural communities. The harmful effects of flooding include destruction of property, economic loss, public safety concerns, and the erosion of a community's sense of place. The Greater Muncy Area has experienced significant damages from flooding throughout the years. Settlement along the waterway was a critical factor for the success of Muncy's development. The first residential lots were laid out in 1797 along the West Branch of the Susquehanna River. Shipping and trading of goods along this waterway provided jobs and served as an important trade center during the lumber industry boom of the Nineteenth Century. However, the project area has experienced severe repetitive flooding due to its location at the convergence of Glade Run, Muncy Creek, and the West Branch of the Susquehanna River. Major floods from the West Branch have occurred in 1889, 1936, and 1972; with recent flooding from Muncy Creek and Glade Run in 1996, 2004, 2009, 2010, 2011 and 2019. The extent of the flood-related damage to the area is also affected by three other contributing factors:

- Muncy Borough and Muncy Creek Township have 1,296 properties within the 100-year floodplain. Additionally, 41% of all commercial and residential structures in Muncy Borough are in the 100-year floodplain.

- 90% of structures in the floodplain were built before 1980 and, therefore, do not meet current flood-proofing design guidelines and are more susceptible to flood damages.
- A large portion of Muncy Borough's historic district and downtown are in the floodplain, including several historic sites.

Flooding has significant community and economic impacts as well. Since 1978, there have been $8,944,470 in flood insurance claims in Muncy Borough and Muncy Creek Township. Changes to the National Flood Insurance Program (NFIP) have increased the urgency to address mitigation and remediation in a more effective way. In the past, flood insurance provided little incentives for property owners to remediate their homes to reduce damages to their property from future floods.

The passage of the Biggert-Waters National Flood Insurance Reform Act of 2012 and the Homeowners' Flood Insurance Affordability Act of 2014 will soon result in significant flood insurance premium increases. This will greatly impact property owners in the planning area. More property owners are looking to their municipal leaders and elected officials for assistance. Resolving this issue has gained a new sense of urgency as area residents face continued flooding risk, increased financial burden of flood insurance, and deterred redevelopment and investment in the community.

Damages from Tropical Storm Lee prompted Lycoming County to seek Community Development Block Grant – Disaster Relief funding and also initiated efforts to form the Greater Muncy Resilience Plan.

The purpose of the Greater Muncy Resilience Plan is to make Muncy, Pennsylvania "The Most Resilient Community" in the Commonwealth of Pennsylvania. The desired outcome of this plan is for Muncy to serve as the model for community resilience in Pennsylvania, to showcase how small-scale, rural communities, situated along rivers and creeks, can successfully leverage a whole community approach and incorporate best practices of resiliency in developing their long-term recovery plans.

1.1 Striving to be the Most Resilient Community in PA

The Greater Muncy Area (GMA) is comprised of Muncy Borough and parts of surrounding Muncy Creek Township in Lycoming County, Pennsylvania. It is bordered to the East and South by PA Interstate 180, to the West by the West Branch of the Susquehanna River, and to the North by Muncy Creek. First settled in 1752 at the intersection of two Indian paths, the area has transitioned from frontier outlier to river town, factory town, and to today's bedroom community.

The desired outcome of this plan is for the Greater Muncy Area to serve as a role model for community resilience in Pennsylvania by implementing a holistic, community-planning approach.

Recent climatic events across the globe have exposed the far-reaching implications of natural hazards for all aspects of a community, including its economy, natural and cultural resources, social services, and overall quality of life. Our communities also continue to face a diversity of other threats and stresses such as economic downturns, declining housing conditions, workforce issues, historic preservation, walkability issues, and lack of recreation opportunities among many other conditions that impact quality of life and community health. In response to these challenges, many communities are now striving for a combination of coordinated planning and implementation of best practices to establish more holistic, long-term community health and vibrancy. Rooted in numerous fields including community planning, hazard mitigation, emergency management, economics, and others, the concept of Community Resilience has emerged to blur the lines among these fields through increased collaboration and information synthesis with the goal of creating communities that are healthy and positioned to withstand, and rebound from, a diversity of threats and challenges.

The GMA hosts numerous waterways, and the community has a long history of flood events. In addition to floods, the community is also exposed to a myriad of other challenges faced by small communities in Pennsylvania. To help ensure long-term community health and economic vibrancy, Lycoming County, in partnership with DCED, has undertaken a holistic planning process with a focus on creative solutions to the unique challenges within the GMA. The desired outcome of this process is for the GMA to serve as a model for community resilience in Pennsylvania.

This GMRP is intended as a guide to establish long-term resilience of the GMA through identification and implementation of achievable projects. The underlying goal is to collect and incorporate robust data and information that will lead to feasible projects, viable funding mechanisms, and establishment of a strong coalition of partners in an effort to increase public safety, minimize impacts of hazards, promote economic

prosperity, and increase quality of life throughout the GMA. The ultimate aim of this effort is to ensure that the GMA remains a stable and vibrant place to live for generations to come.

1.2 Resiliency and Need

Defining Resiliency

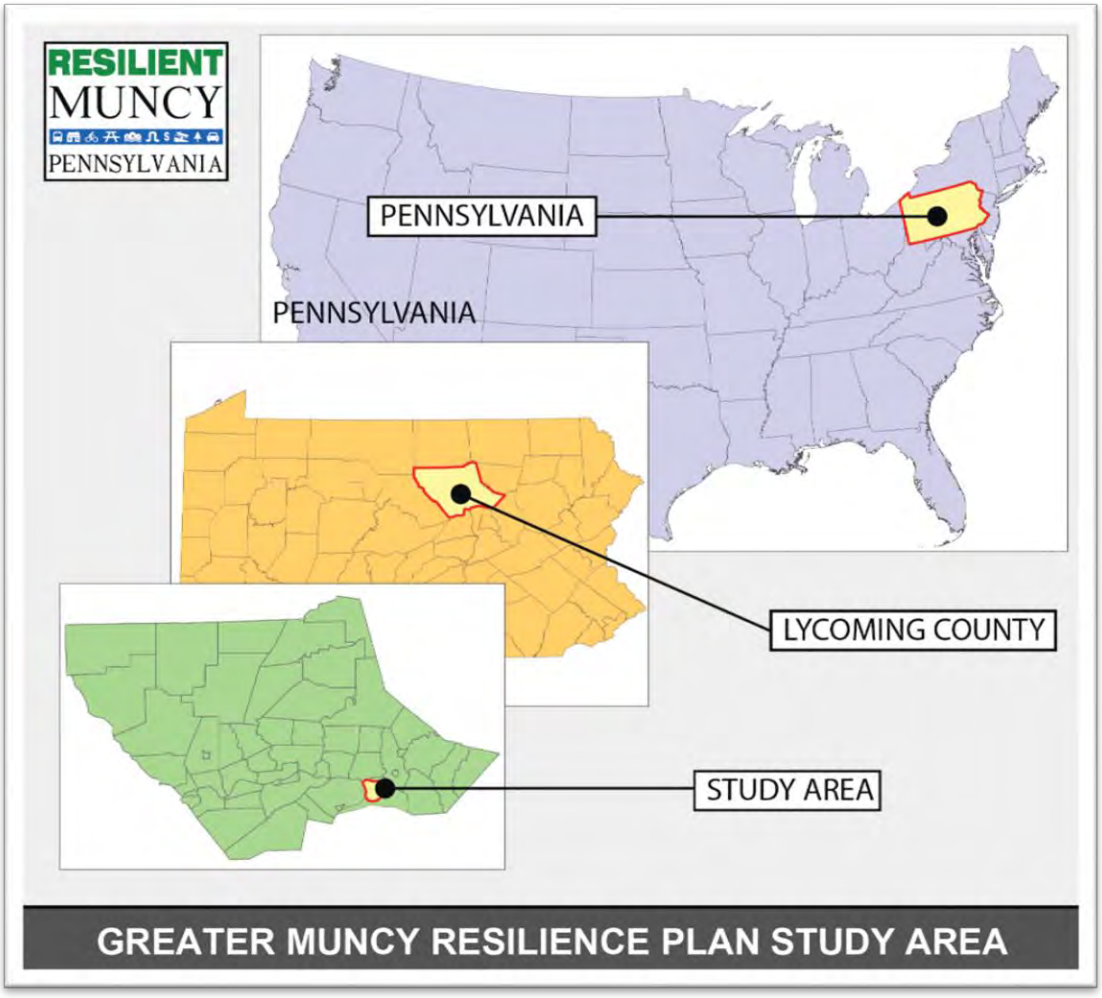
What is "Resiliency?" Generally, this term applies to how a community prepares for disasters, recovers from them, and adapts to new conditions. Resiliency means different things to different people. Below are some common definitions of resiliency:

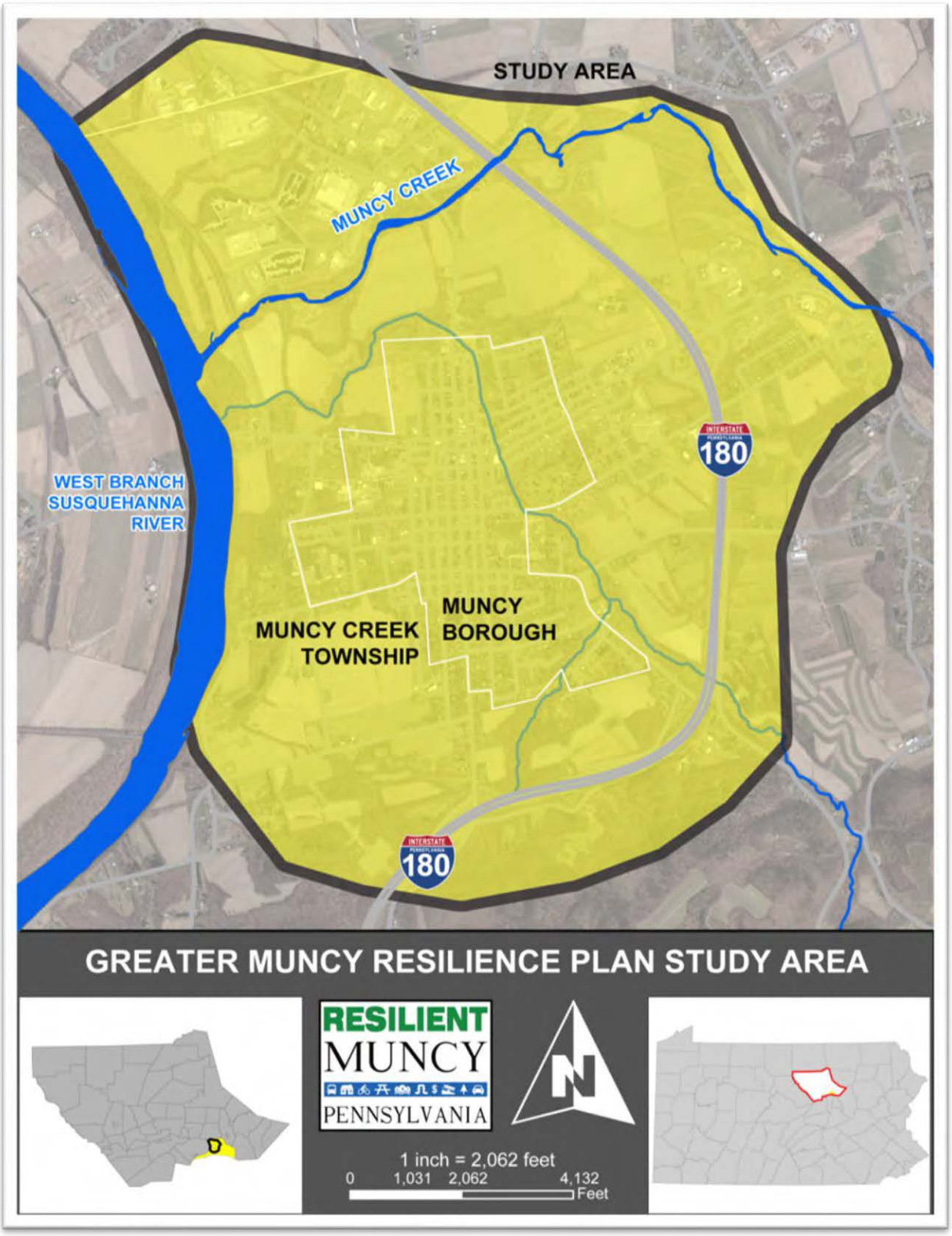
- "The ability to anticipate, prepare for, adapt to changing conditions; and withstand, respond to, and recover rapidly from disruptions." (United States Housing and Urban Development National Disaster Resilience Competition Notice of Funding Availability)
- "The capacity of individuals, communities, institutions, businesses, and systems within a planning area to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience." (The American Planning Association)
- "The capacity of individuals, communities, institutions, businesses and systems to survive, adapt, and thrive no matter what kinds of chronic stresses and acute shocks they experience". (Rockefeller Foundation)

Resiliency is not a static process to be reevaluated at set intervals; rather, as shown above, resiliency is a cycle of strategic planning, implementation, response, and adaptation to new threats.

However simple the above definitions may seem, it is important to understand the difficulty for any community to recover from and/or guard against significant climate events, economic downturns, declining housing conditions, workforce issues, as well as other challenges. While these destabilizing factors stack up, the scales can quickly become unbalanced, especially if a community is not prepared.

The GMA, with a considerable number of properties within the 1% flood risk zone (100-year floodplain, regulatory flood plain, SFHA), faces some significant risks. Aside from risks of flooding and rising insurance premiums, the GMA's housing stock is aging, the population is declining, historic buildings are at risk, and employment opportunities remain a challenge.




STUDY AREA
MUNCY CREEK
WEST BRANCH SUSQUEHANNA RIVER
MUNCY CREEK TOWNSHIP
MUNCY BOROUGH
INTERSTATE 180
INTERSTATE 180
GREATER MUNCY RESILIENCE PLAN STUDY AREA
RESILIENT MUNCY PENNSYLVANIA
1 inch = 2,062 feet
0 1,031 2,062 4,132
Feet

1.3 A Strong Foundation for Resiliency

The Greater Muncy Resiliency Plan builds upon past and current planning efforts in the GMA, including:

Muncy Creek Multi Municipal Comprehensive Plan, Lycoming County Dept. of Planning & Community Development (2017)

Lycoming County completed the Muncy Creek Multi Municipal Plan in 2017 to establish planning goal and priorities for the next 10 years. The planning area includes Muncy Creek Township, Muncy Borough, Wolf Township, Hughesville Borough, Picture Rocks Borough, and Shrewsbury Township. The 2017 Plan includes a set of achievable goals by providing a succinct implementation strategy to address current priorities of the Muncy Creek Planning Area.

Lycoming County Hazard Mitigation Plan, Michal Baker, Jr. Inc. (in progress)

The Lycoming County Hazard Mitigation Plan update, currently under development, will provide a long-term plan for addressing hazards in Lycoming County, including, floods, winter storms, and tornadoes. Public participation includes written surveys, public meetings, and the opportunity to review and comment on the existing plan. Recommendations include improvement of public awareness/ education programs, natural resource protection, and structural projects such as relocation or elevation of possible at-risk structures.

Lycoming County Brownfield Program

Lycoming County has a long-established Brownfield Program to promote the reuse and redevelopment of properties through identification of potential environmental concerns though environmental assessments. In 2012, Lycoming County and partners, including Muncy Borough, were awarded a $550,000 grant from the U.S. Environmental Protection Agency (EPA) for the Lycoming County Brownfield Coalition project. This project updated the County's existing Brownfield Inventory and conducted site specific environmental assessments on properties to identify any areas of environmental concern. The result of the efforts will continue Lycoming County's Brownfield redevelopment progress and promote the reuse of abandoned and underutilized sites throughout the county. The County currently has a US EPA Revolving Loan Fund Grant to assist with brownfield cleanup.

The following park, recreation, and greenways plan were also consulted in the GMRP development:

Creating Safe, Walkable, and Healthy Communities in the Middle Susquehanna Region, SEDA-COG, (December 2010)

A Plan for Muncy Recreation Sites with Connecting Street Designs for Downtown Muncy, SEDA-COG (March 2013)

The GMRP will include elements of previous plans, community input, past experiences, and data to identify methods for improving community resiliency. This plan is intended to be a living document the responds to the changing needs of the community over time.

1.4 Project Methodology

The Greater Muncy Resiliency's Plan's foundation drew heavily from the eight core capabilities of the Federal Emergency Management Agency's National Disaster Recovery Framework (NDRF). The NDRF provides context for how the entire community works together to restore, redevelop and revitalize the health, social, economic, natural and environmental fabric of the community. The NDRF outlines each of its eight core capabilities to include Planning, Public Information and Warning, Operational Coordination, Economic Recovery, Health and Social Services, Housing, Infrastructure Systems, and Natural and Cultural Resources.[1]

Plan development also utilized a Local advisory Committee (LAC) to guide its work, a planning consultant, a network of state and federal "resiliency coalition" partners to provide technical expertise, and local stakeholder to guide the planning process and collaborate on the plan development.

[1] https://www.fema.gov/national-disaster-recovery-framework-0

1.4.1 Municipal Partners

The Lycoming County Department of Planning & Economic Development has long been aware of the plight of flooding among its constituent municipalities. Recognition of the challenges facing its many smaller communities has prompted the county to construct a framework for Resiliency and then to apply this framework to other communities. To this end the county has formed a strong partnership with both Muncy Creek Township and with Muncy Borough and assigned staff to the project.

1.4.2 Resiliency Coalition

The Resiliency Coalition is conceived to be a loose association of large partners. This group includes State, Federal, and private organization with knowledge of the overall Resiliency Effort and an eye toward funding effective, results-driven projects and providing technical expertise throughout plan development and implementation.

1.4.3 Local Advisory Committee

One of the core principles of the GMRP is involvement of the community. To ensure that residents and community leaders within the GMA can guide development of the GMRP and prioritize projects and issues that matter to them most, a Local Advisory Committee (LAC) was formed. The LAC includes residents and business owners from Muncy Borough and Muncy Creek Township, along with staff support from the Lycoming County Department of Planning & Community Development. These LAC members are working together with the planning consultant and other stakeholders to develop the GMRP. Created to provide access to the various stakeholders in the community, the LAC met throughout the planning process and was instrumental in ensuring alignment of the planning process with local goals, values, and specific conditions of the GMA. The LAC has provided invaluable local knowledge and insight, and has assisted with development of prioritization criteria and selection of projects for implementation. The role of the LAC after the formation of the Resilience plan will be that of implementation collaborator and watchdog for local concerns.

Local Advisory Committee meeting, 2019

The LAC met five times during the project. The LAC was asked to function as a liaison to the community and to key stakeholder groups; to provide data, information, and ideas; to offer recommendations, not to make decisions; and to assist during Town Hall meetings.

Engaging stakeholders within the GMA was a primary focus of the planning process. To facilitate this, the LAC was formed in order to provide direct access to all key stakeholders and reduce the level of effort for coordination with the public. The two main themes voiced by all stakeholders were emphases on project implementation and love of Muncy among everyone, including the students in the Muncy School District.

1.4.4Stakeholder & Community Outreach

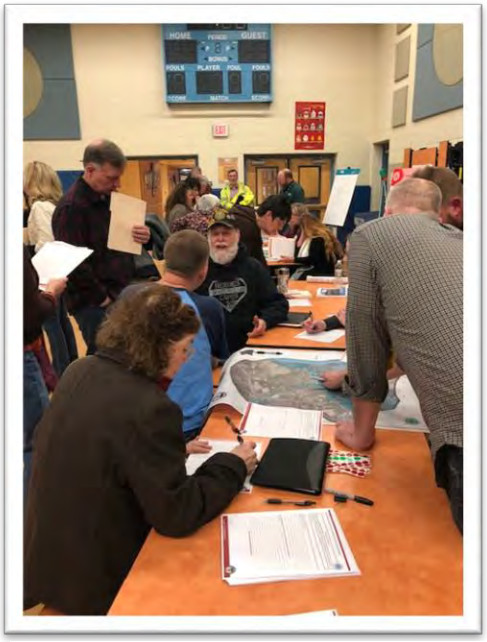
Note: Keys to success of all project packages are public outreach and education, even if not explicitly stated within the implementation steps. Each project is an opportunity to educate people on why the project is important to the GMA, as well as how it will positively affect their quality of life short- and long-term). Implementation of public education/outreach should be part of all planning described in the GMRP.

Stakeholder Outreach Meetings

Several organizations were engaged in face-to-face interviews in an effort to assess the needs of the community.

- Emergency management, health professionals, and first responders
- Students of the Muncy School District
- The Muncy Business & Professional Association
- Real estate and appraisal professionals
- The Muncy Historical Society & Museum
- PA Department of Transportation (PennDOT)
- PA Department of Conservation & Natural Resources (DCNR)
- PA Department of Environmental Protection (PA DEP)

Information gleaned from these interview was incorporated in the LAC meeting for feedback and later incorporated in the project development component of this plan.



Town Hall Meeting, April 2018

Resilient communities depend on community cohesion, pride, and involvement. These actions and committees demonstrate the required commitment and volunteerism within the GMA. Continued involvement and engagement of these groups is critical as the GMRP is implemented, updated, and re-evaluated.

Town Hall Meetings

Town Hall meetings were held as part of the planning process. The initial meeting outlined the proposed overall Resiliency Project, gauged popular opinions, and provided feedback. This proposition was met with overwhelming approval from the audience and prompted county and local officials to drive the project onward.

The LAC assisted in advertising and also staffed the meeting. Most LAC members attended, participated in discussions, and acted as moderators. The meeting provided opportunity to overview the GMRP before the general public. Following this overview, a facilitated discussion occurred pertaining to five major topics.

1.) Economic Development
Supporting a diversity of local businesses
Creating downtown anchors/draws

2.) Quality of Life
Public realm amenities (sidewalks, trees etc.)

Recreation enhancements
"Placemaking"

3.) Housing
Downtown mixed-use housing
Property maintenance and gateways

Short-term and long-term re-use

4.) Flooding and NFIP
Stormwater management
Green infrastructure
Glade Run

5.) The Corner of Main St. and Water St.

After the initial discussion the public was invited to visit moderated stations and discuss these topics and others of local concern. These spirited discussions both informed the LAC of local priorities and gave the planning consultant the information that formed the basic framework of the GMRP.

The desire to have a roadmap to resiliency, complete with implementable plans, should be noted here. The public universally expressed a desire to "do" rather than to have an unused plan on a shelf. Historically, smaller areas are the occasional topic of community planning and these plans do not come to fruition through the lack of involvement of one or more of the parties involved, frustrating the population and eroding their confidence in local government.

This desire has been used as the core of this planning effort.

Concurrent projects

The GMPR is not the sole entity to express a drive to improve conditions in the GMA. Public and private organizations alike are moving forward with projects related to and, in several instances, in association with, this resiliency effort.

Concurrent Efforts

Historical Society	Capt. John Brady Park
Lycoming County	CSVT Impact Study
County/ Borough	Flood Mitigation Buyout Programs
County/ Borough	Floodplain Structures Study
County/ USACE	Floodwater System Modeling
MBPA	Fourth Friday & Special Events
Muncy Borough	Green Street Park Improvements
Pa-DOT	Main & Water St. Intersection Improvements
Muncy Borough	Property Maintenance Sweep
WBRA	Sanitary Sewer System improvements
County/ Borough	Storm Sewer System Digital Mapping
MBMA	Water System Improvements
Muncy Borough	Zoning Ordinance Update (2018)

Figure :1 Concurrent efforts within the GMRP

Municipal officials, organizations, stakeholders, and residents have all worked diligently to foster resiliency efforts throughout the GMA. Figure 1 summarizes some key efforts completed and underway, and highlights current action groups within the GMA.

1.5 Mission Statement and Goals

In collaboration with community stakeholders and the Lycoming County Department of Planning & Community Development (PCD), a mission statement and goals were developed to serve as guiding principles for GMRP and its implementation. These are straightforward but powerful statements indicating commitment to the GMA, its citizens, and its future.

The mission statement describes how the GMRP will be created, identifies who/what will inform it, and indicates generally what it aims to accomplish. The mission statement is more direct, specifying the GMRP as a living document that will identify projects expected to be implemented.

- **Mission** - The mission of this plan is to recommend implementable projects and persist as a living document to be updated regularly with successes, lessons learned, and new opportunities. The plan will include elements of previous plans, community input, past experiences, and data to identify methods for improving community resiliency.

It is difficult for any community to recover from and/or guard against significant climate events, economic downturns, declining housing conditions, workforce issues, and other challenges—especially if the community is unprepared.

The GMRP aims to identify implementable projects that not only will reduce recovery time and improve overall quality of life, but harden the community so that major events are less impactful. These aspirations can be fulfilled by:

1. Establishing long-term resilience of the GMA via identification and implementation of achievable projects. Fulfillment of these aims will result from collection and incorporation of robust data and stakeholder inputs, identification and use of viable funding mechanisms, and establishment of a strong coalition of partners. Anticipated outcomes of the identified projects are:
    - Increased public safety
    - Minimization of impacts of hazards
    - Promotion of economic prosperity
    - Increased quality of life throughout the GMA.
2. Ensuring that the Muncy area remains a stable and vibrant place to live for generations to come.
3. Collection and incorporation of robust data and stakeholder inputs are necessary to:
    - Identify feasible projects.
    - Utilize viable funding mechanisms.

- Establish a strong coalition of partners.

The GMRP is intended to establish long-term resilience of the GMA through identification and implementation of achievable projects. It looks to identify funding opportunities, engage the public, and improve overall quality of life within the project area.

The GMRP capitalizes on extensive planning efforts by the township, borough, County, and community. The GMA will continue to engage the community, as well as the Local Advisory Committee (LAC) specially formed to aid in drafting and implementation of the GMRP.

As part of this engagement process, the LAC has helped to define resiliency within the GMA as a series of achievable goals:

- **Economic Goal**: Leverage and improve community assets to drive economic growth and ensure long-term prosperity.
- **Infrastructure Goal:** Provide high quality and reliable services and infrastructure that increase public safety, protect quality of life, and encourage economic development.
- **Flood Protection Goal:** Enhance public safety and reduce financial risks associated with riverine and stormwater flooding.
- **Quality of Life Goal:** Enhance quality of life for residents through strategic investments in walkability, downtown improvements, and expanded recreation opportunities.

Local Advisory Committee meeting, 2018

- **Resilience Goal:** Identify and prioritize projects that enhance current conditions and strengthen the community's ability to achieve long-term success.

1.6 Summary of Resiliency Projects

Resiliency projects identified in the following sections are focused on housing, quality of life, natural resources, infrastructure, emergency management and response.

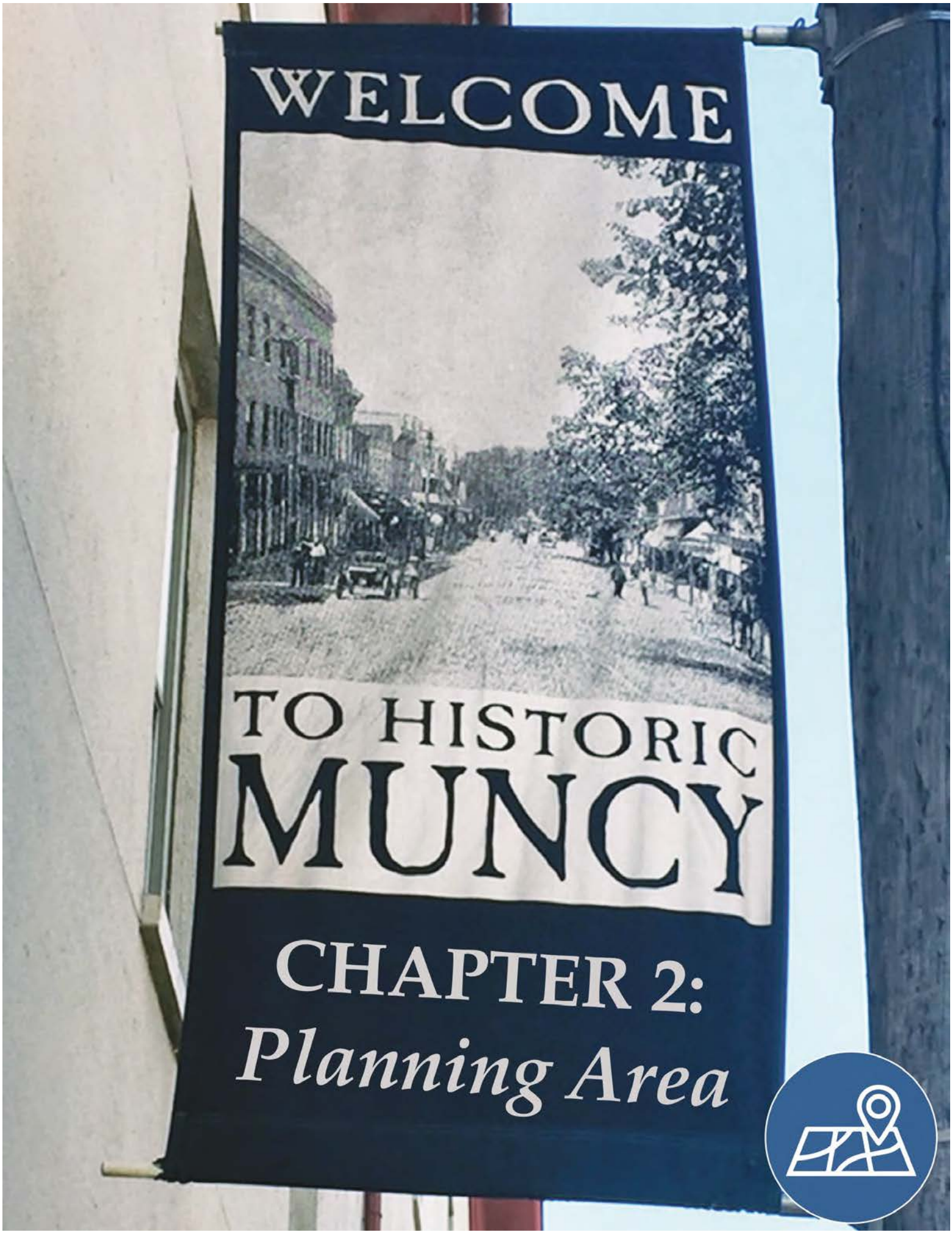
The projects are commonly themed and feasible projects for implementation. To enable long-term resiliency of the Muncy community, project identification, analysis, and planning will focus on reasonably expected outcomes.

Projects for consideration meet one of three criteria:

- They are identified by stakeholders as priorities.
- They represent immediate opportunities to improve health and safety.
- They will require substantial timelines (studies, funding, construction)

Each project consists of:

- The Project Message
- Priority Justification
- Defining the Project Area
- Resiliency Concepts
- Stakeholders
- Implementation Steps
- Funding Resources



CHAPTER 2:
Planning Area

Chapter 2: Planning Area

2.1 Geographic Scope and Content

The Greater Muncy Area (GMA) is located in north-central Pennsylvania along the West Branch of the Susquehanna River just south of the confluence with Muncy Creek.

The study area for the GMRP is a six square mile, roughly rectangular area whose boundaries is dictated by both topography and infrastructure location. This are is comprised of the entirety of Muncy Borough, the urbanized area of Muncy Creek Township, and a portion of Muncy Township.

2.2 Populations and Demographics

Approximately 3,635 residents were in the GMA in 2018 according to ESRI data—a population decrease of 4.9% since 2000. This population included all 2,393 residents in Muncy Borough and approximately 1,230 residents in a portion of Muncy Creek Township. According to ESRI forecasting, by 2023, the population is expected to decline slightly (by 0.16%). Approximately 1,514 households are in the GMA, with a median household size of 2.38. Approximately 28% of households include children, and about 2.4% are multi-generational households.

Full-time residents of the GMA have a median age of 43.1 years. This is an increase from a median age of 41.6 in 2010, suggesting that the population is slightly aging. A cohort analysis shows that age brackets of 25-34 and 35-44 both have decreased slightly over this period, while the numbers of residents between ages 55-64 and 65-74 have increased.

Muncy Borough	Residents	Percentage
SEX AND AGE		
Total population	2,477	100.0
Under 5 years	162	6.5
5 to 9 years	164	6.6
10 to 14 years	161	6.5
15 to 19 years	152	6.1
20 to 24 years	128	5.2
25 to 29 years	165	6.7
30 to 34 years	154	6.2
35 to 39 years	180	7.3
40 to 44 years	159	6.4
45 to 49 years	157	6.3
50 to 54 years	189	7.6
55 to 59 years	178	7.2
60 to 64 years	134	5.4
65 to 69 years	115	4.6
70 to 74 years	78	3.1
75 to 79 years	80	3.2
80 to 84 years	70	2.8
85 years and over	51	2.1

Figure 2.1: Population by Age, US Census 2018

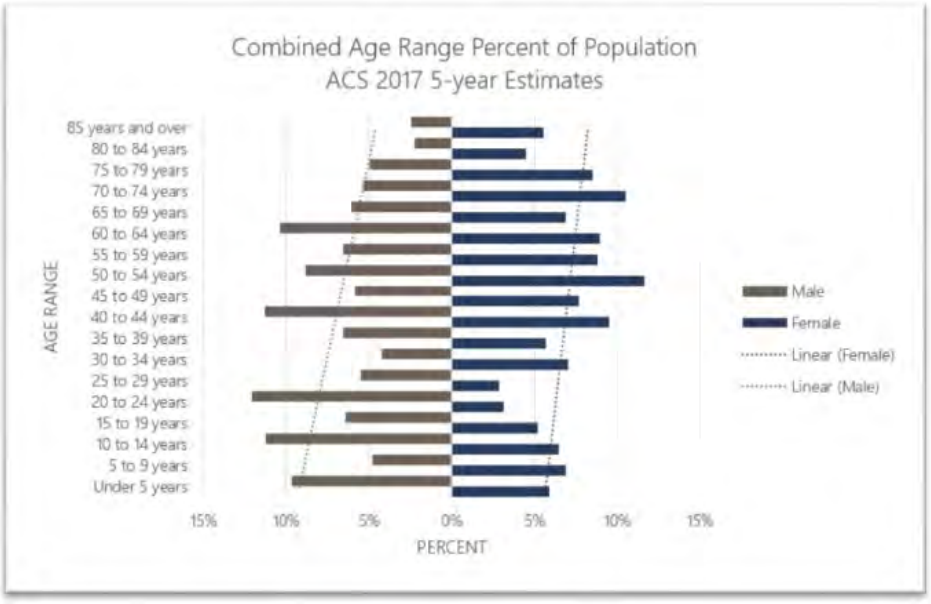


Figure 2.2: Population Percent by Age Range, US Census 2018

Figure 2.2 depicts age range bands for the GMA as of the US Census 2017 5-year estimate. Replacement of older generations by younger generations is anticipated.

However, this is not the case within the borough and township combined—the GMA and surrounding region are not undergoing anticipated sustained growth. Male populations are growing moderately within the GMA, with a sharp contraction within ages 15-34. Female populations are demonstrating a reversed growth trajectory, with older age ranges out-populating the younger generations, signaling a potential future decline. Female populations also similarly contract within ages 20-29. The linear trend lines help illustrate the contradiction in age distribution between male and female populations, which are offsetting. This lack of high percentages of younger age ranges is a significant factor in the projection of potential future declines in overall population within the GMA.

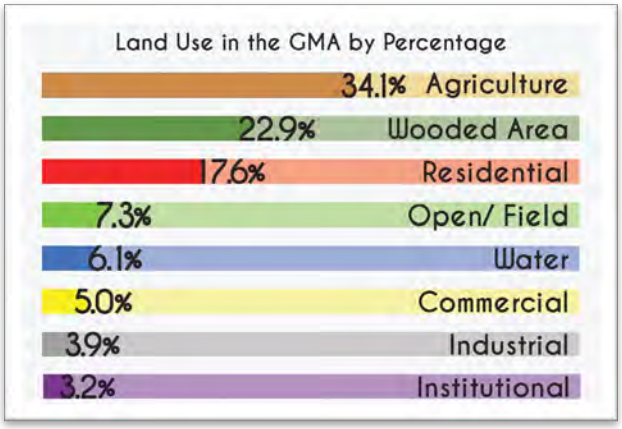
Table 2.1. Median Household Income, 2019 American Community Survey Estimates

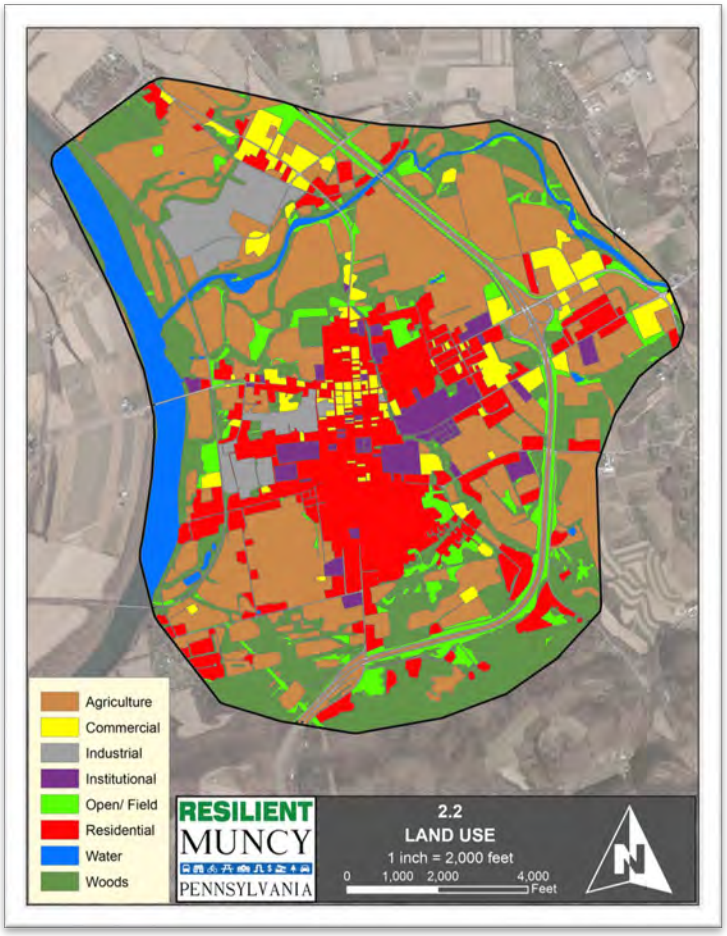
Lycoming County	$54,241
Muncy Borough	$52,772
Muncy Creek Township	$53,636

2.3 Land Use

The GMA features an urbanized core consisting of residential and commercial use structures. Outside of this core, land use turns immediately to agriculture and wooded areas.

Table 2.2. Land Use in the GMA by Percentage



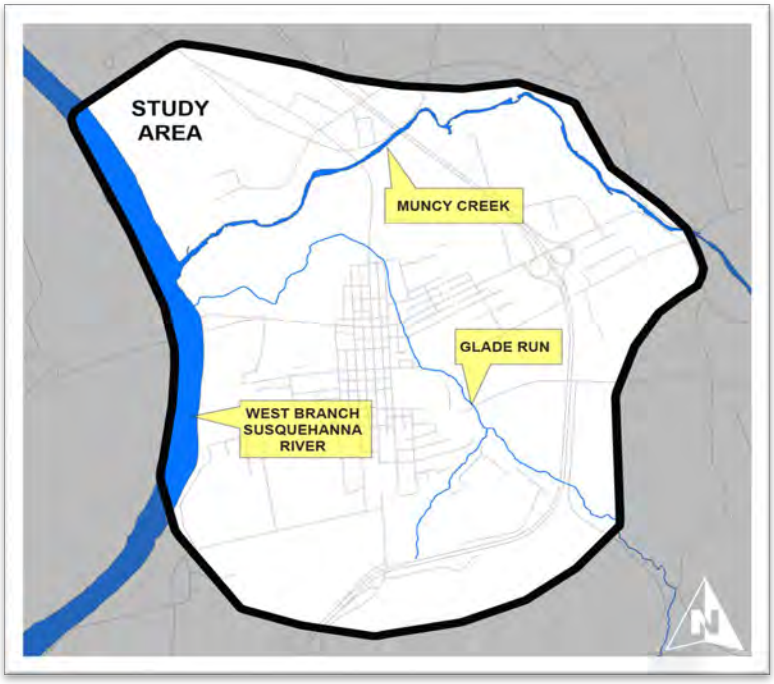


2.4 Flood Hazard Profile

2.4.1 Hydrology

The Susquehanna River drainage basin is the sole catchment area for all of Lycoming County, including the GMA. This drainage basin and its hundreds of tributaries drain 27,510 square miles spread over parts of the states of New York, Pennsylvania, and Maryland. The study area is within the Susquehanna River's West Branch (West Branch) watershed – the largest of the Susquehanna River's six major sub-basins of the Susquehanna River, and the most populated watershed in the County.

The West Branch Susquehanna River drains approximately 6,992 square miles of land flows for 243 miles, 38 miles of which are within Lycoming County. Specifically within the County there are five main tributaries including Pine Creek, Larry's Creek, Lycoming Creek, Loyalsock Creek, and finally Muncy Creek – which traverses the northern portion of the GMA. The Muncy Creek watershed is 33 miles long and drains a 216-square-mile area including portions of the GMA. Glade Run, a small tributary of Muncy Creek, flows south to north through the middle of the GMA before joining the West Branch. Glade Run is the primary conveyor of the GMA's stormwater, and carries an estimated 80% of the area's collected runoff.



Streams of Note in the Plan Area

The stream network in the GMA offers numerous benefits to local and regional quality of life by providing recreation, tourism opportunities, and aesthetic appeal—all of which contribute to local quality life and economic growth. The presence of this stream network also represents distinct disadvantages – including the increased risk of property damage and loss of life due to flooding. It is the goal of this plan to strike a balance between reaping the natural and beneficial benefits of such natural assets and mitigating against its destructive forces through smart development.

2.4.2 Flood Hazard Overview

Riverine Flooding

Characteristics vary with terrain. In relatively flat areas, land may stay covered with shallow, slow-moving floodwater for days or even weeks. In hilly and mountainous areas, floods may come minutes after a heavy rain. The short notice, large depths, and high velocities of flash floods make these types of floods particularly dangerous.

Types of riverine flooding include:

- **Overbank Flooding**, which is the most common type of flooding in the US and most representative of issues we see in the GMA
- **Flash Flooding,** which is characterized by a rapid rise in water, high velocities, and large amounts of debris. Major factors in severity of events include the intensity and duration of rainfall and the steepness of watershed and stream gradients.

  Damage caused by flash floods is often more severe than ordinary flood events.

Flooding is the primary natural hazard facing the GMA and is a relatively common occurrence. This statement is further validated by the vulnerability analysis, which was conducted in the 2015 Countywide Hazard Mitigation Plan Update. In that analysis, *"Floods, Flash Floods, & Ice Jams"* were found to have the highest risk factor of any relevant natural or manmade hazard at both the GMA and Countywide planning areas. The GMA faces two primary riverine flood scenarios: "overbank flooding" and "flash flooding."

Overbank flooding is often slow to develop, and are the result of an extended periods of rain, which causes the West Branch to overflow its banks and results in large-scale inundation. This causes widespread damage through soaking and silt deposits in homes, businesses, and industrial plants located within a particular floodplain. Thankfully, these type of floods occur less frequently and in a timeframe that enables state and local entities the ability to predict and prepare for flood scenarios.

Flash floods on the other hand are typically short in duration and usually occur in a somewhat localized area. In these floods, the velocity rather than the volume of water causes flood damages. Torrents of water can rush down minor hillside gullies at high velocities, carrying trees, debris, and rocks. These floods are often unpredictable, occur with very little warning time and (particularly if they occur at night) can cause major panic and loss of life. Impervious surfaces and frozen soils can more than double normal runoff velocities, particularly in small drainage areas due to the grounds diminished capacity to absorb stormwater and reduce runoff.

Glade Run, Muncy Borough

The Greater Muncy Area has three riverine flooding sources: The West Branch of the Susquehanna River, Muncy Creek and Glade Run. Flash flood events on Glade Run and Muncy Creek occur with far more frequency than full inundation from the West Branch. One aspect that has a significant impact on the frequency and severity of a flood is stormwater runoff. Stormwater flooding that occurs as rainfall exceeds the evaporation rate and infiltration capacity of the soil, creating surface runoff. This runoff also occurs as rainwater falls on paved or other impervious surfaces, and is prevented from infiltrating the ground. The resulting runoff can move quickly across roads and properties, posing risks to public infrastructure, private property, and places a number of other negative impacts on the health and wellbeing of our citizens. Moreover, when local drainage conditions are unable to accommodate and properly direct stormwater, accumulation of runoff in low-lying areas may increase the frequency and severity of localized flooding.

Flooding is typical in the northern portion of the GMA, which is almost entirely within the 100-year (1% annual flood risk) floodplain. During major storm events, farmland northwest of the Borough is at risk for flooding directly from Muncy Creek. Muncy Creek, restricted by topography to the north, typically breaks its southern bank and directs overbank floodwater into low-lying topography waters south towards Muncy Borough. This floodwater then enters the channel of Glade Run at the Main St. Bridge, quickly exceeding the hydraulic capacity of bridge opening and thereby causing Glade Run to backup and increase flood level upstream and onto adjacent land. This floodplain spillover effect from Muncy Creek effectively diminishes the water carrying capacity of Glade run (the primary recipient of nearly 80% of the Borough's stormwater outfalls) greatly exacerbating the urban flood scenario within Muncy Borough.

The areas of Carpenter and Water streets in the northern portion of the Borough appear to be at highest risk for flooding from Glade Run. Additionally, the SR 405 bridge over Glade Run (Water St.) has been blocked by trees during recent events, causing additional localized flooding in downtown Muncy. The southern portion of Muncy Borough undergoes regular stormwater flooding due to lack of curbing and undersized drainage features. Properties along Broadway, Quarry, Sherman, Feigles, and Charles roads have been among the most impacted by past stormwater flooding. A visualization of this type of event can be found in Case study #1, later in this chapter.

GMA's National Insurance Flood Program (NFIP) Profile:

The latest Effective Flood Insurance Rate Maps (FIRMs) for the Greater Muncy Area were released on June 6, 2016. The current effective FIRMs, FIRM database, and Flood Insurance Study (FIS) for our study area and Lycoming County as a whole can be obtained from the FEMA Map Service Center (http://www.msc.fema.gov). These maps can be used to identify the expected spatial extent and elevation of flooding from a 1% and 0.2%-annual-chance event. Map 2.5.2 shows the special flood hazard areas and watercourses of Lycoming County.

The 1% and 0.2%-annual-chance events characterize a community's probability of being flooded in any given year. Respectively, these flood events are also referred to as the inaccurately described misnomers "100-year and 500-year floods." The area contained within the 1% annual chance flood zone have a higher chance of becoming inundated during storm events. This area is used as the regulatory boundary by many agencies including the National Flood Insurance Program (NFIP) to assess need for flood insurance and the implementation of local floodplain management construction requirements. Also referred to as the Special Flood Hazard Area (SFHA), this boundary is a convenient means of assessing vulnerability and risk in flood-prone communities.

Flood Zone Terminology

Special Flood Hazard Area (SFHA)

- Contains both the Floodway and Flood Fringe, and is often referred to as the Regulatory Floodplain.
- Floodplain management regulations must be enforced in this area, and mandatory purchase of flood insurance applies
- The SHFA has a 1% (or greater) annual chance of being of being flooded in any given year
- Also referred to as the base flood or 100-year flood zone.

Source: FEMA Glossary

Floodway

- The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Typically, this portion of the SFHA will contain the deepest and fastest moving water during a flood.

Flood Fringe

- The remainder of the SFHA, which, while still hazardous during flood events

Unfortunately, the GMA (like many other river town communities) was established decades before the creation of the NFIP and the associated floodplain management standards. These river towns strategically located near waterways, which provided a valuable energy source and means of transportation for the growing lumber industry. Some of the GMA's more densely populated areas are in or near identified floodplains, thus placing residents at greater risk.

The FEMA Special Flood Hazard Area Boundaries in the GMA are displayed on map 2.4.2 Because of presence of the West Branch of the Susquehanna River, Muncy Creek, and Glade Run, approximately

1643 acres of the GMA is within the 1% annual flood risk zone. According to the 2017 Multi-Municipal Comprehensive Plan (Comprehensive Plan), 42% of properties in Muncy Borough and 35% of properties in Muncy Creek Township are within the regulatory floodplain boundary. The GMA, as indicated in **Table 2.3**, has undergone numerous flooding events with varying degrees of severity, including heavy flood impacts from Tropical Storm Lee in 2011, as well as "moderate" damage caused by flash flooding (e.g., the events during the summer of 2018).

Date of Flood	Crest (ft)	Category
3/18/1936	35.9	Major
5/28/1946	30.3	Major
11/26/1950	28.8	Major
2/26/1961	23.1	Moderate
3/11/1964	28.78	Major
6/23/1972	37.45	Major
2/26/1975	24.05	Moderate
9/26/1975	28.05	Major
3/6/1979	25.8	Moderate
2/24/1981	20	Minor
2/15/1984	27.1	Moderate
4/7/1984	21.4	Minor
4/2/1993	21.7	Minor
8/19/1994	20.5	Minor
1/20/1996	28.6	Major
9/19/2004	28.8	Major
4/3/2005	20.3	Minor
1/26/2010	21.5	Minor
12/2/2010	24.3	Moderate
3/11/2011	22.7	Moderate
4/28/2011	22.2	Moderate
9/8/2011	26.7	Moderate

Table 2.3 GMA Flood Events

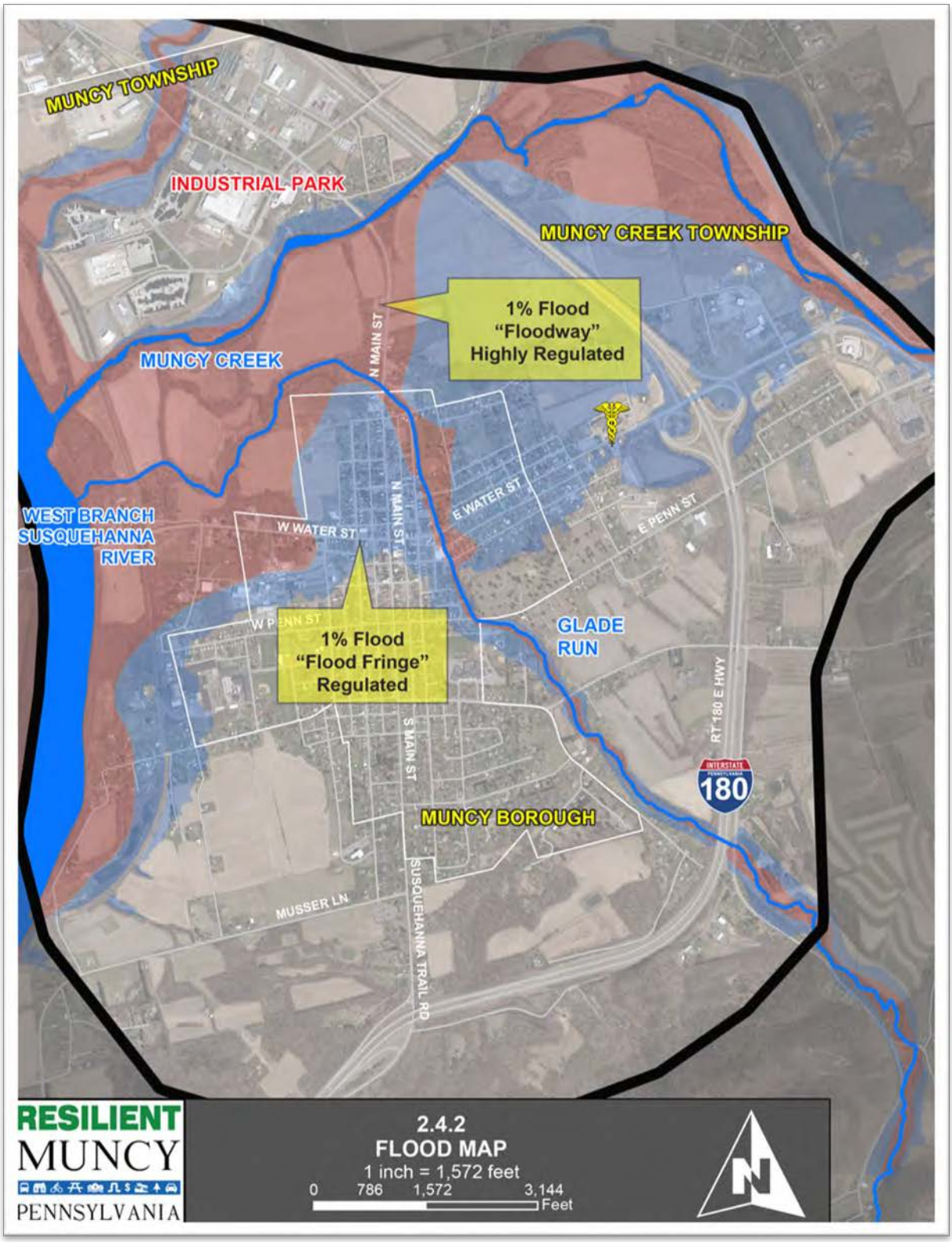
Additionally, the GMA has faced the financial challenge posed by passage of the Biggert-Waters Flood Insurance Reform Act of 2012. That legislation has resulted in dramatic increases in flood insurance premiums that have made owning a pre-firm structure in the SFHA relatively unaffordable and have force many residents to either seek cheaper insurance through the private market – or cancel their flood insurance policies.

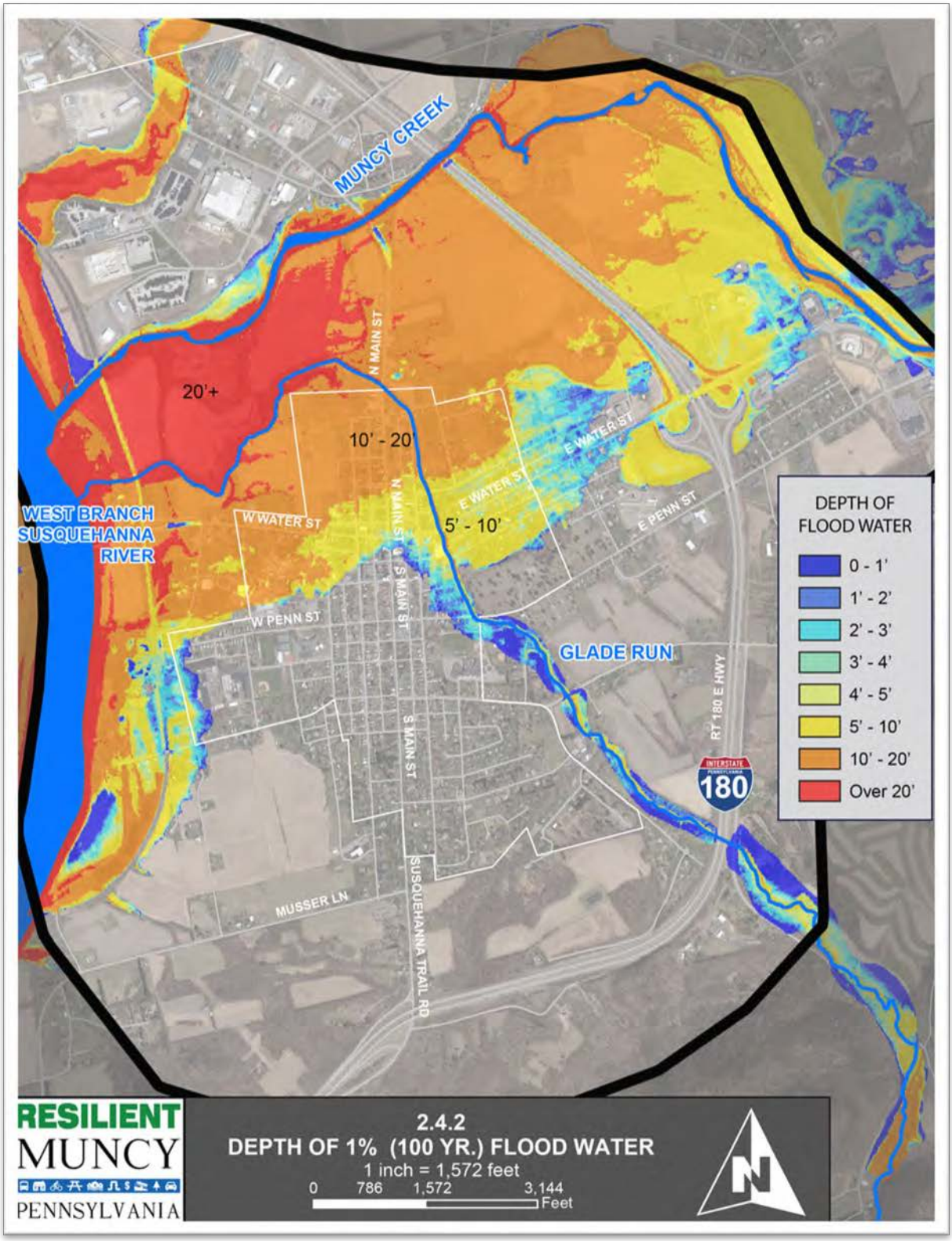
Flooding exerts significant community and economic impacts in the GMA. Since 1978, $8,944,470 (95%) in flood insurance claims have been paid out in Muncy Borough and Muncy Creek Township (see Table 2.4).

Table 2.4: Total Flood FEMA Insurance Claims in the Muncy Creek Planning Area Since 1978

Municipality	Claims Paid	Current Policies in Force	Amount Insured	Premiums	Average Insurance Value	Average Sale
Muncy, Borough of	$5,545,457.61	**145**	$17,226,000.00	$211,237.00	$118,800.00	$86,173.33
Muncy Creek, Township of	$3,399,012.89	**93**	$14,300,400.00	$92,256.00	$153,767.00	$100,309.62
Source: Federal Emergency Management Agency (FEMA), Lycoming Countywide Statistics, as of December 31, 2016, and Lycoming County Assessment Database 2017.						

*Whenever a building located in a mapped floodplain is damaged from **any** source (fire, flood, seismic activity, wind, or human activity), the municipality must determine if the cost of repairs is 50% or more of the structure's "pre-damaged" market value. If so it is said to be substantially damaged and the structure **must** be brought into compliance with the municipality's flood plain ordinance.*


MUNCY TOWNSHIP
INDUSTRIAL PARK
MUNCY CREEK TOWNSHIP
1% Flood
"Floodway"
Highly Regulated
MUNCY CREEK
N MAIN ST
WEST BRANCH
SUSQUEHANNA
RIVER
W WATER ST
E WATER ST
E PENN ST
W PENN ST
1% Flood
"Flood Fringe"
Regulated
GLADE
RUN
RT 180 E HWY
INTERSTATE
180
S MAIN ST
MUNCY BOROUGH
MUSSER LN
SUSQUEHANNA TRAIL RD
RESILIENT
MUNCY
PENNSYLVANIA
2.4.2
FLOOD MAP
1 inch = 1,572 feet
0
786
1,572
3,144
Feet
N


MUNCY CREEK
N MAIN ST
20'+
10' - 20'
E WATER ST
E WATER ST
E PENN ST
WEST BRANCH SUSQUEHANNA RIVER
W WATER ST
5' - 10'
S MAIN ST
W PENN ST
GLADE RUN
RT 180 E HWY
INTERSTATE 180
S MAIN ST
MUSSER LN
SUSQUEHANNA TRAIL RD
DEPTH OF FLOOD WATER
0 - 1'
1' - 2'
2' - 3'
3' - 4'
4' - 5'
5' - 10'
10' - 20'
Over 20'
RESILIENT MUNCY PENNSYLVANIA
2.4.2
DEPTH OF 1% (100 YR.) FLOOD WATER
1 inch = 1,572 feet
0 786 1,572 3,144
Feet
N

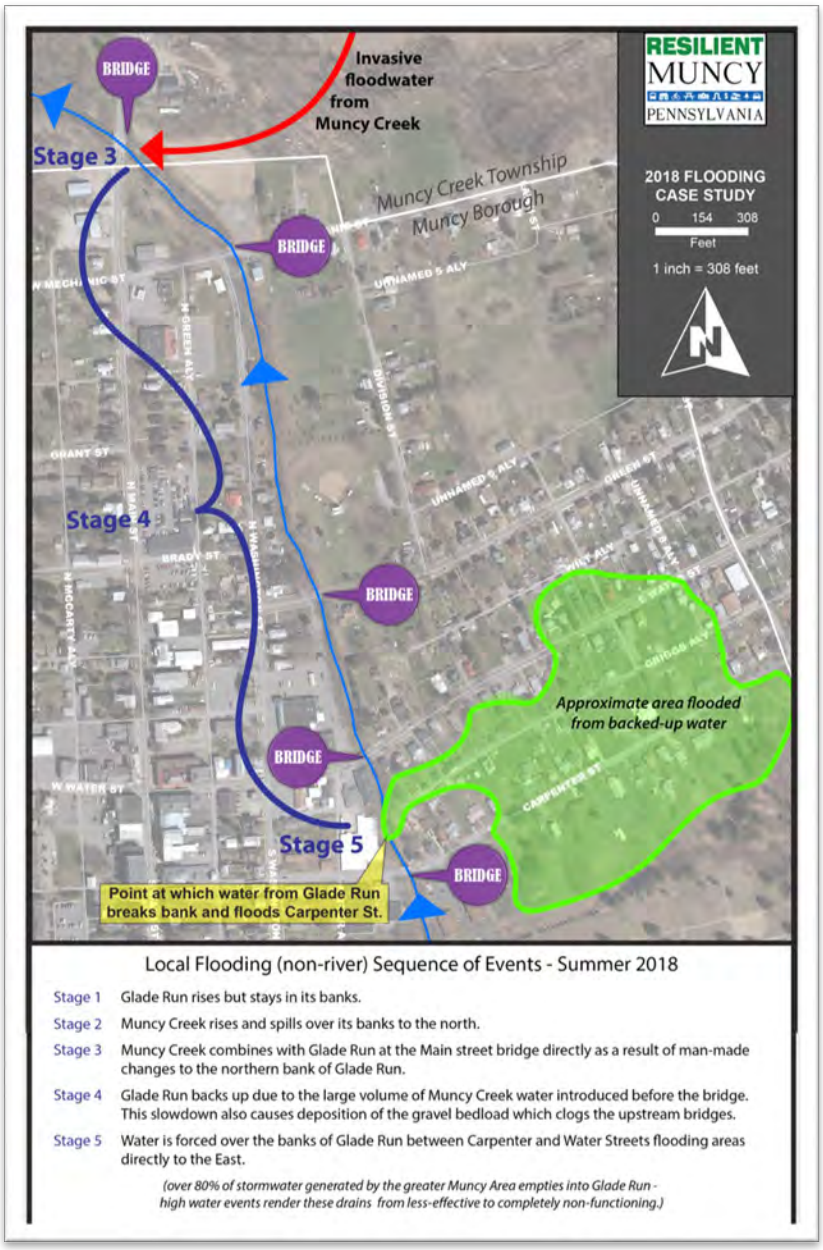
Case Study #1: Summer 2018 Flash Flooding Events

Flood events during summer 2018 provided insight into factors contributing to flooding in the GMA, as well as specific areas of increased flood risk. In late July 2018, the GMA underwent a heavy rain event that caused flash flooding, overwhelmed a local storm water system, caused infiltration of the sanitary sewer system, damaged infrastructure, disrupted the transportation network, and exposed weaknesses in emergency preparedness of the community to respond to extreme weather events.

As illustrated by this story map (https://bsa.nfipstat.fema.gov/reports/1040.htm) and diagram below, Glade Run broke its banks, causing flooding within the areas of Carpenter-Water streets, as well as Green Street Park. Upstream, within Muncy Creek Township, the Lions Park footbridge was lifted from its abutments by rising floodwaters and debris, and settled within the stream channel. The bridge (behind which continued to accumulate debris such as downed trees, garbage, and sediment) formed a waterway constriction that forced the stream out of its banks between Lions Park and New Street. These floodwaters then followed a parallel path to the stream, eventually veering through town near the borough building and leaving behind a swath of mud and flood debris.

Glade Run Flood Damage in Lions Park, 2018, Source: LDG

Concurrently, to the north, Muncy Creek had also broken its banks west of Main Street/John Brady Drive. This overbank flow then finds a familiar path (as outlined below) by traveling south and entering Glade Run near the Main St. Bridge thereby multiplying the flow of an already overwhelmed and constricted drainage area. This scenario demonstrates the potential for Muncy Creek to dramatically influence the water surface elevation of Glade Run during significant events and increase flooding upstream. This specific storm event resulted in a Presidential Disaster Declaration for the area (DR-4408-PA).



A combination of factors including proximity to neighboring streams and the confluence with the West Branch, extent of paved and impervious areas, streambank degradation, pre-FIRM development, a lack of stormwater management, and inadequate drainage infrastructure significantly increases flood risks and occurrences for residents and structures in the GMA. Due to its network of waterways and history of flood events, the GMA, its people, and its properties are undoubtedly vulnerable to future flood hazards. Current information indicates that the area will continue to undergo direct and indirect impacts of flood events annually that may induce secondary hazards such as streambank erosion, road closures, transportation related incidents, infrastructure deterioration/failure (power outages, water quality, water supply), private property damage, and water borne illnesses. These indicated risks were well demonstrated in 2018 when two significant storm events caused significant flooding and disruption to services.

Case Study # 2: Tropical Storm Lee – September 2-10, 2011

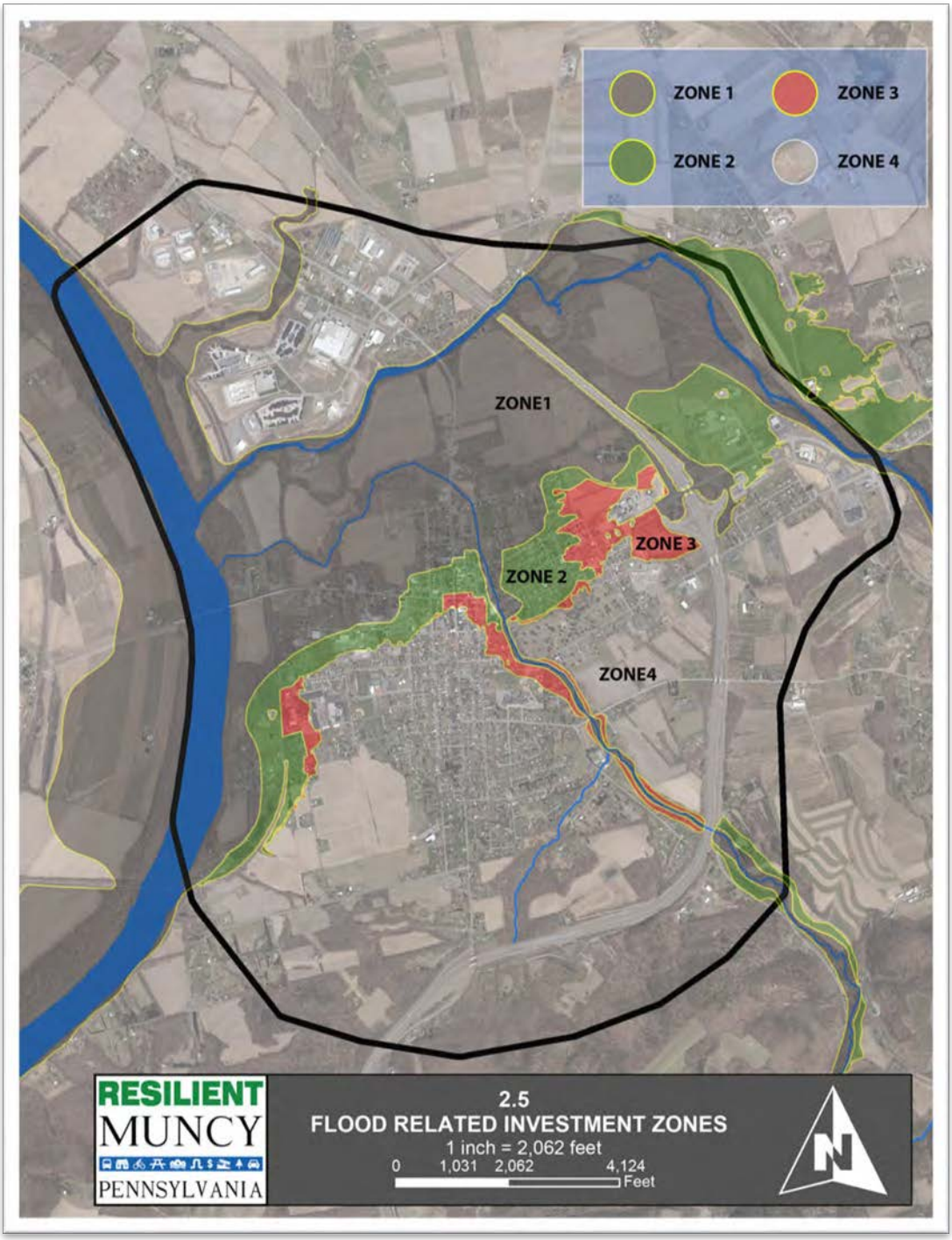
During the first week of September 2011, Tropical Storm Lee made landfall in southern Louisiana and began tracking northeast, causing heavy rains and flooding in the Gulf Coast and southeastern United States over several days. Lee continued moving northeast, becoming stationary over the Mid-Atlantic from September 5-10, causing extremely heavy rainfall in several states including Pennsylvania.

The Mid-Atlantic had undergone a wet summer and had recently been affected by Hurricane Irene the prior week. Heavy rainfall from Lee along with the pre-existing wet conditions led to significant flooding throughout Lycoming County, including Muncy Borough and Muncy Creek Township (National Hurricane Center). Tropical Storm Lee was declared a major disaster (DR 4030) by the President on September 12, 2011. Following this disaster declaration, approximately $104 million in FEMA Individual Assistance, and approximately $148 million in FEMA Public Assistance was approved by the Federal Government. Additional assistance included approximately $94 million in Housing Assistance, $10 million in Other Needs Assistance, $23 million in Emergency Work, and $120 million in Permanent Work for Pennsylvania (https://www.fema.gov/disaster/4030).

Muncy Creek and Glade Run flooding around Muncy Borough during the 2011 Tropical Strom Lee Flood

2.5 Project Zones

Most of the stressors affecting the GMA have a common component, namely flooding. With this in mind, Flood Related Investment Zones (pictured below) were constructed to guide mitigation efforts both in type and magnitude. These zones were deleniated along lines that allow for the grouping of similar effects of recorded flooding.



2.5.1 Zone 1: Strategic Non-Reinvestment Zone

Zone 1 represents the area of the GMA that experiences both the most severe and the most frequent flooding. The structures within are subject to the highest water (over 16 feet in certain areas) and are therefore subject to the most damage. This is also the area that contains the vast majority of "severe repetitive loss" claims – where single properties receive multiple insurance claim payouts over multiple flood events. The depth and frequency of flooding in this zone rule out most mitigation efforts and leave only the buyout process as a solution. The challenge to the municipalities involved is that of adaptive re-use, where the properties are repurposed in a way that benefits the community and complies with floodplain regulations.

2.5.2 Zone 2: Maximum Mitigation

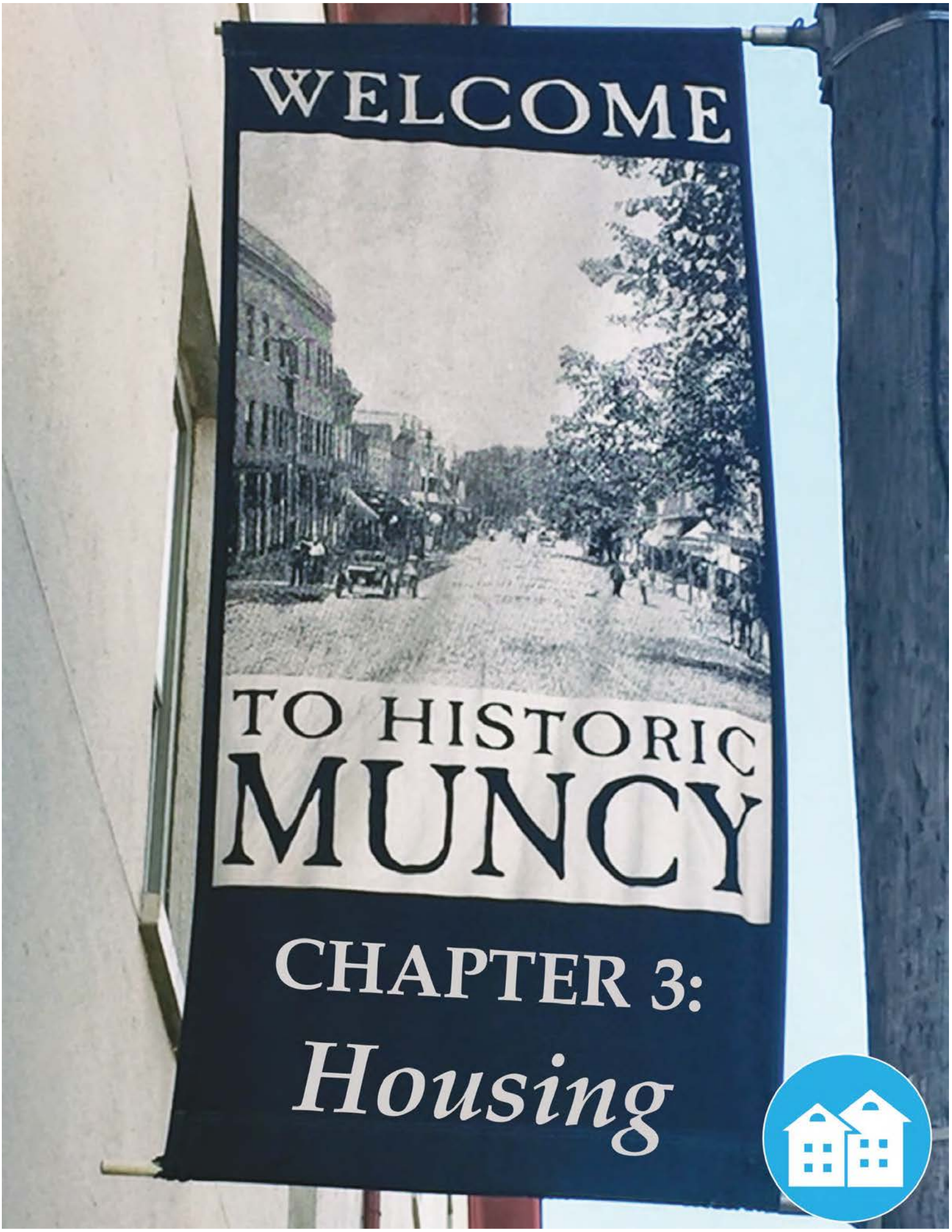
Structures in Zone 2 will see receive 5 to 10 feet of floodwater in a 1% (100 year) flood event. The level of flooding in this zone allows mitigation efforts other than buyouts to be cost effective. Commercial and residential structures can benefit from mitigations techniques such as structure elevation, demolition/ rebuild, utility elevation, and basement fill-in. FEMA's NFIP regulations are evolving and becoming more sophisticated. This is the zone where the GMA may see the most opportunity for change in the coming years given the high likelihood for finding "cost beneficial" alternatives to property acquisition.

2.5.3 Zone 3: Lesser Needs

Zone 3 has the least amount of flood water, damages, and frequency of flooding. Mitigation techniques in this area are similar to those in Zone 2, but can be scaled to the lower floodplain requirements. Most mitigation efforts in this zone will provide to greatest cost/ benefit ratios.

2.5.4 Zone 4: Non-Regulatory Floodplain

Structures in Zone 4 are not subject to floodplain regulations. In this Zone we can look to Homes-In-Need codes improvement and compliance, façade improvement's, side walk improvement initiatives and other targeted actions to improve the livability of the community.



CHAPTER 3:
Housing

Chapter 3: Housing

3.1 Summary of Existing Conditions

Example Housing within Muncy Borough, 2019

The diversity and condition of the housing stock are directly related to the economic vitality and health of the GMA community and larger region. The type and quality of the housing supply can have a significant impact on the health and economic wellbeing of a community. The ability to attract and retain people relies on good housing and attractive neighborhoods. Without a quality supply of housing that is diverse and marketable, the Greater Muncy Area runs the risk of being left behind and overlooked as a choice place to live.

Housing within the GMA is challenged by its aging housing stock and high percentage of homes in the floodplain. The GMA seeks to maintain sufficient affordable housing for all segments of the population and provide housing that meets the needs of its residents.

3.1.1 Historic Housing

Housing stock within the GMA is highly concentrated within Muncy Borough and includes a mixture of primarily late 18th century, 19th century, and early 20th century construction. Muncy Borough is a community of significant historic character, with 57% of homes constructed prior to 1939 (American Community Survey, 2016). The Borough's historic homes include examples from three main construction periods. During the initial period, from 1790 to 1830, construction occurred along north and south Main Street and included homes of the Victorian, Georgian, Federal, and Greek Revival styles. The second

construction period, 1840 to 1875, involved development extending outward from Main Street and included homes of Greek Revival, Victorian, and Italianate architectural styles. The final period of historic development occurred between 1885 and 1905, including homes of the Queen Anne style. Housing construction continued at a slower pace into the middle of the 20th century and slowed down dramatically by the beginning of the 21st century. Within recent years, relatively few new homes have been constructed in Muncy Borough.

The historic character of the Borough is a significant community asset and provides benefits for both economic development and quality of life. Moreover, presence of so many homes built more than 25 years ago presents opportunities for structural upgrades and retrofit improvements to capitalize on modern building techniques, accessibility improvements, adherence to flood plain restrictions, and increased safety. Continued preservation and leveraging of these assets is of great importance. However, historic homes also pose challenges to homeowners and the community that include increased maintenance costs, deteriorating facades, lack of safety, and Americans With Disabilities Act (ADA) features, among others. These issues have several implications for community resilience, including impacts on property values, health and safety concerns, and aesthetic challenges—all of which can deter investment and economic growth.

3.1.2 Housing Units, Type, and Size

Approximately 1,636 housing units are in the GMA (ESRI, 2018). The single-family detached home is the most predominant housing type, evident in approximately 66% of homes within Muncy Borough. The portions of Muncy Creek Township within the GMA include primarily industrial land uses, farmland, and low-density, single-family detached homes. The GMA also hosts a mixture of single-family attached and multi-family units. Within Muncy Borough, approximately 23% of housing stock is multi-family structures with between two and nine units. Additionally, 3.5% of the housing stock are single-family attached homes (i.e., Townhome style), and approximately 6% are large multifamily structures with 20 or more units. Housing stock within Muncy Creek Township are primarily single-family detached structures (72.2%) or mobile homes

Buildings on Main Street, Muncy Borough

(16.7%).

The number of bedrooms per home in the GMA provides a comparable metric to evaluate housing sizes. Houses with three bedrooms are the majority of homes in Muncy Borough (42%), followed by homes with two bedrooms (24%), and homes with either one or four bedrooms (approximately 13-14%, respectively). These figures closely match bedroom ratios for homes in both the County and the State. The relatively low number of four- and five-bedroom homes may be a limiting factor in attracting and retaining certain demographics or families such as professionals with higher spending power or larger families who may require additional bedrooms and square footage.

The housing figures specified above indicate that the current housing stock is largely dominated by single-family detached homes, a number of which are quite old with historic value. While a majority of homes of this type is common and appropriate for this community, feedback from residents and real estate stakeholders, as well as low vacancy trends, suggest demand for additional housing, housing diversity, and more housing choices. Demand for additional housing types is likely, including renovated historic homes, homes with accessibility improvements for seniors, mixed-use housing in the downtown, additional homes for young families, and homes with more bedrooms for larger families.

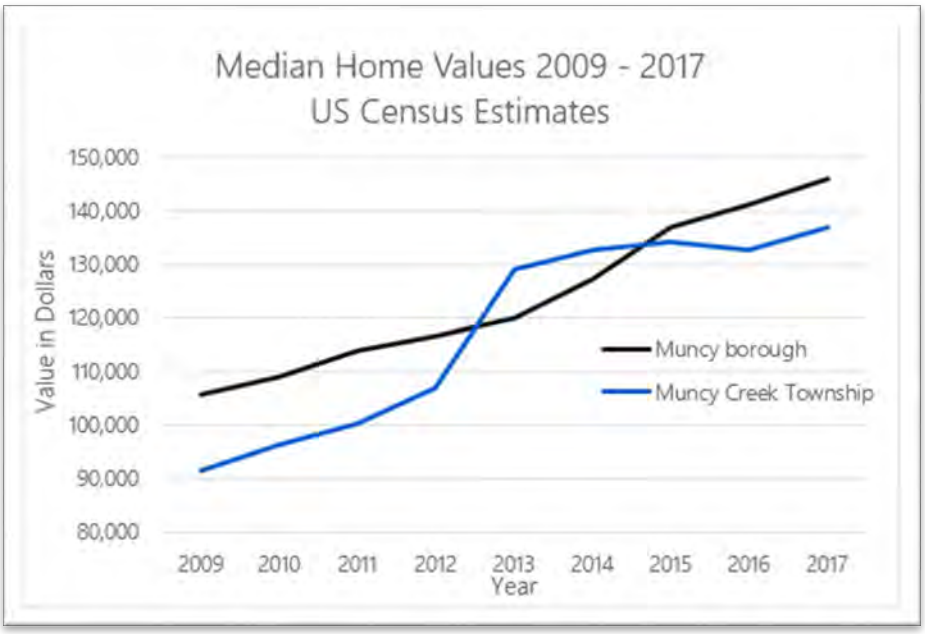
View of housing in Muncy Borough

3.1.3 Housing Conditions

Conditions of homes vary throughout the GMA from well-maintained to deteriorating. Some locations within the GMA suffer from higher degrees of housing stock issues; however, most neighborhoods display a mixture of conditions, with varying degrees of maintenance concerns and deterioration. A number of existing property maintenance code violations within Muncy Borough should be addressed. A recent Borough enforcement initiative resulted in 192 code violations, including a range of infractions such as rubbish and brush piles, high weeds, uninspected vehicles, facade and structure disrepair, fence disrepair, peeling paint, broken windows, and accessory structure issues. The most common violations appear to be brush and rubbish piles, high weeds, and accessory structure disrepair. Overall need to encourage property upkeep, repairs, and adherence to the international property maintenance code is evident throughout the GMA. Well-maintained homes and attractive facades can increase property values throughout the GMA and encourage new investment.

3.1.4 Occupancy and Vacancy

Approximately 62% of homes in Muncy Borough are owner-occupied, and the remaining 38% are renter-occupied. Muncy Creek Township has significantly fewer renters, and renter-occupied units constitute only 20% of housing stock. Approximately 9-10% of housing in both Muncy Borough and Muncy Creek Township is vacant, which is less than both the County (13.4%) and the State (11.3%). While the majority of housing in the GMA is owner-occupied, rates of renters are higher in Muncy Borough than in Muncy Creek Township (ACS, 2016). The relatively low vacancy rate indicates high demand for housing in the Borough and successful absorption of new construction over time. Any existing vacancies are likely to be due to quality of housing rather than demand for housing. The above-cited figures corroborate the under-supply of housing indicated by anecdotal information provided by stakeholders.



Graph 1: Housing Values Over Time, Source: US Census 2019

3.1.5 Housing Values

Median values of owner-occupied homes in Muncy Borough and Muncy Creek Township in 2016 were $141,300 and $132,600, respectively (Graph 2). These values are relatively consistent with the County median home value of $141,100, and lower than the State median home value of $167,700. In Muncy Borough there is a fairly even proportion of homes valued at $100,000 to $149,999 (28% of homes) and $150,000 to $199,999 (29% of homes). Homes in the $50,000 to $99,000 value range are slightly less common and constitute 23% of the owner-occupied housing stock. Very few homes in the Borough are valued at more than $300,000 or less than $50,000.

Cost of housing for both homeowners and renters is an important component of community resilience. These costs can impact a community's ability to attract a strong workforce, may lead to deteriorating property conditions, and may prevent young families from moving into a community. Spending a disproportionately large amount of income on housing can lead to insufficiency of remaining income for investment in property improvements, support of local businesses, or purchase of basic necessities such as food, clothing, transportation, and/or medical costs. The United States Department of Housing and Urban Development (HUD) defines cost-burdened families as those "who pay more than 30% of their income for housing."

Median monthly housing costs in Muncy Borough in 2016 were $1,186 for homeowners with a mortgage, and $502 for owners without a mortgage. In Muncy Creek Township, median monthly costs were $1,080 for homeowners with a mortgage, and $433 for owners without a mortgage. These monthly owner costs are relatively consistent with median monthly costs in the County of $1,192 for those with a mortgage and $466 for those without a mortgage. However, these costs are less than median housing costs for homeowners with a mortgage across the State ($1,426). In 2016, median rent was $727 per month in Muncy Borough and $554 per month in Muncy Creek Township. These figures are lower in both communities than the median rent in both the County ($750 per month) and the State ($859 per month).

As of 2016, approximately 20% of homeowners with and without mortgages in Muncy Borough were paying more than 30% of their income for housing, and thus according to HUD were considered "cost-burdened." In Muncy Creek Township, approximately 28% of homeowners with a mortgage and 6% of those without mortgages were considered cost-burdened. The percent of cost-burdened homeowners with a mortgage in the Borough is lower than in both the County (25%) and the State (28%). However, the percent of cost-burdened homeowners without a mortgage was higher in Muncy Borough than in both the County (15%) and the State (16%). As many homeowners without a mortgage are seniors, this may suggest that a higher number of seniors in Muncy are struggling to pay for their monthly housing costs in retirement or older age. As mentioned above, this may be due to a lack of affordable options for seniors, inducing them to remain in larger homes with higher maintenance costs.

As of 2016, approximately 43% of renters in Muncy Borough and 42% of renters in Muncy Creek Township were paying more than 30% of their income for housing. These figures are slightly less than the percent of cost-burdened renters in the County (39%) and the State (39%).

3.1.6 Housing Demand and Market Potential

Results of stakeholder and public outreach indicate an unmet demand for additional housing options within the GMA. Further qualitative analysis supports this assertion. Moreover, several key events could drive additional significant demand for housing in the GMA. Opening of the Central Susquehanna Valley Throughway (CSVT) may well substantially increase vehicular traffic within the GMA, rendering Muncy once again as the "gateway to Lycoming County." CSVT will likely create many opportunities for new development and job creation within the GMA, resulting in additional housing needs. Also, a new Geisinger healthcare facility is under construction within the region. These regionally significant projects will create new jobs, increase housing demand, and spur auxiliary development. Further complicating the imbalance of supply and demand is the recent loss of residential property via FEMA buyouts and local school expansions.

Market gaps for housing likely include demand for variety in housing stock such as mixed-use housing, new construction, homes with more bedrooms, and an increased range of pricing. Stakeholders also reported necessity for additional housing to meet the needs of specific demographics including young families and seniors. Young families moving into the GMA create a housing demand that far exceeds the existing supply. Stakeholders noted that young families often have a difficult time finding a home within Muncy Borough during what frequently becomes a drawn-out house hunting and purchasing process. In part, this may be due to a lack of senior housing options that retains seniors in their homes longer and thus reduces housing supply for younger families.

Conservation Subdivision Example, Source: Land Choices, and Randall Arendt, "Conservation Design for Subdivisions." Island Press, 1996.

Both new senior housing and retrofits to existing housing stock are needed to improve accessibility for seniors. Providing feasible alternatives for seniors may result in increased availability of larger homes for new families. In addition to demand for single-family detached housing, an unmet demand for mixed-use housing is evident, including apartments above commercial spaces on Main Street in Muncy Borough.

Undeveloped land South of Muncy Creek Borough, in Muncy Creek Township

To meet some of this demand, opportunities may arise to provide apartment or loft-style housing via renovation of key vacant industrial properties within the GMA. New mixed-use housing and apartments could provide opportunities for both young professionals and seniors interested in downsizing but wanting to remain in the community.

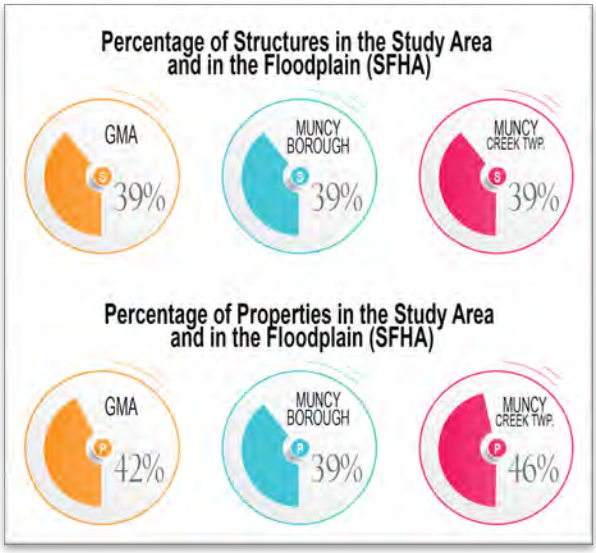
While unmet demand for new housing seems apparent, future housing development may be limited by the large amount of land within the GMA within the floodplain. Additionally, feasibility of new housing is affected by the cost of extending water/sewer infrastructure into areas of potential new development. Infill housing development and repurposing of former industrial properties may be the most feasible options for new housing development. Alternatively, to justify the cost of water/sewer service extension, potential green field development projects may require higher density housing or clustered subdivisions, as in conservation by design communities.

3.1.7 Flood-Related Housing Challenges

As mentioned in Chapter 2 and indicated, both overbank and flash flooding are common within the GMA. A significant portion of the housing stock within the GMA is located within the 100-year floodplain:

- 720 properties in the GMRP study area are at least partially in the 100-year, regulatory floodplain (SFHA.) This represents 42% of all properties in the GMRP study area.
- Approximately 39% of properties in Muncy Borough 39% of properties in Muncy Creek Township are within the regulatory floodplain boundary (SFHA).

- NFIP data indicate 152 NFIP Claims and 13 substantial damage claims in Muncy Borough. Muncy Creek Township has had 411 NFIP claims and 15 substantial damage claims (HMP).
- 90% of structures in the floodplain were built before 1980, thus do not meet current flood-proofing design guidelines, and are more susceptible to flood damages
- A large portion of Muncy Borough's historic district and downtown are within the100-year floodplain (47%)



*Whenever a building located in a mapped floodplain is damaged from **any** source (fire, flood, seismic activity, wind, or human activity), the municipality must determine if the cost of repairs is 50% or more of the structure's "pre-damaged" market value. If so it is said to be substantially damaged and the structure **must** be brought into compliance with the municipality's flood plain ordinance.*

Flood risks for these structures have several key implications for housing stock and the housing market in the GMA.

First, homes within the floodplain are at risk of physical damage that can lead to high future repair and flood insurance costs. Many of the homes in the GMA are considered repetitive loss or sever repetitive loss properties under the FEMA National Flood insurance Program (NFIP). Repetitive loss properties are structures insured under the NFIP that have incurred at least two paid flood losses of more than $1,000 over any 10-year period since 1978. A property is considered a severe repetitive loss property either if at least four losses, each exceeding $5,000 and cumulatively exceeding $20,000, have occurred, or if two or more losses have occurred whereby building payments exceeded the property value. A total of 53 repetitive loss properties and 7 severe repetitive loss properties are within Muncy Borough, the majority of which are single family homes. 22 repetitive loss properties and 15 severe repetitive loss properties are within Muncy Creek Township.

Homes within the GMA floodplain are intrinsically less valuable. This loss in valuation amounts to what can be described as a "flood plain discount" (approx. 30% less). The lesser value and risk of damage skew ownership towards perspective owners who already have a primary residence and will transform these homes into apartments as investments. Homes in the regulatory floodplain also are subject to higher flood

insurance costs which increasing in the percentage of population that is cost burdened, and leads to blighted properties, and a possible slowdown of economic growth within the GMA.

The entire floodplain in Muncy Borough is also considered to be one of the most distressed and most damaged Low-Moderate Income (LMI) census tracks impacted by 2011's Tropical Storm Lee. There have been 475 flood insurance claims paid in the borough since 1978 for a total of $5,545,457 and this includes a total of $1.8M in damages to 63 residential structures that sustained damage from Tropical Strom Lee alone (Source: FEMA Insurance Claims). To fully mitigate all floodplain properties in the LMI census track would cost approx. $22M.

Passage of the Biggert-Waters Flood Insurance Reform Act of 2012 compounds the physical risk faced by owners of properties. This legislation resulted in dramatic increases in flood insurance premiums required for mortgaged properties within the regulatory floodplain. Rising flood insurance costs, combined with regulatory restrictions in the floodplain, impact the financial feasibility of housing development in portions of the GMA. However, and notably, actual risk of flood damage to these homes may not be accurately reflected by the cost of flood insurance.

For homes farther away from streams within a floodplain or at the floodplain's peripheral, risk may be low. This reduction in risk is not reflected in the cost of insurance.

Finally, the underlying regulatory restrictions in the floodplain require additional protective measures for rehabilitation or new construction and can limit the financial feasibility of private investments. Many measures to reduce flood risk for existing buildings, such as elevating the first floor of structures, filling in basements, and wet or dry flood proofing, require significant financial investments. This level of investment may not be cost-effective when compared to the value of a structure within the GMA.

3.1.8 Summary of Gaps and Opportunities

Opportunities are available to capture the unmet housing demand, retain current residents, and attract young families/professionals. Analyses have indicated a current unmet need for more diversity in housing prices, sizes, and styles. The remaining lack of feasible senior housing options further exacerbates the scarcity of housing for young families. Additionally, there is demand for larger housing to accommodate larger families, as well as need for mixed-use housing.

The following have been identified as opportunities to address the above-cited unmet needs within the GMA:

- **Gap:** Lack of mixed-use housing opportunities

  Opportunity: Improve/encourage use of upper floors of commercial buildings along Main St. creating mixed-use housing.

- **Gap:** Reduced housing and economic viability within the downtown

  Opportunity: Incentivize façade renovations/improvements through the borough, creating attractive housing options, increasing economic viability, and improving community resiliency.

- **Gap:** Lack of residential flood mitigation options

  Opportunity: Provide range of flood mitigation options within the GMA

- **Gap:** Maintenance/code violations evident at various properties within the GMA

  Opportunity: Address property maintenance and ordnance violations through enforcement of existing codes.

- **Gap:** Lack of sites for creation of new housing options

  Opportunity: Redevelop key sites to increase availability of a variety of housing opportunities:

  - Former industrial sites
  - Infill development of vacant lots and properties

  Opportunity: Capitalize on increased demand likely to occur from CSVT and new hospital development.

  Opportunity: Create opportunities for new development on strategic parcels in growth areas by implementing clustered subdivisions utilizing various innovative planning methods, including conservation by design, which:

  - Reduce costs of construction and of development of infrastructure
  - Increase property values and satisfy demand
  - Create sustained value.

3.2 Ongoing Projects Tied to Resiliency

3.2.1 Property Code Compliance

The Project Message

“A common goal for the common good.”

Muncy Borough and Muncy Creek Township have adopted the Pennsylvania statewide building code, generally known as the Uniform Construction Code, which includes the 2015 additions of the International Residential Code and the International Building Code, as the standard property code.

The municipalities have jointly renewed their interest in compliance with this ordinance in recognition of the concept of “community gateways” and are moving in this direction.

Priority Justification

Providing the right type of regulations is an important part of achieving redevelopment and overall resiliency. Coupled with increased compliance measures, regulations can help increase economic growth, improve property values, and create safer communities.

Defining the Project Area

This project reflects a partnership and shared vision between the Township and the Borough and included both municipalities.

Resiliency Concepts

The concept of "community gateways" is one of importance within the GMA. The majestic tree canopy and the positive neighborhood quality of the southern entrance to Muncy are not replicated in the other three cardinal points that serve as entrances into town. This project is a necessary first step in providing a welcoming and attractive entrance into the GMA.

Implementation Steps

This project is ongoing.

1. Continued enforcement of locally adopted property codes.

Stakeholders

Lead Agency - Muncy Creek Township, Muncy Borough

Other Partners – Community at Large

3.2.2 Lycoming County Flood Buyout Program

The Project Message

"Reduce repetitive loss – increase community resiliency."

Acquisition or relocation of insurable buildings includes removing buildings from the path of flooding and ensuring that the property will stay vacant. This activity physically removes structures from the flood hazard area. The objective of this activity is to encourage communities to acquire, relocate, or otherwise clear existing buildings out of the flood hazard area.

Since 2005, both Muncy Creek Township and Muncy Borough have worked with Lycoming County to acquire flood prone properties within the floodplain. Hazard Mitigation Grant Program (HMGP) as funding available. This program has been prioritized by the Pennsylvania Emergency Management Agency (PEMA) to focus primarily on acquisition of properties repeatedly damaged by flooding. Muncy Borough

has acquired over a dozen within the severe repetitive loss area of the borough, and Muncy Creek Township has acquired two. Because of the presence of multiple flooding sources—Glade Run, Muncy Creek, and the West Branch of the Susquehanna River—this area undergoes a damage-causing flood about every five to seven years.

The program will continue to acquire and remove floodplain properties that are repetitively and severely damaged. The Lycoming County Buyout Program focuses on primary residential homes that are located in the Floodway 100 Year Flood (1%) plain. There are a multitude of potential funding sources based on the level of loss/damage to a home, a Presidential Disaster Declaration, and income level. FEMA funding sources for this program have a mandatory restriction that all buyout lots must remain open space. Open space can incorporate recreational assets but all uses must be approved by the funding source.

Program challenges include:

- Balance the loss of tax base and increased maintenance cost with benefit to the community
- Duration of buyout process
- Limitations to adaptive reuse of sites based on funding sources used
- Upkeep of lots once transferred to municipalities for long-term ownership

Priority Justification

Although this is an existing program, Lycoming County will develop formal criteria and priorities for acquisitions in Muncy, particularly in the Strategic Non-Reinvestment Zone 1. There are acquisitions underway in the neighborhood, particularly in the vicinity of the Market and Mechanic Street intersection. Existing buyouts are selected based on dynamic factors such as buyer willingness and historic flood damage. The inability to anticipate these factors from year-to-year generates a need to develop, rank, and formalize criteria to prioritize acquisitions. Factors such as flood damages, structure value, flood depth, cost of appurtenant infrastructure, adjacency to buyout clusters, and property ownership will be weighted to develop a ranking system that can be used to better guide and target acquisitions when resources become available.

Defining the Project Area

Several Severely Repetitive Loss properties are along Mechanic and Market Street in the Borough, as shown on the map, in Zone 1.

Resiliency Concepts

Acquisition in the target zone that experiences the deepest levels of flooding prevents the future loss of life and property due to flooding. Once the sites are acquired and the structured have been removed, the properties can be repurposed for dedicated uses

such as open space, habitat, recreation or other passive uses that are compatible with the floodplain.

The project will enable prioritization and targeting of impacted properties for acquisition and relocation. Identifying properties for acquisition will allow the Borough and County to leverage and focus limited resources. The ranking system will aim to avoid scatter-site acquisitions and instead focus on "clusters" that facilitate removal of utilities such as streets and sewer service and the consolidation of land for recreational purposes. This will increase the cost effectiveness of buyout and mitigation efforts, enabling the Borough and County to more quickly enjoy the cost savings from reducing service areas.

The overall project goal is to prevent flood damage by keeping flood-prone lands free of development and protect and enhance the natural functions of floodplains.

Stakeholders

Lead Agency - Lycoming County Department of Planning Community Development (PCD)

Other Partners - Muncy Borough , LAC, FEMA, PEMA, PHFA, property owners

Implementation Steps

1. Engage property owners to discuss the project, funding, and benefits.
2. Acquire funding for property acquisition and structure demolition.
3. Coordinate future uses.
4. Reengage stakeholders. Identify any funding-related delays, implications, and potential risks to landowners.
5. Reengage funding sources to move the process forward, and identify criteria gaps. Evaluate benefits that relate to flooding mitigation, community resiliency, and repetitive losses.

Funding Resources

Potential funding sources for this project include:

- Federal Emergency Management Agency (FEMA)
  - Federal Mitigation Assistance (FMA)
  - Hazard Mitigation Grant Program (HMGP)
- DCED Community Development Block Grant – Disaster Recovery (CDBG-DR)
- PHFA Pennsylvania Housing Affordability and Rehabilitation Enhancement Fund (PHARE)

3.2.3 Lycoming County Project LOMA

The Project Message

FEMA uses the most accurate flood hazard information available and applies rigorous standards in developing Flood Insurance Rate Maps (FIRMs). However, because of limitations of scale or topographic definition of the source maps used to prepare a FIRM, small areas may be inadvertently shown within a Special Flood Hazard Area (SFHA) even though the property is on natural ground and is at or above the elevation of the one-percent-annual-chance flood. This elevation is most commonly referred to as the Base Flood Elevation (BFE). Such cases are referred to as "inadvertent inclusions."[1]

Project LOMA is a County sponsored program to identify residents who are considered inadvertent inclusions, and assist them in applying for a Letter of Map Amendment (LOMA) from FEMA. A LOMA provides property owners with a means of certifying that their structure is in fact outside of the regulatory floodplain. It also greatly influences a homeowner's ability to modify or renovate a specific structure and reduces/eliminates the need to purchase flood insurance. If a property succeeds in obtaining a LOMA, the County makes sure to explain the importance of carrying a much more affordable preferred risk policy given their proximity to the SFHA.

Priority Justification

This program is intended to identify structures that are above the Base Flood Elevation but are inadvertently mapped inside of the regulatory flood plain. More specifically, if the Lowest Adjacent Grade (LAG) of a structure is higher than the Base Flood Elevation, the structure is technically outside of the regulatory floodplain. A structure meeting these specifications is eligible to apply to FEMA for a LOMA. Those structures, which are successfully removed regulatory floodplain, benefit from a reduced financial burden of flood insurance while also potentially increasing the real estate value for homeowner.

The County wrapped up a FEMA Risk MAP initiative in 2016. This initiative focused on creating more accurate floodplain delineations by utilizing best available data, such LiDAR. As a result, the County reduced the number of addressed structures within the SFHA's regulatory boundary from 5,500 to 4,188 (over 9% of all addressed structures in the County). Lycoming County followed up the implementation of RISK Map with a LOMA program in an effort to help "ground truth" the new mapping product and assist homeowners who were inadvertently mapped into the regulatory floodplain. In a review of the Lycoming County floodplain depth grids (a product created through RISK Map),

[1] FEMA, Change Your Flood Zone Designation: https://www.fema.gov/flood-maps/change-your-flood-zone/loma-lomr-f

Lycoming County was able to identify and secure a number of LOMAs at little or no cost for eligible homeowners. A total of forty-eight (48) LOMAs have been granted to date.

Defining the Project Area

This project is primarily focused on the edge of the 1% chance and the 0.2% chance flood zones. In Muncy, this project would focus on the Flood Related Investment Zone 3 and Zone 4 boundaries.

Resiliency Concepts

This project intends to identify the actual elevation of a property, reduce flood insurance rates and, depending on the applicant's income, reduce the cost of the process.

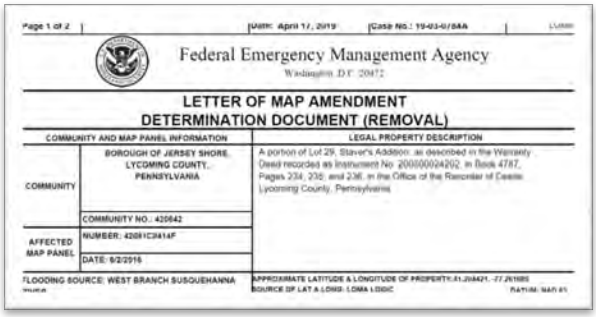
Stakeholders

Lead Agency - Lycoming County Department of Planning Community Development (PCD), Muncy Borough , Muncy Creek Township

Other Partners - Property owners, FEMA

Implementation Steps

1. Identify potential property owners - primarily located on the edge of the 100 Year (1% Regulatory Flood Plain (Zones 2 & 3, as discussed above.)
2. Obtain signed voluntary-participation documentation.
3. A County contracted surveyor conducts a survey of the property and produces an elevation certificate.
4. If the elevation certificate shows that the ground around the house is above the BFE, the Planning Department can process the LOMA application through FEMA for the residents for review.
5. Upon receipt of final determination, the County sends an official letter to the property owner.
6. The homeowner submits the LOMA notification to their flood insurance carrier and primary lienholder.



Federal Emergency Management Agency

LETTER OF MAP AMENDMENT
DETERMINATION DOCUMENT (REMOVAL)

COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION
COMMUNITY	BOROUGH OF JERSEY SHORE, LYCOMING COUNTY, PENNSYLVANIA	A portion of Lot 29, Staver's Addition, as described in the Warranty Deed recorded as Instrument No. 200000024202, in Book 4787, Pages 234, 236, and 238, in the Office of the Recorder of Deeds, Lycoming County, Pennsylvania.
	COMMUNITY NO.: 420642	
AFFECTED MAP PANEL	NUMBER: 42081C0414F	
	DATE: 6/2/2016	
FLOODING SOURCE: WEST BRANCH SUSQUEHANNA		APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 41.264421, -77.261685

Copy of an official Letter of Map Amendment Removal

Funding Resources

Potential funding sources for this project include:

- PHFA Pennsylvania Housing Affordability and Rehabilitation Enhancement Fund (PHARE)
- FEMA

3.3 Project Package - Housing

Funding to remediate or mitigate floodplain-vulnerable structures has historically been extremely limited and most often time is awarded as the direct result of a federal disaster declaration. Traditional community development funding sources often expressly prohibit addressing housing concerns in the floodplain. Within the GMA, 39% (720) of the structures are located within the regulatory flood plain. The need greatly exceeds potential funding sources, thus targeting and leveraging of multiple revenue streams is critical to moving forward.

Chapter 3 outlines housing solution for each Zone within the GMA and calls for strategies traditional housing reinvestment, maintaining housing stock in less flood prone areas through mitigation activates, and in strategic disinvestment in areas where the risk of flooding and the depth of flood water necessitate for other options.

3.3.1 Lycoming County Utility Relocation Project

The Project Message

Utility elevation is a flood proofing option for residential and non-residential structures. With an initial focus on residential structures, this project will relocate utilities from below the 100-year flood level to above the flood level so they are less susceptible to damage in a flood event.

Priority Justification

This project retains the residential structure and associated tax base contribution, reduces the impact of future high water damages to major utilities, helps property owners to avoid or minimize the nuisance of flood-related cleanup of their structure, may improve potential resale value of the property, and may reduce the cost of flood insurance premiums.

The Lycoming County Utility Relocation Program is being revisited because of upcoming changes in the National Flood Insurance Program (NFIP). This program was originally initiated in 1999-2002 in Muncy and 46 structures had their utilities elevated. In the County's original utility elevation program, only seven of the 46 participating structures had damage from flood events that triggered a flood insurance claim. This represents a decrease in flood insurance claim of 69%. When deep-water outliers are excluded, the average claim amount was $3,730 as opposed to the $5,934 average before utility elevation (decrease of 37%.)

Defining the Project Area

The project area includes structures located in Zones 2-3.

Resiliency Concepts

The objective of this activity is to protect buildings from flood damage by retrofitting the buildings so that they suffer no or minimal damage when flooded. Encouraging and providing flood protection to properties in the form of structural modifications and infrastructure construction provide effective but cost-intensive flood protection.

Stakeholders

Lead Agency - Lycoming County Department of Planning Community Development (PCD)

Other Partners - Muncy Borough , Muncy Creek Township, property owners

Implementation Steps

1. Engage property owners.
2. Reengage stakeholders and project partners.
3. Implement project.

Funding Resources

Lycoming County has the following funding available for this program:

- PHFA Pennsylvania Housing Affordability and Rehabilitation Enhancement (PHARE) Flood Mitigation Funds

Additional funding sources may include:

- FEMA Building Resilient Infrastructure and Communities (BRIC) Grant Program

3.3.2 Muncy Homes-in-Need Housing Rehabilitation Project

The Project Message

The Homes-in-Need (HIN) program is an existing county-wide homeowner-occupied rehabilitation program run by STEP, Inc., a regional non-profit community action agency, that assists low-to-moderate income homeowners with home repairs, energy efficiency improvements, code deficiencies, and accessibility modifications. The Muncy HIN program will target homes in the Greater Muncy Area Project Area outside of the floodplain.

Priority Justification

When homeowners receive direct affordable housing benefits, the County and municipalities indirectly benefit from the prevention of blight and the stabilization of neighborhoods, as well as the preservation of the tax base.

In 2005, the Lycoming County and STEP collaboratively designed and launched the Homes-in-Need Program to address code and accessibility issues for homeowner occupied residences within the County. Since its inception, the HIN has leveraged more than $6 million in other funding and assisted more than 3,500 households in Lycoming County. As of 2021, the Homes-in-Need program has a waiting list of 87 homeowners in Muncy Borough and Muncy Creek Township.

Defining the Project Area

The HIN will target owner-occupied an income qualified homeowners in the GMA with an emphasis on properties in Zone 4 outside of the floodplain.

Resiliency Concepts

The Homes-in Need program will reinvest in affordable housing within the GMA.

Stakeholders

Lead Agency - STEP, Inc., Lycoming County Department of Planning & Community Development (PCD)

Other Partners - Muncy Borough , Muncy Creek Township, property owners

Implementation Steps

1. Engage property owners to discuss the project, funding, and benefits.
2. Implement project. See below draft program guidelines.

Program Guidelines

Lycoming-Clinton Counties Commission for Community Action (STEP) provides interior and exterior renovation and repair services to homeowner properties that meet the eligibility requirements. Services are offered at no charge for eligible homeowners and offer up to $25,000 per home.

Eligible activities include:

- Heating system: repair or replacement of supply source (furnace/boiler), repair, cleaning, and/or replacement of distribution system, replacement of oil or propane tank, replacement and/or repair of gas/oil supply lines
- Shell repairs: exterior sheeting and covering, windows and doors, floors, walls, ceilings, drywall and paneling repairs or replacement, insulation removal and reinstallation
- Weatherization
- Accessibility assistance

Code deficiency upgrades:

- Electrical repairs: service panel replacement, distribution replacement

- Minor plumbing distribution repairs, including water heater replacement
- Fire safety: smoke and CO detectors

Funding Resources

Potential funding sources for this project include:

- Pennsylvania Housing Affordability and Rehabilitation Enhancement Fund (PHARE)
- DCED Community Development Block Grant (CDBG)
- DCED Home Investments Partnerships Program (HOME Program)
- Lycoming County Affordable Housing Funds (formerly known as Act 137 funds)

3.3.3 Resilient Preservation Housing Rehabilitation Program

The Project Message

The Resilient Preservation Housing Rehabilitation Program is a pilot program to preserve historic homes located in the floodplain. This program will combine historic renovations techniques with flood risk reduction strategies such as utility elevations, basement fill-in, green infrastructure, and dry flood proofing.

Priority Justification

This project will prevent the loss of historic structures and resources through reinvestment and will preserve the community's historic character.

Defining the Project Area

The program will target both income qualified owner-occupied and renter occupied residential structures in Zones 2 and 3 that are located in Muncy's National Historic District.

The historic buildings located in Muncy's National Historic District are categorized into three distinct groups based on architectural and historic integrity: Outstanding, Contributing, and Intrusions. Outstanding represents those structures that are most indicative of the best example of an important architectural style or a notable site. Contributing structures are also important and play a significant role in the District. These structures enhance the built history of Muncy or expand the historic narrative. Structures built outside of the District's period of significance or those that have been altered beyond recognition are categorized as Intrusions and are often referred to as 'non-contributing.'

Historic District, by Category

Historic Relevance Category	Number of Structures	Average Year of Construction
Outstanding	34	1894
Contributing	121	1905
Intrusions	27	1947
TOTAL	182*	

* Total includes 5 recently demolished 'Contributing' structures

Outstanding Historic Structure Profile

Flood Related Investment Zone	Number of Structures
Zone 1: Strategic Non-Reinvestment	8
Zone 2: Maximum Mitigation	16
Zone 3: Lesser Needs	10
TOTAL	34

The Flood Related Investment Zones in Muncy can help local decision-makers determine the future of the borough's most flood prone and flood vulnerable properties. Preservation-appropriate flood mitigation strategies for Outstanding and Contributing Typology #3 buildings in Muncy's Zone 1 include the following:

- Relocation
- Dry Flood-Proofing
- Abandon the First Story
- Protect the Utilities

Preservation-appropriate flood mitigation strategies for Outstanding and Contributing Typology #3 buildings in Muncy's Zone 2 include the following:

- Building Elevation
- Buoyant Foundation
- Dry Floodproofing
- Fill the Basement
- Protect Utilities
- Site and Landscape Adaptations (e.g., pervious pavement, rain gardens)
- Relocation (when mitigate in-place is not an option)

Preservation-appropriate flood mitigation strategies for Outstanding and Contributing Typology #3 buildings in Muncy's Zone 3 include the following:

- Site and Landscape Adaptations (e.g., pervious pavement, rain gardens)
- Protect Utilities
- Fill the Basement
- Temporary Protective Measures, if necessary (e.g., sandbags)

See Appendix A for the Resilient Preservation Guide and for the Resilient Preservation Housing Rehabilitation Program Guidelines.

Resiliency Concepts

The project resiliency concepts include:

- Historic preservation
- Food risk reduction

Stakeholders

Lead Agency - Lycoming County Department of Planning Community Development (PCD)

Other Partners - Muncy Borough , Muncy Creek Township, LAC, property owners, STEP, SEDA-COG

Implementation Steps

1. Develop program scope of work with project partners.
2. Determine lead agency for implementation.
3. Identify potential property owners.
4. Implement project.

Funding Resources

Lycoming County has secured 2014 and 2015 Pennsylvania Housing Affordability and Rehabilitation Enhancement Fund (PHARE) Flood Mitigation funds for this program.

Additional funding sources for this project may include:

- DCED Community Development Block Grant (CDBG)
- DCED Home Investments Partnerships Program (HOME Program)
- Lycoming County Affordable Housing Funds (formerly known as Act 137 funds)

3.3.4 Demo-Rebuild Project

The Project Message

“Elevating the community, one house at a time.”

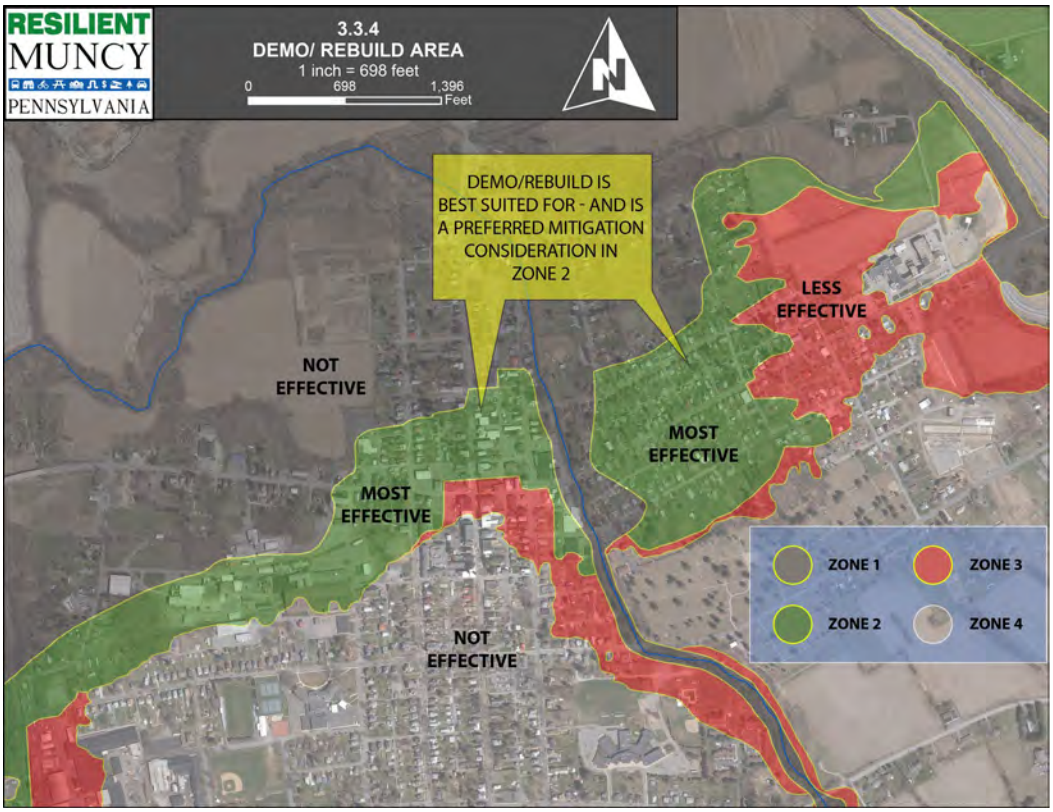
Demolition-Rebuild is an option primarily for residential structures that experience frequent flooding. In this project, a flood-prone structure is demolished and rebuilt on the same parcel following new floodplain standards. This program aims to maintain the existing community structure and tax base but reduce the flood risk of home and flood insurance costs to homeowners.

Priority Justification

The concept of this project is to demolish the existing structure and replace it with one that is elevated above the 1% annual flood risk elevation. The application of modern home building techniques, including use of prefabricated modular structures, serves to reduce the required flood insurance. Moreover, this will serve as an educational tool for the community. This project complies with Substantial Improvement standards that are required for properties in the floodplain.

Defining the Project Area

The target zone for this project is the Zone 2 areas of Muncy Borough that receive than 5-10 feet of water in a 100 year/ flood event.



Resiliency Concepts

This project will help retain the residential tax base, community character, and reduce future structure damage and flood risk.

Stakeholders

Lead Agency - Lycoming County Department of Planning Community Development (PCD)

Other Partners - Muncy Borough, LAC, property owners

Implementation Steps

1. Develop program scope of work.
2. Identify potential property owners.
3. Secure project funding.
4. Implement project.

Funding Resources

Potential funding sources for this project include:

- Federal Emergency Management Agency (FEMA) - Building Resilient Infrastructure and Communities (BRIC) Grant Program
- Pennsylvania Housing Affordability and Rehabilitation Enhancement Fund (PHARE)

3.3.5 Land Use/ Zone Changes – Conservation Overlay

The Project Message

"Focused residential development and resource protection."

A clustered subdivision has something to offer to all parties—public, private, and the community.

Developing a cluster subdivision with open space recognizes strategic natural resources while allowing for the same number of units as the land would accommodate under full yield.

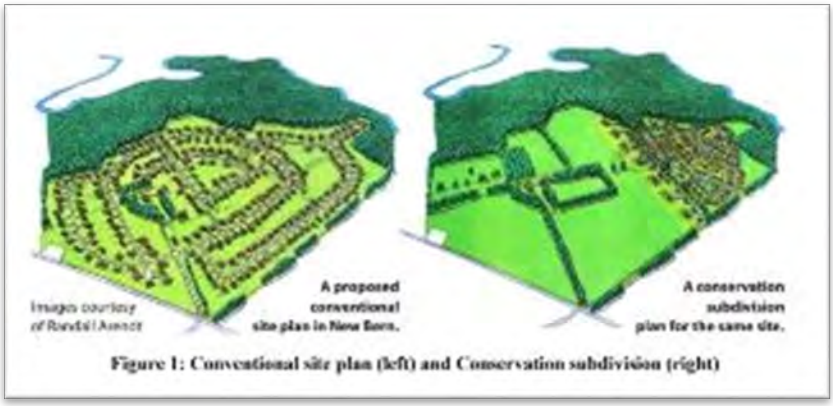


Figure 1: Conventional site plan (left) and Conservation subdivision (right)

Conventional Site plan (left)
Conservation Site Plan (right) Source: Arendt

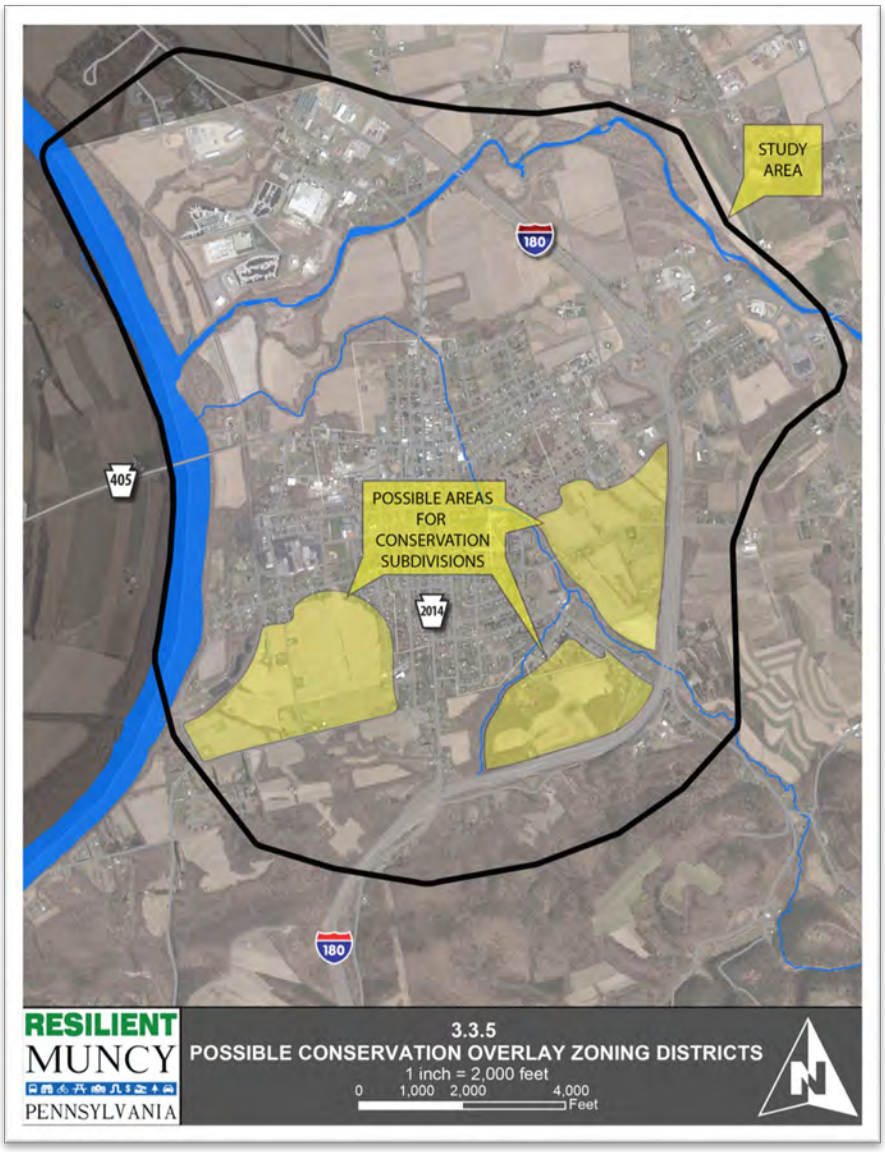
Priority Justification

Neighborhoods of this design have sold at higher prices and faster, and have required less overall construction, infrastructure, and thus maintenance costs

Homes in these settings maintain their value, largely because of their proximity to conserved open space.

Defining the Project Area

The project area for this initiative would be anywhere within the GMA where groundwater withdrawal, sanitary sewer, infrastructure density, and impervious surfaces are of concern. In particular, Muncy Creek Township has large parcels of underdeveloped land available suitable for cluster subdivisions.



Resiliency Concepts

This method of subdividing land introduces resiliency into:

Economy – Stable housing prices, increased value, and tax revenues

Infrastructure – A reduction in total linear feet of water, sewer, and roads

Community wellbeing – Open space that improves community well-being, encourages activity, and reduces impacts on resources important to community health, such as groundwater

Environmental stability – Reductions in impervious surface and groundwater impacts.

Encourages engagement – Maintains the full rights, use and enjoyment, and economic gain of the land owner.

Stakeholders

Lead Agency - Local municipalities and their elected officials, planning commission members, and local zoning officers will review their local land use requirements.

Other partners - Land Owners, West Branch Regional Authority, Muncy Borough, Lycoming County, LAC, Community at large

Implementation Steps

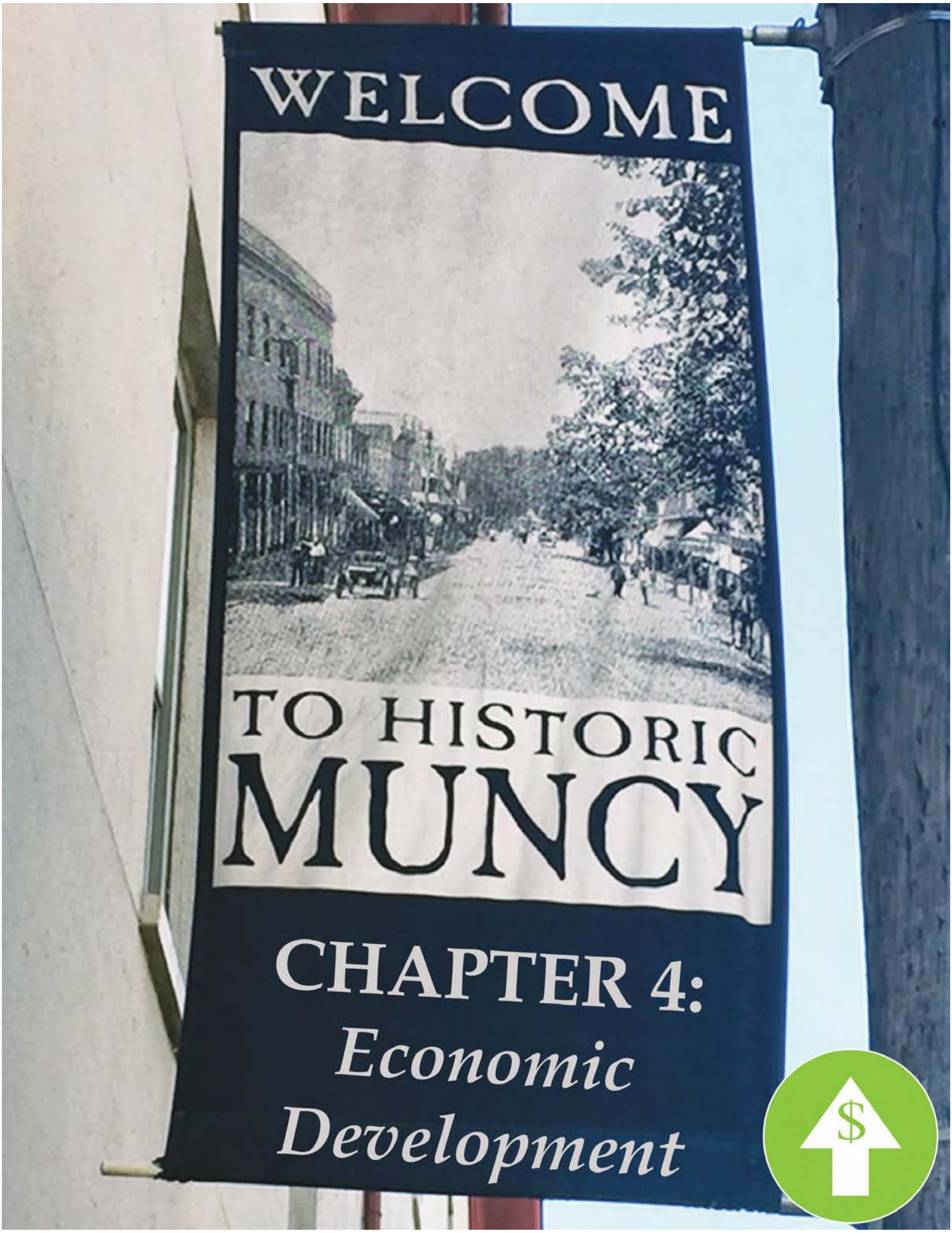
1. Identify areas of potential future development where overlaps of community essential resources, potential infrastructural expansion, and economic pressures are significant.
2. Develop a comprehensive stakeholder matrix highlighting economic values and concerns, and resource interests.
3. In collaboration with stakeholders, develop a list of negotiable items including infrastructure maintenance, tax incentives, and potential for increased cluster density beyond original full yield.
4. Hold a mediated collaboration session with interested stakeholders, and address concerns.
5. Draft overlay zoning language.
6. Offer intensive assistance to Muncy Creek Township to reduce budgetary impact.
7. Review overlay language with interested stakeholders in collaborative forum.

8. Continuously ensure that landowner right to property and realization of profit are met, and concerns are allayed.
9. Implement zoning overlay.

Funding Resources

Potential funding sources for this project include:

- PA Department of Community And Economic Development (DCED)
- Municipal and County Staff time



CHAPTER 4:
Economic Development

Chapter 4: Economic Development

4.1 Summary of Existing Conditions

4.1.1 Economic Trends

The GMA is in an economically unique position. According to economic data obtained via ESRI's Business Analyst, the community has an imbalance between supply and demand—supply of most business sectors is far greater than the demand or available spending power within the GMA at 3, 5, and 10-mile radii, resulting in significant gaps or opportunities in various business sectors to leverage and expand new businesses and economic opportunities. While this is not a great economic position, the GMA manages its existing businesses well, and with future developments such as a new hospital, subsequent potential for residential demand, and increased transportation access resulting from current improvements associated with the CSVT, the GMA may have significant opportunity to reverse the imbalance and expand its economy in the near future.

Three terms are important pertaining to the economy in the GMA. First is Surplus—an overabundance of supply and trailing demand. An example of this would be overabundance of restaurants in the area, more than the public is willing and/or able to spend its money to purchase goods and services. The second is Leakage—the public going outside the area to purchase goods and services. This would result from a lack of supply and increased demand. An example indication of this would be insufficient number of restaurants in the area but trends and data indicating that the public is spending over the national average on restaurants. This would indicate that the area could support more restaurants. The goal is to establish the difference between surplus and leakage at net zero or higher. Unfortunately, this is not currently the case within the GMA. The third term to be defined is the consumer Spending Potential Index (SPI)—comparison of money spent on goods within a retail classification to the national average, whereby an index value of 110 is 10% higher than the national average.

Overall, the GMA is in a surplus status, meaning that supply of businesses and services exceeds public

demand, although statistics indicate some businesses/services provider areas not in great enough supply to fulfill the needs of the public and residents in the GMA. These include furniture and home furnishings stores; beer, wine, and liquor stores; and miscellaneous retail stores. The public within the GMA must travel outside of the GMA to purchase these goods and services. Another area of concern is that the GMA's SPIs are below the national average in virtually all retail and service sectors (indicating limited spending power within the GMA compared to the national average). Notably, the GMA has managed to survive a status of businesses outputting services at a level greater than demand and some SPIs far below average, demonstration of resilience within its economy. This, however, is a very fine balance, because an influx of new business without identification and encouragement of increased demand (spending) could lead to disaster for long-standing local businesses with the GMA. The GMA must focus on becoming a destination, drawing patrons from outside the GMA into the GMA, thus increasing demand and decreasing leakage. Once demand within the GMA exceeds supply within a given targeted service industry, i.e. restaurants, it will be advisable to encourage further business development. Fortunately, the GMA has a strong business association—the Muncy Professional & Business Association—that works continually to attract more patrons to the GMA. The Association supports existing businesses, attracts and assists new businesses in Muncy, and, importantly, manages and markets events throughout the year (i.e., *Fourth Fridays* and the *Annual Corvettes on Main Street and Artist from Our Own Backyard Festival*) that bring a significant number of visitors and patrons to the GMA. The Association focuses on "Encouraging, Fostering and Strengthening our community through business." Also, resiliency projects recommended within this GMRP, new developments like the hospital, CSVT improvements in access to the GMA, and resulting residential development will foster a destination atmosphere resulting in increased demand for new businesses, goods, and services—rendering implementation of the projects recommended herein even more important.

Workforce, Industry, and GMA Trends

In 2018, the workforce within the GMA consisted of approximately 1,694 residents of working age. Of these, 42% are projected to be employed within the service industry, with manufacturing and retail trade close seconds. The GMA has an unemployment rate of 3.6% (ESRI 2018), below the national average of 3.8% (Bureau of Labor Statistics).

The key industries currently within the GMA are of the retail trade and food & drink variety. This may change as new businesses move in to support the community as it transitions and adapts to a potential influx of new residents, traffic increases with travel on the newly improved CSVT, and the Lycoming Valley Mall closes. However, based on best available data, the present trend is expected to continue.

At this time, growth within the community is stagnant. As is discussed further below, given the variability in the region's potential future developments and transportation projects, projecting the workforce and key industries is difficult. However, the analysis herein reveals need for investment within the GMA to improve the existing community and building stock in order to attract new residents. Capitalizing on potential of another hospital within the region and its increase in job opportunities, as well as provision by the CSVT of increased accessibility to the region and reduced times to commute to other employment centers surrounding the GMA, will allow the region to progressively address its economic issues and identify new economic opportunities.

The GMA must be resilient, economically and physically, to capitalize and leverage these investments. Establishing proper land use regulations, compatible zoning within the GMA, as well as an atmosphere of awareness and preparedness will be critical to the GMA's ability to support new economic and residential opportunities and build a robust economy.

4.1.2 Spending Potential, Commercial Leakage, and Gap Analysis

Understanding commercial market supply and demand is a critical component in determining potential for new or expanded uses in a commercial district. The balance between supply and demand can help to determine if specific new commercial uses can be supported by the disposable income and spending patterns within the trade area. Spending potential and commercial supply and demand within trade areas of 3, 5, and 10 miles of the GMA was evaluated. Although data were reviewed within all three distances, this analysis focused primarily on the 10-mile trade area because rural customers are likely to drive farther to purchase some good and services than will customers in more suburban and urban areas.

This analysis of potential commercial gaps in the market compared the amount of potential spending on a good or service with the revenue of businesses providing that good or service within the trade area. A Spending Potential Index (SPI) compares the amount spent by the population of a given area on a specific good or service to the national average. An SPI of 100 indicates spending potential at the national average. An SPI below or above 100 indicates spending potential less than or more than the national average, respectively. Within the 10-mile trade area of the GMA are approximately 50,000 people with a median disposable income of $42,035. SPIs within this area for nearly all industries are less than 100, indicating generally lower spending on goods and services than the national average overall within the GMA. Industries with SPIs in the mid to upper 90s, indicate comparatively stronger spending (automotive sectors, appliances, lawn and garden, smoking products, home maintenance and remodeling, recreational vehicles, and pets), but still weak when compared nationally.

These spending patterns and generally lower spending potential overall likely reflect rural lifestyles and lower cost of living.

ESRI data from the trade area surrounding the GMA allows a comparison of demand to current supply (commercial revenue). Where spending potential exceeds current revenue for a good or service, customers are likely traveling outside of the trade area to purchase that good or service. This "commercial leakage" indicates potential for additional commercial uses within the trade area. Conversely, where current revenues in an industry exceed spending potential, an over-supply exists in the market. In general, data indicate that supply within the trade area exceeds demand across most industries. ESRI data indicates that supply exceeds demand by approximately $435 million across all retail trade and food & drink establishments. These data reflects a market not necessarily ripe for significant new development. However, part of this imbalance is likely due in part to presence of the Lycoming Mall, which draws customers from outside the trade area and thus injects additional supply (revenue) into the area.

A few gaps in some key industries merit attention because they may be the right types of industries to locate in the downtown area of Muncy:

- Furniture & home furnishings stores: $6.7 million gap
- Food and beverage stores (grocery, specialty food, beer/wine/liquor): $23.3 million gap
- Health and personal care stores: $4 million gap
- Florists: $600k gap
- Stationery and gift stores: $2 million gap.

While significant gaps are not evident across many industries, strategic investments in commercial uses that reflect the unique spending patterns of the GMA may be supported by the market. Additionally, a developer or proprietor more knowledgeable of local demand and preferences could provide specific amenities, goods, services, or offerings to capture a greater market share. Opportunities for stores with specific features such as those within a walkable distance to downtown or in historic buildings may be positioned to exceed the market potential indicated by the data.

4.1.3 Summary of Gaps and Opportunities

By combining the qualitative economic analysis above with the perspective gained through stakeholder engagement efforts, it is possible to build a contextually relevant profile of locations or buildings within the GMA that are prospects for new development or redevelopment. These locations could be developed so as to meet future demands, or as recreational spaces. Chapter 4 offers recommendations for potential future uses of properties within the GMA, and some identified locations are as follows:

- "The Corner" – Main/Water St. Corner
- Northern FEMA buyouts
- Flour Mill
- Valley Trucking Site
- Fire Company Building
- Land Southwest of Muncy Borough

"The Corner" at Main and Water Street, Muncy Borough

Based the economic trends, stakeholder inputs, identified (re)development opportunities cited above, and application of observational judgment, it is possible to analyze the GMA, as well as its risk factors, resiliency vision, and mission, to identify gaps in current social, service, and commerce realms. Identifying a gap is a step toward identifying an implementable project that can help increase the GMA's resiliency. In this section, gaps are economically derived. Below is a bulleted summary of the findings:

- **Gap:** Perceived economic need for a downtown anchor feature.

  Opportunity: "The Corner" lot area. This not only stands to improve the aesthetics of the downtown, as well as its economic prospects, but would improve community morale, demonstrating accomplishment and highlighting the GMRP's validity for implementation.

- **Gap:** Perceived need and economic argument for a more welcoming gateway into town. Gateways are the first impression a town offers to those traveling through it.

  Opportunity: First impressions can make the difference between someone stopping for dinner or driving straight through.

- **Gap:** From an economic prospective, property maintenance and façade improvements increase property values, potentially attracting new residents and businesses, and improving the local economic outlook. They also affect public perception and morale. How a person identifies with his/her community can significantly impact the community as an economic factor.

  Opportunity: Incentivize private investment in the downtown. While best intentions may be to improve a property, monetary considerations typically determine action. Improving the cost-benefit ratio will increase the chance that a private citizen will further invest.

- **Gap:** Need for more economic opportunity.

  Opportunity: Implement the comprehensive and resiliency plans that offer several recommendations to improve the economic outlook for the GMA. Success begets success. Redevelopment can increase demand, in turn possibly leading to more redevelopment.

- **Gap:** Growth of businesses that reflect current market potential and consumer spending patterns.

  Opportunity: Capitalize on the economic assessment within the comprehensive and resiliency plans. Identify realistic opportunities that fit the economic market assessment and incentivize them. Do not allow perception to interfere with fact. If the market is saturated with

a type of industry, encouraging more will result in potentially adverse effects that may force out an established business, blight vacant properties, and/or lead to a further depressed market.

- **Gap:** Lack of housing for families within a range of incomes.

  Opportunity: Capitalize on the momentum of the GMRP and CSVT to develop implementation steps for regulations or overlay districts that allow for mixed uses, clustered density housing, senior housing opportunities, and/or apartments. Additionally, incentivize property investment. This will attract families at a various income levels and will increase feasibility of and market potential for additional commercial and retail uses. This will help establish a diversity of demand, improve the economic profile of the community, and create opportunity. Taking these steps prior to completion of CSVT will also prepare the community for increased development pressures.

- **Gap:** Business/Organization interface with the community. Lack of opportunities for more events and collaboration between businesses and/or organizations.

  Opportunity: Encourage stewardship of the community via design of common spaces of common vested interest. This not only will provide businesses and organizations exposure to and interaction with the community; it will help identify further needs within the community, establish values, and encourage community pride. An example would be "The Corner," a location of opportunity for Public/Private collaboration.

- **Gap:** Community branding.

  Opportunity: Capitalize on recent planning initiatives and the GMRP to develop a coordinated community reflecting the values and character of the GMA.

  Opportunity: Combine efforts with the

- **Gap** of "Perceived need and economic argument for a more welcoming gateway into town."

- **Gap**: Buildings in the immediate downtown Muncy are in need of reinvestment.

  Opportunity: Create incentives for property owners to reinvest in their properties. This may include tax incentives and/or grant funding for improvements to the buildings and facades.

4.2 Ongoing Projects Tied to Resiliency

4.2.1 Central Susquehanna Valley Thruway (CSVT) Impact Study

The Project Message

"Regional changes exert local impacts."

The Central Susquehanna Valley Transportation Project (CSVT) is a phased, $670 million 12-mile four lane limited access highway transportation project under construction that will span Northumberland, Union, and Snyder counties. This project will connect I-80 near Milton with US 11/15 just south of Selinsgrove and bypass the

congested area around Northumberland Borough while eliminating congestion and increasing direct connections.

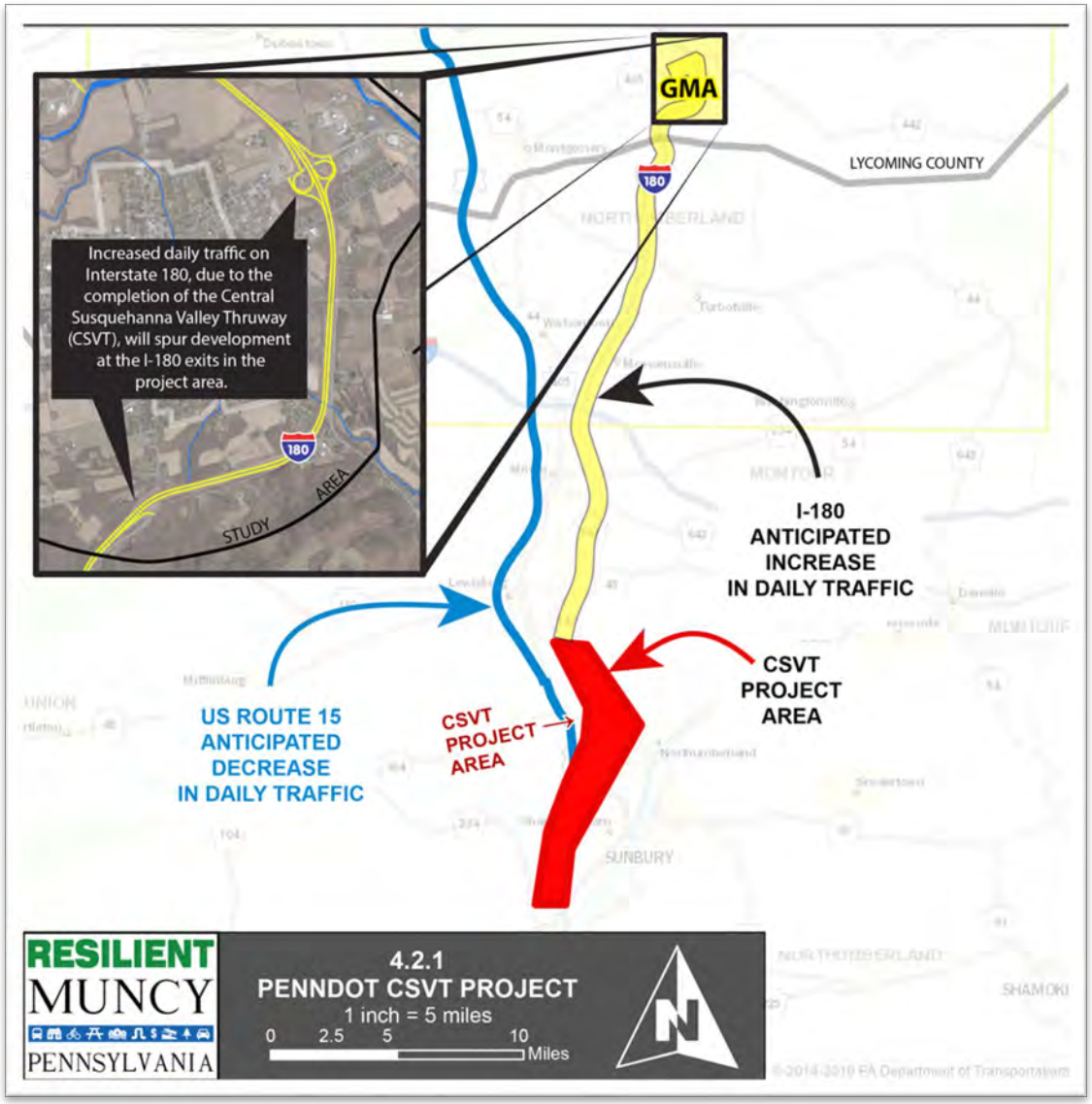
By 2020 traffic is anticipated to more than double on regional roadways. The CSVT project will alleviate congestion on region primary roadways. Also, the CSVT will improve safety by reducing the number of fatal crashes the current transportation system experiences by separating truck and through traffic from local traffic. 50% of cars and over 90% of trucks pass through the project area, nearly 50% of accidents involve truck traffic. By removing the large portion of truck and through traffic the CSVT will greatly reduce crashes and fatalities.

Large-scale changes in regional transportation infrastructure can exert significant impacts at the local level. Whether a road bypassing a town or a new connection increasing traffic volume, impacts can be social, economic, safety, or environmentally related.

Across Pennsylvania are countless examples of transportation development impacting localities in expected and unexpected ways. Because of the boom of online shopping, logistics centers at many major intersections along I80, I81, I78, US Route 15, and others have increased dramatically. With these have come increased truck traffic volume, stormwater management issues, and land-use planning concerns.

Elsewhere in Pennsylvania, expansions of roadways, and increased capacities and bypasses have had the unintended consequence of dramatically increasing the rate of residential development beyond the localities' ability to plan for this. For example, the I581 bypass in the Camp Hill/Mechanicsburg region of Pennsylvania is recognized as a catalyst for the explosive growth within the region. For these reasons, understanding potential impacts of transportation changes before they occur is important.

The WATS MPO/ Lycoming County Planning & Community Development and PennDOT are partnering to study future effects of this major transportation improvement on the central part of the State that will impact the GMA.



Consider the time frame of CSVT completion. A completion date of approximately 2024 may seem to provide plenty of time to complete the study, but land prospectors and developers also will be considering how CSVT might impact land values, trucking operations, economy, and efficiency.

Defining the Project Area

The CSVT impact study will evaluate effects of overall land use and the transportation system in Lycoming County (including the GMA) resulting from completion of the CSVT project—with emphasis on the Interstate 180 corridor from the Lycoming/Northumberland County line to its intersection with US 15, and the US 15 corridor between the Lycoming/Union County line and its connection with Interstate 180. The study will include a set of actionable recommendations to ensure orderly land

development patterns, smart growth, and a safe and efficient multi-modal transportation system responsive to the increased traffic demand. This project will provide the information and data necessary for the GMA to understand and capture positive economic benefits while ensuring that the GMA can address any necessary improvements to address transportation impacts. This study will be funded by PennDOT, and the Requests for Proposals should be issued in late 2018.

Resiliency Concepts

This study will provide information and data necessary for the GMA to understand and capture positive economic benefits while ensuring that GMA can implement any necessary improvements to address the transportation impacts.

Stakeholders

Lead Agency - WATS MPO, Lycoming County, PennDOT

Other Partners - Muncy Creek Township, Muncy Borough, LAC, Community at Large

Implementation Steps

This project is currently in progress. Findings should be evaluated and implemented as determined necessary by stakeholders.

Funding Resources

This project will be funded by PennDOT.

4.3 Project Package – Economic Development

4.3.1 Redevelopment of "The Corner"

The Project Message

"This is a catalyst property! Location, location, location."

This statement represents a common theme. From the Town Hall meeting held on April 9th, 2018 to previously completed planning documents, the desire for reinvestment in the buildings and facades in the immediate downtown of Muncy Borough is strong and consistent.

A common theme heard in most small boroughs in Pennsylvania, Muncy is unique in that a good portion of the downtown is in the floodplain and this serves to exacerbate the matter.

This corner of Muncy Borough is highly visible to the public and has the potential to serve as a flagship example of what can be accomplished through stakeholder engagement, the use of available funding, and the counties commitment to the community.

Adaptive reuse and redevelopment of this corner is considered the number one priority because of its ability to serve as a catalyst for resiliency within the whole of the Greater Muncy Planning Area.

The community has its eye on Water and Main Street in anticipation of its redevelopment.

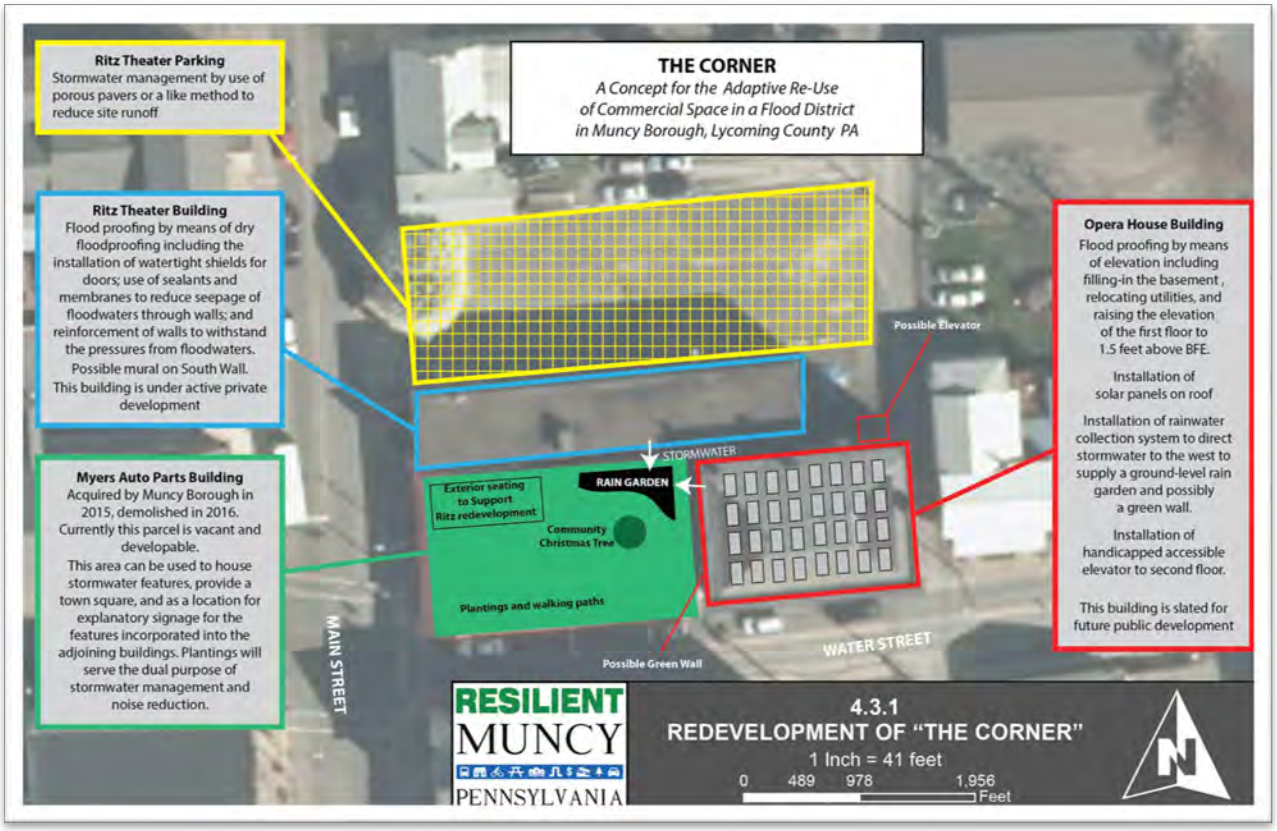
Priority Justification

This project is considered a top priority because of its potential to spur redevelopment and to encourage reinvestment within the community. This sets the stage for revitalization. This corner is one of the most heavily traveled intersections in the GMA. Historically, a focus of the town, this corner has significant potential. Now vacant, the corner once functioned as a community hub where residents purchased goods, went to the movies, or took in a show at the opera house.

Over time, use of these buildings changed, the Ritz Theatre closed and the vacant Myers Auto Parts store was purchased and razed by the Borough. As of November 2018, the Ritz has been sold to a new private owner, and Mozely's Opera House is controlled by the West Branch Regional Authority (WBRA) and cannot be sold to a private entity for two more years.

Defining the Project Area

Located at the NE corner of Water and Main Street, "The Corner" consists of the old Mozely Opera House, Ritz Theater, the Ritz Theater Parking area, and vacant Myers Auto Parts lot, encompassing approximately 28,500 square feet (Figure 4.6.1). The three properties are within the 1% risk flood plain (100-year flood plain.),



The Corner provides an opportunity for redevelopment and also to showcase green, and floodplain compliant, adaptive techniques. The first floor of the Opera house is very close to the Base Flood Elevation (BFE) and, with its high ceilings, is an excellent candidate for first floor elevation and basement abandonment. The lower lying Ritz Theater Complex is an excellent candidate for commercial dry-floodproofing by means of barrier construction. The parking area at the Ritz Complex property is currently approximately 8,500 ft^2 of impermeable crushed stone, various methods of green paving/ parking would turn this ponding heat island into a cooler drier space of equal functionality. The roof of Mozely's Opera House is situated in a manner conducive to housing solar panels and its exposed western wall could support the construction of a green wall. Adjacent to these structures lies 6,000 ft^2 of greenspace that can be utilized in support of either building. The opportunity exists to re-purpose this entire site and have the site also be a living laboratory for resilient techniques. This site will also benefit from a 2020 PennDOT project which will modernize the intersection. Redevelopment of "The Corner" should provide a catalytic effect on commercial adaptation in the floodplain.

Potential adaptive reuse options for the site include:

Opera House

- Potential flood proofing example property
- Basement filling
- Utilities relocation

- Raised flooring
- Green infrastructure opportunities
- Solar panels on roof
- Possible green wall
- Rain collection system as a green infrastructure stormwater solution in vacant lot

Ritz Theater

- Projected variety of uses of area
  - Wedding venue
  - Gym
  - Juice bar
- Green roof
- Parking area
- Green infrastructure opportunities
- Flood doors
- Sealants and membranes
- Wall reinforcement
- Community cohesion
- Mural on south wall
- Community accessibility
- Handicap elevator

Vacant lot

- Stormwater management project – Potential MS4 credit example project
- Plantings
- Community space – town square
- Rain garden (See Chapter 7 for a rain garden plan).

Resiliency Concepts

The project resiliency components include:

- Adaptive reuse
- Economic redevelopment
- Community education
- Flood risk reduction
- Stormwater capture

Implementation Steps

1. Engage core stakeholders to develop a unified vision – **In Progress.**
2. Develop a site plan that demonstrates a generalized concept for adaptive re-use of the three properties as defined by the core stakeholders.
3. Identify funding sources that:
   a. Can be applied to both public and private projects
   b. Have funding significant enough to impact the project area
   c. Are currently available
   d. Fit stakeholder timelines.

Stakeholders

Lead Agency - Muncy Borough, West Brach Regional Authority (WBRA)

Other Partners - Ritz Theater owner, LAC, surrounding business owners, Community at large

Funding Resources

Potential funding sources for this project include:

- The Redevelopment Assistance Capital Program (RACP)
- PA Department of Community and Economic Development (DCED)

4.3.2 Commercial Flood Proofing Initiative

The Project Message

This project would develop a commercial flood program. Flood proofing is any combination of structural or non-structural adjustments, change, or actions that reduce or eliminate flood damage to a building, its content, or related utilities and equipment.

Commercial flood proofing elements may include:

- *Continuous impermeable walls*. - Sealing the building's exterior walls using technologies that include impermeable waterproof membranes and potentially strengthening those walls
- *Flood resistance in interior core areas.* - Critical core components and areas can be made flood resistant when dry floodproofing the entire building footprint is not needed or possible
- *Sealants for openings* - Protection of the building depends on sealing openings, such as doors, windows, and utility penetrations, and sealing walls and slabs, which are rarely designed to be watertight or resist flood loads
- *Flood shields for openings in exterior walls* - Watertight structural systems that close the openings in a building's exterior walls to the entry of water
- *Backflow valve.* - Prevent floodwater flow into the building because of blockages in the sewage system
- *Internal drainage systems* - Primary method of removing water that may seep through small fissures and pathways in the protection system

See Appendix A for additional information on mitigation commercial structures.

Priority Justification

Flood mitigation methods available to commercial property owners help comply with floodplain regulations and possibly help reduce flood insurance premiums, therefore contributing to the long-term viability of the commercial enterprise.

Defining the Project Area

The project area includes Zone 1-3 in the GMA.

Resiliency Concepts

The project resiliency components include:

- Tax base retention
- Economic redevelopment
- Flood risk reduction

Stakeholders

Lead Agency – Business owners, Lycoming County Dept. of Planning and Community Development, Muncy Borough, Muncy Creek Township

Other Partners – PEMA, FEMA

Implementation Steps

This project requires partnership between a lending institution and the municipal entities involved.

1. Engage project partners.
2. Develop project funding plan and secure project funding.
3. Identify funding sources
4. Identify and engage property owners.
5. Implement project.

Funding Resources

Potential funding sources for this project include:

- Private lending institutions
- PA DCED

4.3.3 Implement Local Revitalization Tax Assistance (LERTA) District

The Project Message

"Let's make it easier for people to invest in their community!"

LERTAs are geographically defined areas that provide local tax incentives to property owners to allow them to make improvements to their properties. A LERTA allows a municipality to exempt a pre-determined portion of the value of all improvements made

to a property from local, county, and school taxes for a pre-defined length of time, not to exceed 10 years. While the property owner still pays taxes on the property, he/she receives a discount on the increased taxable value of the property due to improvements. This creates incentive for reinvestment on existing structures or properties.

Priority Justification

A LERTA is needed to make redevelopment of the corner lot a reality because of its ability to encourage reinvestment within the community. It sets the stage for revitalization.

From the Town Hall meeting on April 9, 2018, to previously completed planning documents, desire for reinvestment in buildings and facades within the immediate downtown of Muncy Borough has been strong and consistent.

Although this common theme is expressed in most small boroughs in Pennsylvania, Muncy is unique in that a good portion of its downtown is in the floodplain, thus exacerbating the flooding issue. Many buildings in the immediate downtown are leased to small businesses and have rentable residential space on the second and third floors. While most buildings are fully occupied, some vacancies to exist. This mixing of uses is in and of itself a step toward greater resiliency, and with continued investment can help prevent blight, disinvestment, and a slow reduction in the tax base. To continue this trend, the municipality has several options available that can assist with creating an environment for reinvestment in existing buildings.

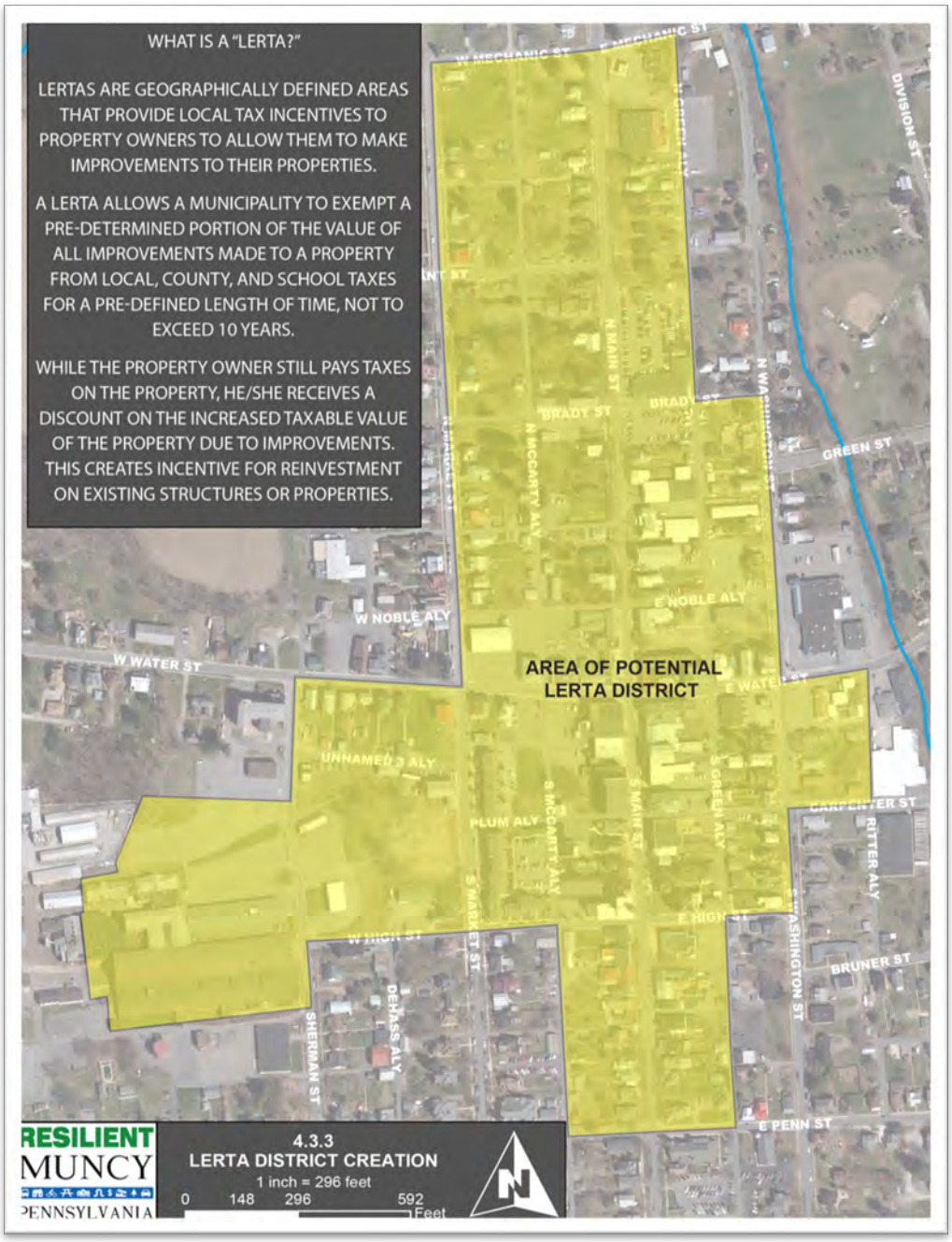
Many examples of implementations of LERTAs within the region are evident—Williamsport is one. For a detailed description of LERTA components, see Appendix C.

Defining the Project Area

The area defined within the LERTA boundaries must meet one or more of the following criteria:

- Unsafe, unsanitary, inadequate, or overcrowded condition of the dwellings therein
- Inadequate planning of the area
- Excessive land coverage by the buildings thereon
- Lack of proper light and air and open space
- Defective design and arrangement of the buildings thereon
- Faulty street or lot layout
- Economically or socially undesirable land uses.

The Borough, County, and School District could work together to mutually define the LERTA boundary based on the above criteria, and the area could adequately meet one or more of these criteria, allowing for establishment of a LERTA District.



A recommended LERTA district boundary is defined above. The proposed district includes the main business portions of Main Street and Water Street, and the former industrial property along Sherman Street. The proposal would be to limit the district to only properties outside the floodway.

Resiliency Concepts

A LERTA incentive economic development district the GMA would allow other landowners in the district to capitalize on investment while other priority projects are underway and contribute to economic revitalization in the GMA.

Stakeholders

- Lead Agency - Muncy Borough, Lycoming County, Muncy Area School District
- Other Partners - Local Business owners, LAC, Community at large

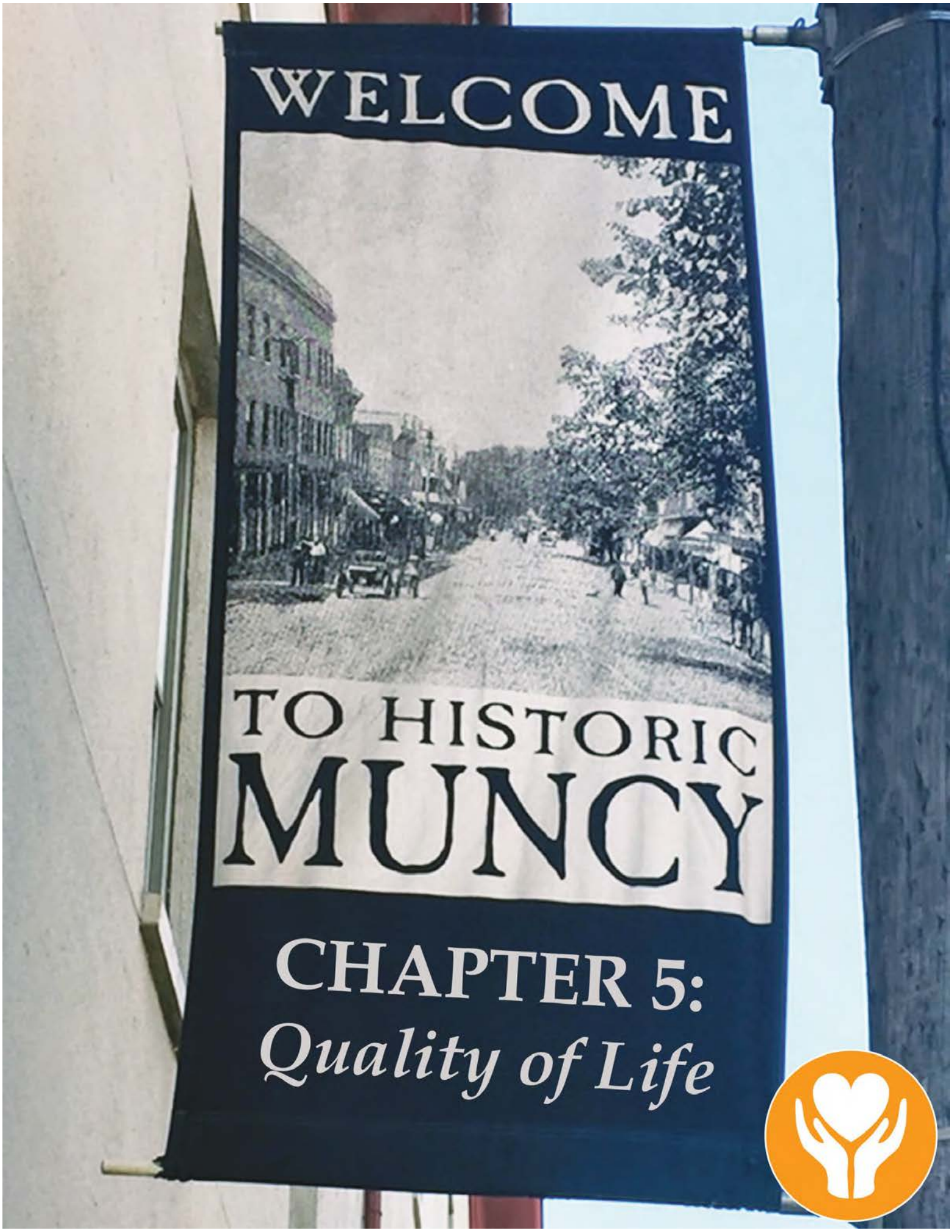
Implementation Steps

1. Define the LERTA boundary.
    a. Consult community stakeholders as partners in planning.
    b. Approach Lycoming County Planning Department to assist in Geographic Information System (GIS) activity and mapping.
2. Meet with the Borough, County, and School District to discuss concept and impacts.
    a. Perform economic assessments.
    b. Identify potential future economic benefits via scale provided.
3. Establish the schedule for the LERTA.
4. Each taxing authority must approve the LERTA.
5. Develop an application and review process based on criteria that support the resiliency mission and vision.
6. Advertise to the property owners within the boundary via an awareness and education campaign.
    a. Town Hall or Borough meeting announcement
    b. Mailing
    c. Publicly displayed flyers
    d. Web site content.

Funding Resources

Potential funding sources for this project include:

- Municipal and local staff time and in-kind services



CHAPTER 5:
Quality of Life

Chapter 5: Quality of Life

5.1 Summary of Existing Conditions

Quality of life in Lycoming County can be most easily defined by what things most concern the residents of our communities. What needs to be improved? What needs to be preserved? The current comprehensive plan covering the Greater Muncy Area was adopted in 2017 and contains a thorough explanation of the issues that the Greater Muncy community feels most impact their quality of life. These issues are:

- Threats to water quality
- Flood Impacts
- Deficiencies of the transportation system
- Fragmentation of services across local government boundaries
- Need for revitalization of downtowns

5.1.1 Recreational Features

The GMA has a rich mix of natural and historical features attractive to tourists and locals alike. Analysis and stakeholder engagement identified locations to which people travel and where they spend time. Locations are divided into four destination categories: hubs, nodes, project locations, and corridors. Project locations are specified as a separate category because these may be independent of current hubs or nodes. Corridors are specified as a separate category because the GMRP seeks to create a system of connectivity that incorporates these project locations to increase community awareness of resiliency and improve ability of bicyclists and pedestrians to move throughout the community. A corridor is a connector, or commonly traveled path between hubs, nodes, or project locations. Corridors are perhaps the most critical of the four features because these affect ability of the community to access important locations identified within this section. Corridors are unique in that they cover large areas, can vary widely in safety and condition, and involve diverse user groups, including bicyclists, pedestrians, vehicle operators, and in some instances, animal-powered traffic.

Open Space within the GMA

Features discussed herein were identified largely by stakeholders. It is understood that members of the community firmly understand connectivity within the GMA and connections that they desire. While qualitative analysis can identify locations where pedestrians or bicyclists transit in highest volume and where accidents occur most frequently, it often misses the human element. Therefore, stakeholder observations and perceptions of safety and near misses are emphasized. This observational analysis aids identification of hubs, nodes, and corridors. Planning experience and professional judgment help inform the process. Below, the four primary destination categories are defined and identified:

Hubs: Areas identified during engagement efforts as locations to which people move and terminate. Hubs within the GMA are as follows:

- Retail services between State Route 405 and East Penn Street, at the far east of the GMA, currently consisting of Sheetz and Wise Markets
- The Lions Park and Pool adjacent to the elementary school
- Heritage Park along the Susquehanna River and SEDA-Council of Governments (COG) joint rail authority right-of-way
- The downtown of the Borough of Muncy.

- Green Street Park
- UMPC Susquehanna Muncy
- The Elementary and Junior-Senior High Schools.

Nodes: Areas within the GMA identified as secondary locations or destinations along a commonly traveled corridor at which people may stop or visit while enroot to a hub or project area. Nodes within the GMA are as follows: Various Historical Markers (18)

- The Muncy Borough Building

Project Location: Resiliency projects are locations of feasible, implementable projects that will increase resiliency within the GMA. Projects, once implemented, may become nodes or hubs.

Corridors: Major connections and/or recreational streets or trails on which the community frequently travels from one location to another. The corridors are identified as:

- Green Street to the hospital
- SR-405 from the hospital to the retail complex hosting Sheetz and Weis
- The SR-405 bridge exiting the GMA to the east
- Lafayette Street between the Elementary School and the Junior-Senior High School
- Pepper Street from the Heritage Park Entrance to Green Alley
- Musser Lane to South Market Street, Riddell Ln, Quarry Rd, to Broadway Street
- SR-442 from the athletic complex adjacent to the Muncy Creek Township Building north to the retail complex hosting Sheetz and Weis.

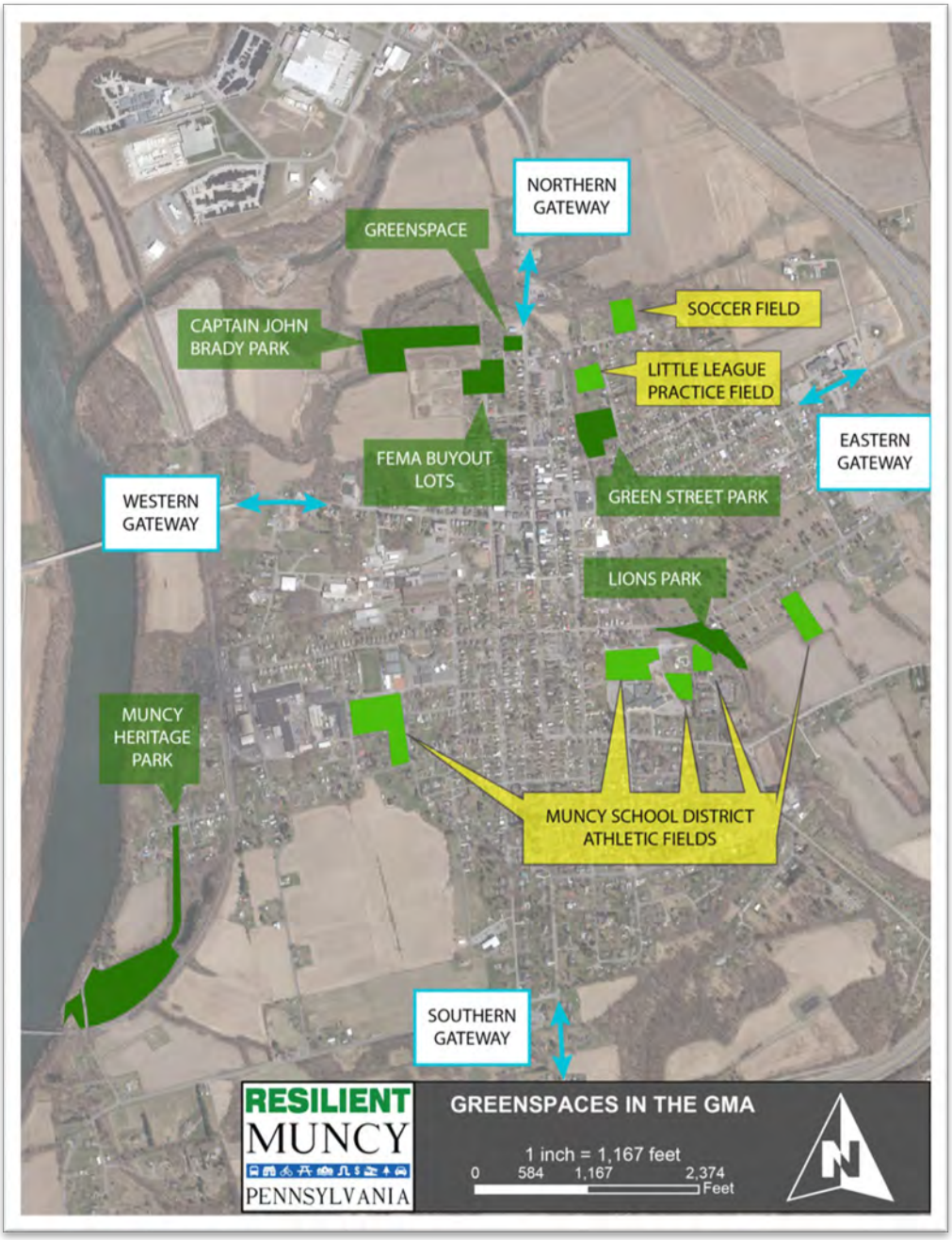
5.1.2 Recreation, Open Space, and Community Gathering Spaces

This section builds on locations identified above as hubs and nodes. It is common to find that the areas identified above have significant overlap with recreational activities, enjoyment of open space, and community gathering within the GMA. Within the GMA are three parks—Green Street, Lions, and Heritage Park—as well as the Captain John Brady Park currently under development. Additionally are recreational fields associated with the Elementary and Junior-Senior High Schools, as well as a recreational complex adjacent to the Muncy Creek Township Building. These opportunities are geographically diverse, with the three parks on the north, east, and southern quadrants surrounding the Borough, and the recreational complex to the far east in Muncy Creek Township. Sheetz has also been identified as a gathering space for a variety of demographics, particularly in the warmer seasons and after sporting events.

Each of these locations has unique features and appeal to various users. The diversity of venues that each space offers strengthens stability and sustainability of facilities within that space.

5.1.3 Greenspace

The GMA area is abundant with parks and green space from small parks like the Muncy Veterans parklet and Muncy Gardens to more encompassing spaces embracing a variety of recreational uses such as Heritage Park and Muncy School Recreation Area. Most of these greenspaces are owned, operated, and maintained by the municipality; some are the responsibility of the school district. Heritage Park and the future Captain John Brady Park are the exceptions—owned by the Muncy Historical Society and Museum.



Extensive planning occurred prior to development of the GMRP. SEDA-COG prepared previous reports in 2010 and 2013. In 2010, the report "Creating Safe, Walkable, and Healthy Communities in the Middle Susquehanna Region" focused on enhancing the walking and biking environment in Muncy, Hughesville, and Berwick. In 2013, SEDA-COG produced the report entitled "A Plan for Muncy Recreation Sites with Connecting Street Designs for Downtown Muncy." This plan more comprehensively examined existing and new project sites, focusing on specific sites and developed concepts, benefits, and costs of each. Subsequent, further evaluation demonstrated additional need for recreational sites and connectivity within the GMA.

5.1.4 Connectivity and Mobility

The Greater Muncy Area has a well-developed and maintained transportation system oriented to traditional automobile-centric travel. However, opportunities exist to expand the multimodal character of the transportation system. When any system over-relies on one element, it introduces fragility into the system. In this case, since the community is so dependent on automobiles for travel if a disruption to the automobile transportation network occurs it will cause severe negative impacts. The best way to promote a resilient transportation system in the Greater Muncy Area is to insure that no particular mode of travel is so dominant that its failure prevents safe travel in the community.

As stated, motor vehicle travel in the GMA is well developed. Some opportunities for enhancement do exist. Elevation of some roadways could make them more resistant to closure during flood events. In contrast, a variety of challenges and risks face a pedestrian/bicyclist within the GMA. Sidewalk condition, lack of sidewalks, overgrown alleyways, traffic volume, traffic speed, pedestrian aid condition, shoulder width/condition, as well as other factors impede movement of pedestrians and bicyclists. These impediments can lead to unfortunate consequences, including injury or even death. A barrier to movement, such as a highway, also can impede movement of pedestrians/bicyclists. Similarly, opportunities to access public transportation are limited to travel within Muncy and between Muncy and neighboring communities.

For example, the retail complex hosting Sheetz and Weis is recognized as hub destination; however, most pedestrian/bicyclist traffic to and from this hub utilizes Water Street (SR-405), moving from the downtown and surrounding area back and forth as a primary corridor. This can be a risky proposition, as one must navigate the I-180 and SR-405 merge areas four times in a single round trip.

Connectivity is a vital part of resiliency, as it promotes health, wellbeing, and a vibrant community, as well as opportunity for the community to connect with both the natural environment and other residents. Discussion of community connectivity must also include a consideration of the ability for goods and services to reach people. Connectivity and

mobility must also be considered and analyzed at two discrete but connected scales: connectivity between locations within a community and connectivity between the community and neighboring communities. Both scales of connectivity are well developed for automobiles within GMA, but opportunities exist to improve connectivity for transit users and for active transportation.

While multiuse trails primarily provide non-motorized mobility between communities, downtown areas can implement various streetscape improvements to facilitate non-motorized travelers within the community. These improvements are typically grouped together under the umbrella of "Complete Streets." According to the National Complete Streets Coalition, the definition of a complete street is a street designed and operated to enable safe access for all users." This means that all modes of transportation should be accommodated in a way that is safe and convenient for all modes. Both PennDOT and FHWA have produced guidance documents for implementation of complete streets within communities.

A need was identified within the community for recreational trails and walkways not on or adjacent to roadways. Stakeholder interviews exposed a desire among GMA residents for multi-use trails. This can be accomplished in variety of ways, one of which is coupling of design standards that incorporate walking trails. This can occur as part of an overlay district that allows clustering of housing units and preservation of open space, also known as conservation by design, or conservation subdivisions.

5.2 Summary of Gaps and Opportunities

Two significant gaps within the GMA relate to quality of life—ability of the community to gather and move throughout the GMA.

- **Gap:** Lack of gathering spaces within the Borough of Muncy that are appealing, easy to access, and conveniently located.

  Opportunity: Redevelopment of the corner lot stands to add a considerable space for the public to gather.

  Opportunity: Buyout properties are limited in future use. These large spaces would add a considerable amount of open space that is cleared, level, and accessible for gathering of the community. The challenge to use of this space as a gathering location would be rendering pedestrian and bicycle movement to the buyout properties more convenient/safe.

  Opportunity: Work with the new owner to encourage development of the Opera House and the Ritz Complex in a way that incorporates space available for gathering.

- **Gap:** Connectivity between GMA hubs, nodes, and project areas is unsafe, does not promote accessibility, and is indirect.

  Opportunity: Work with the community to identify key corridors that promote pedestrian and bicycle movement throughout the community.

Opportunity: Capitalize on invested stakeholders (e.g., schools' interest in student movement throughout the community).

Opportunity: Encourage investment in commercial development that encourages/offers services to pedestrian and bicycle users.

Opportunity: Encourage placement of bicycle racks and/or pedestrian shelters to render movement throughout the community convenient.

5.3 Ongoing Projects Tied to Resiliency

5.3.1 Captain John Brady Park Development

The Project Message

"History, nature, and resilient use."

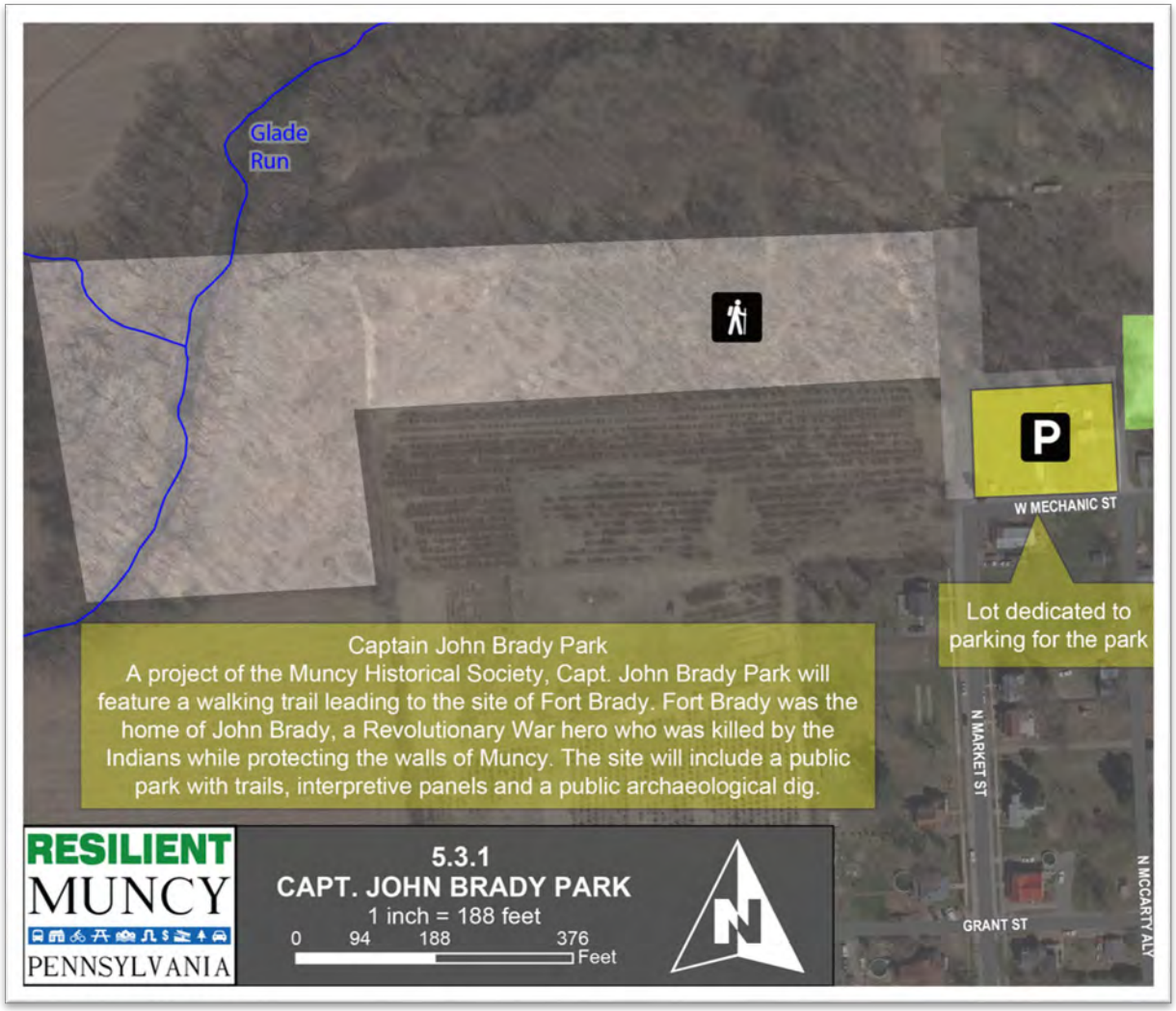
The 8-acre property was donated to the Muncy Historical Society and Museum and was once part of the 300-acre track homestead and fort owned by Captain John Brady, a Revolutionary War hero. The Muncy Historical Society is creating a park on the property that will include walking trails, interpretive displays, and a public archeology dig. Parking for the site will be on the adjacent FEMA flood buyout property, now owned by Muncy Borough. There are opportunities to educate the public on site about floodplain issues and also demonstrate BMPs in the parking area.

Priority Justification

On the surface, a park looks and feels like open space available for a variety of activities from running to biking, possibly soccer or a pick-up game of football. The Captain John Brady Park may have the same feel, but it is much more than just a park because of the multiple benefits it provides.

Defining the Project Area

Located east of North Main Street, at the corner of North Market and East Mechanic Street the park encompasses 8.06 acres, with road access; it is adjacent to FEMA buyout properties. It is within the 1% flood plain, generally flat, and straddles the boundary of Muncy Creek Township and Muncy Borough.



Resiliency Concepts

A Master Plan for creating a passive recreational park trail has been developed. Additionally is an opportunity to leverage the former Severely Repetitive Loss residential properties that were recently purchased by the County for parking, trails, or other passive recreation features. Expansion of the downtown trail along or through the FEMA buyout lots going north is also a possibility. Recommendation also is to locate within the park as educational components kiosks that highlight flood risk, the FEMA buyout program, and the historical significance of the region. All proposed uses of areas acquired via FEMA assistance will require FEMA approval.

Resiliency within this project is achieved by maintaining the area as passive recreation, which would limit infrastructural impacts and cost of maintenance, increase awareness of flooding risks, and contribute to community health and wellbeing.

Recommendation for the site include construction of parking areas according to a BMP for use as a credit if/when MS4 is implemented within the region.

Implementation Steps

This project is already underway. As the FEMA buyout project progresses and the houses are razed, further master planning for the site should continue, as should stakeholder engagement as a significant factor in development of the site.

Stakeholders

Lead Agency – Muncy Historical Society

Other Partners - FEMA , Muncy Creek Township, Muncy Borough, PFHA – Pennsylvania Housing Affordability and Rehabilitation Enhancement Fund (PHARE), Adjacent landowners

Funding Resources

Potential funding sources for this project include:

- Private foundation funds/donations
- Waldron Memorial Foundation
- PA Department of Conservation and Natural Resources (DCNR)

5.4 Project Package – Quality of Life

5.4.1 Floodplain buyout lot/ Adaptive Reuse

The Project Message

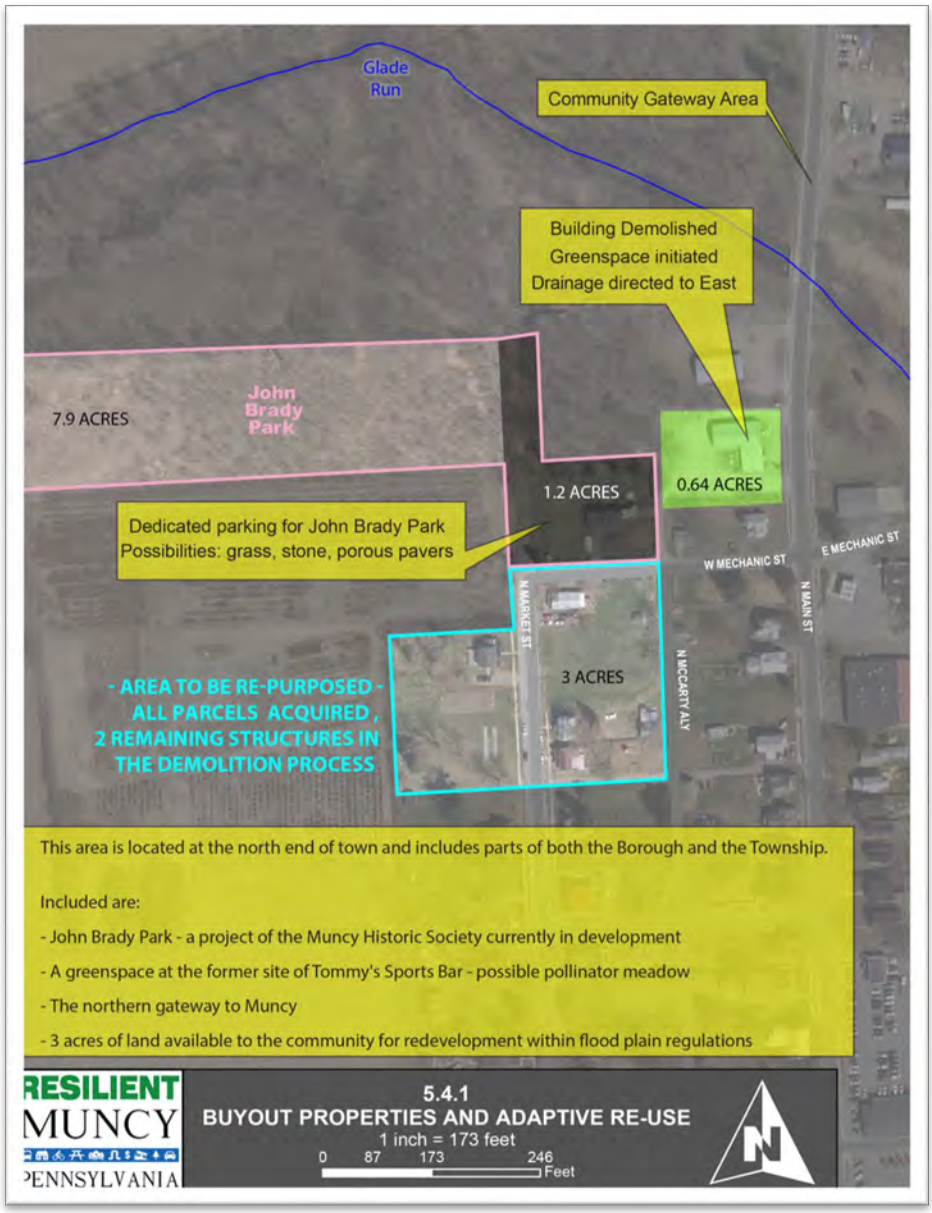
Multiple properties were obtained in Muncy Borough through the County's long established flood buyout acquisition program. Buyout properties are flood-prone properties that are voluntarily purchased by the Lycoming County. The County uses FEMA, PEMA, or Pennsylvania Housing Finance Authority (PHFA) funds to purchase the property, demolish existing structures, and transfer the property to the local municipality to own and maintain as open space. These properties typically have restrictions prohibiting most structure on them in the future, but open space uses are allowed

Vacant FEMA buyout lots in Muncy Borough

(parks, passive recreational use, community gardens, etc.).

These properties are a priority for reuse because they represent a tax loss for the Borough. This project includes developing short and long-term plans for the buy-out lots to determine their highest and best use. Possible end uses include:

- Public open space/ park
- Community garden
- Recreation
- Dog park
- Natural area



Priority Justification

Empty lots spread throughout a flood-prone area do not provide much opportunity for the community. Repurposed, these spaces could lend themselves to artisan fairs, farmers markets, passive recreation with a trail, or educational opportunities (explaining the history of Muncy and flooding, and all the reasons why Muncy is a resilient town). Other options for flood-prone areas include a dog park, community garden, and reforestation projects. If the repurposed properties draw people to these areas of town, others will take notice, with potential to attract new investment in the surrounding properties to those who want to improve their properties because the neighborhood has direction and cohesiveness.

Defining the Project Area

The project area include the municipal-owned FEMA and PHARE buyout lots in Zone 1 in Muncy Borough *(see map above)*.

Preliminary Resiliency Concepts

Resiliency within this project is achieved by maintaining the area as open space or compatible uses, which would limit infrastructural impacts and cost of maintenance, increase awareness of flooding risks, and contribute to community health and wellbeing.

Implementation Steps

1. Determine short and long term use strategies for properties
    a. Gather public input on end use
    b. Confer with youth sports organizations and school district
2. Coordinate use with FEMA and PEMA on allowable use
3. Implement project(s)

Stakeholders

Lead Agency – Muncy Borough

Other Partners - Lycoming County Department of Planning and Community Development, PEMA, FEMA, LAC, Community at large

Funding Resources

Potential funding sources for this project include:

- PA Department of Community and Natural Resources (DCNR) - C2P2 grant program
- First Community Foundation
- PA Department of Community and Economic Development (DCED)

5.4.2 Connectivity

The Project Message

“Tying resiliency to the community”

Resiliency is not just about physical projects that harden a community against adverse conditions. It is also about building a healthy community, community connectivity, and education. Connectivity allows for movement of people via several modes—transit, walking, bicycle, or vehicle.

Priority Justification

While other projects within the GMRP look to improve vehicular corridors, bridges, and infrastructure, this project will be different. It will focus on pedestrian and bicycle movement between significant destinations within the community and resiliency projects, to improve pedestrian/bicyclist safety and increase resiliency awareness.

Several planning initiatives have identified connectivity opportunities and improvements within the GMA. The goal within this project is to narrow the focus and increase the impact.

Use of local knowledge would enhance existing plans so that implementation of these project is meaningful, directly beneficial, and relevant. This project also relies on professional judgment for recommendation of phases. The layout of this project development would look slightly different. Some of this judgment would be based on need, proximity to other projects, and complexity of implementation.

Connectivity can be improved by developing and improving corridors, cores and nodes:

Corridors: A corridor, for the purposes of this project package, is a line or segment between cores and nodes that must be improved or developed.

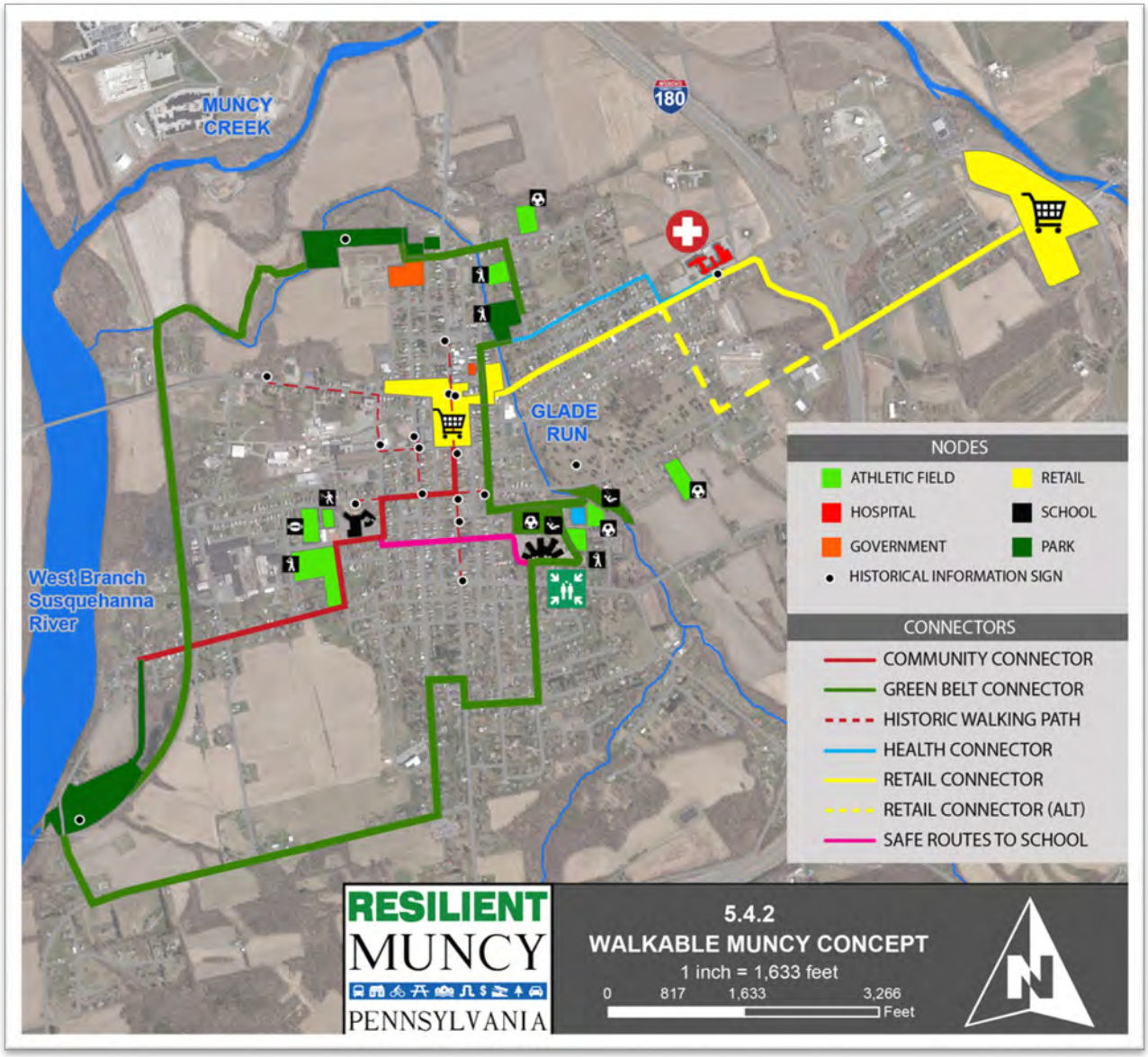
Cores: A core is an area of primary focus or a major destination/project area through which movement of people would accomplish one of two resiliency tasks: education/awareness or recreational access. For example:

- Green Street Park
- Captain John Brady Park and associated buyout project
- The Lions Park Project
- Redevelopment of “The” Corner Project
- Muncy Area School District properties
- Retail and commercial areas near Sheetz.

Node: A node is an incidental opportunity to create awareness, enhance a corridor—for example, a historical marker, demonstration project, or marker that is part of the blue-ribbon education project.

Defining the Project Area

The map below depicts proposed connectivity projects within the GMA.



5.4.3 Phase 1:– Safe Routes to School

General Information

The Muncy Area School District covers a large area. Two of its schools, Ward L. Myers Elementary and Muncy Junior High School, are significant destinations within the GMA, and are associated with a high volume of pedestrian traffic. On any given afternoon, children can be seen walking along Lafayette St (many in the center of the road), and crossing busy streets.

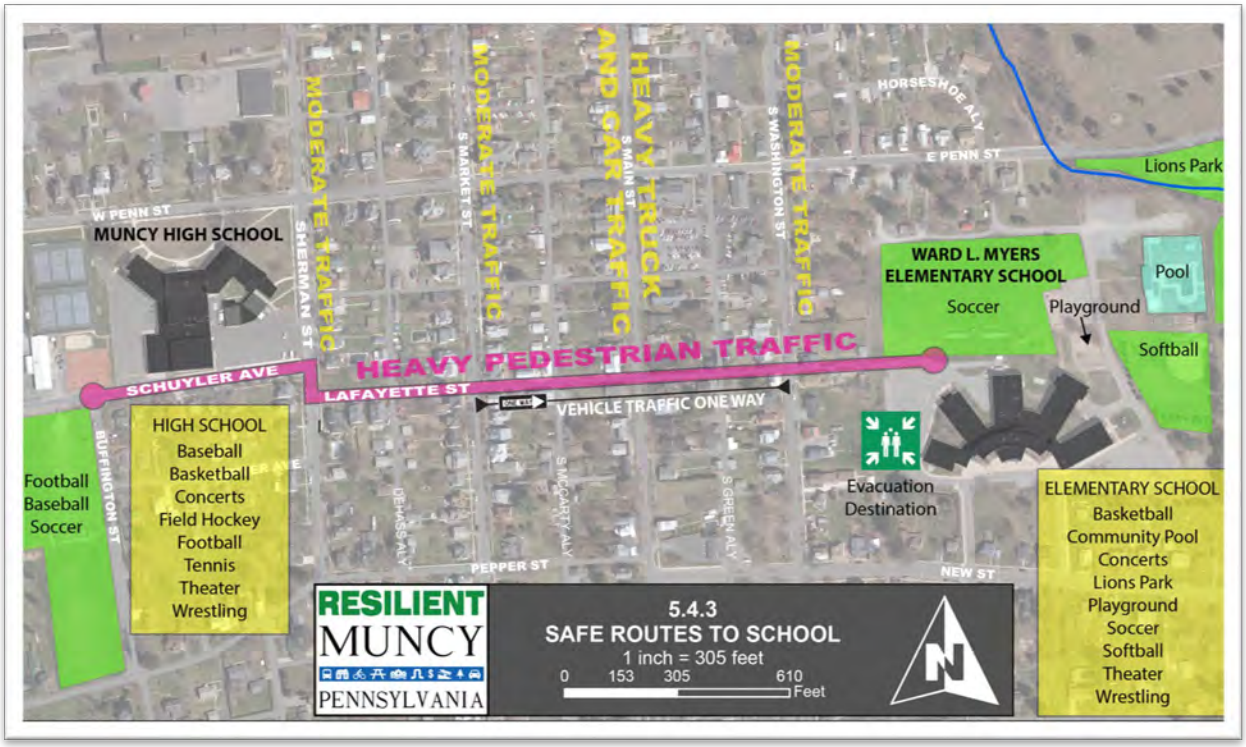
The elementary school is near Lions Park and the nearby pool. It is associated with significant pedestrian and bicycle traffic.

Creating safe connections among these three locations is important. While movement of school age children occurs along many routes, this project emphasizes the main connecting corridor between the Junior-Senior High School and Elementary School.

Goals of this project are to create a healthy community by encouraging alternative modes of transportation (walking and biking), and to establish safe connections between major destinations, accommodating barriers to movement (S Main St).

Defining the Project Area

This corridor can be described as Schuyler Ave along the junior-senior high school to Sherman Street, W Lafayette Street crossing at S Main Street to E Lafayette Street, where it connects to the Elementary School. A recent study by SEDA-COG identified this corridor as a primary pedestrian route.



Stakeholders

Lead Agency - Muncy Borough, Property owners with access to property via alley only

Other Partners - Contributing stakeholders, Adjacent Property owners, LAC, Community at large, Muncy Area School District

Implementation Steps

1. Identify the route and its cores. - **Completed**
    - Junior-senior high school

- Elementary school
- Lafayette corridor and associated connectors to school property.

2. Identify barriers to movement
    - Significant street crossings
    - Poorly lit areas
    - Damaged sidewalks
    - Narrow alley ways
    - Cross walk improvements (painted and stamped concrete)
    - Speed Table considerations
    - Road closure opportunities
    - Impeded sidewalks, overhanging brush, or other barriers.
3. Develop a list of priority actions, identifying those opportunities easily accomplished as immediate opportunities, those that are safety oriented as immediate need, and those that require significant stakeholder engagement, financing, and infrastructural improvement as lower priority.
    a. Immediate Opportunity – Removal/trimming of brush that narrow roads or reduces visibility
        i. East Lafayette Street between Green Alley and South Main Street – Narrows Road
        ii. W Lafayette Street between S Main Street and McCarty Alley – Brush over sidewalk.
    b. Immediate Opportunity – All new sidewalk or features should be ADA-compliant curb ramps, new curb, and stamped concrete crosswalks.
    c. Immediate Need – Cross Walk improvements and signage.
        i. Sherman Street crossing to West Lafayette Street – No cross walk or pedestrian signage
        ii. West Lafayette Street crossing S Market – No Cross Walk or pedestrian signage; consider flashing pedestrian signs.
    d. Immediate Need – S Main Street Crossing – Review cross walk paint condition. Determine need for Yellow light as at hospital
    e. Low Priority – S Main street is a 25-miles-per-hour (mph) corridor; consider stamped concrete speed table at the S Main and Lafayette Street crossing.
    f. Immediate Need – S Washington street crossing; review cross walk paint condition.
    g. Low Priority – Consider closing streets on one end to eliminate through traffic.

i. Alley east of S Washington – This is a redundant alley; consider pedestrian only barrier (drop bollards) that can be removed if needed.

ii. Eliminate entrance to E Lloyd Aly. from S Washington St; allow entrance from Green Aly only

iii. Eliminate entrance to E Lafayette St from S Main St; allow entrance from Green Alley only.

h. Low Priority – Improve sidewalk condition along corridor.

i. Low Priority – Add lighting along the corridor, mainly at intersections.

j. Immediate Opportunity – Place signage along route indicating it is a safe route to school to induce awareness and caution.

i. Paint lines in areas where no sidewalks exist to provide visual indication that these are shared use areas.

4. Work with stakeholders to determine a way forward.
5. Engage community by use of educational materials, signage, and other media to create awareness.

Funding Resources

Potential funding sources for this project include:

- PennDOT Municipal Liquid Fuels Funding: Safe Routes to School
- Multimodal Transportation Fund – PennDOT: Street Signs
- Multimodal Transportation Fund – PA DCED: Directional Signs
- Transportation Alternatives Program (TAP): Traffic Control Systems

Cost Estimates

Larson Design Group

Opinion of Probable Construction Cost

Project Information		Report Information	
Name:	Muncy Resiliency		
Number:	9007-001	Date:	2.4.2019
Location:	Muncy, PA	Prepared By:	EDD
Contact:		Reviewed By:	CEK

Project Description

ENHANCED SIDEWALKS, SIGNAGE, CROSSWALKS, CURB RAMPS, PEDESTRIAN SIGNAL POLES, LIGHTING SAFE ROUTE TO SCHOOL

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT PRICE	AMOUNT BID
1	Mobilization/clearing and trimming	1	LS	$10,000.00	$10,000.00
2	Survey and ROW	1	LS	$10,000.00	$10,000.00
3	Maintenance and Protection of Traffic	1	LS	$10,000.00	$10,000.00
4	Concrete Sidewalk (includes removal of existing)	421	SY	$155.00	$65,255.00
5	Concrete Curb (including removal of existing)	757	LF	$75.00	$56,775.00
6	Curb Ramp	14	EA	$1,068.00	$14,952.00
7	Stamped Concrete Crosswalks	350	SF	$38.00	$13,300.00
8	Painted Crosswalks	5	EA	$1,500.00	$7,500.00
9	Detectable Warning System	252	SF	$40.00	$10,080.00
10	Pavement Markings	300	LF	$0.55	$165.00
11	Signage	10	EA	$1,000.00	$10,000.00
12	Lighting (conc base and pole)	15	EA	$7,500.00	$112,500.00
13	Pedestrian crossing flashing signs	6	EA	$10,000.00	$60,000.00
14	Wiring and Conduit	1800	LF	$30.00	$54,000.00
15	Electric Service	1	LS	$3,000.00	$3,000.00
16	Drop bollards	4	EA	$1,500.00	$6,000.00
17	E&S	1	LS	$5,000.00	$5,000.00
				BASE BID SUBTOTAL	**$448,527.00**
				10% Engineering	$44,852.70
				8% Inspection	$35,882.16
				20% Contingency	$89,705.40
				TOTAL PROJECT COST	**$618,967.26**

Please Note:

Engineer's opinion of probable Construction Cost is made on the basis of Engineer's experience and qualifications and represents the Engineer's judgment as an experienced and qualified professional generally familiar with the construction industry. However, since the Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, or over contractor's methods of determining price, or over competitive bidding or market conditions, Engineer cannot and does not guarantee that proposals, bids or actual Construction Costs will not vary from opinion of probable Construction Cost prepared by the Engineer.

5.4.4 Phase 2 – Greenbelt Implementation

General Information

"A greenbelt of resilient projects."

A green space trail within the GMA can serve as a primary corridor that can connect to other spur routes. Linking John Brad Parky, Green St, Lions Park, and Heritage Park would create a continuous loop near several unique projects.

Generally, this project will require signage, markers at project sites, and mobility improvement like cross walks, speed table, and sidewalks.

Goals of this project is to tie both resiliency projects and areas into a connective/improved pathway that uses green spaces as cores, to furnish a safe and healthy way for people to move as pedestrians or bicyclists, to enhance awareness of resiliency, and to allow people more easily to connect with the outdoors.

Defining the Project Area

See map, next page

Stakeholders

Lead Agency - Muncy Creek Township, Lycoming County Planning Department, Muncy Borough

Other Partners - Andritz – Alternative Route, Dollar General – Alternative Route, Puff Express – Alternative Route, Muncy Area School District, LAC, and Community at Large

Implementation Steps

1. Identify the core areas to be intersected by the greenbelt.
    a. John Brady Park
    b. Green Street Park
    c. The Downtown, specifically the corner lot redevelopment project
    d. Heritage Park
2. Identify core areas that could be connected by the green belt.
    a. UPMC Susquehanna – Muncy Valley Hospital
    b. Sheetz/Weis complex
    c. Lions Park
    d. Heritage Park


Muncy Creek
John Brady Park
MECHANIC ST
Soccer
T-ball
DIVISION ST
New walking trail component
Green Street Park
WASHINGTON ST
Glade Run
SEDA COG rail-trail partnership
West Branch Susquehanna River
Lions Park
Soccer
Pool
Soccer
Softball
BROADWAY ST
Township roads & Borough streets
QUARRY RD
MARKET ST
Heritage Park
MUSSER LN
Total walkable length 5.2 miles
RESILIENT MUNCY PENNSYLVANIA
5.4.4
GREENBELT IMPLEMENTATION
1 inch = 917 feet
0 459 917 1,834
Feet
N

3. Conduct an unofficial survey of the corridor to document needed improvements.
    a. Identify associated funding sources for each type of needed improvement.
    b. Attempt to tie each improvement to a resiliency project to consolidate and maximize funding.
4. Develop an improvement schedule.
    a. Prioritize areas used by school-age children moving to and from schools.
    b. Prioritize areas with significant safety issues.
    c. Reference PennDOT and local crash data to review crash rates and statistics.

Funding Resources

Potential funding sources for this project include:

- PA Department of Conservation Natural Resources (DCNR)
- Susquehanna Greenway Partnership

5.4.5 Phase 3 – Walkable Muncy

General Information

"Moving toward wellbeing."

The goal of this project is to connect an employment hub that focuses on health to the green belt. This project could also stimulate collaboration with PennDOT to connect the Muncy community to the large services-oriented retail center east of town.

Defining the Project Area

See map, next page

Stakeholders

Lead Agency – Muncy Creek Township

Other Partners - Lycoming County Planning Department, Muncy Borough, LAC, Community at large, UPMC Susquehanna – Muncy Valley Hospital

Implementation Steps

1. Conduct an unofficial survey of corridor to document needed improvements.
    a. Identify associated funding sources for each type of needed improvement.
    b. Attempt to tie each improvement to a resiliency project to consolidate and maximize funding.
    c. Develop an improvement schedule.
2. Prioritize areas used by school-age children moving to and from schools.
3. Prioritize areas with significant safety issues.
4. Analyze PennDOT and local crash data to review crash rates and statistics.

Funding Resources

Potential funding sources for this project include:

- PA Walkworks
- DCNR

5.4.6 Phase 4 – Sheetz/Weis Connector

General Information

"Connecting people to goods in a great way."

The goal of this project is to demonstrate collaboration among the County Planning Department, Township, and community by creating a unique connection. Connecting to the large services retail area east of town via state right-of-way will demonstrate the community's commitment to pedestrian and cyclist connectivity and resiliency.

Stakeholders

Lead Agency - Muncy Creek Township, Lycoming County Planning Department, Muncy Borough
Other Partners – LAC, Community at large, UMPC Susquehanna – Muncy Valley Hospital

Rt. 405 in Muncy Creek

Implementation Steps

1. Conduct an unofficial survey of corridor to document needed improvements.
    a. Identify areas where right-of-way collaboration is needed and begin conversation.
    b. Identify associated funding sources for each type of needed improvement.
    c. Attempt to tie each improvement to a resiliency project to consolidate and maximize funding.
2. Develop an improvement schedule.
    a. Prioritize areas used by school-age children moving to and from schools.
    b. Prioritize areas with significant safety issues.
    c. Reference PennDOT and local crash data to review crash rates and statistics.

Funding Resource

Potential funding sources for this project include:

- PennDOT

5.4.7 Phase 5 – SEDA-COG Joint Rail Authority Collaboration

General Information

"The missing link"

The connectivity map reveals that the SEDA-COG Joint Rail Authority Collaboration project fills a gap and connects Heritage Park. The SEDA-COG pedestrian and bicycle master plan map highlights a potential off-road trail system near the Susquehanna River. Part of this system involves use of the SEDA-COG Joint Rail Authority right-of-way. The whole of the river trail system is likely not implementable at this time; however, the portion cited above is likely implementable and fills a direct need within the connectivity plan.

Project Location

See map, next page

Implementation Steps

1. Conduct an initial engagement and collaboration meeting with SEDA-COG Joint Rail Authority, and demonstrate the following to the SEDA-COG Joint Rail Authority:
    a. Need
    b. Vision
    c. Benefits
    d. How this development would tie into other larger community initiatives
2. Identify associated funding sources for each type of needed improvement.
3. Work with adjacent land owners to increase participation and awareness.
4. Develop trail.

Stakeholders

Lead Agency - Muncy Creek Township , Lycoming County Department of Planning & Community Development , Muncy Borough, SEDA-COG Joint Rail Authority
Other Partners - LAC. Community at large, Adjacent land owners

Funding Resources

Potential funding sources for this project include:

- PA Department of Community and Economic Development (DCED)
- PA Department of Community and Natural Resources (DCNR)
- PennDOT


SEDA COG JOINT RAIL AUTHORITY ACTIVE RAIL LINE
CAPTAIN JOHN BRADY PARK
RR BRIDGE OVER GLADE RUN
OVERLAND (NON-RAIL) PORTION
RTE. 405 OVERPASS
WEST BRANCH SUSQUEHANNA RIVER
STUDY AREA
MUNCY HERITAGE PARK
SEDA COG JOINT RAIL AUTHORITY ACTIVE RAIL LINE
W MECHANIC ST
E MECHANIC ST
N WASHINGTON ST
DIVISION ST
N MAIN ST
VETERANS MEMORIAL DR
N MARKET ST
BRADY ST
GREEN ST
AQUATIC RD
RT 405 HWY
W WATER ST
E WATER ST
CARPENTER ST
SHERMAN ST
W HIGH ST
E HIGH ST
BRUNER ST
ANGLETOWN RD
SWAMP ALY
W PENN ST
E PENN ST
SMITH ST
UNNAMED ALY
SCHUYLER AVE
FAYETTE ST
S WASHINGTON ST
PAINTER ST
BUFFINGTON ST
CENTER AVE
PEPPER ST
S MAIN ST
NEW ST
RAILROAD ST
W LINCOLN
PORT PENN RD
FISHER LN
HEBERLING RD
SHERMAN ST
MUSSER LN
RESILIENT MUNCY PENNSYLVANIA
5.4.7
SEDA COG JOINT RAIL AUTHORITY COLLABORATION
1 inch = 783 feet
0 392 783 1,566 Feet
N

5.4.8 Phase 6 – Final Connectors

General Information

The goal of this project is to make final connections to the remaining local features or focus on areas within the GMA that must be improved to facilitate pedestrian/bicycle transportation. Stakeholder engagement efforts led to identification of three areas in this regard.

Defining the Project Area

Stakeholders

Lead Agency - Muncy Creek Township, Lycoming County Planning Department, Muncy Borough, Impacted land owners, The Lions Club

Other Partners – LAC, Community at large

Implementation Steps

1. Focus on areas initially identified as connections on previous map.
    a. Identify areas where right-of-way collaboration is needed and start conversation.
    b. Demonstrate how these projects are tied to resiliency.
2. Conduct an unofficial survey of corridors to document needed improvements.
    a. Identify areas where right-of-way collaboration is needed and start conversation.
    b. Identify associated funding sources for each type of needed improvement.
    c. Attempt to tie each improvement to a resiliency project to consolidate and maximize funding.
    d. Reference PennDOT and local crash data to review crash rates and statistics to better understand metrics impacting the corridor.
3. Develop an improvement schedule, prioritizing areas with the most significant safety issues.
4. Work with local land owners to grant access if required.
5. Develop trails where no infrastructure is present.
6. Look to couple the project with other funding sources. For example, try to pair the project with a stream bank stabilization project
7. Once implemented, conduct a secondary review of the GMA to identify new areas for future investment or of importance to the community and repeat the above steps.

Funding Resources

Potential funding sources for this project include:

- PA Department of Community and Economic Development (DCED)
- PA Department of Community and Natural Resources (DCNR)
- PennDOT

5.4.9 Lions Park Bridge and Pool Infrastructure Improvements

The Project Message

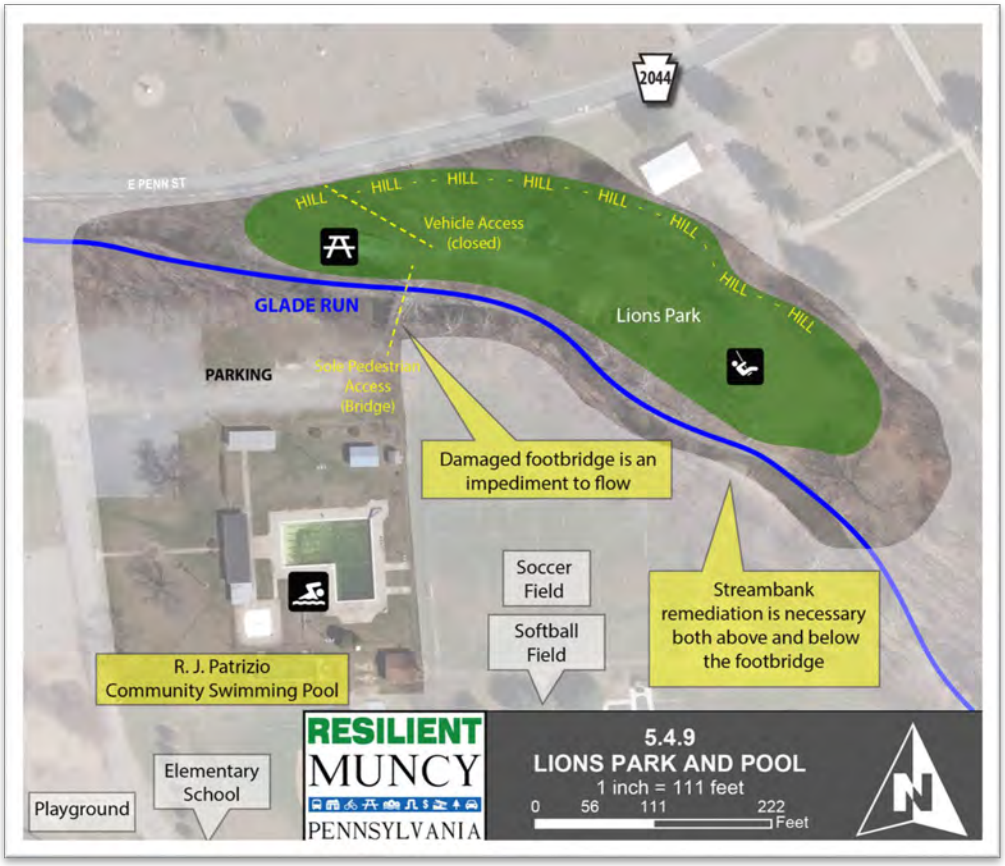
"A cause and a concern"

The Muncy Area Lions Park bridge and R. J. Patrizio Community Swimming Pool infrastructure improvement project will evaluate the effects of stream overbank storage and floodplain expansion in the area of the Lions Park. For this project, a portion of Lions Park along Glade Run could be lowered to allow for high floods to be attenuated and the area could be cleared of vegetation close to the stream to improve stream conveyance.

Priority Justification

This project will not only benefit community connectivity, recreation, and infrastructure resilience, but the bridge design will help prevent future flooding. The impacts and feasibility of this should be evaluated using the Glade Run USACE HEC-RAS model and proposed modifications. Resulting inundation at various streamflow events could be used to determine benefits of the proposed modifications.

Defining the Project Area



Resiliency Concepts

Improvement of infrastructure that will prevent future flooding, increase community connectivity, and increase recreational opportunities.

Stakeholders

Lead Agency - Lions Club, West Branch Regional Authority, Muncy Borough, Muncy Creek Township, Muncy Area School District, Muncy Area Pool Association

Other Partners – LAC, Community at large

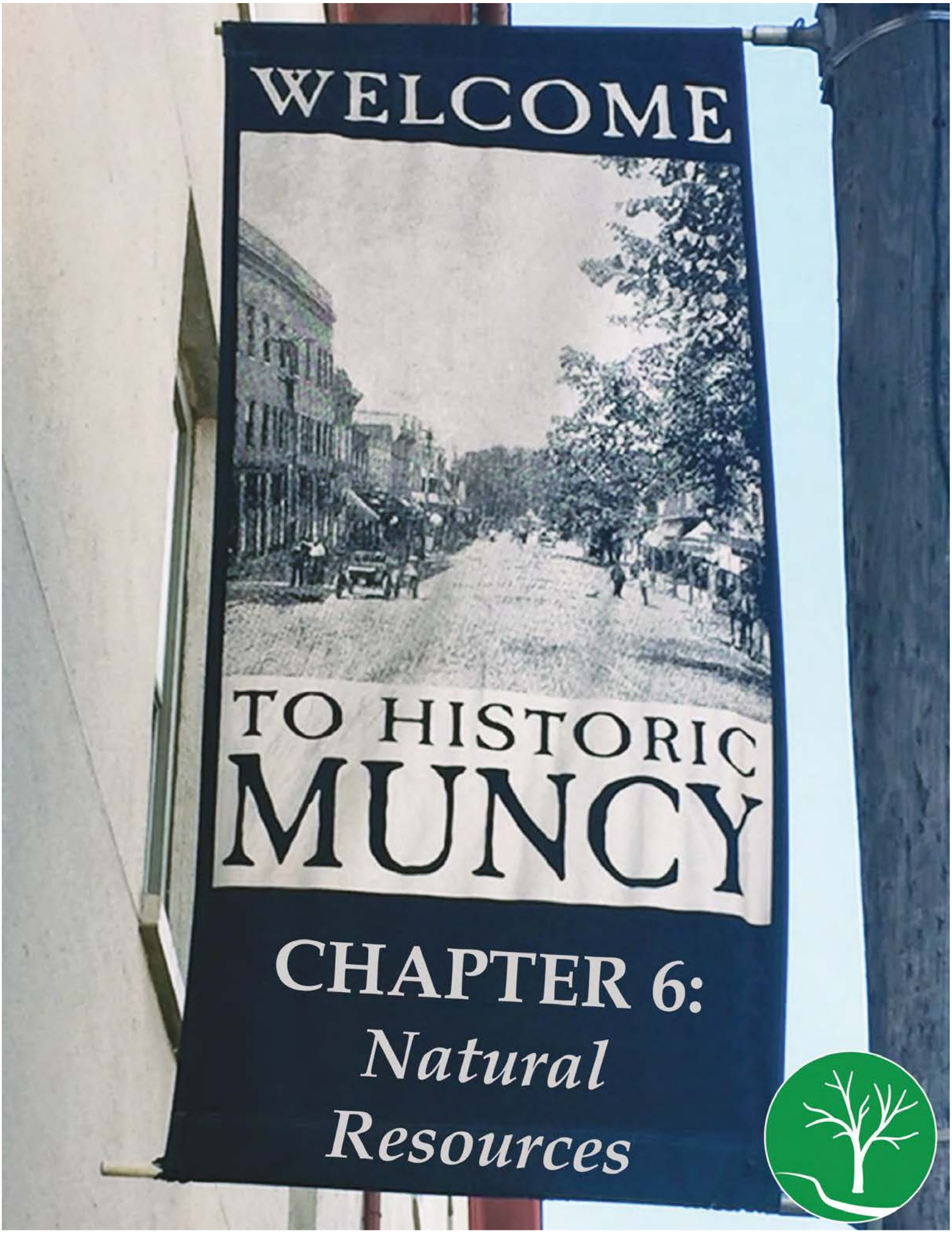
Implementation Steps

1. Collaborate with the decision-making stakeholders to determine a way forward.
2. Examine the USACE study to determine if the project would be co-located with the recommended USACE project.
3. Implement water and sewer improvements (consider incorporating bridge construction and water/waste water construction concurrently to minimize environmental impact).
4. Implement erosion control and stream bank stabilization.

Funding Resources

Potential funding sources for this project include:

- PA Department of Community and Economic Development (DCED)
- PA Department of Community and Natural Resources (DCNR)



CHAPTER 6:
Natural Resources

Chapter 6: Natural Resources

6.1 Summary of Existing Conditions

Chapter Two noted that the GMA is host to three bodies of flowing water: Muncy Creek, Glade Run, and the West Branch of the Susquehanna River. The interplay of these bodies influences to a great degree both land use and flooding risk for the study area. Glade Run and Muncy Creek are tributary streams to the West Branch of the Susquehanna River and contribute to flooding in Muncy Creek Township and Muncy Borough.

Flooding is a regular occurrence in the GMA. Land use and development patterns have caused environmental degradation and erosion of streams and have altered the natural course and function of waterways within the area. Restoration work to improve the natural function of these waterways would include streambank and habitat restoration—notably in the Glade Run stream segment in Muncy Borough and in Muncy Creek north of Muncy Borough.

6.1.1 Glade Run

Glad Run is a direct tributary to the West Branch of the Susquehanna River. The proliferation of impermeable surfaces and other manmade activities have contributed to an unnatural lowering of the water table, reducing Glade Run to an intermittent stream in Muncy Borough. The stream, running sub-surface for long stretches of the year, is the recipient of most of the collected stormwater for the area. 80% of all conveyed water in the borough and 65% of the conveyed water in the study area flow into Glade Run. The stream functions as an effective storm sewer leading to the Susquehanna River until high water events block the sewer outflows.

The storm sewer system in the GMA is outmoded, outdated and under-sized, as recent intense, localized storms have shown. As there is no single solution to retool the entire system, efforts must be concentrated on small improvements on a case-by-case basis, and some thought must be given to diverting a portion of this water before it is introduced to the storm sewer system or into this creek.

6.1.2 Muncy Creek

Muncy Creek is 33 miles long and drains a 216-square-mile area that encompasses parts of Sullivan, Columbia, Montour, and Lycoming Counties. The upper reaches of the

drainage basin are relatively rough, forested areas, while the lower reaches consist of rolling topography and broad agricultural lands. Within the GMA, Muncy Creek is susceptible to frequent floods and stream bank erosion.

6.2 Summary of Gaps and Opportunities

A few significant gap within the GMA relate to the natural environment:

- **Gap:** Flooding occurs frequently along Muncy Creek.

  Opportunity: Use nature-based solution to address flooding in the GMA.
- **Gap:** Glade Run, channelized throughout Muncy Borough, is the primary drainage area for stormwater in the borough.

  Opportunity: Restore natural function to Glade Run and reduce stormwater runoff.

6.3 Ongoing Projects Tied to Resiliency

6.3.1 Muncy Creek Stabilization Project

The Project Message

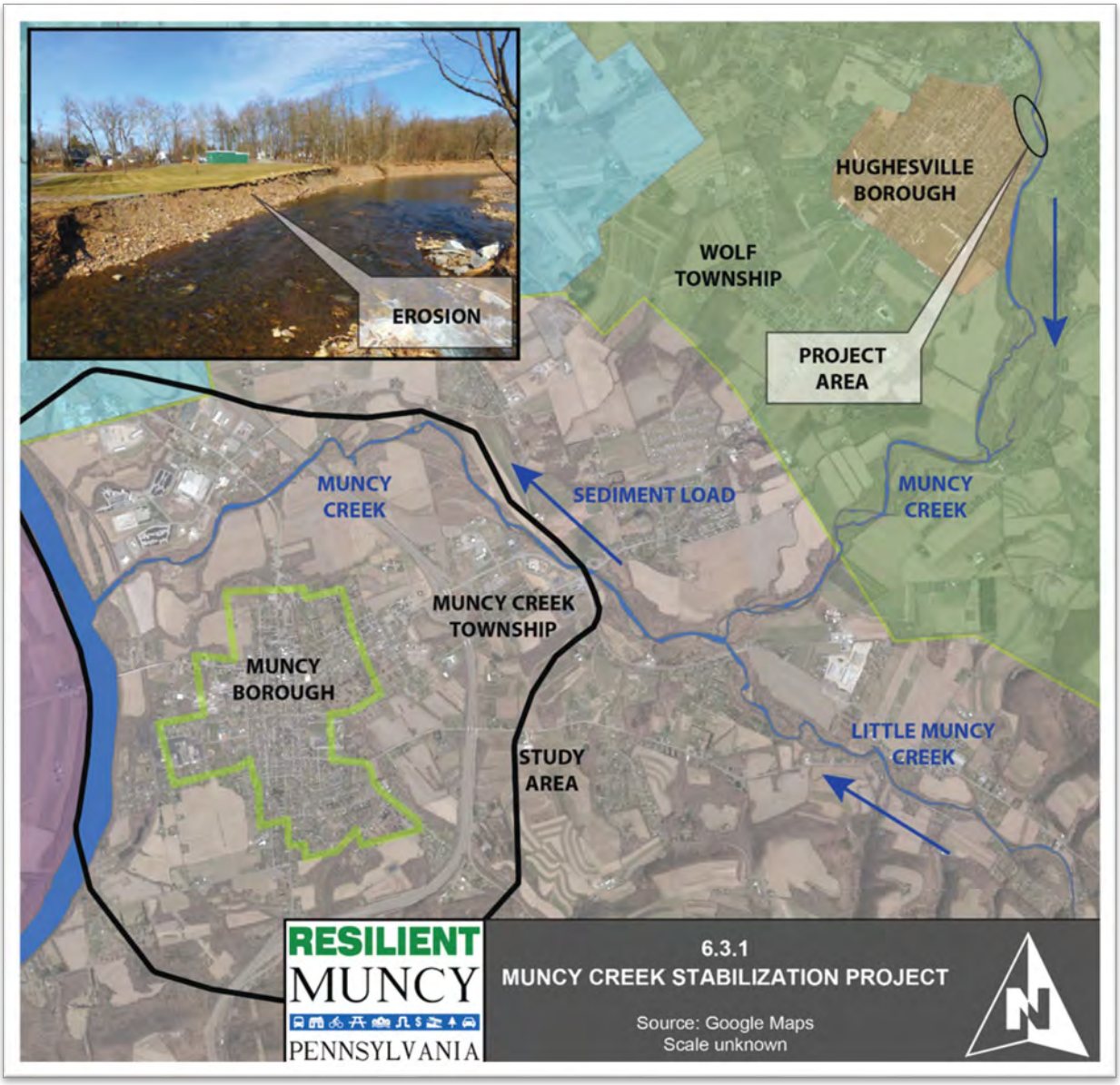
This project will stabilize 500 feet of Muncy Creek streambank upstream of the GMA that has been eroded by numerous flood events, sending an estimated 4,000 tons of sediment downstream over the past seven years. The stream has migrated close to the Hughesville Water Authority well pump house that provides public drinking water to 2,900 area residents. The site is vulnerable to additional damage and the public water supply well is at risk of total loss if action is not taken.

Muncy Creek

Priority Justification

Muncy Creek is actively experiencing significant erosion leading to the loss of public land and decreased downstream water quality. This project will restore and implement streambank stabilization using bio-engineering BMPs to address these issues. The desired result is to eliminate the uncontrolled streambank erosion and discharge of sediment, protect fish and wildlife habitats as well as critical infrastructure to include municipal drinking water sources, and improve the overall water quality of the impaired West Branch Susquehanna River.

Defining the Project Area



This project is located on Muncy Creek NE of Hughesville Borough in Wolf Township, upstream of the GMA.

Resiliency Concepts

This project will implement watershed based Best Management Practices (BMPs) for streambank restoration and protection of the Muncy Creek watershed.

Stakeholders

Lead Agency – Lycoming County Conservation District, Lycoming County Dept. of Planning and Community Development,

Other Partners – Hughesville Borough, Hughesville Borough Water Authority, NRCS, DEP

Implementation Steps

1. Feasibility Study to determine project structure – **Complete**
2. Secure funding – **Complete**
3. Complete stream restoration

Funding Resources

Funding secured for this project include the following grants:

- PA Department of Environmental Protection (DEP) - Growing Greener Grant
- PA Department of Community and Economic Development (DCED) - Water Restoration and Protection Program (WRPP)

6.3.2 Countywide Action Plan (CAP) for the Watershed Implementation Plan (WIP)

The Project Message

The Countywide Action Plan (CAP) is Lycoming County's plan to meet local water pollution reduction goals as part of PA's Phase 3 Watershed Implementation Plan for the Chesapeake Bay watershed. This plan focuses on local solutions for nutrient and sediment reduction in Lycoming County waterways.

Priority Justification

This project will identify project and programs to reduce nitrogen, prosperous, and sediment loads in Lycoming County's waterways. Under this plan, the County has a target nitrogen reduction goal of 1.2 million lbs/year and a phosphorus reduction goal of 76,000 lbs/year by 2025.

Defining the Project Area

This is a countywide project.

Resiliency Concepts

The CAP provides an opportunity to serve residents and businesses by cleaning up waterways, lowering flood risks, and improving the quality of life in local communities.

Stakeholders

Lead Agency – Lycoming County Dept. of Planning and Community Development

Other Partners – Lycoming County Conservation District, local municipalities, Community-at large

Implementation Steps

1. Complete CAP for Lycoming County
2. Implement CAP projects and watershed BMPs

Funding Resources

Funding secured for this project includes the following grants:

- PA Department of Environmental Protection (DEP) - Chesapeake Bay Countywide Action Plan Implementation Grant

6.4 Project Package – Natural Resources

6.4.1 Glade Run Stream Maintenance

The Project Message

This project involves snagging and clearing of vegetation along the entirely of Glade Run. Leaving healthy trees and removing underbrush and dead trees will improve conveyance in the channel. A vegetation management policy/ordinance could be considered for formal adoption to maintain the channel once the initial snagging and clearing is completed. In addition, formal inspection and operations and maintenance procedures could be developed to remove dead trees and brush on an annual or semi-annual basis.

The impacts and feasibility of this would be evaluated using the Glade Run HEC-RAS model. Resulting inundation at various streamflow events could be used to determine benefits of the proposed modifications.

Priority Justification

Dead trees, underbrush, and debris within the stream channel constrict and alter water flow and contribute to flooding in storm events. During heavy storm events, stream debris often collects under narrow bridge opening and further limits water flow.

Defining the Project Area

This project is located in Muncy Borough and in Muncy Creek Township.

Resiliency Concepts

This project will address erosion and flooding issues in the GMA and protect critical infrastructure.

Stakeholders

Lead Agency – Muncy Creek Township, Muncy Borough

Other Partners – Lycoming County Conservation District

Implementation Steps

1. Determine regulatory requirements prior to starting work. Review DEP stream Maintenance Guide prior to completing stream work: https://files.dep.state.pa.us/Water/FactSheets/StreamMaintenance/StreamMaintenSmallPosterNCR0forWEB.pdf
2. Complete stream maintenance work
3. Project evaluation.
4. Local stakeholder discussion

Funding Resources

Potential funding sources for this project include:

- Local municipalities (staff time and equipment)

6.4.2 Muncy Creek Floodplain Restoration Project

The Project Message

"Nature-Based Flood Solutions"

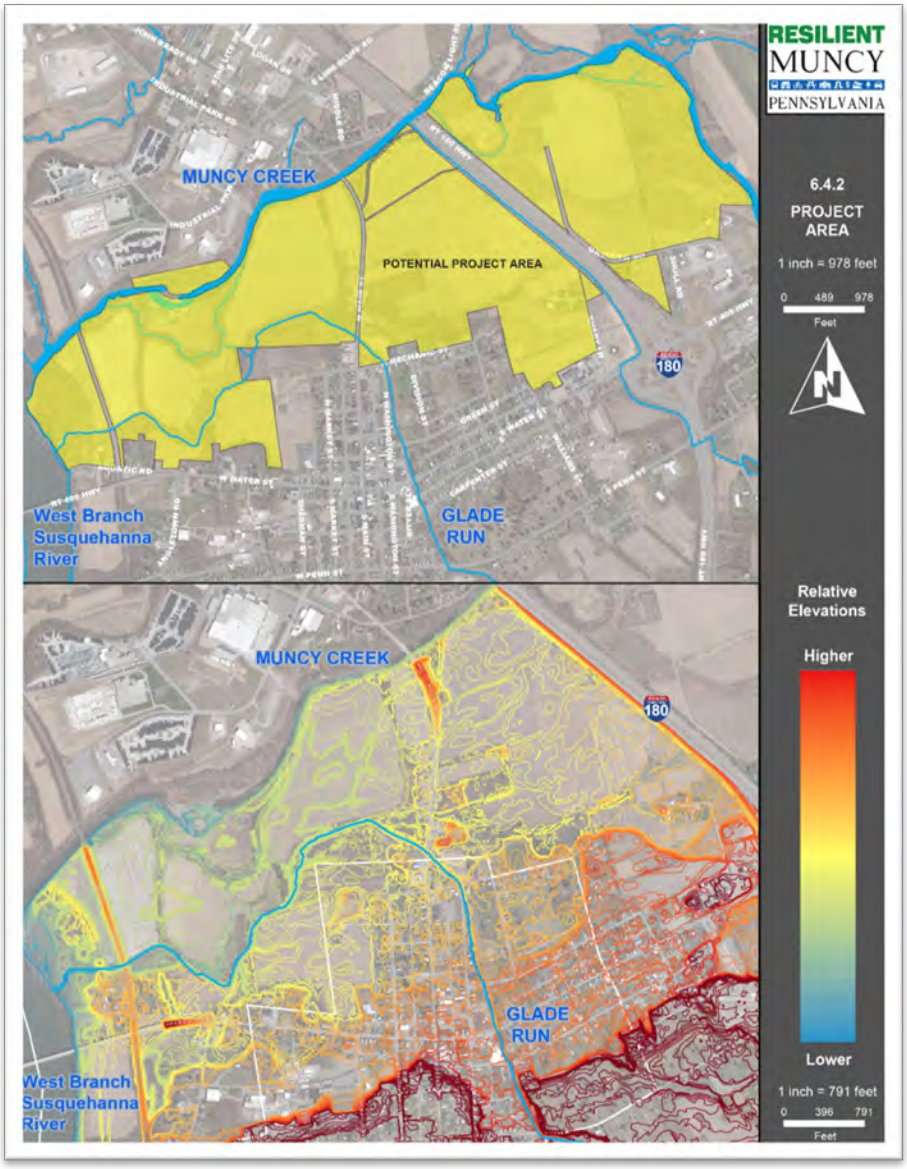
The Muncy Floodplain Restoration Project will use nature-based solutions to restore the floodplain storage capacity and riparian habitat along to Muncy Creek. This project will protect and restore forested riparian buffers along Muncy Creek, the flood channel, and important habitat.

Priority Justification

This project could reduce or limit GMA exposure to flooding, reduce flood recovery time, and improve overall quality of the local environment. Restoring the natural floodplain functions will provide multiple benefits including flood protection, reduced siltation, habitat protection, and recreation. Floodplains help to convey floodwaters, store floodwater, and recharge groundwater. They provide fish and wildlife habitat and also provide passive recreational benefits to the community.

Defining the Project Area

This project is located along Muncy Creek in Muncy Creek Township. It is currently in agricultural use.



Resiliency Concepts

This project would create a natural, self-sustaining system of addressing floodwater and stormwater management through nature-based solutions that is cost neutral, fits within the context of the current community, is compatible with adjacent land uses, and provides opportunity for new economic markets within the community, such as recreational birding, non-motorized boating, and fishing.

This, coupled with consensus of the community that this project is important, encourages early initiation of it within resiliency implementation so that the process runs parallel to the other resiliency projects implemented within the community, and benefits are realized sooner.

Project Components

This project will consider multiple options for the site. The final project will depend on additional site analysis, funding available, and project partnerships. Project elements may include: streambank stabilization, floodplain restoration, riparian buffer plantings, and/or wetland restoration.

- **Streambank stabilization**
  Practices and measures to correct erosion in the streambank that exacerbates erosion and cause excessive stress on streambanks. Best management practices (BMP) may include installation of log vanes and riparian plantings. The goal of reducing erosion, sedimentation and stabilization the streambank where needed

- **Floodplain restoration**
  Floodplains are part of the river and stream corridors and help store and slow flood waters.

- **Riparian Buffers**
  Riparian forest buffers areas the area of grass, trees, and shrubs that act as a buffers in the transitional area from land to water. This area acts as filter for the adjacent water pollution and sediment runoff.

- **Wetland Restoration**
  Wetland restoration would increase floodwater storage capacity in the watershed. One option for wetland restorations includes wetland mitigation banking:

  Wetland Mitigation Bank: Wetland banks are utilized where construction projects, such as implementation of sewer infrastructure, exert what the U.S. Environmental Protection Agency (EPA) refers to as "unavoidable impacts to aquatic resources." PennDOT frequently applies such banking practices within the State of Pennsylvania, a significant opportunity for the GMA. This offers the GMA not only the opportunity to develop wetlands that can help mitigate flooding within the region, but opportunity to establish a wetland bank authority whose primary goal and responsibility would be to sponsor the wetland bank.

  The U.S. Department of Agriculture (USDA) identifies how wetland banks are developed by use of wetland bank sponsors:

  "Bank sponsors develop mitigation banks. A bank sponsor is any individual or entity that develops wetlands for use in wetland mitigation banking. The sponsor is responsible for the cost of wetland development, as well as long-term maintenance to ensure that the wetland continues to function as designed in the

future. Credits are determined using a functional assessment procedure that evaluates individual wetland functions. As the credits are sold, they are subtracted from the bank until all of the available credits are purchased. At this time, the mitigation bank closes and no additional credits can be sold from that bank." (USDA 2018)

Only wetlands restored, created, or enhanced qualify within a banking program, rendering the opportunity within the GMA all the more attractive, as the project area would primarily consist of newly created wetland or restored floodplains.

Stakeholders

Lead Agency – Muncy Creek Township, Lycoming County Dept. of Planning and Community Development, Lycoming County Conservation District

Other Partners – Muncy Borough, East Lycoming Recreation Authority, DEP, NRCS, The Conservation Fund, PennDOT

Implementation Steps

1. Feasibility study
2. Local stakeholder discussion
    a. Including current landowners, potential long-tern owners, potential funders, and community stakeholders
3. Full Wetland delineation
4. Existing Stream(s) Evaluations. Considerations:
    a. Reconnection to floodplains
    b. Connectivity to existing wetlands?
    c. Potential hydrology source.
5. Soil, Infiltration, and Water Table Analysis
    a. This will be required to determine the type of hydrology and source. Will the soils be viable or require soils additive, etc.?
    b. This will be required in grid type evaluation to identify existing substrate in all areas of potential development.
    c. Is enough hydrology available to sustain a wetland system?
6. THREATENED AND ENDANGERED SPECIES ANALYSIS (DESKTOP ANALYSIS)
    a. Presence of threatened and endangered species will impact project permitting and timeline.
    b. This could also lead to limitation of type and locations of wetlands.
7. Invasive Species Analysis
8. Existing Land Use Analysis
9. Existing Functional Analysis

10. Topo of Site and Existing Rights-of-Way
    a. Necessary if identification of areas that are feasible based on slope, required earth movement, etc.
    b. Lower lying areas and gradual slopes are recommended.
    c. Increased cost and risk are associated with steeper graded areas.
    d. Restrictions and agreements.
    e. Potential source of invasive species.
    f. Potential source of reduced functional value.
    g. Potential cost associated with redevelopment of that part of the wetland after maintenance activities.
11. Permitting
12. Proposed Conceptual Development Plans
    a. This would include what is being constructed.
    b. What functional value will be created?
13. Construction Cost to Return on Investment Analysis (based on all data above)

Cost Estimate (for wetland mitigation bank option)

Opinion of Probable Construction Cost

Project Information		Report Information	
Name:	Muncy Retiliency		
Number:	9007-001	Date:	2.4.2019
Location:	Muncy, PA	Prepared By:	EDD
Contact:		Reviewed By:	CEK

Project Description:

FEASIBILITY STUDY FOR WETLAND BANK The study should include:

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT PRICE	AMOUNT BID
1	Full Wetland Delineation	1	LS	$10,000.00	$10,000.00
2	Stream evaluation	1	LS	$1,000.00	$1,000.00
3	Soil, infiltration, and water table analysis	1	LS	$2,000.00	$2,000.00
4	Threatened and Endangered Species Analysis (Desktop Review)	1	LS	$1,000.00	$1,000.00
5	Invasive species Analysis	1	LS	$7,000.00	$7,000.00
6	Topo Survey (LIDAR) of Site with existing ROW determined	1	LS	$30,000.00	$30,000.00
7	Permitting	1	LS	$10,000.00	$10,000.00
8	Existing Land Use analysis	1	LS	$4,000.00	$4,000.00
9	Existing functional analysis	1	LS	$8,000.00	$8,000.00
10	Proposed Conceptual Development Plans	1	LS	$15,000.00	$15,000.00
11	Construction Cost to Return of Investment analysis	1	LS	$5,000.00	$5,000.00
				BASE BID SUBTOTAL	$93,000.00
				10% Engineering	$9,300.00
				20% Contingency	$18,600.00
				TOTAL PROJECT COST	$120,900.00

Please Note:
Engineer's opinion of probable Construction Cost is made on the basis of Engineer's experience and qualifications and represents the Engineer's judgment as an experienced and qualified professional generally familiar with the construction industry. However, since the Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, or over contractor's methods of determining prices, or over competitive bidding or market conditions, Engineer cannot and does not guarantee that proposals, bids, or actual Construction Costs will not vary from opinion of probable Construction Cost prepared by the Engineer.

Funding Resources

Potential funding sources for this project include:

- PA Department of Conservation and Natural Resources (DCNR)
- PA Department of Environmental Protection (DEP)
- PA Department of Community and Economic Development (DCED) – Flood Mitigation Program (FMP)
- US Army Corps of Engineers (USACE)
- National Fish and Wildlife Foundation (NFWF)
- PennVEST
- Foundation for PA Watershed Project Grants
- USDA - Emergency Watershed Protection - Floodplain Easement (EWPP-FPE)

6.4.3 Glade Run Restoration & Stormwater Demonstration Project

The Project Message

Glade Run is a tributary stream to the West Branch of the Susquehanna River and contributes to flooding in Muncy Creek Township and Muncy Borough. This project consists of Glade Run streambank and habitat restoration in Green Street Park.

Little League field at Green Street Park, 2004

Priority Justification

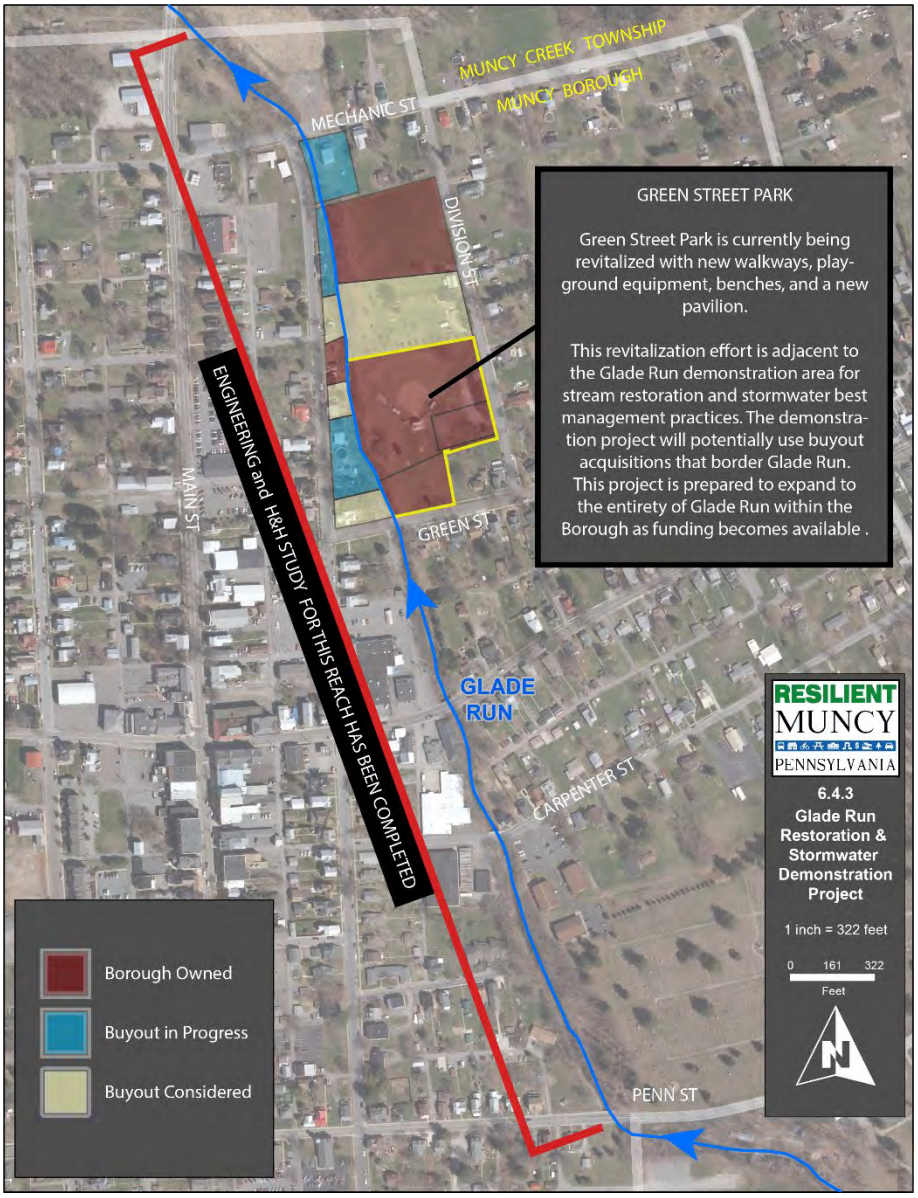
Green Street Park is adjacent to a natural watercourse, Glade Run. Infrastructure development in Muncy over the past century has had a profound effect on the hydrology in the stream.

In the GMA, a large percentage of the stormwater runoff (65%) is piped into Glade Run where it collects during storms, increasing in velocity, eroding the streambank along the way. The effect of this is two-fold: sediment from the bank makes its way downstream impacting the fragile ecosystem of the Chesapeake Bay Watershed and more immediate for Muncy residents: erosion along the streambank threatens adjacent homes, roads, and

businesses with loss of land and in some cases impacts to basements and structural footings.

Defining the Project Area

This project located in Green Street Park in Muncy Borough.



Resiliency Concepts

This project will demonstrate to the community on the ground techniques that address some of the erosion and flooding issues in the GMA. The average person is mostly unaware of the ecosystem services that streams and rivers provide for stormwater management, water filtration, wildlife habitat, and aesthetic interest. This project will

also begin to improve stormwater management challenges within the community, specifically at Green Street Park by addressing and managing stormwater onsite, utilizing Low Impact Development (LID) principals.

This project demonstrates a best management practices (BMPs) for resilient communities including: streambank protection and stormwater management techniques. The techniques that will be implemented highlight the latest design and construction principles focusing on water resource conservation and sustainable community infrastructure.

Specific measurable goals of this program/project:

- Decrease in stormwater runoff from Green Street Park related impervious surfaces.
- Decrease in bank erosion in Glade Run adjacent to Green Street Park.
- Greater community engagement in Greater Muncy Resiliency Plan process and project implementation.
- Decrease impacts of flooding on local landowners.
- Watershed Stewardship: Improved environmental health and vitality within the Glade Run, Susquehanna, and Chesapeake Bay Watersheds.
-

Stakeholders

Lead Agency – Muncy Borough, Muncy Creek Township Lycoming County Conservation District

Other Partners – Endless Mountains Resource Conservation and Development Council, USACE, USFWS, DEP, DCNR

Implementation Steps

14. *Site acquisition*: Muncy Borough is moving to acquire properties in the floodway of Glade Run in this area though the Flood Buyout program. Preliminary engineering for the entirety of Glade Run within the borough has been completed by the borough engineer and a full Hydrologic and Hydraulic Study (H&H) has been performed by the United States Army Corps of Engineers (USACE.)
15. Streambank protection: this element will protect the streambank by armoring the toe (foot or bottom) of the bank with rock. The rock will prevent undercutting erosion at the foot of the bank and help with maintaining the flow of Glade Run within its primary channel.
16. Bank Repair: Currently, erosion has created a deeply cut bank with near vertical slopes. The vertical slope destabilizes the bank leading to ongoing erosion and produces a safety hazard to park visitors and adjacent property. In many areas

the vertical drop at the top of the bank is 5-6 feet and the mature tree roots have been exposed, threatening adjacent buildings. The bank repair will include removing trees that have the potential to fall on nearby structures (such as houses) and pulling back the bank (excavation) to a 4:1 or 3:1 slope (a one foot rise in elevation to every 3 or 4 feet of horizontal distance). Finally, trees, shrubs, and livestakes (or cuttings) will be planted to stabilize and shade the bank and stream.

17. Raingarden and Bioswale: The raingarden will be installed at the downstream end of the park near the parking lot and baseball field. This stormwater management feature will collect runoff (rain, brake dust, dirt, etc.) from the park's impervious surfaces. The raingarden and bioswale will infiltrate stormwater onsite before runoff reaches Glade Run. The bioswale feature will be an overflow channel connecting the raingarden to Glade Run.
18. Community Outreach: Information and onsite events will coincide with design and pre/post construction of the project. These events will educate adjacent landowners and community members about the scope and goals of the project.

Glade Run stream bank at Main St.

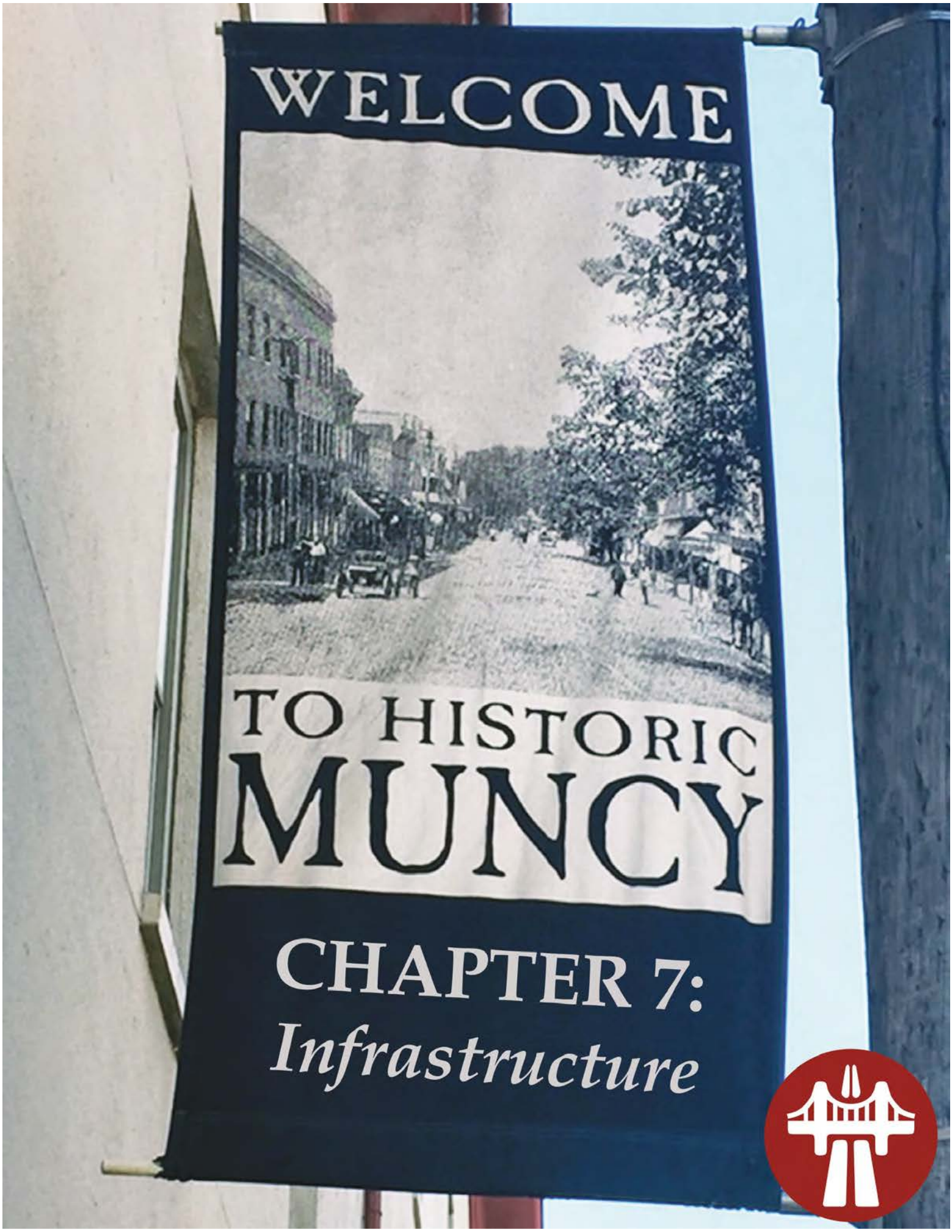
This project was initially developed and budget estimates were derived by the Endless Mountains Resource Conservation and Development Council (RC&D)).

Estimated Budget (RC&D): $282,087

Funding Resources

Potential funding sources for this project include:

- PA Department of Conservation and Natural Resources (DCNR)
- PA Department of Community and Economic Development (DCED)



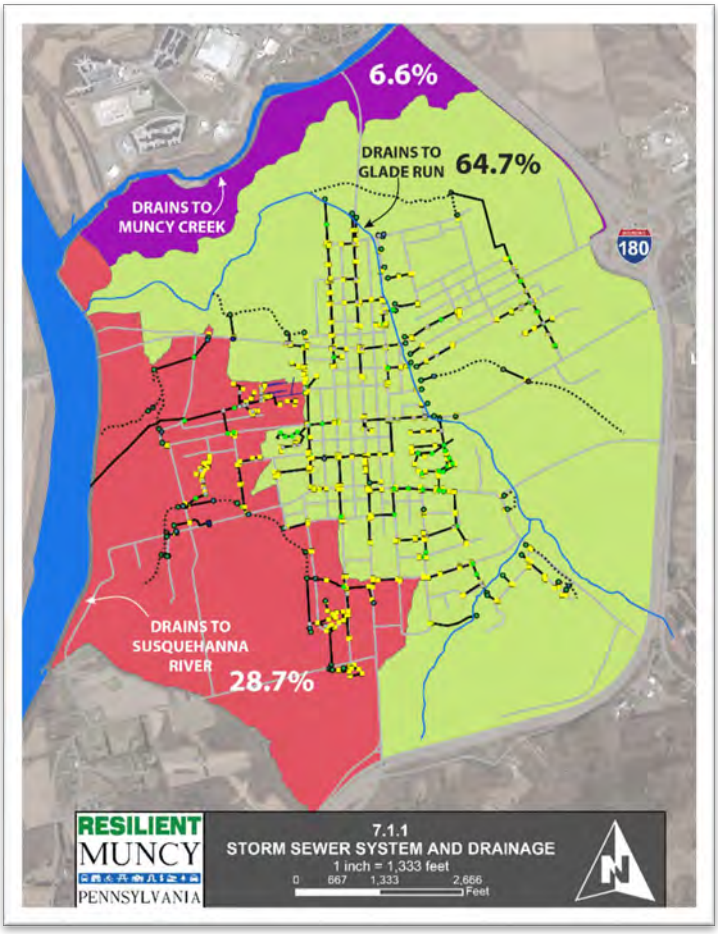
CHAPTER 7:
Infrastructure

Chapter 7: Infrastructure

7.1 Summary of Existing Conditions

7.1.1 Storm Sewer System

Muncy Borough owns and operates storm sewer infrastructure in Muncy Borough. The storm sewer infrastructure inside the study area is older, and such has been developing a few issues as it ages out of its useful life. Broadway, Feigles Rd, and Charles Rd in Muncy Borough all have some storm drainage issues including reverse flow pipes, missing curbing, overflows, or even running through other utility manholes. Residents report issues to borough officials.



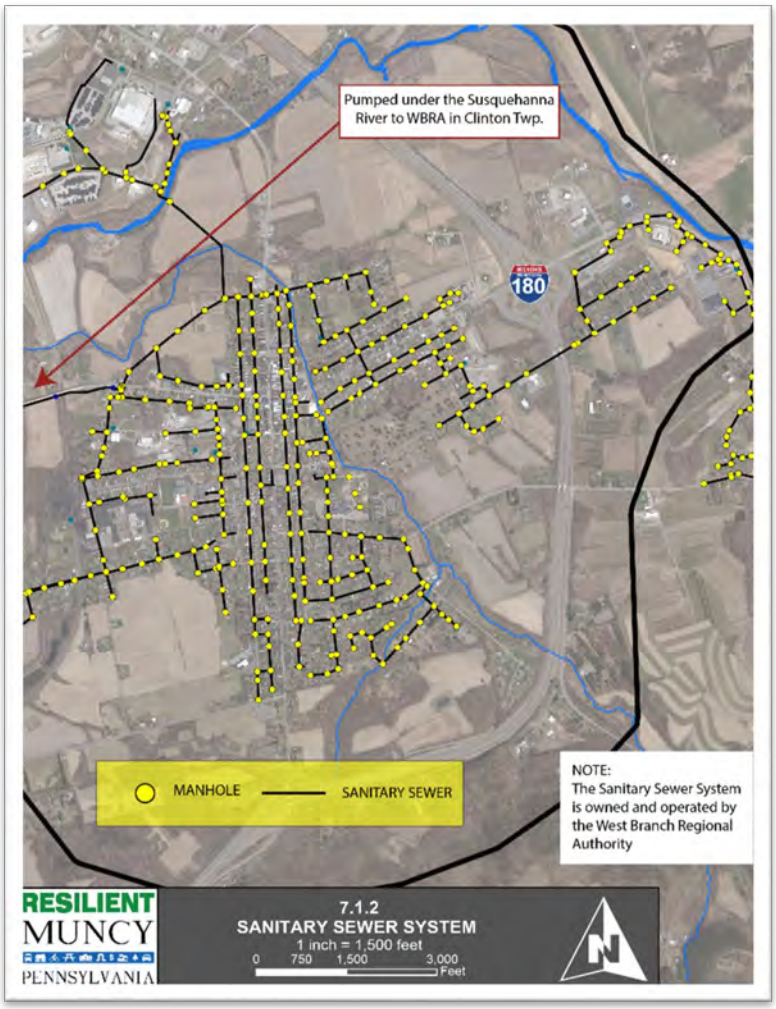
The issue that almost the entire outflow of the storm sewer system is directed into Glade Run has been noted. Implementation of alternative methods can be costly and therefore less attractive to the municipality than standard maintenance. The availability of funding from outside sources will be the determining factor in how and when this issue is addressed.

7.1.2 Sanitary Sewer System

West Branch regional authority (WBRA) owns and operates sanitary sewer system in Muncy Borough. The sanitary sewer infrastructure within the study area ranges in condition from excellent to fair. Some sections that need the most attention are Broadway Avenue, Sherman St, Quarry Rd, Feigles Rd, and Charles Rd. Sanitary sewers are important to the concept of resiliency because effects of flood events in deficient areas lead to more environmental hazards within the study area—as demonstrated within the Muncy Borough where in 2018, flash flood waters overwhelmed the sanitary sewer causing uncontrolled overflow. Updating systems on a schedule and repairing them regularly lowers the chance that a flood will affect those systems.

Inflow and Infiltration (I & I) is a problem that affects all buried sewer systems.

Inflow: The Pennsylvania Department of Environmental Protection (DEP) mandates that no sump pump discharges or floor drains may connect to a sanitary sewer. When property owners connect sump pumps and downspouts to the sanitary sewer system through their lateral, it can contribute large amounts of water to that system. This results in increased hydraulic load, which hinders the treatment process and can result in discharge of untreated sewage into streams and rivers. This discharge, bad enough on its own, can also trigger action by state regulators many of which may have financial repercussions can affect the entire community



Infiltration: Pipes, through joints and cracks, absorb water from the ground surrounding them – and nearby trees and shrubs will find cracks in pipes and use these as a water source. This aspect of I&I is mitigated by main/ lateral replacement or repair and is an ongoing effort.

Existing Conditions of System:

1. **WBRA 2014 lateral replacement project –**The sewer laterals located in older parts of the system are in poor condition and contribute to excessive Infiltration and Inflow (I & I). WBRA has implemented a lateral replacement program where enforcement is deferred until WBRA can apply for a Community Development Block Grant (CDBG) to assist Low-to-Moderate Income (LMI) customers. The lateral replacement program is especially vital for the flood-impacted areas, as flooding accelerates the degradation the laterals, and difficult construction conditions exist (unstable sandy soils and deep sewer mains located in alleys can require excavation work to include expensive shoring support of structures to prevent collapse from shifting soils).The lateral replacement project involves annual inspections and correction when funding is available.
2. **2014 Sanitary Sewer Replacement –** WBRA replaced approximately 6,000 feet of sanitary sewer in the Muncy service area from 2014 through 2016. This project was a part of a larger project that totaled 13,000 feet of main replacement and included sections in Montgomery. Much of the sewer main replaced was located in the flood area where wear and tear was accelerated by flood conditions. The poor condition of the sanitary sewer was allowing silt and debris to enter the system, robbing the sewer of capacity. Properly functioning sanitary sewers are essential to the community's resilience, as the inability safely dispose of human waste could slow response/rebuilding and spread disease. WBRA continues to dig and replace sewer main on an annual basis.
3. **The Fox Run Sewer Crossing –** This is an existing sanitary sewer line installed underneath a stream and is now exposed as the Run has eroded the stream channel. The sewer line is now above grade and susceptible to damage and/or failure from debris carried down the Run during storm events.
4. **The overall sewer system –**The system was originally constructed using vitrified clay pipe (also known as terra cotta pipe) which is subject to degradation over time and requires a more durable replacement. Some of the lines are deep (12 to 16 feet) and are functional, but are difficult and expensive to maintain or replace at this depth. Flooding introduces large volumes of water and flood debris into the system through both infiltration and inflow (cracked piped, floor drains, manhole covers), this increases chemical usage and wear and tear on pump stations.

Future Sewer Projects in the Area

1. **The Muncy interceptor –** The interceptor receives 80% of system flow and crosses a farm field with manholes buried as far as 6 feet below the surface in the floodplain. These manholes must be located and raised, and their pipes inspected. During flooding, debris can clog the interceptor, causing backups and environmental and property damage. The interceptor is the most critical line in the Muncy system directing the vast majority of sewage to the Muncy Pump Station and then on to the treatment plant at WBRA. The service area for this pipe includes most of the GMA and serves areas that are essential to resilience including the

downtown, the industrial park, the commercial district in Muncy Creek Township, and government center.

2. The Muncy pump station – This pump station transports all sewage from the Muncy side of the Susquehanna River under the river to the Regional WWTP. The pump station is powered by separate electrical feeds from the Muncy and Montgomery power grids. In the event that both feeds fail WBRA is prepared to employ a gas generator to ensure continuous operation of the pump station
3. **The Fox Run Sewer Crossing** – The crossing would require a pump station to re-install a lowered sewer line below the creek bed. Employment of a pump station provide service for the remainder of properties along Old Glade Run Rd, eliminating some known and suspected on-lot system malfunctions, which pose a significant health hazard.
4. **Industrial Park Pump Station** – The pumping system is in dire need of replacement with corrosion resistant materials, which will occur in 2021-2022
5. **Restructuring the sanitary sewer system** – An opportunity exists to radically redesign the sanitary sewer to greatly enhance the resilience of the system and the community.

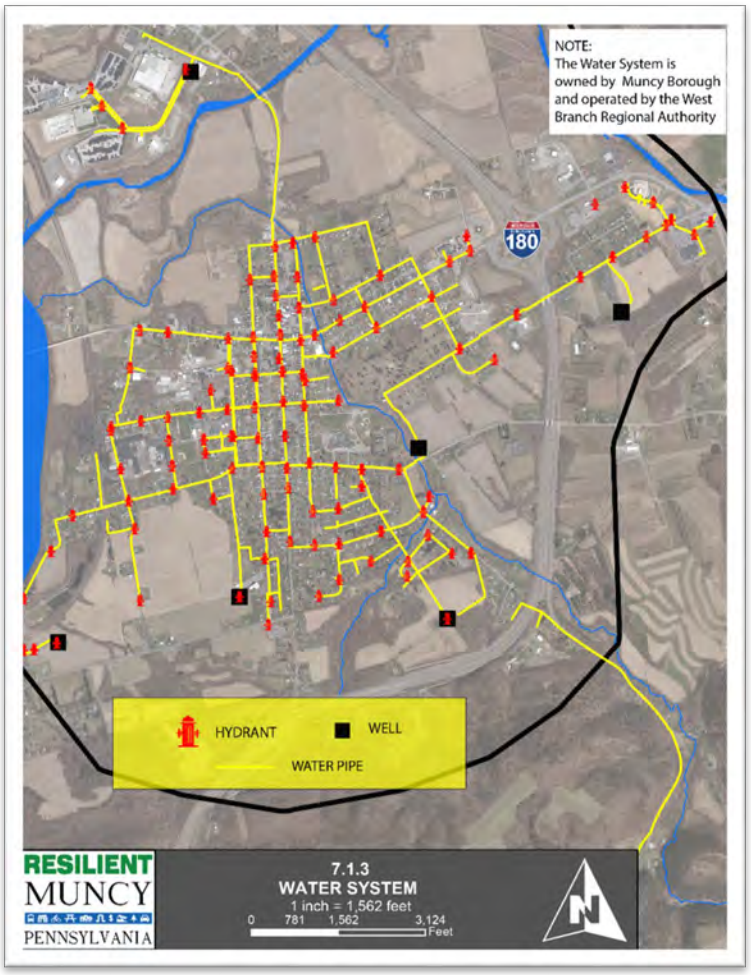
Sanitary sewer cover

The sanitary sewers in the downtown portion of Muncy are deep underground, as they were originally designed to capture water from floor drains in the buildings as an easy way to get rid of flood waters. These sewers are typically made of vitrified clay materials and are in poor condition. Maintaining or replacing the system is difficult due to the combination of depth, unstable sandy soils, and proximity to building foundations. Any excavation work must be made with painstaking and costly shoring and support systems to protect workers and buildings.

Current laws forbid the discharge of non-sewage water into the sanitary sewer system, and WBRA has made significant progress with inspecting properties and requiring floor drains to be removed (the last round of inspections will occur in 2019). With the floor drains removed, it may be possible to redesign the sanitary sewer system to reside a shallower depth, renewing the infrastructure and making future maintenance and replacement far safer and more cost effective. This can be supported by a future utility elevation program to raise the sewer lines to a depth that is more manageable to work on.

7.1.3 Water System

The Muncy Borough Municipal Authority (MBMA) owns the water system in Muncy Borough and portions of Muncy Creek Township. It dates back to the late 1800's and at one point even extended into the neighboring county Constructed in the late 1800's it has functioned well enough to allow for spot repairs only. There has only recently been efforts to bolster and improve the system with MBMA embarking on a $6M improvement plan to address redundancy and pressure issues. Water quality throughout the system meets and exceeds state guidelines. Per DEP's requirement, fire hydrants are flushed and evaluated, and valves are exercised, on an annual inspection plan to determine functioning and problematic fire hydrants and valves throughout the system.



Customers of the MBMA system do notice a significant amount of calcium-based hardness with the delivered water. This contributes to a shorter life for some household appliances but as the calcium level in the water is below state maximums, there exists no cost effective system wide treatment solution. Most customers chose to mitigate this hardness onsite with water softeners.

Existing Conditions of System:

1. **Water valve replacement** – Some water valves are old and inoperable. Valves are critical to mitigate damage from water leaks and resulting health concerns. Valves are the most critical component of any repair/ replacement effort as they allow personnel to control water flows locally. MBMA has instituted a program to exercise water valves on a rotating basis and to replace them when needed.

2. Secondary water line –The water system in the GMA is pressurized by two complimentary storage tanks on opposite sides of the area. MBMA has taken steps to provide redundant supply lines from the southern tank, but a single line connects the northern tank, located in the Industrial Park, to the system. This line contains a bottleneck (large pipe- smaller pipe-large pipe) that should be addressed. It would be prudent to install a second line in this part of the system to prevent interruptions in flow.
3. **Fire hydrants** – Some fire hydrants are not operating or are operating at a reduced flow due to connection to small water mains (4-inch or 6-inch diameter), often when other larger mains are located nearby. Some of the hydrants are very old (greater than 40 years) and repair parts are unavailable. Fire hydrants are a line item in MBMA's budget every year and are replaced as they are found to be broken or as part of the Fire Hydrant Replacement Program

Fire hydrant in the GMA

4. **Lead goose necks** – The older parts of the water system have small sections of ~~lead~~ water service lines that are made of lead. These lead "goose-necks" exist at the connection point to the water main and were used to provide flexibility to the water service so settlement of soil over time would not break the connection to the water main. Their gentle S-shape configuration earned them the moniker "goose-necks". While the current water system supplies are not corrosive (and so the lead is not likely to be pulled out of the lead goose-necks) future water supplies may add more corrosive water to the system. As sadly demonstrated in Flint Michigan, lead in the water supply can have devastating effects on children. As a result, these goose-necks should be removed from the system.
5. Historically some water service lines were made from lead to afford them some flexibility and lessen damage from the sediment settling around them, and their gentle S-shape configuration earned them the moniker "goose-necks". The lead in these goosenecks is stable and does not pose a threat to the water chemistry at present, but concerns over future scenarios suggest that these goosenecks should be systematically replace with modern alternatives.

Future Water Projects:

1. **Future well development to meet potential demand –** The water system currently has ample volume and adequate quality. However, the wells are approaching the mid-point of their projected life cycle. The current Susquehanna River Basin Commission regulations and lengthy review times require up to 5 years to test, develop, permit, and implement a new source. If development demands increase because of development generated by the CSVT project, available land for new sources could become limited. A plan should be developed MBMA should develop a plan to establish locations for new wells in the near future.

Well #5

2. **Safety upgrades** – Replacement of fire hydrants and their isolation valves is needed to allow greater access to water flow and pressure for fighting fires. Recent improvements in the water system (replacement of the water storage tanks and addition of system looping) has increased the system pressure and availability of water flow and pressure; the last remaining part to be replaced includes the hydrants and valves. This work would address a critical safety issue, reduce fire insurance premiums, and help the fire companies to prevent structure loss due to fire
3. Water Line Upgrades – A new 12" line from the town out to the Muncy Industrial Park would provide security and redundancy within the system. Extending a 12 inch water line between Wendy's and the Muncy Hospital under Route 180, and the replacement of small mains in the Sherman St area are also considerations.

7.1.4 Other Utilities

Natural Gas

UGI Utilities, Inc. is the utility provider for the project area. Natural gas is highly regulated by federal and state guidelines, which render it a safe and resilient resource. There are few natural gas outages, and in those rare circumstances, this usually has little to no effect on customers because most networks have the ability to be re-routed to other transmission lines. Natural gas also can be stored in tanks for future use, which makes it a resilient resource should need should arise in a natural disaster.

Eclectic

PPL Electric Utilities (PPL) is the main electric supplier in Lycoming County and in the GMA. PPL cannot provide mapping or line information for the entire project area, but Larson Design Group confirms that electric service is provided to the entire study area by PPL. In late 2017, PPL was one of 28 utilities to join the Regional Equipment Sharing for Transmission Outage Restoration (RESTORE) program, which establishes a proactive approach to provision of critical equipment for utilities needing additional resources during disaster recovery[1]. This is significant because, as mentioned in the introduction, creating cohesiveness among utilities is a key component of infrastructure resiliency. PPL has indicated that joining forces with 20 neighboring utilities has strengthened its ability to respond, recover, and return service to customers.

Telecommunications

The study area is covered by AT&T, Verizon, and numerous other wireless telephone services. According to the Federal Trade Commission in 2016, a voluntary industry commitment occurred to promote resilient wireless communications during disasters. The

[1] https://pplweb.mediaroom.com/news-releases?item=137383

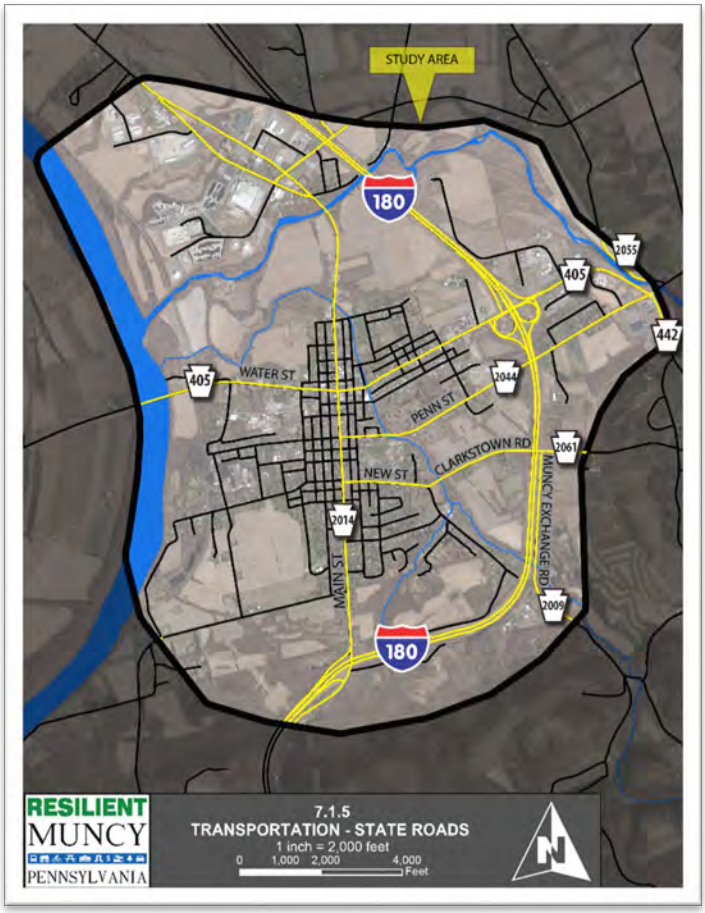
commitment known as the Wireless Resiliency Cooperative Framework set out a stepped approach to improve coordination during an emergency:

1. Providing reasonable roaming under disaster arrangements when technically feasible
2. Fostering mutual aid among wireless providers during emergencies
3. Enhancing municipal preparedness and restoration by convening with local government public safety representative to develop best practices
4. Increasing consumer readiness and preparation
5. Improving public awareness and stakeholder communications regarding services and restoration status.

This stepped framework will help communications recover more quickly, as multiple carriers can work together during disasters to restore service as safely and quickly as possible.

7.1.5 Transportation

The GMA is situated between the West Branch of the Susquehanna River and the Susquehanna Beltway near the I-180 and US 220 junction. The project area includes only a portion of the 20.7-square-mile Muncy Township. Sitting in the center of Muncy Township is the Borough of Muncy, which encompasses roughly 0.8 square mile. The borough's main transportation system includes SR 405 (Water St), which connects the east of the Susquehanna River via The Last Raft Memorial Bridge to I-180 and Main St, which connects to the south at I-180 and to the north in Montoursville.



The Williamsport Area Transportation Study (WATS) serves as the designated Metropolitan Planning Organization (MPO) for Lycoming County transportation planning and programming. Within the GMA,

PennDOT owns 6 bridges and Muncy Borough owns the remaining 3 bridges. Most of these bridges are in a good condition and none of them are classified as structurally deficient.

The borough itself maintains a plethora of roadways, many in good or fair condition. Sidewalks on many of the borough's streets need upgrades with ADA-compliant ramps and crosswalks. Below are a few of the planned transportation improvement projects within the resiliency area.

Future PennDOT Transportation Projects

"The Corner Lot"

1. **Signal replacement** – SR 405 (Water St) and SR 2014 (Main St) is a heavily traveled intersection with much truck traffic and emergency vehicles. Signal replacement could also include other work around this intersection such as crosswalk improvements and addition of accessible curb ramps. This project is currently on the 2022 PennDOT construction schedule but is subject to budgetary constraints.
2. **Bridge replacement** – The bridge over Glade Run along SR 405 (Water St) is on the Transportation Improvement Plan for 2020/2021. The culvert under this bridge acts as a dam for catching debris during floods, causing Glade Run to overflow its banks and damage properties. PennDOT has consulted with the borough and has incorporated what design elements are consistent with their bridge standards into the project to allow increased flow.
3. **Milling and repaving** – Along SR 405 (Water St), Section 094 is scheduled to be milled and resurfaced in 2021. The scope of the project is on SR 405 (Water St) from SR 2014 (Main St) east past the hospital, under I-180 almost to Cookie Drive in Muncy Creek Township. Sections of this road do not have curbs, and the borough has requested inclusion of curbs in the design as part of this project (Muncy Creek Township does not employ curbs.). If curbs are added as part of this project, other streetscape enhancements should be proposed such as sidewalks, street trees, and lighting.
4. **Milling and repaving** – Another mill and resurface project is anticipated on SR 2014 (Main St.), Section 097. This is the section of SR 2014 (Main St) from SR 405 (Water St) to south to the Partial Interchange with I-180. Main St from Water to Partial interchange. Incorporating crosswalk and accessible curb ramp projects with this paving project is possible at New St, South Main St, and Lafayette St.

Future Muncy Creek Township Transportation Projects

1. **Industrial park interchange** – A new interchange to the industrial park will enhance access to the industrial park. Currently, trucks must travel an extra 2-to-3 miles to access I-180 interchanges, with one route traversing Muncy on narrow roadways.
2. **Connection project** – A road connection project between Clarkstown Rd and East Penn St would create roughly 1,350 feet of new roadway.
3. **Bicycle lane** – A bicycle lane from East Penn St west of Muncy Cemetery to the intersection of SR 405 and SR 442 would add about 1 mile of new bike lane and provide bicycle/ pedestrian access to the retail stores developing there.
4. **Paving** – Industrial park paving of all roads could be completed within the next 5 years.

Future Muncy Borough Transportation Projects

1. **Sherman St Reconstruction** – Reconstruction of existing narrow street from West High St to East Penn St. Construction would include new bituminous concrete pavement, curb, and sidewalk as necessary.
2. **Buffington St Reconstruction** – Reconstruction of existing narrow street from Schuyler St to Lincoln St. Construction would include new bituminous concrete pavement, curb, and sidewalk as necessary.
3. **Shuttle Hill Rd Reconstruction** – Reconstruction of existing narrow street from Quarry Rd extending 800 feet. Construction would include new bituminous concrete pavement, curb, and sidewalk as necessary.

7.2 Summary of Gaps and Opportunities

The following have been identified as opportunities to address the infrastructure needs within the GMA:

- **Gap:** Transportation infrastructure does not meet the needs of the community.

  Opportunity: Transportation infrastructure improvements are needed to ensure public safety and reduce the impact of flooding from transportation systems.

- **Gap:** Water and sewer infrastructure is older and susceptible to stormwater infiltration.

  Opportunity: Water and sewer upgrades are necessary to ensure public safety and limit disruptions in service.

- **Gap:** Stormwater overwhelms storm drains and streams in rains events and contributes to flooding.

  Opportunity: Capture and divert stormwater before it reaches local streams.

7.3 Ongoing Projects Tied to Resiliency

7.3.1 Water & Main St Intersection Improvements

The Project Message

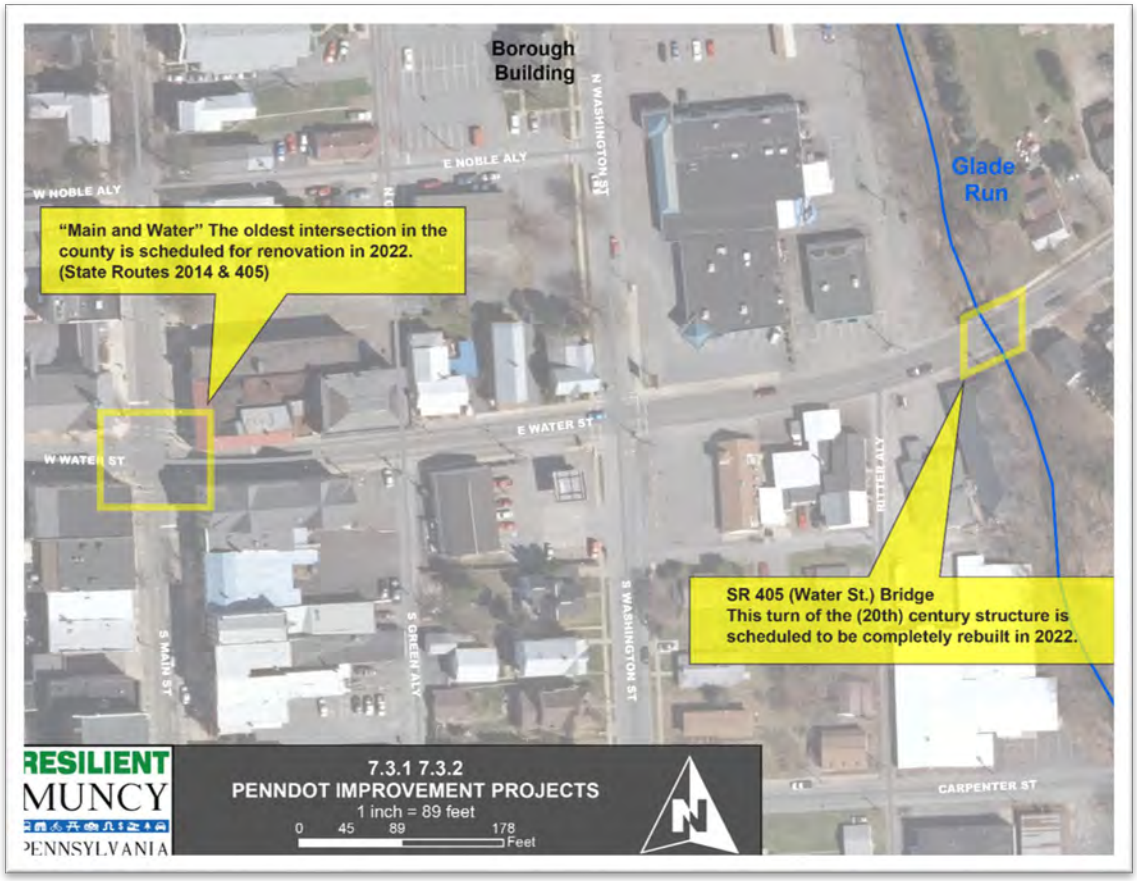
"Safe and resilient connectivity within the community."

The goal of this project is to improve road conditions, safety, and traffic flow while working with the primary project sponsors to coordinate additional projects, such as utility infrastructure improvements that should proceed cautiously.

Intersection of Water and Main Streets, Muncy Borough

Priority Justification

This project involves safety improvements and directly benefits redevelopment efforts in downtown Muncy Borough.



Defining the Project Area

This project is located adjacent to the corner-lot redevelopment project, at the intersection of Water St and Main St. The intersection is rough, narrow, and subject to traffic flow issues, as well as general safety concerns.

Resiliency Concepts

This project will improve infrastructure.

Stakeholders

Lead Agency -PennDOT

Other Partners – Muncy Borough, Surrounding business owners, WBRA, LAC, Community at large

Implementation Steps

Initial steps of engagement and collaboration are completed. Monitoring of the project is recommended at this time.

Of critical importance is collaboration with PennDOT because this project directly relates to and impacts redevelopment of the corner lot. Failing to engage and collaborate via the PennDOT Connects process on potential improvements to stormwater management, accessibility, and multimodal improvements would be a lost opportunity.

Funding Resources

This project is fully funded by PennDOT and will be completed in in early 2023.

7.3.2 SR 405 Bridge Replacement

The Project Message

“Safe and resilient connectivity within the community.”

A means of keeping the community connected during times of disaster, with knowledge that infrastructure can withstand natural disasters and maintain continued operations.

Priority Justification

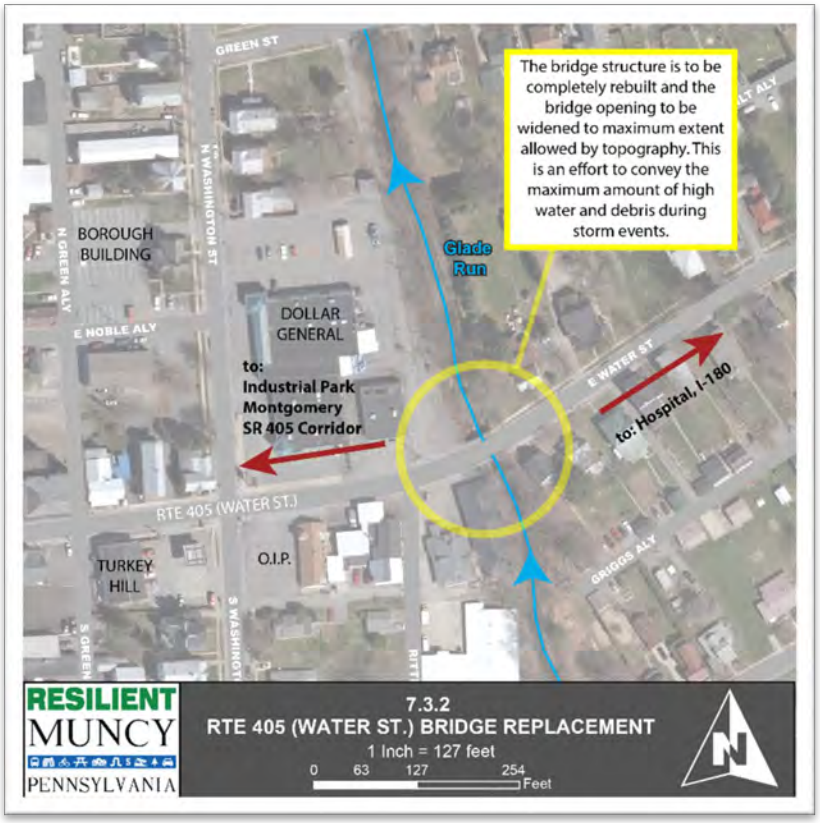
Flooding in 2018 demonstrated need for replacement of this bridge.

The Borough and the County have been working to ensure that the replacement bridge is designed to allow maximum capacity for flood waters given the current characteristics of the project area.

So that design of this bridge will maximize resiliency, PennDOT is preparing a Hydrologic and Hydraulic (H&H) Study of the project area on the Glade Run, and will review the USACE H&H study from 2018.

Defining the Project Area

Located west of the corner lot on East Water St near Ritter Alley, the bridge over Glade Run is slated for replacement in 2021



Stakeholders

Lead Agency: PennDOT

Other Partners: Muncy Borough, WATS MPO

Implementation Steps

This project is to be completed in 2022.

Initial steps of engagement and collaboration have been completed. Monitoring of the project is recommended at this time.

Funding Resources

This project is fully funded by PennDOT – Transportation Improvement Plan (TIP).

7.3.3 USACE Flood Risk Assessment

The Project Message

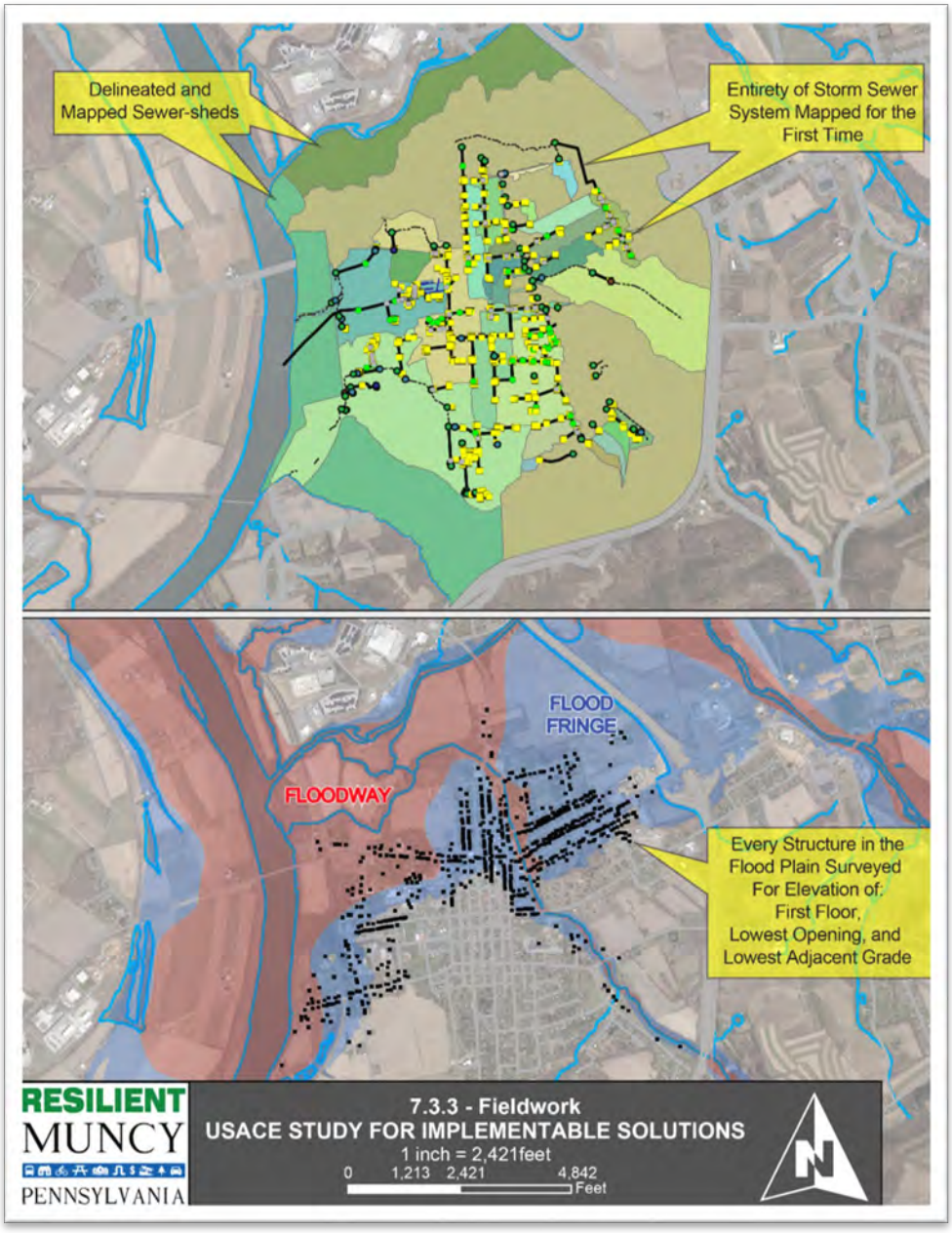
"Flooding is a problem, identifying solutions is the answer."

In 2017 Lycoming County partnered with the U.S. Army Corp of Engineers, Baltimore District (USACE) and the Susquehanna River Basin Commission to develop ways to address flooding in the GMA through a flood risk assessment for Muncy Borough. This study includes hydrologic and hydraulic analyses of riverine flooding sources in the GMA, the impact of riverine floods to building and roadways, stormwater modeling, and risk reduction solutions to riverine and stormwater flooding.

Project Justification

USACE will complete a series of tasks to provide a comprehensive plan to reduce the risk of flooding within the GMA. This project and partnership is intended to build upon past work and complement existing planning efforts.

The USACE study includes a full hydrologic and hydraulic analyses (H&H) of the project area. This study identifies structures that are at risk of flooding by combining real-world survey data with computer modeling of storm events at key levels. The data generated by this analysis will be a key component of future projects as well as setting the stage for the next step in the overall project.



Defining the Project Area

The study area for this investigation is Greater Muncy Area.

Resiliency Concepts

The purpose of this plan is to provide floodplain management support to reduce the risk of flooding within the GMA. This USACE study is a key part of resiliency planning for the GMA, as it will identify, projects that are feasible, impactful, and visible.

Stakeholders

Lead Agency – US Army Corps of Engineers (USACE)

Other Partners - Muncy Creek Township, Lycoming County Planning Department, Muncy Borough, The Muncy Bank & Trust Co., The Susquehanna River Basin Commission (SRBC)

Implementation Steps

1. Analyze and develop recommendations pertaining to the Borough's stormwater system.- **Completed**
    - Fieldwork for this project was completed in 2018 by Lycoming County PCD and Muncy Borough under the guidance of USACE. This effort provided the data needed for analysis and provided the Borough with the first complete map of its storm sewer system including all known infrastructure, delineated sewersheds, and drainage destinations. Valuable survey-grade data was generated for every primary structure in the flood plain consisting of First Floor Elevation, Lowest Opening, and Lowest Adjacent Grade.
2. Tasks specified in the USACE Plan include:
    a. Collect up-to-date data regarding roadways, stormwater infrastructure, and buildings within the GMA. .- **Completed**
    b. Conduct a revised hydrologic and hydraulic analysis of riverine flooding sources affecting the GMA, and apply results of the analysis to develop up-to-date floodplain mapping, flood depth grids, and flood elevations for multiple frequencies of flooding (2-year flood to 500-year flood); the focus of the revised hydrologic and hydraulic analysis will be Glade Run, as fairly recent modeling is available for West Branch Susquehanna River and Muncy Creek from FEMA.- **Completed**
    c. Develop stormwater modeling and mapping to identify areas in the GMA susceptible to stormwater-related flooding. .- **Completed**
    d. Determine impacts on buildings and roadways of current riverine and stormwater-related conditions pertaining to flooding.
    e. Develop planning-level solutions to reduce the risk of both riverine and stormwater-related flooding within the GMA.

The second part of the project is currently underway and will consist of detailed analysis and the formation of projects and Best Management Practices (BMP) that will allow the GMA to better withstand the stresses of creek and stormwater flooding. check above for accuracy

Continued engagement with USACE is important so that funding, scheduling, or other gaps within the process can be addressed quickly and without delay.

Funding Resources

This project is fully funded by the following entities:

- US Army Corps of Engineers (USACE)
- The Muncy Bank and Trust Co.
- Lycoming County
- Susquehanna River Basin Commission (SRBC)

7.4 Project Package – Infrastructure

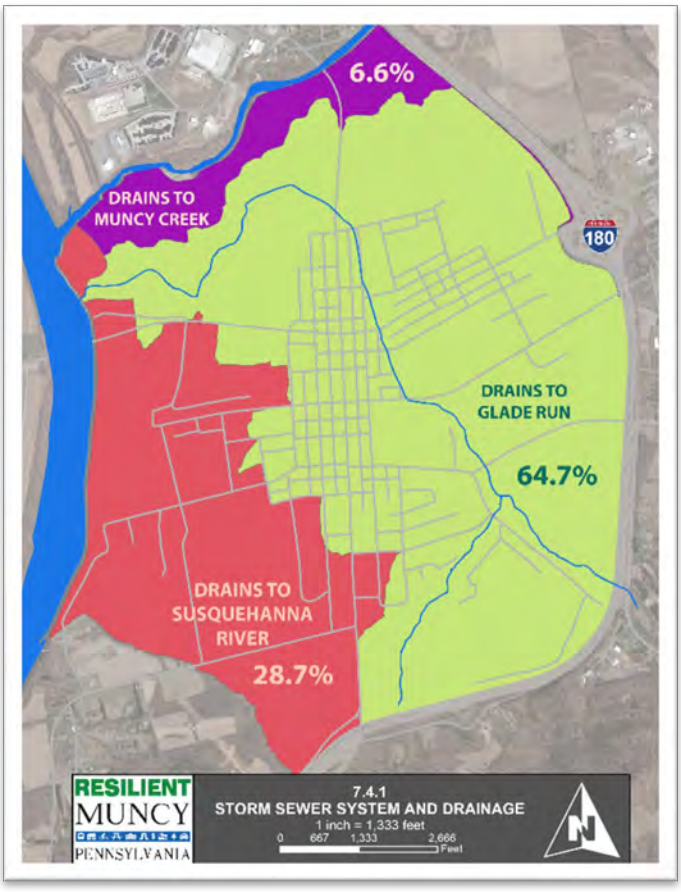
The goal of this project package is to stabilize critical infrastructure functions, minimize health and safety threats, and efficiently restore and revitalize systems and services to support a viable, resilient community.

7.4.1 Sewershed Interconnection Project

The Project Message

"Glade Run is NOT a Storm Sewer"

The basic concept of these projects is to interconnect storm water systems at multiple locations within the GMA. There are multiple outfall areas for the Muncy storm sewer systems, which are presently separate. Some of the outfalls discharge to Glade Run and some discharge to the Susquehanna River. This project would involve flow diversion chambers, flap gates and additional piping that could divert flows normally going to Glade Run to the Susquehanna River when Glade Run is at flood stage. Weirs and flap gates would divert flows when Glade Run is at high flood stage and the Susquehanna River is at low stage. The additional piping would also increase system storage.



Priority Justification

The Susquehanna River drainage system has evolved over time from a series of open ditches to a complex chain of pipes and swales in both municipalities. This is an example

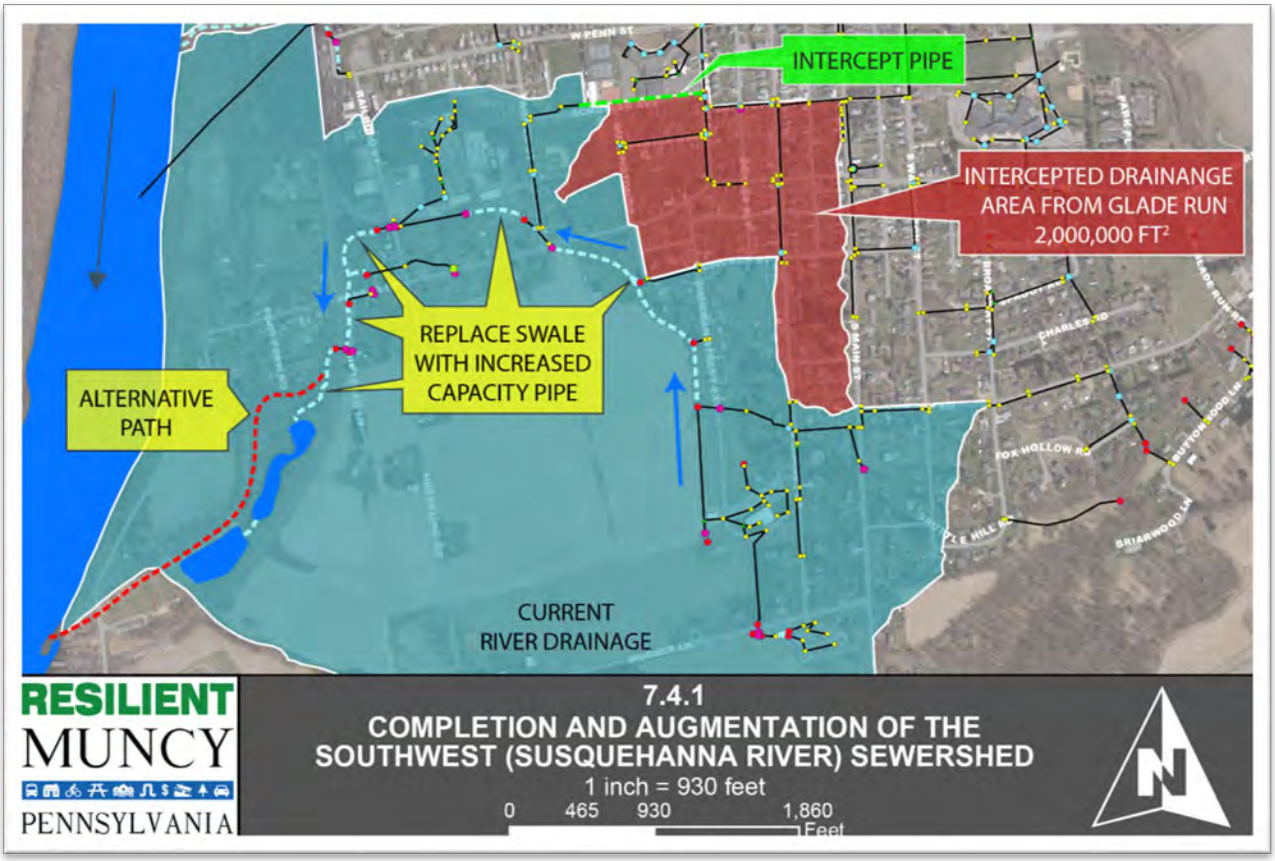
of how a system can evolve organically (spurred on mostly by property owners) and it lacks a cohesive vision and a common engineering base.

As indicated in the map above, less than 30% of conveyed stormwater drains to the Susquehanna River and as previously stated 65% of the GMA's stormwater (80% of the borough's stormwater) drains into Glade Run. Glade Run serves as an effective and convenient storm sewer until the water in it rises to the level of the outfall pipes. This is problematic as the storm sewer system seems to be designed to fail at the time that it is needed most.

It would be prudent to consider alternative destinations for this gathered stormwater, but a wholesale reconfiguration of the system would be both costly and invasive. It is possible to connect some of the storm sewer from the Glade Run system to the Susquehanna River system and bolster it to handle the increased capacity.

The pipes in this system vary in size, and in some cases are simply covered drainage ditches. Any improvements would require stormwater calculations by a professional engineer to properly size the system and produce a design. Adding capacity and commonality to the entirety of the Susquehanna River portion of the storm sewer would allow the water from a portion of the Glade Run system to be intercepted and re-routed towards the river.

This project necessitates a common understanding and also coordination between Muncy Creek Township and Muncy Borough.



Defining the Project Area

Potential locations for these interconnections include:

- Quarry Rd
- Lincoln St
- Water St
- South Market St & West High St

Resiliency Concepts

The resiliency concepts for this project includes increased capacity, flood reduction, and diversion of 2,000,000 ft^2 of residential drainage.

Stakeholders

Lead Agency - Muncy Creek Township, Muncy Borough, WBRA

Other Partners – Lycoming County

Implementation Steps

In order to evaluate these locations and identify additional interconnections, additional modeling and analysis of the storm water systems would be required to quantify the impacts of diversions. Various rainfall scenarios and resulting inundation could be

evaluated to determine the benefits of the interconnections. Catch basin elevations and watershed/ sewershed divide elevations are the key to viability of these connections. Surveys may be needed to determine feasibility of gravity flows across the watershed/sewershed divide.

1. Survey of system – **Complete**
2. Dual-municipal partnership and agreement on procedure (Phase One)
3. Stormwater engineering assessment and design (Phase One)
4. Joint municipal construction (Phase One)
5. Intercept piping in Muncy Borough (Phase Two)

Funding Resources

Potential funding sources for this project include:

- Department of Environmental Protection (DEP) - Growing Greener Grant Program
- Pennsylvania Infrastructure Investment Authority (PennVEST) – loan and grant program for BMPs

7.4.2 Water & Main St Rain Garden

The Project Message

This project would install a demonstration rain garden on the vacant lot on the corner of Water and Main St in Muncy Borough. For this project, the Opera House's downspout will be disconnected to allow rainwater from the roof of the building to infiltrate into the ground instead of directly to the storm sewer that discharges to Glade Run. The downspout will be connected to serve as the inlet for stormwater flow into the rain garden, with overflow discharging to the storm sewer through an overflow outlet and piping.

Vacant lot on the NE Corner of Water Street and Main Streets, Muncy Borough

Priority Justification

The rain garden will divert water from the stormwater that directly flows into Glade Run in to a rain garden in order to increase water infiltration and reduce the amount of overall stormwater that burdens Glad Run in flooding events. The volume of rain stored by the rain garden when full is 7,695 gallons.

Defining the Project Area

This project is located in the vacant lot owned by Muncy Borough at the corner of Water St and Main St. The rain garden basin on site would be approximately 30 feet by 13 feet

and designed at a depth of 9 inches to the base with 3 inches of soil amendments, 3 inches of mulch, and a 3 inch shallow depression of freeboard to store the stormwater. A rainwater downspout collection pipe would collect rain water from the adjacent Opera House via a PVC pipe, and discharge into the rain garden via an inlet with stones to prevent against erosion. The water will flow into the basin for infiltration. In storms producing water levels greater than 3 inches, an outlet would provide connection to the storm sewer system.

Resiliency Concepts

The goal of this demonstration is to capture stormwater and also encourage Muncy Borough residents to consider a rain garden for their residence

Inclusion of signs for public education will facilitate education and public awareness of green infrastructure and downspout disconnection to capture and infiltrate stormwater.

Example of rain garden on corner lot
Source: Larson Design Group

Stakeholders

Lead Agency – Muncy Borough, Downtown Muncy Business Association, adjacent landowners

Other Partners – Garden groups (i.e. Muncy Garden Club), Lycoming County - Penn State Cooperative Extension, Penn College of Technology, local garden centers

Example of rain garden on corner lot
Source: Larson Design Group

Implementation Steps

1. Conduct soil percolation test on site
2. Secure project funding
3. Complete projects according to project plans

4. Install educational signage
5. Maintenance planning & long term maintenance after installation (1st year watering, weeding, mulching, replanting, pruning, sediment removal, etc.)

Cost Estimate

The following costs and amounts are estimates and will need to be adjusted depending on the seasonal availability of plant materials. Costs for soil amendments can be reduced if soil tests reveal healthy soil.

Partnering with a local nursery is essential to establishing a rain garden program for residents and reducing costs.

Location	Plant/Part name	Spacing	Estimated number	Estimated cost	Total
Base	Great Blue Lobelia	8 to 12 inches apart	10	$10.99	$109.90
Base	Blue Flag Iris	18 to 24 inches apart	17	$10.99	$186.83
Slope	Sweet Bay Magnolia	-	1	$130.00	$130.00
Slope	Coreopsis	12 to 18 inches apart	15	$10.99	$164.85
Slope	Swamp Azalea	24 to 60 inches apart	5	$35.00	$175.00
Slope	Switchgrass (Panacum)	12 inches apart	6	$10.99	$65.94
Buffer	Black Eyed Susan's (Rudbeckia)	18 inches apart	25	$10.99	$274.75
Buffer	Wild Indigo (Baptisia)	18 to 30 inches apart	2	$10.99	$21.98
Buffer	False Sunflower (Heliopsis)	18 to 24 inches apart	2	$10.99	$21.98
Base	Amended soil	2 cuyd	2	$36.00	$72.00
Base top	Mulch	3 cuyd	3	$27.00	$81.00
	Catch Basin	12" x 12"	1	$60.00	$60.00
	PVC Piping for inlet and outlet	-	1	$50.00	$50.00
					$1,414.23

Funding Resources

Potential funding sources for this project include:

- Muncy Borough
- Local garden centers and nurseries
- Local garden clubs (i.e. Muncy Garden Club)
- Waldron Memorial Fund
- PA DEP - Environmental Education Grant Program

Stormwater flow into rain garden
Source: Larson Design Group

7.4.3 Stormwater Ordinance Update

The Project Message

This project involves updating the local stormwater ordinances in Muncy Creek Township and Muncy Borough to reduce and clarify the areas that are exempt from stormwater and impervious area requirements.

Priority Justification

Exemptions in the stormwater ordinance allow large volumes of runoff to enter local waterways and overwhelm natural systems; this contributes to flooding, water pollution, erosion, habitat degradation, and stresses local infrastructure.

Defining the Project Area

This project includes all of Muncy Creek Township and Muncy Borough.

Resiliency Concepts

Updating the local stormwater ordinances will reduce the volume and rate of stormwater leaving a site so that excess stormwater is not entering local streams.

Stakeholders

Lead Agency – Muncy Borough, Muncy Creek Township

Other Partners – Lycoming County Dept. of Planning and Community Development

Implementation Steps

1. Update municipals stormwater ordinances.
2. Hold public outreach and training sessions to inform the community of the stormwater requirements.

Design Criteria to be adopted in the next phase are listed for each project type below.

The intent of the stormwater is to be more stringent for local code Part II, Chapter 232 of the local stormwater ordinances to decrease the areas of exemption and clarify disconnection from impervious area requirements.

Stormwater System Modifications and Detention Basins

- Borough of Muncy, PA / PART II: GENERAL LEGISLATION
  - Chapter 232, Stormwater Management (HISTORY: Adopted by the Borough Council of the Borough of Muncy Adopted by the Borough Council of the Borough of Muncy 3-1-2011 by Ord. No. 512. Amendments noted where applicable.)
  - Uniform construction codes — See Ch. 128.

  - Subdivision and land development — See Ch. 241.
  - Zoning — See Ch. 286.
- Utilize updated NOAA Atlas 14 Rainfall Data for Precipitation Amounts
- Utilize standard Muncy and Lycoming storm water design criteria (catch basins, inlet designs, minimum slopes, end walls, headwalls, etc.)
- State of Pennsylvania Dam Safety Criteria – Detention basins will be designed to avoid jurisdictional dam heights and to minimize the hazard classification

Stream Conveyance and Bridge Improvements

- HEC-RAS Hydraulic Reference Guide
- Pennsylvania DOT Design Criteria for bridges
- Muncy and Lycoming County bridge design criteria (for non-state bridges)
- NRCS Guidance on Snagging and Clearing
- FEMA Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR) if revised FIS mapping is desired
- Local Floodplain Permit and FEMA No Adverse Impact – for bridge modifications

Funding Resources

Potential funding sources for this project include:

- Lycoming County Dept. of Planning and Community Development and municipal staff time

7.4.4 Complete and Green Streets Policy

The Project Message

Enact a complete and green streets policy in Muncy Creek Township and Muncy Borough to consider the needs of all users and apply green infrastructure where feasible.

Green infrastructure example

Priority Justification

Green infrastructure is a cost effective way to manage stormwater in the GMA. Green infrastructure (GI) features can be integrated during routine right-of-way maintenance and operation work as both retrofits and new construction.

Defining the Project Area

This project includes both Muncy Creek Township and Muncy Borough.

Resiliency Concepts

Green infrastructure provides multiple benefits including :

Environmental:

- Stormwater capture
- Improved air quality
- Reduced urban heat island

Quality of life:

- Public health
- Public safely
- Recreational opportunities
- Property aesthetics

Education:

- Public education/signage
- Community building

Green infrastructure examples

Stakeholders

Lead Agency – Muncy Creek Township, Muncy Borough

Other Partners – Lycoming County Dept., of Planning and Community Development

Implementation Steps

1. Enact a complete and green streets policy
2. Hold public outreach sessions to inform the community of the new requirements.

See Appendix B for a sample Resolution and Policy.

Funding Resources

Potential funding sources for this project include:

- Lycoming County Dept. of Planning and Community Development and municipal staff time

7.4.5 Glade Run Bridge Improvements

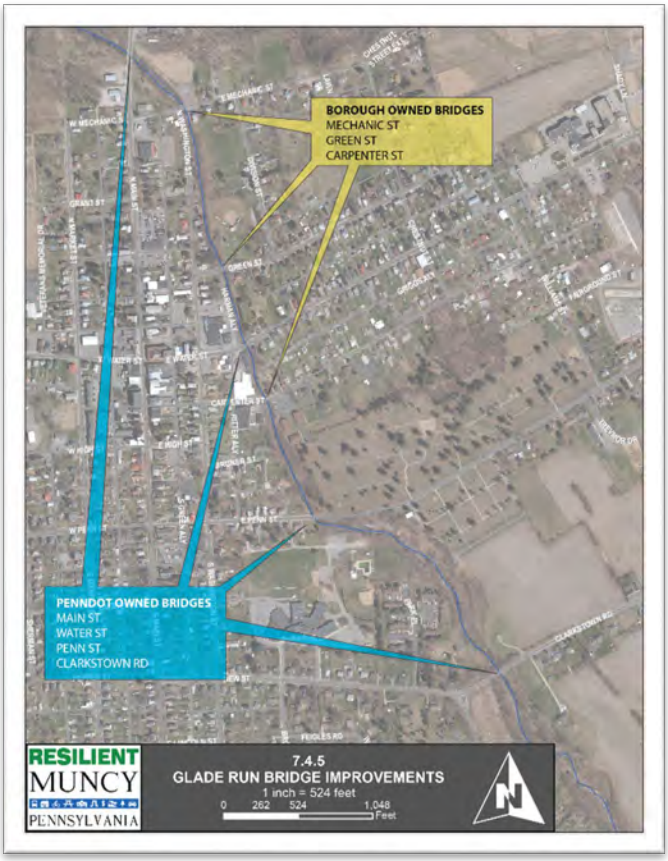
The Project Message

The goal of this project is to raise and widen bridge openings along Glade Run to improve stream flow. Where bridge replacement is not feasible, the openings and bridge approach could be improved to reduce hydraulic losses through the openings. Where PennDOT is already designing the Water St Bridge replacement, the borough could coordinate and

possibly improve the hydraulics of the opening and approach without impacting a majority of the engineering and design.

Priority Justification

During flood events, debris such as trees, limbs, and litter, gets snagged under bridge underpasses along Glade Run. This narrows the flood channel and contributes to flooding and erosion in the GMA.



Defining the Project Area

The bridges to be evaluated include: Mechanic St, Green St, E. Water St, Carpenter St, E. Penn St, and Clarkstown Rd.

Resiliency Concepts

Some improvements could be made to the channel in proximity to the bridges that would improve hydraulics as well as complete replacement projects. An additional public safety benefit is that these projects may also raise the elevation of east-west evacuation routes.

Stakeholders

Lead Agency - PennDOT, Lycoming County Dept. of Planning & Community Development

Other Partners – Muncy Creek Township, Muncy Borough

Implementation Steps

1. Bridge openings and geometry over Glade Run should be evaluated for improvement and replacement.
2. The impacts of these improvements and proposed replacements would be evaluated using the HEC-RAS Glade Run model and coordinating with the bridge owners.
3. Resulting inundation at various streamflow events could be used to determine benefits of the proposed modifications.

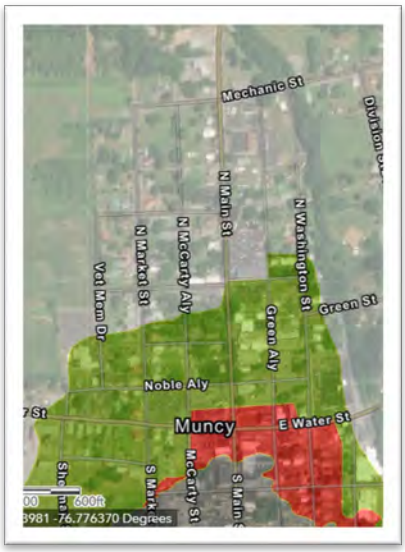
Funding Resources

Potential funding sources for this project include:

- PennDOT
- FEMA
- DCED

7.4.6 North Main St Elevation Project

The Project Message



This project will elevate the roadbed of North Main St by several feet and address drainage to mitigate runoff impacts on adjacent properties. Approximately 750 feet of North Main St is proposed for elevation between Water St and Brady St to provide for emergency access and egress during flood conditions. North Main St serves not just regional traffic, but also the neighborhoods in the northern and eastern section of the Borough.

Priority Justification

North Main St/SR 2014 is an important route through Muncy that connects the Borough to Muncy Creek Township and to regional destinations. The road runs through the Strategic Non-Reinvestment Zone between Brady St and Muncy Creek and the Maximum Mitigation Zone between Brady St and near Noble Alley. Near the intersection of North Main and Water Sts, the street is within the Lesser Needs zone. Though a total elevation of the section of the road between North Main St to Muncy Creek is not currently feasible, elevation of the roadbed in the mitigation zones will reduce impacts of stormwater flooding and provide greater access to higher ground during flooding conditions. In addition, associated improvements including upgrade of related catch basins and the installation of street lighting at intersection can provide increased benefits.

Defining the Project Area

This project is located in Muncy Borough.

Resiliency Concepts

The elevation of North Main St provides a point of egress for the northern mitigation area during flood conditions. This would facilitate the evacuation of residents in the northern and eastern section of the community by providing a gateway to higher ground that is centrally accessible to the neighborhoods impacted by the deepest flooding.

Stakeholders

Lead Agency –PCD, WATS MPO, PennDOT, Muncy Borough

Other Partners – Muncy Creek Township

Implementation Steps

Coordination with PennDOT is required for this project due to the status of North Main St as a State road. The proposed project should be coordinated with the Williamsport Area Transportation Study (WATS) for incorporation into regional transportation plans.

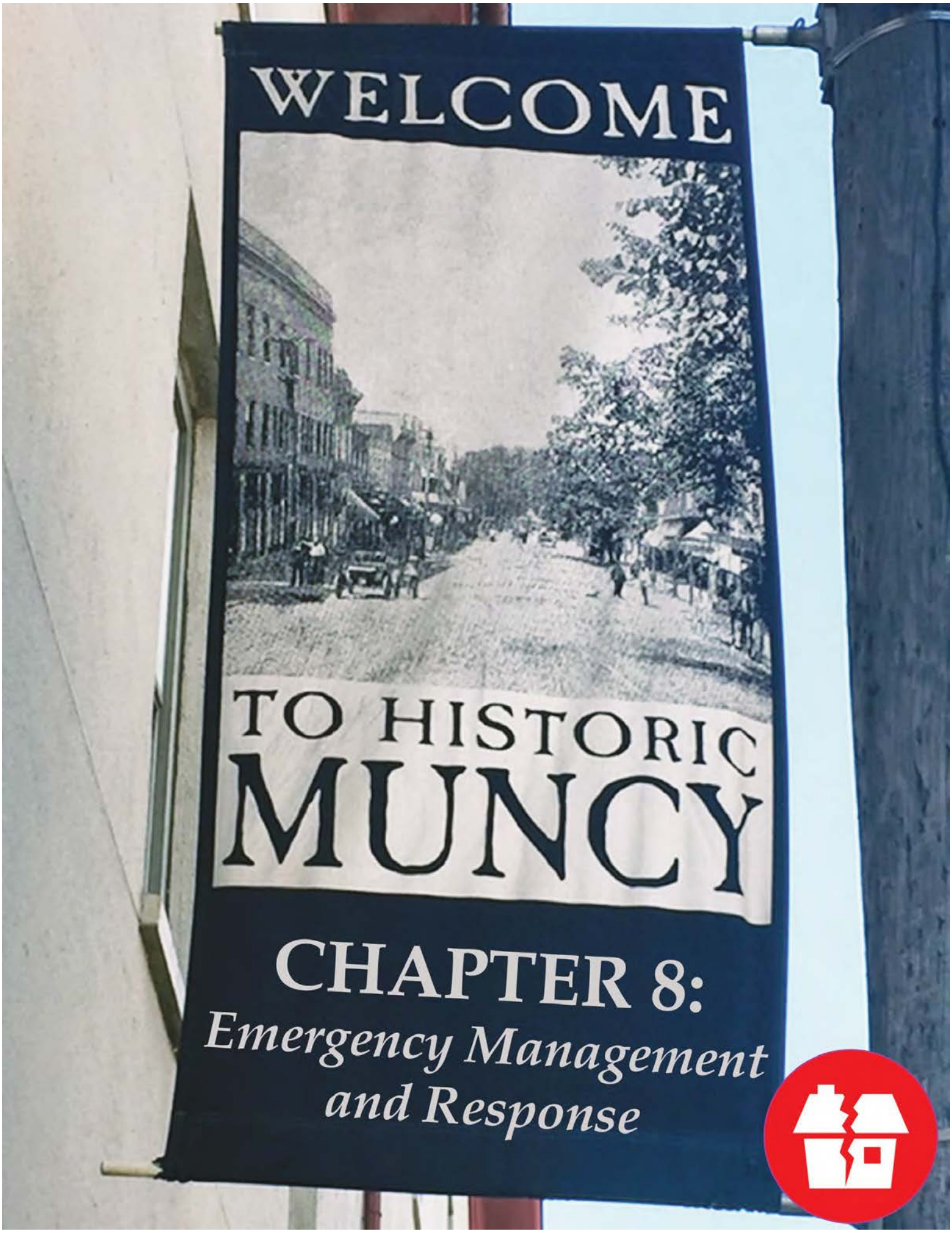
Construction of the roadbed to base flood elevation is likely infeasible due to the depth of water from the 100-year storm approaching Brady St (approximately nine feet). Additional study should identify a proper height and should ensure there is no displacement of flood waters resulting from fill. Special consideration will need to be given to stormwater drainage infrastructure due to the potential difference in grade between the roadbed and adjacent properties. There are stormwater inlets located approximately 120 feet north of the intersection with Noble Alley. Stormwater pipes carry runoff north to Glade Run.

Funding Resources

The project cost is estimated to be approximately $1.25 million. This is derived from a recent project in New Jersey to elevate a 9,000-foot long two-lane road by 4.5 feet through an ecologically sensitive wetland area. This project totaled $12.7 million, or approximately $1,414 per linear foot. The project included appurtenant drainage facilities . Based on this per-foot cost, it is estimated that a project to elevate North Main St to a similar elevation could cost approximately $1.1 million, or $1.25 million inclusive of lighting and stormwater upgrades. This is a conceptual estimate, subject to revision based on the outcome of detailed H&H studies and more project specific stormwater drainage mitigation and traffic control designs. It is noted that the elevation of the northern road segment to the 100-year flood elevation may not be feasible due to technical restraints related to the depth of water at base flood elevation.

Potential funding sources for this project include:

- FEMA - Building Resilient Infrastructure and Communities (BRIC)
- PennDOT - Municipal Liquid Fuels Funding; Motor Taxes
- Pennsylvania Infrastructure Bank
- USDOT- Better Utilizing Investments to Leverage Development (BUILD)
- DCED - Community Development Block Grant

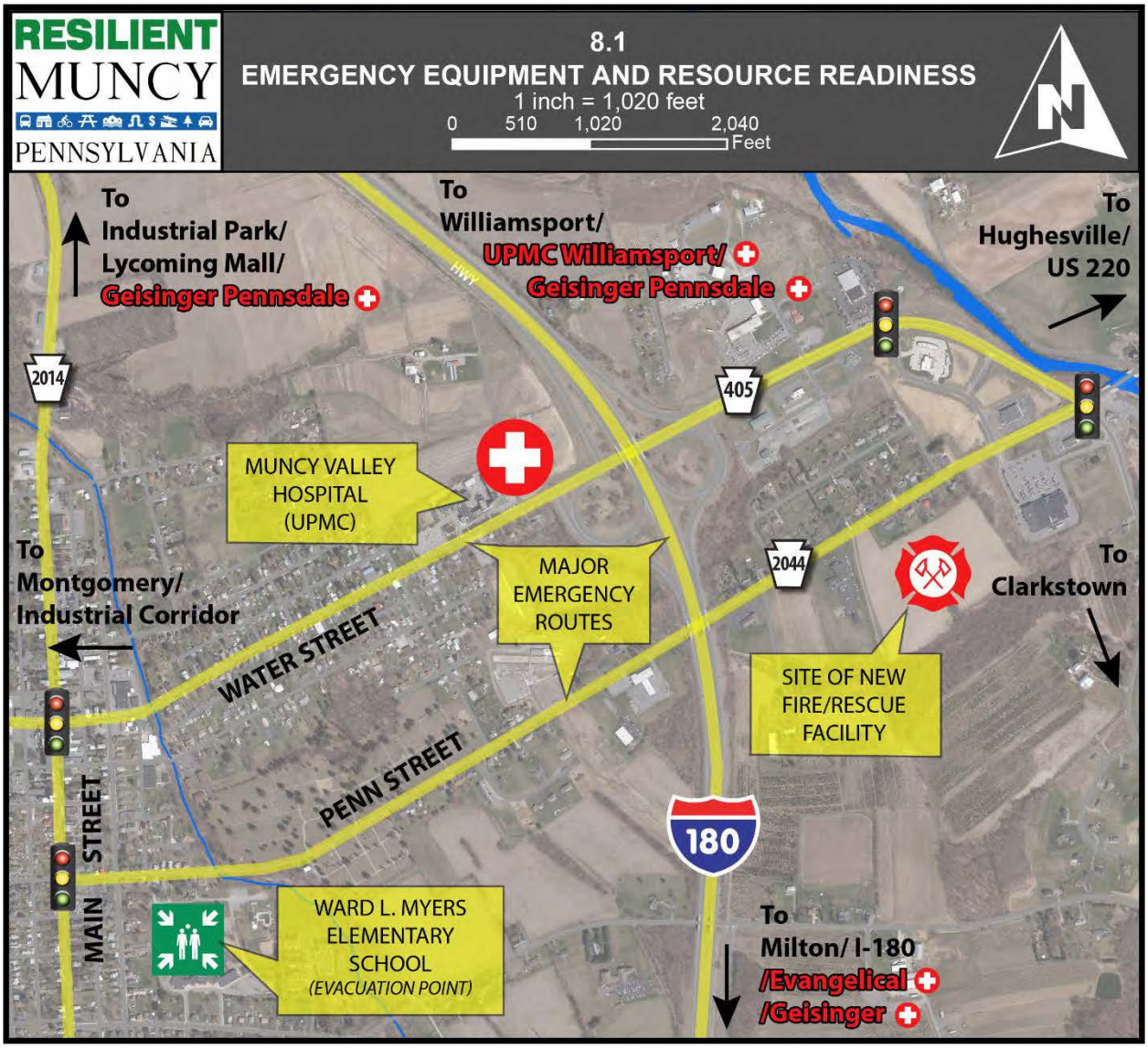


CHAPTER 8:
Emergency Management and Response

Chapter 8: Emergency Management and Response

8.1 Summary of Existing Conditions

The goal of this chapter is to examine the existing infrastructure utilized respond to emergency event(s) that may result in hazardous conditions for the residents of the Greater Muncy Area, identify gaps and opportunities for improvement.



8.1.1 Fire Protection

The GMA is served by two fire departments: the Muncy Area Fire Department (MAFD), and the Muncy Township Volunteer Fire Department (MTVFD). MAFD is in the process of relocating from downtown Muncy Borough to a more centralized location where it is constructing a fire station on the 1200 block of East Penn Street. A station there, however, would be cut off from Clarkstown when flooding occurs. The MTVFD maintains one station on Village Road in Muncy Township. A diesel-powered backup electrical generator supports this station.

Muncy Area Volunteer Fire Co. Source: Google Street View, 2019

8.1.2 Water Rescue

Swiftwater rescue capabilities are maintained by Task Force 84, composed of MTVFD, MAFD, and Clinton Township Emergency Management Agency (EMA) personnel. Task Force 84 personnel include rescue divers and swift-water rescue technicians. In addition, Picture Rocks Volunteer Fire Company, located just North of the GMA, maintains six swift-water rescue technicians. MAFD maintains several boats that can be used during flood situations. The MTVFD maintains no water rescue equipment.

8.1.3 Emergency Medical Services

MADF Ambulance. Source: MAFD

Emergency Medical Services (EMS) consist of Basic Life Support (BLS) and Advanced Life Support (ALS). Within the Muncy Area, BLS ambulance service is provided by MAFD. Paid emergency medical technicians (EMT) are on duty from 0600-1600 hours, Monday through Friday. On weekends, all BLS providers are volunteers, with MAFD and the Hughesville Fire Departments providing EMTs from 0700-1900 hours.

ALS services are provided by the University of Pittsburgh Medical Center (UPMC) Muncy, located in Muncy Creek Township at the intersection of I-180 and SR 405. An ALS medic unit is stationed at UPMC Muncy. However, it is not equipped to transport patients. The next closest ALS units are in Montoursville and Loyalsock. UPMC Muncy maintains a mobile

Intensive Care Unit (ICU). Loyalsock ALS has three mobile ICUs—one in Old Lycoming, one in South Williamsport, and one on Almond Street in Williamsport.

8.1.4 Hospital Capabilities

UMPC Muncy, Source: Google Street View, 2019

University of Pittsburgh Medical Center (UPMC) Muncy is the primary hospital for both the Borough and the Township. UPMC Muncy maintains a robust emergency management program, in conformance to requirements of the Centers for Medicaid and Medicare Services (CMS), the Joint Commission, and the Pennsylvania Department of Health. In addition, UPMC Muncy participates in the North Central Task Force, the North Central Pennsylvania Healthcare Coalition, and the EMS Council. Currently, operating rooms and the emergency department can function under generator power. The hospital's capital planning process includes funding for a generator upgrade to service the rest of the hospital.

8.1.5 Law Enforcement

The Muncy Police Department (MPD) and the Pennsylvania State Police (PSP) provide law enforcement for the area. The MPD serves Muncy Borough. At present, the MPD does not operate on a 24/7 basis. Three full-time officers and four part-time officers that have varying weekly work schedules maintain coverage. PSP troopers serve Muncy Creek Township from the Montoursville Barracks. PSP service Muncy Township at all times. PSP service the Borough when there is no Borough PD on duty. The PSP Montoursville service area is enormous, and has limited staffing during the evening and night shifts in the entire area.

8.1.6 Municipal Emergency Management

The Borough Emergency Management Coordinator (EMC), from the borough Emergency Operations Center (EOC), coordinates response operations throughout the Borough. The MAFD Station in Muncy Borough serves as the Borough's EOC. The meeting room serves as the planning room. The station has a communications room where radio operators can maintain communications with responders. Two other rooms in the station serve as breakout rooms, as necessary. Individuals at the EOC can access the Internet.

The kitchen can serve to feed emergency responders. The facility has a backup power supply, running on natural gas with diesel as a backup fuel source. In Muncy Township, the Township Building serves as the EOC. The Township Building has a diesel-powered backup generator.

8.1.7 Mass Care Shelter

The Ward L. Myers Elementary School in the Borough is used as a community shelter. It has a large diesel-powered backup generator. The generator's fuel tank contains enough fuel to keep the generator running for 72 hours, but the generator's fuel tank also draws from the 10,000-gallon heating fuel tank. When activated, shelter operations are managed by the American Red Cross. Other community organizations have opened their facilities as places of refuge during an emergency.

Case Study: Impacts of Tropical Storm Lee, 2011

During 2011 Tropical Storm Lee, the GMA experienced flooding in the Muncy Area from stillwater (water that ponds, but does not run with a high velocity), and not swiftwater (water that runs with a high velocity). Both Glad Run and Muncy Creek flow into the Susquehanna River. During this flood event, Glade Run and Muncy Creek underwent flash flooding that the Susquehanna River could not absorb, resulting in record flooding along Muncy Creek and nearby Loyalsock Creek.

Tropical Storm Lee Impacts, Washington Street, Muncy Borough Looking South-West

During Tropical Storm Lee, flooding first occurred in the northern parts of the County. In response, MAFD sent many emergency response resources to the northern part of the county. At that time, they were not needed in the Muncy area. By the time floodwaters had affected the Muncy area the connecting roads were inundated and unpassable. While several water rescues occurred in the northern part of Muncy Borough, many others could not occur due to the road closures.

Emergency responders operated the Incident Command Post (ICP) at MAFD for three days. Power went out around midnight the first night. The Ward L. Myers Elementary School served as a shelter for several days. It accepted pets, a best practice among shelter operations. As the school served as a shelter, the front of the building housed a supply distribution center to distribute donations among affected residents. The American Red Cross and school district jointly operated the shelter, while the school district operated the distribution center operations by itself.

Tropical Storm Lee Impacts, the Muncy Access Boat Launch, Muncy Creek

Traffic control was the biggest issue from a law enforcement perspective. In particular, it was difficult to identify which roads to close due to flooding, and to coordinate with the Department of Public Works (DPW) to close those roads. Because the municipalities owned a limited number of barricades, DPW staff had to move roadblocks around during the emergency.

There are only two traffic lights in the Borough, with a third located on Rt. 405 at the Sheetz access road, and a fourth located at the intersection of Rt. 405 &Rt. 442 in Muncy Creek Township. Both municipalities use fire department volunteers and police officers to direct traffic when power outages occur. There is presently no backup power for traffic lights in the Borough. In Muncy Creek Township, traffic lights have electric service hookups which are able to connect to a portable generator.

Floodwaters effectively turned UPMC Muncy into an island. The hospital staff sheltered in place during Tropical Storm Lee, caring for patients in 20 acute care beds and 130 resident beds. The only way in or out of the hospital was by use of the I-180 on-ramp as an off-ramp.

8.2 Summary of Gaps and Opportunities

- **Gap:** The Borough EOC was frustrated that local water resources could not be utilized in the GMA due to being dispatched elsewhere in the County instead of locally.

  Opportunity: Forecasting must occur to determine if local resources can dispatch to other locations before they deploy.

- **Gap:** Need for improved resident education and preparation for evacuations. During Lee, people failed to obey the evacuation order, which led to need for additional emergency

response. Relaying information about National Weather Service (NWS) messaging (watches vs. warnings) and the importance of family preparedness to the public is necessary.

Opportunity: Establish regularly scheduled, high-profile awareness campaigns.

- **Gap:** Inability to evacuate nursing home and hospital patients from UPMC Muncy. The closest bus for medical transportation is in Altoona. EMS units were occupied with local responses.
- **Gap:** Need for improved communication before and during an emergency event. Phone communications were intermittent, on a carrier-by-carrier basis. Lack of adequate emergency road signage.

  Opportunity: Coordinate with PennDOT on variable message signage and the 511 systems.
- **Gap:** Lack of detailed damage assessment records from the storm.

  Opportunity: Establish a team/commission/protocol for reporting/assessing damage from future storms.
- **Gap:** Lack of backup power (redundancy) for traffic signals.

  Opportunity: Obtain additional generators and update existing traffic signals so they can connect to backup power during a sizable storm event.
- **Gap:** Equipment needs—priority to traffic signals; shallow water rescue resources, such as an air boat; medical evacuation bus for mass evacuations.

  Opportunity: Pursue capacity building/resiliency grants to address equipment/infrastructure needs.

8.3 Ongoing Projects Tied to Resiliency

8.3.1 Blue-Ribbon Education Project (Marking Flood Elevations)

The Project Message

"Visual awareness of the risk."

It is one thing to talk about resiliency and risk in terms of flooding frequency, feet of water, elevation, and cost. It is another to render these relatable.

Blue Ribbon flood marker signs, downtown Muncy Borough

The Muncy "Blue Ribbon" project is an two-pronged effort to raise awareness and educate the community about the regulatory 100-yearflood plain or Base Flood Elevation (BFE) as defined by the Federal Emergency Management Agency (FEMA). In 2019, blue ribbons were placed at the height of the regulatory floodplain to indicate the water depth in a 100-year flood event. The ribbons were informative but did not weather well. In 2020, blue aluminum "-Flood-" signs replaced the plastic ribbons.

Priority Justification

The project arose from the observation that the people affected by floodplain regulations and flood risk were not cognizant of the scope or depth of this regulatory area. The placement of flood signs in a publically visibly manner serves to get the public's attention and increase awareness.

Defining the Project Area

The project area includes Zones 1-3.

Resiliency Concepts

Knowing the risk is important. Many residents are aware of the regulatory floodplain but are unaware of the depth of flooding. The floodplain is a concern to everyone in the community whether they live, work or do business in it.

Stakeholders

Lead Agency – Lycoming County Department of Planning and Community Development

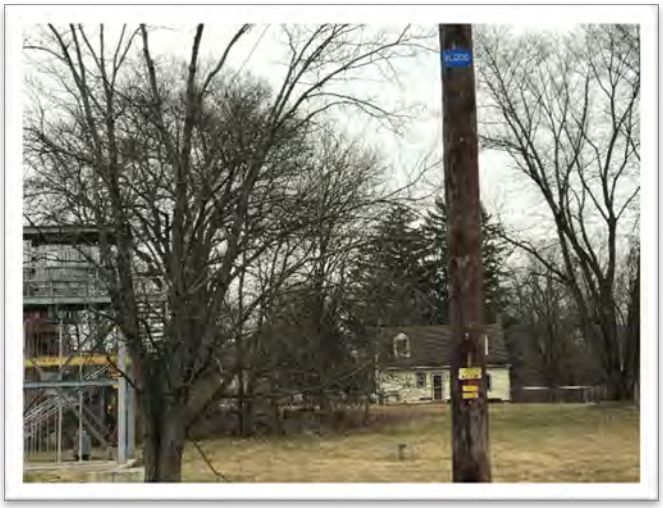
Other Partners - Muncy Creek Township, Muncy Borough, PennDOT, LAC, local property owners

Implementation Steps

1. In 2018, County staff mapped out the project area by the using ESRI's ArcMap GIS software and specified by flood data from FEMA.
2. PCD Staff identified individual utility poles in the project area and GPS coordinates were set in close proximity to the poles. The height of the Base Flood Elevation was calculated from the GPS points and then noted on the pole with a lumber crayon. A blue ribbon was then placed on the pole at the height of the mark. 222 utility poles were monumented.

Flood marker signs, Main Street, Muncy Borough

3. The edge of the 100 year flood plain was marked out on intersecting road surfaces by use of existing mapping and GPS. They were monumented with white marking paint and labelled "100." 11 road surfaces have been temporarily monumented.
4. Blue ribbons were replaced with permanent laminated aluminum blue signs imprinted with the word "Flood." These are expected to have a life of 20-30 years. These signs can be easily installed or removed with galvanized nails and a hammer. (Stages 1-4 are completed)
5. Develop and deploy public engagement materials.
6. Engage stakeholders for possibility of placing markers on private property or other land marks with greater visibility:
    a. Public buildings/parks
    b. Bridges and abutments
    c. Restaurants
    d. Historical landmarks (both the Registry and historical to Muncy)
    e. Road markings where the flood plain begins
    f. Kiosks around town (3) explaining the program,



Flood marker sign

and conveying historical information and impacts of flooding Funding Resources

Funding Resources

Lycoming County provided funding and staff time for the blue ribbons and flood signs.

Potential funding sources for additional project educational components include:

- PA Department of Environmental Protection (DEP)- Environmental Education Grants
- Susquehanna Greenway – Mini-Grants (Environmental Education)
- First Community Foundation Partnerships (FCFP)
- PPL Foundation

8.4 Project Package – Infrastucure

"Safety of our citizens is our primary concern."

Efficient and effective emergency management and response is critical to resilient design. Past incidents such as Tropical Storm Lee have exposed gaps within emergency response efforts—namely in resource deployment, manpower, physical resources, energy resources, and resident awareness.

This section highlights several opportunities that, if taken advantage of, can improve emergency preparedness and coordination during disaster scenarios, including: reduce utility interruptions, Implement emergency plans, and increased communicate plans to the public.

8.4.1 Emergency Equipment and Resource Readiness

The Project Message

"Resources at the ready."

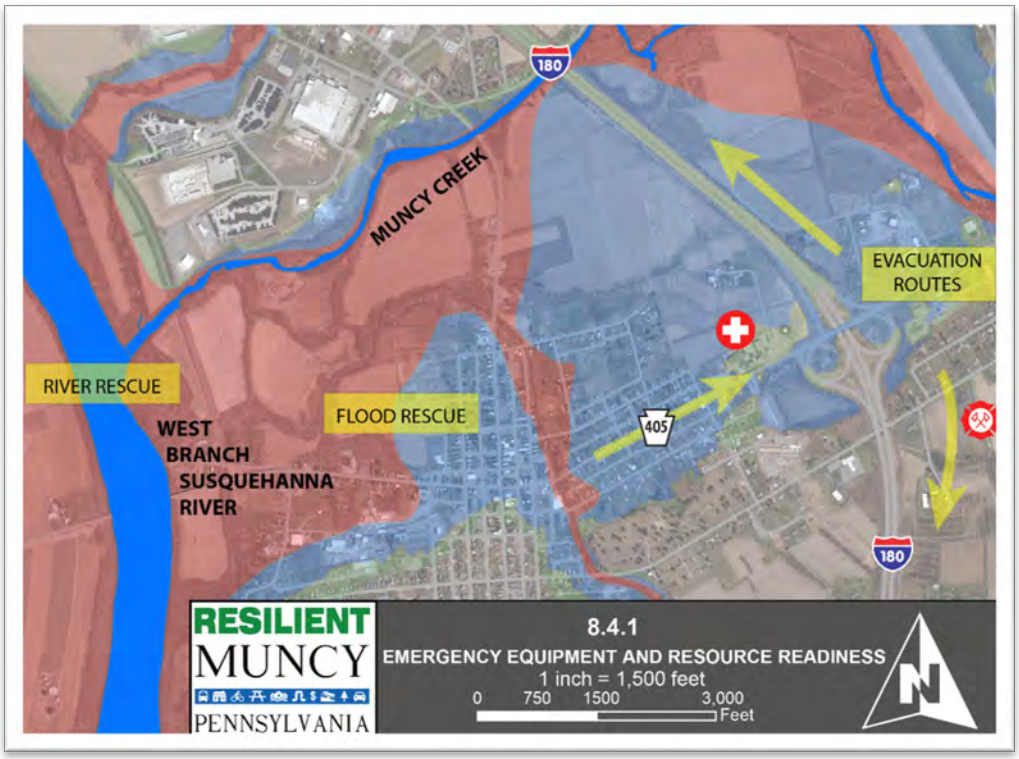
Stakeholders recognized that lack of resources hindered response actions after Tropical Storm Lee in 2011. The following project is to list recommended resources that would enhance readiness of the community's first responders and to effectively manage a response in the aftermath of a disaster.

Priority Justification

Equipment procurement can be an ongoing effort and should parallel other initiatives.

Defining the Project Area

The project area is all of the GMA.



Resiliency Concepts

The resiliency concepts for this project are redundancy and resource readiness.

Stakeholders

Lead Agency- Pennsylvania State Police, Muncy PD, UMPC Muncy, Muncy Township VFD, MAFD, Borough Emergency Management Coordinator (EMC), Lycoming County Department of Public Safety, PennDOT, Muncy Area School District

Other Partners - Muncy Creek Township, Muncy Borough, LAC, Community at large

Implementation Steps

1. Acquire and train first responders on use of shallow water rescue equipment such as an air boat.
2. Acquire a medical evacuation bus for mass evacuations.

Funding Resources

Potential funding sources for this project include:

- First Community Foundation Partnerships (FCFP)
- United States Department of Agriculture

8.4.2 Battery Storage/ Back-up Traffic Signals

The Project Message

"Keeping the Lights On"

Traffic signals are a critical municipal service that can benefit from continuous power, especially during emergencies and extreme weather events. No backup power for traffic lights exists in the Borough, and in the Township traffic lights have electric service hookups into which a portable generator can be plugged. Both municipalities use fire and police to direct traffic when power is out. This project would provide backup power systems for the traffic signals.

Priority Justification

Traffic control has been reported as the biggest issue from a law enforcement perspective during Tropical Storm Lee. Considering the lack of back-up power which has been identified as a redundancy gap, pairing traffic signals with battery backup systems and potential solar PV/other Distributed Energy Resources (DERs) can provide back-up power for multiple hours at the main intersections during PPL electrical outages.

Defining the Project Area

The project area is all of the GMA. There are two traffic lights in downtown Muncy, with a third on Rt. 405 at the Sheetz access road, and a fourth at the intersection of Rt. 405 and Rt. 442 in Muncy Creek Township. PennDOT specifies and installs these signals, but after installation, the individual municipalities assume ownership and thus responsibility for these signals. Implementation of the project should not face major obstacles. However, since the lights are located on State-owned roads, PennDOT partnership is key.

Resiliency Concepts

The project resiliency concepts include redundancy and resource readiness. This will benefit the community by increasing energy resilience and redundancy, improving public

safety and avoided costs associated with directing traffic and potential traffic accidents during outages. Other projects that can be considered alongside this initiative include:

1. Battery backup systems can be set up to communicate with the utility (PPL) outage management system, contingent on PPL approval. This will enable intelligent allocation of available power and battery charge-discharge management during outages based on estimated restoration time using advanced data analytics.

2. Implementation of LED lights should be considered to reduce energy consumption and increase available power during outages. During normal conditions LED lights offer energy bill savings, more visibility in foggy conditions, longer lifespan, and lower maintenance requirements.

Stakeholders

Lead Agency- UMPC, Muncy Borough Emergency Management Coordinator, Muncy Creek Township Emergency Management Coordinator, MAFD, PennDOT,

Other Partners - Lycoming County Department of Public Safety, Muncy PD, Muncy Creek Township, Muncy Borough, Muncy Area School District, LAC, Community at large

Implementation Steps

1. Acquire and implement backup power for traffic signals with PennDOT.
2. Enable preemption on traffic signals.
3. Battery Storage/DER Backed-up Traffic Signals, the following projects should also be considered:
    a. Pairing Battery Backup systems with utility outage management system
    b. Application of LED lights in traffic signals

Funding Resources

Potential funding sources for this project include:

- First Community Foundation Partnerships (FCFP)
- United States Department of Agriculture

8.4.3 Resident Education and Preparedness for Evacuation

The Project Message

“Help us help you.”

During Tropical Storm Lee, some residents failed to obey the evacuation order. This led to additional emergency response, stressing an already stressed system. This project would create and communicate and evacuation education and preparedness plan.

Priority Justification

Implementation of this project would be straightforward, relatively inexpensive, and critical to health and well-being of GMA citizenry.

Defining the Project Area

The project area consists of all the GMA.

Resiliency Concepts

This project is one of awareness and education to enable people to make informed decisions under a disaster scenario.

Stakeholders

Lead Agency - Lycoming County Department of Public Safety

Other Partners – Lycoming County Dept. of Planning & Community Development, local municipalities

Implementation Steps

1. Develop a **regionally specific message** – flooding is the primary disaster for which the GMA is preparing.
    a. Recognize the danger – How will people know when a disaster is imminent? Who will alert them?
    b. React – What should people do when the alert is issued? Where should they go? When?
    c. Inform – What resources are available? How do people obtain them? To whom can they talk?
2. Deliver the message.
    a. Public meetings
    b. Bill boards
    c. Schools – elementary, middle, high
    d. Radio
    e. Social Media
3. Host a mock scenario.
4. Refresh – continue to update the message and deliver it regularly, especially before potentially hazardous events.

Water rescue equipment used to assess flood damage, 2004 flood, Water Street, Muncy

Funding Resources

Potential funding sources for this project include:

- PEMA
- FEMA

8.4.4 Improved Emergency Event Communication

The Project Message

"**Informed citizens make informed decisions**."

The message is out, people are educated and prepared to evacuate, and hopefully they do. A need still remains during a disaster for communication with the public regarding status of the response, new or changing conditions, and instructions on what to do next. Communication can be difficult under conditions of no power, no cellphone connectivity, and isolation of people.

Priority Justification

Actions improve communication can reduce stress on emergency services, promote public safety, and minimize risk for first responders.

Defining the Project Area

The project area is all of the GMA.

Resiliency Concepts

Collaboration and redundancy of systems – this project should seek to identify stakeholders involved in the communications process who can aid in ongoing communications during disasters.

Stakeholders

Lead Agency - Muncy Creek Township, Muncy Borough

Other Partners – Mass Emergency Messaging System Administrators PennDOT, Cellphone service providers, 911 and emergency communications administrators, PSP, Muncy PD, UMPC Muncy, Muncy Township VFD, MAFD, Lycoming County Department of Public Safety, LAC Community at large

Implementation Steps

1. Identify core communications-providing stakeholders.
    a. Develop a Program for Public Information (PPI) to organize outreach efforts, involve non-governmental officials in designing outreach, and receive the PPI multiplier on existing outreach efforts.

b. Increase the use of pre-existing social media accounts (Facebook, Twitter, and Youtube) to conduct outreach.
c. Increase flood outreach in mailers and newsletters.
d. Host outreach materials at farmer's markets, and annual festivals.
e. Develop a pre-flood plan of outreach actions. These notification methods could be utilized, along with other avenues such as the municipal website and social media, to provide outreach leading up to, during, and after a flooding event. Such a notification could include the following:
f. The Borough could organize outreach to be conducted through stakeholders.
g. The Borough could conduct targeted outreach to specific populations.

2. Review each stakeholders' response plan.
   a. Identify gaps.
   b. Work to create overlap or redundancy in the system.
   c. Create a unified disaster event communications plan.
3. Develop scenarios.
   a. Test the plan by creating various scenarios under which an aspect of the plan is interrupted.
   b. Preform an after-action review.
   c. Correct gaps or weaknesses in plan.
   d. Retest.

Funding Resources

Potential funding sources for this project include:

- PEMA
- FEMA
- PA Department of Community and Economic Development (DCED)

8.4.5 Stream Gage Public Education

"Translating Stream Gauge Readings to Real World Flooding"

The Project Message

This project would provide a web-map display for the relationship between stream gage levels and flooding levels for the greater Muncy area.

Priority Justification

There is a gap in our community awareness between the stream gage level and flooding level for the greater Muncy area. There is increased need to understand what the risks are and when to initiate emergency preparedness plans.

In Lycoming County, there are automated flood warning system gages located on five major creeks and on the Susquehanna River at Muncy. In the GMA, this includes Muncy Creek and the Susquehanna River gage at Muncy near the SR 405 bridge. The public currently has access to flood level and flood gauge information through the County' Flood Ready website: http://floodready.lyco.org/. This site includes current automated stream gauge readings along the waterways of Lycoming County, along with rainfall amounts and road closures, including a link to state road closures through PennDot's website.

Although this information is available, it can be difficult to determine when upstream flooding will impact downstream areas, the extent of flooding, and when action needs to be taken to minimize risk. This project would provide a tool to geographically determine which areas will be inundated by floodwaters at set stages as read from the river gauge.

Defining the Project Area

This project includes all of the GMA.

Resiliency Concepts

Resiliency concepts for this project include: flood awareness, flood risk response and preparedness.

Stakeholders

Lead Agency – Lycoming County Departments of Planning and Community Development, Public Safety (DPS), and Information Services (IS)

Other Stakeholders - Local municipalities, LAC, Community at large

Implementation Steps

1. Identify core team
2. Develop web-based interactive mapping application and display
3. Develop communication plan

Funding Resources

Potential funding sources for this project include:

- Lycoming County - staff and equipment resources

8.4.6 Increasing Electric Grid Resiliency with Microgrids

The Project Message

Although traditional reliability improvements on the PPL-owned grid will increase overall performance of the system during normal conditions, they will not be able to adequately sustain resilience during large scale events. This is particularly important during major storms and flooding events that are a major risk factor in GMA.

An increasingly popular strategy to improve energy resilience and reduce reliance on the central power grid is adoption of microgrids and energy storage systems at the community level.

Priority Justification

The repetitive flooding events in GMA have caused multiple issues for the community including property damage, safety concerns and economic loss. Among these are electric power outages which on occasion have caused traffic light outages adversely impacting community safety and resilience, and creating economic loss. Some notable flooding events include flash flooding that occurred during summer 2018 and Tropical Storm Lee in September 2011.

Microgrids are innovative grid modernization platforms that provide a redundant power supply during disruptions on the utility grid. They facilitate adoption of clean energy, increase efficiency and create innovative hubs for demonstrating state-of-the-art technologies and consumer products. The term “microgrid” refers to a set of medium or low voltage Distributed Energy Resources (DERs) including generators, solar (photovoltaic (PV)), battery energy storage and loads that work together and can connect to the utility grid. In addition to operating in the grid-connected mode, a microgrid can disconnect or island from the grid and remain operational in case of disruptions or outages on the main grid. Installing microgrids that serve one or more critical infrastructure helps protect and power the sensitive loads and supply all or a portion of non-critical loads during outages.

DERs in a microgrid can be selected from a wide variety of technologies including solar PV arrays, battery storage, geothermal, biomass and conventional sources such as diesel and natural gas generators (often as Combined Heat and Power units).

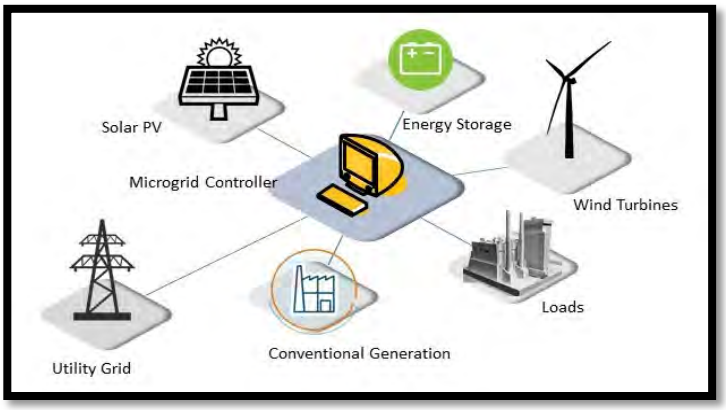


Figure 1: A Sample Microgrid

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Defining the Project Area

Ideal microgrid sites include locations with minimum flooding, such as Zone 4 or Zone 3, with a critical function and central access to the community.

Pilot candidate sites for identified for Behind the Meter Microgrid(s) in Critical Facilities include:

1. Muncy Pump Station
2. Ward L. Myers Elementary School
3. Muncy Area Fire Department (MAFD) a
4. "The Corner" historical area located at NE intersection of Main St. and Water St.

Resiliency Concepts

Community infrastructure lacks the critical alternative or backup power supplies, leaving this resource vulnerable when disruptions to the power grid occur due to flooding or other events.

Electric transmission and distribution systems are highly susceptible to storms, flooding and extreme weather events due to vulnerability to high winds, falling trees, falling poles, wires, etc. Although major electric utilities continually implement reliability improvement projects, such efforts cannot adequately sustain the resilience of the centralized grid during large-scale events. GMA is no exception to this phenomenon and exposed to a similar risk due to its historic vulnerability to flooding.

PUC's 2019 Reliability report concludes that the reliability and resilience of Pennsylvania distribution systems has trended negatively in the past years and is expected to be challenged if severe weather events show an upward trend. Assessment of the reliability performance of PPL in GMA in section 2 revealed that on average in the past 28 months "Trees-outside of Right of way" and "Equipment Failure" were the main causes of outages in GMA.

Installing microgrid(s) in critical facility(s) such as center of refuge, fire station, or police station is an innovative measure that can provide multiple socio-economic benefits to the community. These include:

- Increased energy resilience and continuous power
- Improved public safety, emergency response and preparedness
- Avoided costs of blackouts for the hosting facility and community at large
- Energy bill saving from continuous operation of microgrid compared to backup power only
- Reduced emissions and environmental benefits through application of renewables compared to backup diesel gensets
- Demonstration of state-of-the art consumer technologies

- Potential energy efficiency improvements

Stakeholders

Lead Agency – Lycoming County DPS, WBRA, Muncy Area School District

Other Stakeholders - PPL

Implementation Steps

1. Develop microgrid/energy storage project concept for select location(s)
2. Assess feasibility, regulatory landscape and stakeholder appetite
3. Potential funding/financing applications
4. Design, build and operate project

Funding Resources

Potential funding sources for this project include:

- PA Department of Community and Economic Development (DCED)
- PA Department of Environmental Protection (DEP)
- Pennsylvania Emergency Management Agency (PEMA)

Appendix A: Resilient Structures Toolkit

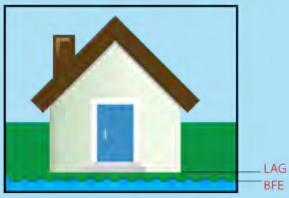
Residential Structures

The only way to remove a structure from the Flood Insurance Rate Map (FIRM) is to:

1) Determine that the Lowest Adjacent Grade (LAG) is above the BFE and apply for a Letter of Map Amendment (LOMA)

-or-

2) To physically move the structure to an area above the BFE.



There are, however, options to maintain a structure in the floodplain and reduce damages resulting in a greatly reduced flood insurance premium. These mitigation measures may increase the value of your home. Examples have indicated that for every $1 invested in mitigation efforts resulted in $6 damage savings.

Note: The understanding of flood mechanics, and the calculation of flood risk and the regulations these factors generate are constantly evolving. Before applying any of these techniques please consult with your state or county Hazard Mitigation Officer to find out if they will provide you with the end results that you expect.

Standard Mitigation Techniques

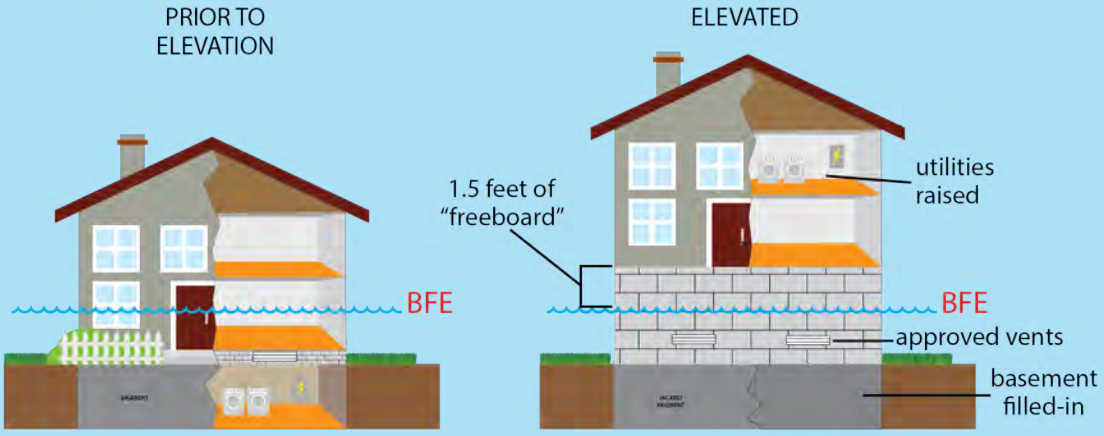
Relocation - Moving your home or structure out of the floodplain to higher ground where it will not be exposed to flooding. Prior coordination between the property owner, the Floodplain Manager, and FEMA can result in the structure being removed from the floodplain.

Demolition -Tearing down your damaged structure and either rebuilding on the same property outside the floodplain or buying a building or home/business elsewhere.

Demo/Rebuild - Tearing down your damaged structure and rebuilding it in compliance with floodplain regulations on the same property. Once a structure is rebuilt in compliance with floodplain regulations it will no longer be classified as a Pre-FIRM structure and will also be rated above the BFE in terms of flood insurance considerations. This should result in drastically reduced flood insurance premiums. Another benefit to this process is the substantial reduction of structural damage sustained by most normal flooding situations.

"**Substantial Improvement**" is any repair, reconstruction, rehabilitation, addition, or improvement of a building, the cost of which equals or exceeds 50 percent of the market value of the building before the improvement or repair is started (cer-tain historic structures may be excluded) (FEMA 2010c).

"**Substantial Damage**" is damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damage condition would equal or exceed 50 percent of the market value of the struc-ture before the damage occurred (FEMA 2010c).



EXAMPLE OF A PROPERLY ELEVATED RESIDENTIAL STRUCTURE

Elevation - Elevation of the structure is permitted and ***required*** *when an existing structure in the floodplain is substantially damaged or substantially improved.* Elevation is raising your home/structure so that the lowest exposed floor is at least 1.5 feet above the BFE. Mechanical equipment (utilities) will also have to be elevated and the basement will have to be vacated in an appropriate manner.

Additional Mitigation Techniques

There are ways to reduce the damage to a structure in a flood event that, while effective, will not result in a reduction of flood insurance rates.

Wet Flood Proofing - The use of flood-damage-resistant materials and construction techniques to minimize flood damage to areas below the flood protection level of a structure, which is intentionally allowed to flood.

*Note: FEMA does not allow dry flood proofing for **new, substantially improved** or **substantially damaged** residential structures located in the SFHA.*

Utility Elevation - Relocating your utilities *(furnace, hot water heater, circuit breaker box, washer, dryer, etc.)* to a floor or level above the BFE.

Keep in mind that only **elevation**, **relocation**, and **demolition** can be used to meet the minimum requirements of FEMA *(i.e. will result in the building being removed from the floodplain -or- will substantially reduce flood insurance premiums).* The other methods may be used to minimize damages but are **not** recognized as meeting the minimum requirements of FEMA *(i.e. the homeowner may relief in terms of time and expense but floodplain requirements will remain unchanged).* Remember that if you're able to relocate your structure just outside of the regulatory floodplain or qualify for a LOMA – it is still highly encouraged that you consider purchasing an affordable preferred risk flood insurance policy to continue to protect your investment at a much more affordable rate.

It is also important o note that many of the mitigation techniques discussed here will require an elevation certificate (nearly always) and also require the services of a professional engineer.

Those mitigation techniques that apply to residential structures (Resilient Housing Toolkit, Chapter 3) also apply to commercial structures. Additionally there are floodproofing methods available to owners of commercial buildings to help comply with floodplain regulations and possibly to reduce insurance premiums. These techniques will need to designed by a registered engineer and approved by the Flood Plain Manager.

Floodproofing is defined as any combination of structural or nonstructural adjustments, changes, or actions that reduce or eliminate flood damage to a building, contents, and attendant utilities and equipment (44 Code of Federal Regulations [CFR] §59.1 and American Society of Civil Engineers [ASCE] 24, Flood Resistant Design and Construction [2005]). Floodproofing can prevent damage to existing buildings and can be used to meet compliance requirements for new construction of non-residential buildings.

The concepts of the floodproofing measures used in this manual are defined as follows:

DRY FLOODPROOFING

A combination of measures that results in a structure, including the attendant utilities and equipment, being watertight with all elements substantially impermeable to the entrance of floodwater and with structural components having the capacity to resist flood loads.

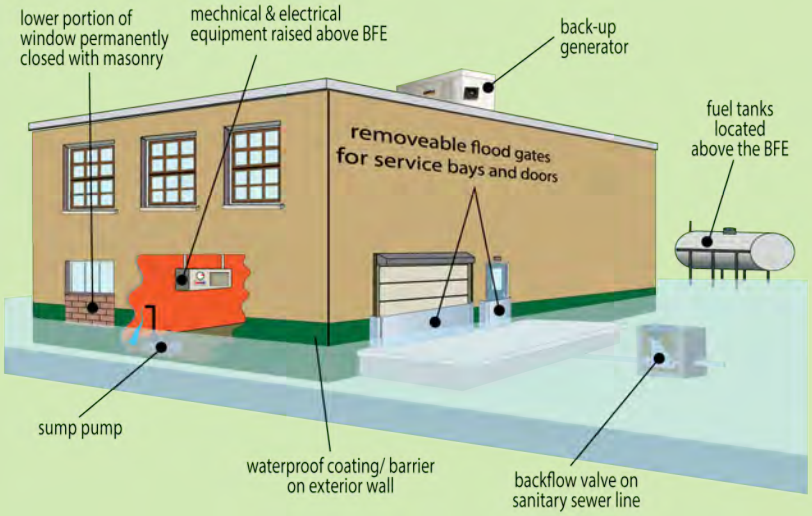
WET FLOODPROOFING

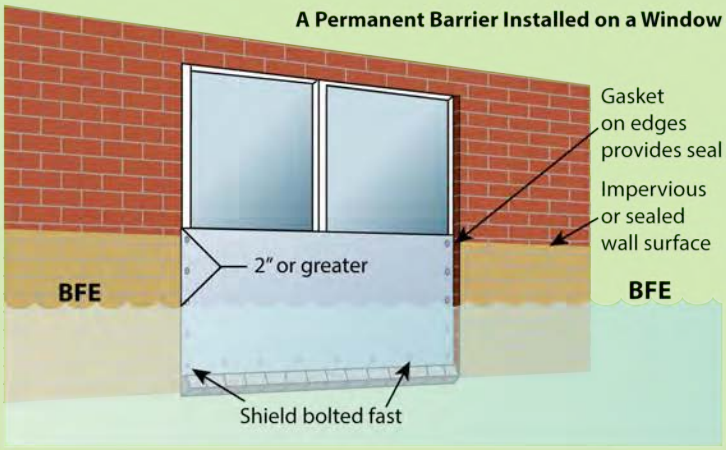
The use of flood-damage-resistant materials and construction techniques to minimize flood damage to areas below the flood protection level of a structure, which is intentionally allowed to flood.

DRY FLOODPROOFING

The purpose of dry floodproofing a building is to make it watertight to floods of limited duration (a few hours) and depth (typically less than 3 feet). Dry floodproofing reduces the potential for flood damage by reducing the probability that the building interior will be inundated. It can be an appropriate alternative for flood mitigation when relocating or elevating buildings is not cost-effective or technically feasible. The minimum performance requirement for dry flood-proofing measures is a space that is protected by walls that are substantially impermeable and resistant to flood loads. A substantially impermeable wall should limit water accumulation to a maximum of 4 inches in a 24-hour period with a sump pump to control seepage (USACE 1995).

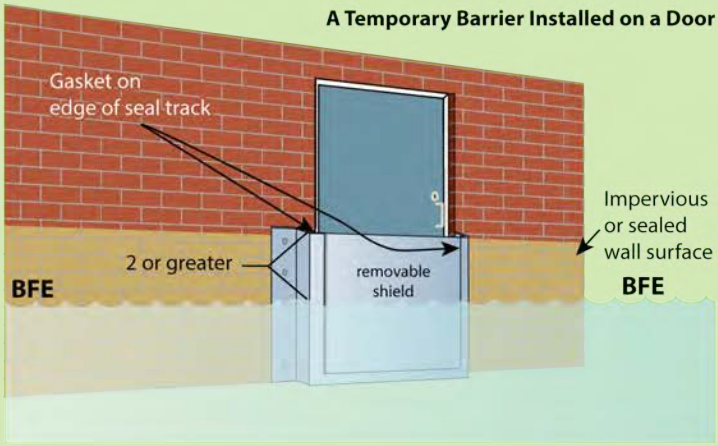
Incorporating flood damage-resistant materials into the dry floodproofing design up to the height of the dry floodproofing measure is recommended. Additionally, building systems such as walls and foundations may need to be strengthened to withstand direct flood forces and the loads imposed by floodproofing measures (e.g., shields, watertight doors), which are used to temporarily seal openings.



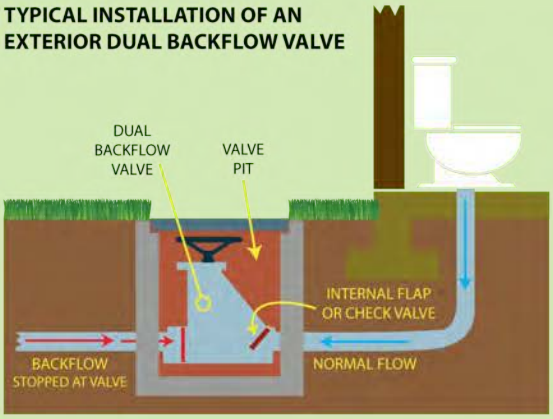


Sealants for openings - Protection of the building depends on sealing openings, such as doors, windows, and utility penetrations, and sealing walls and slabs, which are rarely designed to be water-tight or resist flood loads

Flood shields for openings in exterior walls - Watertight structural systems that close the openings in a building's exterior walls to the entry of water

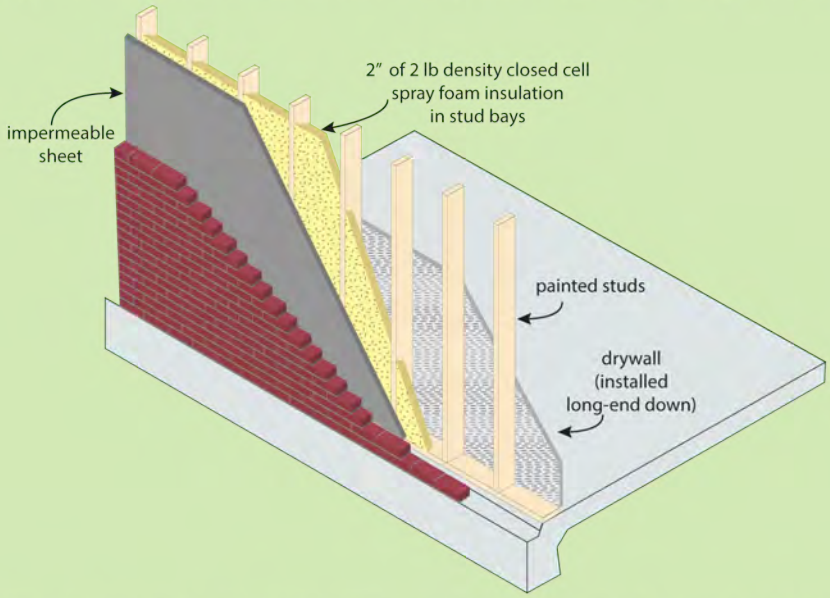


Backflow valves - Prevent flood-water flow into the building because of blockages in the sewage system



Internal drainage systems - Primary method of removing water that may seep through small fissures and pathways in the protection system

Continuous impermeable walls - Sealing the building's exterior walls using technologies that include impermeable waterproof membranes and potentially strengthening those walls

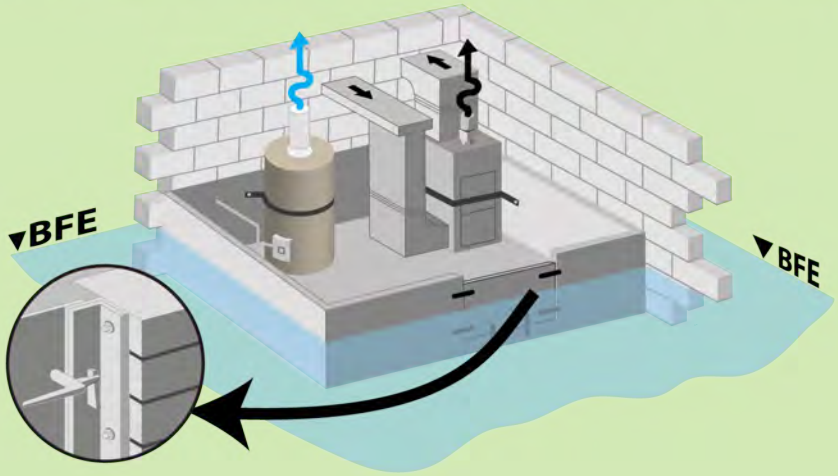


The final step in designing a dry floodproofing project is to provide a Floodproofing Certificate for Non-Residential Structures. See your Floodplain Administrator.

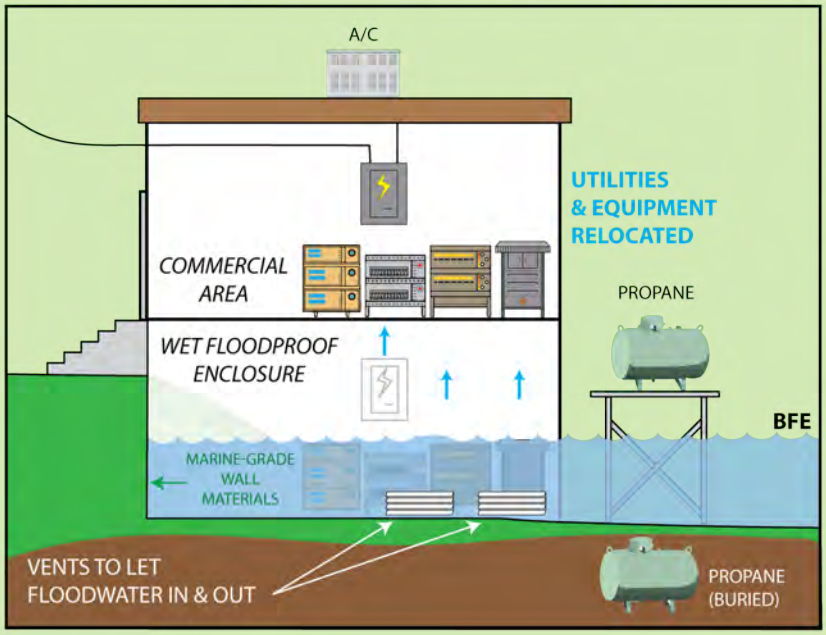
WET FLOODPROOFING

Making uninhabited portions of your structure resistant to flood damage by allowing water to enter during flooding. Because wet floodproofing allows floodwaters to enter the structure, all construction and finishing materials that may be under water must be resistant to flood damage. For this reason, wet floodproofing is practical only for non-living spaces, such as a basement as defined by NFIP regulations, a walkout-on-grade basement, crawlspace, or garage.

Flood resistance in interior core areas - Critical core components and areas can be made flood resistant when dry floodproofing the entire building footprint is not needed or possible



The exterior cladding of a building subject to flooding should be nonporous, resistant to chemical corrosion or debris deposits, and conducive to easy cleaning.



Raise utilities and important contents to or above the flood protection level.

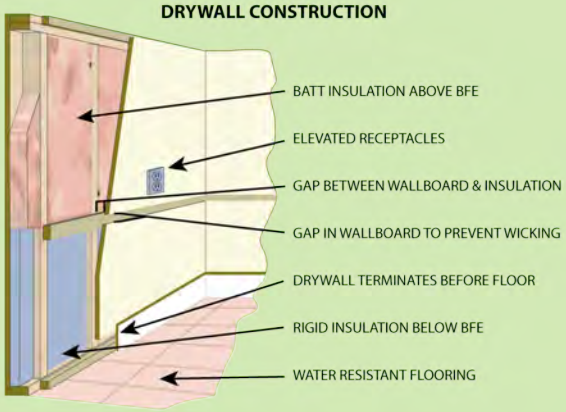
Install flood openings or other methods to equalize the hydrostatic pressure exerted by floodwaters.

Install and configure electrical, and mechanical systems to minimize disruptions and facilitate repairs.

Fuel tanks should be elevated or buried.

Using flood damage-resistant materials can help reduce flood damage and facilitate cleanup to allow buildings to restore service as quickly as possible. Interior building elements such as wall finishes, floors, ceilings, roofs, and building envelope openings can suffer significant damage from inundation by floodwaters, which can lead to failure or unsanitary conditions. Interior finishes should be easy to clean and not susceptible to damage from inundation. Likewise, floors, ceilings, roofs, fasteners, gaskets, connectors, and building envelope openings should be constructed of flood damage-resistant materials to minimize damage during and after inundation.

DRAINABLE DRYWALL CONSTRUCTION



Note: A detailed list of appropriate flood damage-resistant materials can be found in NFIP Technical Bulletin 2, Flood Damage-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program (FEMA 2008a)

Resilient Preservation Guide: Muncy, PA

Introduction

The Muncy Historic District was listed on the National Register of Historic Places in 1980 and provides irreplaceable context for telling the story of Muncy through three distinct and unique periods of the town's history: 1790-1830, 1840-1875, and 1885-1905. The first period, 1790-1830, is marked by the first two roads licensed in Lycoming County (Water Street and Main Street) and adoption of a municipal grid system with standard lot dimension of 50 feet by 180 feet. Initial building in Muncy took place along the North and South Main corridor, which also happened to be the main north-south corridor in the County. Representative architectural styles of this era include early log homes, Federal and Georgian-inspired residences, and a group of early Greek Revival buildings. The second period, 1840-1875, is marked by a variety of different styles of architecture located further from the center of town. These historic structures include Greek Revival architecture, Victorian-Eclectic architecture (almost entirely located along South Main Street), and Italianate style. The third period, 1885-1905, came following a short economic downturn between 1875 and 1885. This period is dominated by primarily Queen Anne style residences and a number of in-fill commercial buildings on South Main Street.

Muncy's early relevance is closely associated with its proximity to the Susquehanna River. In fact, the river was the main driver for why Muncy exists where it does. During the height of Muncy's economic success the town was known as the trading center for the West Branch River Valley. The West Branch of the Pennsylvania Canal was built in 1834 and quickly proved to be an excellent mechanism for cheap bulk transportation. This changed the dynamic of Muncy's economy and soon individual businesses focused on dry goods trade and essential services took precedent over the initial economic profile of Muncy, which included hotels, taverns and travel oriented businesses. Muncy experienced a rise in the merchant class by 1850, signaling a major social movement for the town. [https://www.livingplaces.com/PA/Lycoming_County/Muncy_Borough/Muncy_Historic_District.html]

Unsurprisingly, Muncy has a long history of flooding with over 20 official floods (ranging from major, to moderate, to minor) recorded since 1936 when the recording began. Of those floods, 8 were 'major,' 8 were 'moderate,' and 7 were 'minor' [https://www.weather.gov/media/marfc/FloodClimo/WBS/Muncy.pdf]. On June 2, 1889 the Susquehanna River crested at 26.80 feet after nine inches of rain fell in 36 hours. This event led to most of Muncy and neighboring communities of Williamsport, Lock Haven, Jersey Shore, and Montgomery to be submerged [https://www.pennlive.com/news/erry-2018/07/4545db0ff19996/these-are-the-10-biggest-flood.html].

Local Regulatory Context

The following treatments and adaptations describe in broad-brush strokes what can be done to reduce the impact that a flood may have on a singular building. It is vitally important to remember that these types projects must be reviewed on a case-by-case basis for floodplain management and zoning compliance at a local level prior to being undertaken. FEMA grants special consideration is to historic structures as noted in the "Risk Reduction and Flood Insurance" section later in this document. Certain structures may be grated relief with regard to conformance with the floodplain management regulations of a particular jurisdiction, but should only be done in close coordination with the following individuals:

- The official tasked with administering the zoning and floodplain management ordinances for the jurisdiction.
- The jurisdictions Zoning Hearing Board (if required).
- The Commonwealth's NFIP Coordinator (for guidance)
- The State of Pennsylvania's Historical and Museum Commission and the Historic Preservation Office (to certify that the subject structure is in fact truly historic)
- A FEMA Flood Insurance Advocate (to determine how a proposed action may impact the home owner's flood insurance premium)

National Context

The National Park Service (NPS) released new draft guidance on appropriate flood mitigation measures for historic buildings in November 2019, entitled *Guidelines on Flood Adaptation for Rehabilitating Historic Buildings*. [https://www.nps.gov/tps/standards/rehabilitation/flood-adaptation-guidelines.pdf] The *Guidelines* provide a much-needed and useful context for those historic buildings in the country that are most vulnerable to flooding, in a way that balances preservation and mitigation needs equally. The goal of the NPS guidelines is to provide information about how to adapt historic buildings to be more resilient to flooding that simultaneously preserves their historic character and will meet *The Secretary of the Interior's Standards for Rehabilitation*. It is the intention of the NPS authors that owners of a historic building use the *Guidelines* in conjunction with the *Secretary's Standards* when carrying out flood mitigation work either in or on the site of a historic building. In Muncy, applicable buildings would include any Outstanding or Contributing building in the Muncy National Historic District (listed in the National Register of Historic Places in 1980). Overall, the *Guidelines* prioritize treatment selection as always one that minimizes changes to the building's character yet providing for necessary reduced flood risk.

Possible Adaptation Treatments: The *Guidelines* outline and review the following FEMA-defined flood mitigation and adaptation strategies, including relative compatibility with historic buildings and identified limitations or precautions. See the *Guidelines* for a complete review of each possible adaptation treatment. For quick review, short summaries of each treatment are outlined below:

- Temporary Protective Measures
    - Temporary and non-permanent protective installations that are deployed or activated in advance of anticipated shallow to moderate flooding and then removed and stored when flood waters have receded. This treatment has a low impact on the historic character of a building due to its temporary nature. Temporary measures are best suited for properties that have the benefit of ample warning time due to the time required to deploy the protections.
    - Examples include:
        - Sandbags
        - Temporary dams
        - Temporary floodgates
        - Flood-wrapping systems
- Site and Landscape Adaptations
    - Numerous configurations of site and landscape adaptations can be implemented to protect a historic building from flooding. This can take place directly on the property's site and even off-site if the outcome is flood water storage or diversion, for example.

Landscaping adaptations are strongly compatible with historic buildings as the building itself remains untouched or unaltered. At the same time, changes to the site should be thoughtfully planned to avoid negatively impacting its historic integrity.

- Examples include:
  - Stormwater management systems
  - Pervious surfaces
  - Bioswales
  - Raingardens
  - Floodwalls
  - Infrastructure projects to protect entire neighborhoods
  - Restoration of natural flood control systems like wetlands or marshes

- Protect Utilities
  - Many historic buildings have basements where utilities and mechanical systems are often located. All flood-vulnerable historic buildings should relocate or elevate utility and mechanical systems above the established flood risk level. When elevating and raising utility and mechanical systems in historic buildings it is important to pay close attention to where the raised systems are moved, including factoring in minimizing visibility and impact on historic character.
- Dry Floodproofing
  - Dry floodproofing requires a watertight seal to prevent water intrusion inside a building. This requires sealing the exterior of a building's foundation and sealing all interior spaces below the established flood risk level. Possibly, this adaptation method would even require the permanent (or temporary) sealing of all openings (windows, doors, and any utility penetration) that extend or are completely below the established flood risk level. A waterproof coating or membrane must be applied to exterior foundation surfaces. Dry floodproofing requires a high level of intervention that will likely significantly alter a structure's historic character. For this reason, dry floodproofing should only be used with historic buildings when no other more compatible adaptation measure is possible or cost-effective. In addition to undermining the integrity of a historic structure, dry floodproofing waterproof coatings are vapor impermeable and therefore trap moisture in walls or interior wall surfaces which can lead to the deterioration or damage to historic materials.

    Note: This option is more suitable for non-residential structures so long as the activity that the home owner proposes does not constitute a substantial improvement. This approach would be particularly useful to reduce damages in existing basements.

- Wet Floodproofing
  - This adaptation measure allows flood water to enter a historic building during a flood event and then drain out as the water recedes. Wet floodproofing should not be considered in areas where flood waters typically remain for over 24 hours to limit damage to historic materials. Strategically placed vents allow water to move in, through, and out of the building. Utility protection and elevation should be combined with this measure to protect utilities from anticipated water. The greatest preservation consideration for this measure is the impact to interior materials and the common need for replacement of historic interior materials. If original materials have already been replaced for something newer (e.g., plaster has been replaced with drywall), it is possible to replace the drywall with flood-damage resistant material without impacting

the historic character of the building. For those historic buildings that still retain a high level of original, historic materials, features, and finishes at or below the established flood risk level, preference would be to find an alternative adaptation measure that has less impact on the historic materials.

Note. This approach would be particularly useful to reduce damages in existing basements and accessory structures. This is not suitable in primary living space unless under the substantial improvement threshold.

- Fill the Basement
  - One adaptation measure that is highly compatible with historic buildings that have full below ground level masonry basements is to fill in the basement to prevent flooding. Although filling in a historic basement eliminates the use of that space, its impact is limited to the interior, often not visible or discernable from the exterior of the building. In some cases, the basements of historic buildings contain elements contributing to the significance of the property (e.g. fireplace, dumbwaiter, etc.). For these buildings, this adaptation measure is not recommended.
- Elevate the Building on a New Foundation
  - Many buildings in all regions of the country utilize this adaptation measure to mitigate their flood risk. It is a proven risk reduction strategy for buildings of all shapes and sizes and is commonly associated with the gulf south and most recently the northeast. For a standard wood constructed non-historic building in a floodplain, building elevation is often one of the best choices. For historic buildings located in floodplains, building elevation requires a closer more intentional approach and consideration. The change of height, introduction of a new foundation, and the raising process in general may impact the historic character and integrity of the building. Particularly for those buildings that have front porches or other street-facing character elements, raising of the structure interferes with their original intended use and context. Through careful planning, creative design, and consideration historic building elevation can be a success, however. In general, it's easiest to elevate frame buildings above crawlspaces, piers, or post foundations. Maintaining proportions of structure to site can also help minimize visual impact. For example, it is not recommended to elevate a small building a full story.
  - Other considerations to balance building elevation and historic character:
    - Topography and landscaping
    - Shape and size of lot
    - Placement of the building on the site, such as set-back
    - Building footprint in relation to the shape and size of the lot
    - Massing noting the existing overall width to height ratio
    - Building height and number of floors
    - Horizontal or vertical orientation
    - Property type
    - Construction type
    - Relative visibility of the foundation or basement
    - Mass of foundation in comparison to the main mass of the building
- Elevate the Interior Structure
  - This measure requires removal of the existing first or ground-floor level and replacing it with a new floor plate at a level above the established flood risk level. This can be done

without visually altering the exterior of the building. First floor elevation is most compatible with buildings that have large-volume first-floor spaces, such as Main Street commercial buildings. These buildings also have high ceilings to provide excess vertical height that can accommodate the elevated floor. The new floor height should be limited to a level below the sills of the first-floor windows or storefronts to limit visual intrusion. Historic structures with character-defining first floor spaces should limit the use of this measure or implement it carefully, balancing the needs of the historic building with flood mitigation needs.

- Abandon the First Story
    - This measure is most compatible with multi-story masonry buildings. It requires the modification of a multi-story structure to relocate all living or use spaces to upper floors above the established flood risk level. The abandoned first story must be altered and adapted using either wet or dry floodproofing and probably turned into a utilitarian space that either can accommodate water (wet floodproofing) or is sealed off from water intrusion (dry floodproofing), introducing new materials throughout. Since this measure results in the loss of usable floor area, new additions to the building may be considered. If so, the guidance in the *Guidelines for Rehabilitating Historic Buildings* should be consulted.
- Move the Historic Building
    - To move a historic building, it must be separated from its foundation and relocated to a new site and foundation. Typically, relocating a historic building is not recommended because it removes the building from its original site and/or context. At the same time, however, moving buildings is a common practice in certain parts of the country (e.g., Galveston, TX). Moving a historic building is typically only considered when there are very limited options to reduce flood risk to the building in its original site and context (e.g., repeat floods, risk of demolition, etc.). If pursued, the new site must be one with significantly lower or non-existent flood risk. It should also be in a similar setting compared to the original. State Historic Preservation Offices (SHPOs) play significant roles in historic building relocations and will help determine whether or not a building's historic designation can remain upon relocation to a new site.
- Buoyant Foundation
    - Buoyant foundation retrofit systems are a relatively new potential alternative to mitigate flood risk for historic buildings. Where permanent static elevation does not work for many small historic buildings, buoyant foundations may. The system uses guideposts to allow a building to "float when it floods." The historic building is retrofitted with buoyancy blocks, vertical guideposts, and structural sub-frame to accommodate the floating of the building during flood events. This measure, while somewhat unconventional, is a great low-impact solution for residential buildings located in historic districts that face repeat minimal to moderate slow rising flood waters. On non-flood event days, the building looks unchanged. On flood event days, the building rises with the flood waters and rests on top of the water until the water recedes.

National Best Practices

Over the last decade, the historic preservation profession has been actively grappling with how to address the exponentially increasing flood risks posed to thousands of historic communities nationwide. As a result, today there are numerous local examples of successful adaptation and mitigation solutions.

A few are outlined in this section with the intention of some aspects of each national best practice being applicable to Muncy.

Miami Beach, Florida

- The City of Miami Beach just completed a draft set of resiliency and adaptation guidelines for two of its historic districts: Flamingo Park and Collins Waterfront. The draft guidelines offer a range of approaches for each historic district ranging from mid- to long-term strategies, including flood resistant building material, the use of green infrastructure, dry floodproofing, stormwater management, and even future proofing through the incorporation of solar panels and water recycling systems. The mid- and long-term strategies are split into two general approaches or alternatives: "Adapt in Place" and "Raise." All elements of each approach take the core elements of historic preservation into account and balance each approach with the need to mitigate flood risk with protection of the historic character of each historic district.
- Resource: Buoyant City – Historic District Resiliency & Adaptation Guidelines (Miami Beach 2019) [http://www.mbrisingabove.com/wp-content/uploads/HPB-Presentation-10-29-2019re.pdf]

Annapolis, Maryland

- The City of Annapolis has been recognized nationally for the last 5+ years as being the first historic city to integrate FEMA's guidance on the development of a Cultural Resources Hazard Adaptation and Mitigation Plan into a typical Hazard Mitigation Plan process. Since completion in 2018, they have been recognized as a leader in how to holistically and comprehensively integrate hazard mitigation planning with historic property and cultural resource preservation. One of the outcomes of the innovative planning process was an ArcGIS-based story map that illustrates the flooding threat to Annapolis' historic downtown in a user-friendly format.
- Resource: Landmark at Risk: Protecting the Historic Seaport of Annapolis, Maryland [https://arcg.is/1STeHf] and Weather it Together: A Cultural Resource Hazard Mitigation Plan for the City of Annapolis [https://www.annapolis.gov/DocumentCenter/View/10064/Consolidated-CRHMP-Report-April-2018]

Boston, Massachusetts

- The City of Boston developed a Resilient, Historic Buildings Design Guide in 2018 to support owners of Boston's flood vulnerable historic buildings. The document is intended to be a comprehensive guide to retrofitting historic buildings to address climate change. There are four overarching purposes of the design guide: a) Familiarize yourself with key terms – mitigation, resilience, adaptation; b) Identify your property's risks; c) Understand strategies for implementation; and d) Visualize a resilient future for your historic district. While the Guide was written for Boston's most common historic building typologies, many cities may find the Guide as, at the very least, useful inspiration about how to integrate resilience and flood adaptation strategies into many other historic districts across the country.
- Resource: Resilient, Historic Buildings Design Guide: A comprehensive guide to retrofitting Boston's historic buildings to address climate change [https://www.boston.gov/sites/default/files/embed/file/2018-10/resilient_historic_design_guide_updated.pdf]

Charleston, South Carolina

- The City of Charleston has recently completed a multi-year process to determine appropriate flood mitigation solutions for its large stock of historic buildings, particularly building elevation guidelines for some of the city's more premier and historically relevant buildings. The Board of Architectural Review (BAR) led the process which resulted in development of a visual guide for how to (and how not to) elevate flood vulnerable historic homes in Charleston. The guidelines also consider the option of elevating internal floors within a building, particularly recommended for historic commercial structures with tall ceilings.
- Resource: City of Charleston Board of Architectural Review: Elevation Design Workshop #2 [https://www.charleston-sc.gov/DocumentCenter/View/17816/March-2-2018-Elevation-Workshop-Presentation?bidId=] and City of Charleston Board of Architectural Review: Design Guidelines for Elevating Historic Buildings [https://www.charleston-sc.gov/DocumentCenter/View/18518/BAR-Elevation-Design?bidId=]

Darlington, Wisconsin

- Darlington experiences routine annual flooding from the Pecatonica River, some years worse than others. Following a devastating flood in the early 1990s, members of the town devised a way to mitigate the flood risk posed to its historic storefronts while retaining the historic character. They did this by raising the interior first floors to the Base Flood Elevation (BFE), taking advantage of high ceiling heights. The raised floors were then dry floodproofed to BFE +2 and basements were filled in, utilities raised. The integration of historic preservation and hazard mitigation in Darlington was so successful that they earned a Preservation Achievement Award from the State Historical Society of Wisconsin.
- Resource: Mitigation Leads to Preservation and Economic Recovery – For One Community: Darlington, Wisconsin [https://dma.wi.gov/DMA/divisions/wem/mitigation/docs/stories/Darlington_Downtown_Retrofit_WEM.pdf]

State Context and Precedent

The State of Pennsylvania's Historical and Museum Commission and the Historic Preservation Office have developed a two-phase program aimed at reducing flood risk for Pennsylvania's many historic buildings, particularly vulnerable to riverine flooding. [https://www.phmc.pa.gov/Preservation/Disaster-Planning/Pages/Mitigation-Projects.aspx]

- Phase I includes utilization of a specialized Historic Resource Natural Hazard Vulnerability Form to capture hazard vulnerability data such as flood zone and vertical elevation information like the height of a historic buildings' first floor level and openings (doors and windows, etc.) where water may enter during a flood event. In Muncy, this form would be completed for every 182 historic buildings (Outstanding and Contributing categories) located in the floodplain. The information collected during Phase I enables hazard planners to estimate historic building replacement costs and develop smart risk reduction strategies to better protect community assets, as well as potentially reduce flood insurance premiums for owners of historic buildings.

- Phase II includes using the data collected in Phase I to build a property sheet for each surveyed historic property. Each property sheet illustrates the hazard and potential mitigation or adaptation solutions that could benefit the property and includes the following specific information: Phase I data; results of a GIS analysis including estimated flood depth during a 100-year flood event; architectural considerations and at-risk features; photos that illustrate the property; and a list of recommended sensitive hazard mitigation actions based on the building's style and historic features. Ideally, a visualization would be created for each relevant historic building similar to the following, to communicate estimated 100-year flood depths.

[https://www.phmc.pa.gov/Preservation/Disaster-Planning/Pages/Mitigation-Projects.aspx]

In the future, as Lycoming County prepares to undertake its next hazard mitigation plan update, Phase I integration of historic resources into hazard mitigation planning could be considered. The exercise would be conducted in line with FEMA Guidance.

Muncy's National Historic District Flood Risk: by the numbers

The historic buildings located in Muncy's National Historic District are categorized into three distinct groups based on architectural and historic integrity: Outstanding, Contributing, and Intrusions. Outstanding represents those structures that are most indicative of the best example of an important architectural style or a notable site. Contributing structures are also important and play a significant role in the District. These structures enhance the built history of Muncy or expand the historic narrative. Structures built outside of the District's period of significance or those that have been altered beyond recognition are categorized as Intrusions and are often referred to as 'non-contributing.'

To better understand the flood risks posed to the buildings in the Historic District, this section summarizes relevant known statistics.

Historic District, by Category

Historic Relevance Category	Number of Structures	Average Year of Construction
Outstanding	34	1894
Contributing	121	1905
Intrusions	27	1947
TOTAL	182*	

* Total includes 5 recently demolished 'Contributing' structures

Outstanding Historic Structure Profile

Flood Related Investment Zone	Number of Structures	Historic Building Survey	USACE Structure Survey
Zone 1: Strategic Non-Reinvestment	8	1 (100 N Main Street)	7
Zone 2: Maximum Mitigation	16	1 (26 N Main Street)	14
Zone 3: Lesser Needs	10	1 (7 E Water Street)	6
TOTAL	34		

Contributing Historic Structure Profile

Flood Related Investment Zone	Number of Structures	Historic Building Survey	USACE Structure Survey
Zone 1: Strategic Non-Reinvestment	37	0	33
Zone 2: Maximum Mitigation	67	0	59
Zone 3: Lesser Needs	17	0	15
TOTAL	121		

Intrusions Historic Structure Profile

Flood Related Investment Zone	Number of Structures	Historic Building Survey	USACE Structure Survey
Zone 1: Strategic Non-Reinvestment	6	0	5
Zone 2: Maximum Mitigation	16	0	13
Zone 3: Lesser Needs	5	1 (2 N Main Street)	3
TOTAL	27		

Balancing Historic Preservation and Flood Mitigation

Lycoming County has designated Flood Related Investment Zones in Muncy which help local decision-makers determine the future of the city's most flood prone and flood vulnerable properties. Properties in the flood plain can be divided into the following four categories:

- Zone 1 – Strategic Non-Reinvestment Zone
  - Buyouts and adaptive reuse of properties (e.g., park/open space, etc.)
- Zone 2 – Maximum Mitigation
  - Structure elevation, basement fill-in, utility elevation, demolition/rebuild, etc.
- Zone 3 – Lesser Needs
  - Structure elevation, utility elevation, basement fill-in, demolition/rebuild (Note: all mitigation measures in Zone 3 should be scaled back to provide greatest cost/benefit ratio)
- Zone 4 – Non-Regulatory Floodplain*
  - Code improvements and compliance, façade improvements, sidewalk improvement initiatives, home renovation programs, new housing investment (cluster subdivisions)

** This Zone includes properties outside of the floodplain and therefore were not considered in this review of flood vulnerable historic properties*

The following tables summarize, by typologies and use, how many Historic District structures are found in each of the three primary Flood Related Investment Zones (Zone 1, Zone 2, and Zone 3). Furthermore, preservation-appropriate potential flood mitigation measures are listed for each typology.

Typology #1: Commercial + Mixed Use

Type	# of Buildings	% of Total Muncy Historic District Buildings	Outstanding (O) + Contributing (C) Buildings in Zone 1	O + C Buildings in Zone 2	O + C Buildings in Zone 3
Food	5	3%	n/a	1	2
Retail	7	4%	n/a	n/a	3
Storage	4	2%	2	1	1
Service Garage	4	2%	n/a	1	n/a
Office	7	4%	n/a	3	2
Other	4	2%	2	1	1
TOTAL	31	17%	4	7	9

Outstanding Example: Fort Brady Hotel
(18 N Main Street – Zone 2 – built in 1901)

Preservation-appropriate flood mitigation strategies for Outstanding + Contributing Typology #1 buildings in Muncy's Zone 1 include the following:

- Relocation
- Temporary Protective Measures
- Fill the Basement
- Abandon the First Story

Preservation-appropriate flood mitigation strategies for Outstanding + Contributing Typology #1 buildings in Muncy's Zone 2 include the following:

- Building Elevation
- Buoyant Foundation
- Elevate the Interior Structure
- Dry Floodproofing
- Fill the Basement
- Protect Utilities
- Site and Landscape Adaptations (e.g., pervious pavement, rain gardens)

Preservation-appropriate flood mitigation strategies for Outstanding + Contributing Typology #1 buildings in Muncy's Zone 3 include the following:

- Protect Utilities
- Temporary Protective Measures
- Site and Landscape Adaptations (e.g., pervious pavement, rain gardens)

Typology #2: Institutional

Type	# of Buildings	% of Total Muncy Historic District Buildings	Outstanding (O) + Contributing (C) Buildings in Zone 1	O + C Buildings in Zone 2	O + C Buildings in Zone 3
Bank	3	2%	n/a	1	2
TOTAL	3	2%	0	1	2

Outstanding Example: The Muncy Bank and Trust Company
(2 S Main Street – Zone 3 – unknown date of construction)

Preservation-appropriate flood mitigation strategies for Outstanding + Contributing Typology #2 buildings in Muncy's Zone 1 include the following:

- n/a

Preservation-appropriate flood mitigation strategies for Outstanding + Contributing Typology #2 buildings in Muncy's Zone 2 include the following:

- Temporary Protective Measures
- Site and Landscape Adaptations
- Protect Utilities
- Fill the Basement
- Dry Floodproofing

Preservation-appropriate flood mitigation strategies for Outstanding + Contributing Typology #2 buildings in Muncy's Zone 3 include the following:

- Temporary Protective Measures
- Site and Landscape Adaptations
- Protect Utilities

Residential

Type	# of Buildings	% of Total Muncy Historic District Buildings	Outstanding (O) + Contributing (C) Buildings: Zone 1	O + C Buildings: Zone 2	O + C Buildings: Zone 3
Single-Family	98	54%	31	50	6
Duplex	25	14%	4	17	4
Multi-Family	3	2%	1	n/a	2
Apartment	13	7%	1	6	4
TOTAL	139	77%	37	73	16

* Note: the percentages for all three major typologies do not equal 100% due to some demolished and other unidentified buildings not included in the tables.

Outstanding Example: Dr. Wood-Jackson House
(26 N Main Street – Zone 2 – built in 1840)

Preservation-appropriate flood mitigation strategies for Outstanding + Contributing Typology #3 buildings in Muncy's Zone 1 include the following:

- Relocation
- Dry Flood-Proofing
- Abandon the First Story
- Protect the Utilities

Preservation-appropriate flood mitigation strategies for Outstanding + Contributing Typology #3 buildings in Muncy's Zone 2 include the following:

- Building Elevation
- Buoyant Foundation
- Dry Floodproofing
- Fill the Basement
- Protect Utilities
- Site and Landscape Adaptations (e.g., pervious pavement, rain gardens)
- Relocation (when mitigate in-place is not an option)

Preservation-appropriate flood mitigation strategies for Outstanding + Contributing Typology #3 buildings in Muncy's Zone 3 include the following:

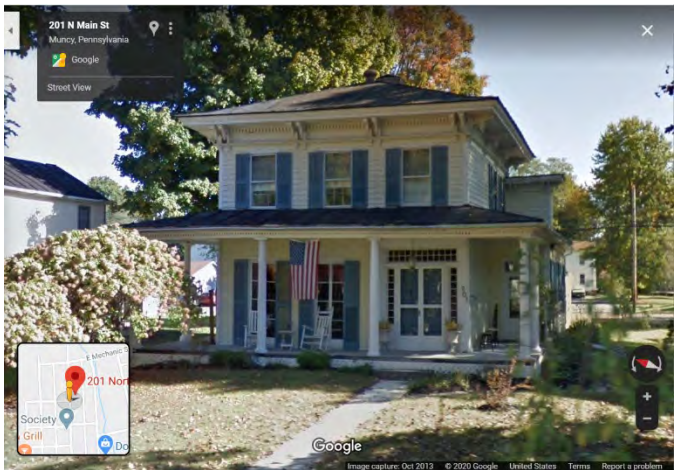
- Site and Landscape Adaptations (e.g., pervious pavement, rain gardens)
- Protect Utilities
- Fill the Basement
- Temporary Protective Measures, if necessary (e.g., sandbags)

Gathering Information: Historic District Building Profiles

Five historic building profiles have been developed for the purposes of profiling typical flood mitigation strategies for a variety of historic building typologies in Muncy. The following alternatives represent a range of actual historic buildings (both Outstanding and Contributing categories) with a variety of characteristics and flood risk profiles. Each building has an associated aggregate set of data representative of the kind of information that exists for each building in the Muncy National Historic District. To successfully protect each structure's historic integrity and reduce its flood risk all relevant data must be collected and analyzed. See **Appendix A** for a spreadsheet of flood and historic data for all buildings located in both the Historic District and the floodplain, and **Appendix B** for data regarding historic buildings with repetitive flood loss (**Appendix B** data is only representative of each of the five Alternative buildings in the following section. The template could be built out to include historic flood loss data for all 182 historic buildings in the floodplain).

From that point, a custom set of recommended potential resilient preservation flood risk strategies that simultaneously protect the structure's historic integrity and reduce its flood risk could be developed (*see the following Resilient Preservation Demonstration Project section using the Muncy Historical Society as a potential demonstration project*). Preferably the strategies would be outlined to be implemented in two phases: Phase 1: short term, and Phase 2: long-term. The length of time represented with both the Phase 1 and Phase 2 planning horizons should be determined at the County level.

Alternative #1: typical Outstanding residential structure



- ***201 N Main Street***: wood frame/wood siding; 2-story single family home; some original windows; Greek Revival architectural style; approximate construction year = 1850 (indicative of second major historic era of Muncy's construction, 1840-1875); most likely rental property; basement = yes; located in floodplain; located in the "Strategic Non-Reinvestment" flood investment zone ($73,986 total insurance funds paid due to flooding, years: 1979, 1984, 2004); located in the *proposed* Core Preservation District.
    - https://www.realtor.com/realestateandhomes-detail/201-N-Main-St_Muncy_PA_17756_M43615-75811#photo0
    - http://lycomingpa.devnetwedge.com/view/RE/39+0020020700000+

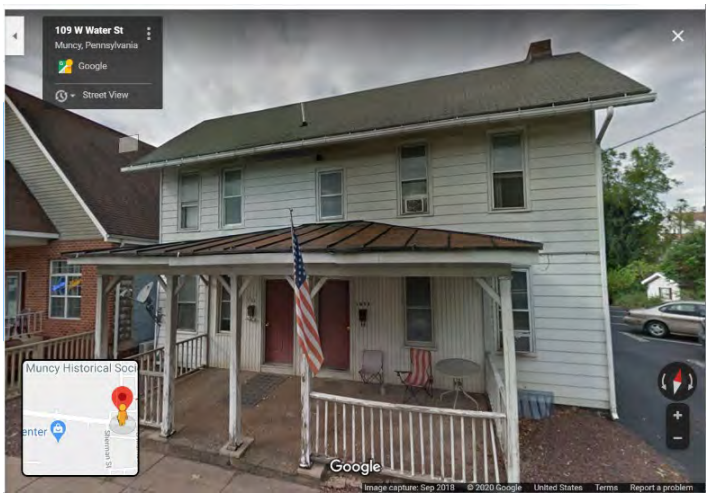
Alternative #2: typical Contributing residential structure

- ***107 N Market Street***: wood frame construction/wood siding; 2-story single family home; approximate construction year = 1901 (indicative of third major historic era of Muncy's construction, 1885-1905); owner-occupied; basement = yes; located in floodplain; located in the "Strategic Non-Reinvestment" flood investment zone ($65,085 total insurance funds paid due to flooding, years: 1979, 1996, 2004, 2011); located in the *proposed* Core Preservation District.
    - https://www.realtor.com/realestateandhomes-detail/107-N-Market-St_Muncy_PA_17756_M43614-64013

Alternative #3: typical Outstanding commercial structure

- ***13 S Main Street***: brick construction; 3-story mixed-use building (2 retail spaces on first floor with apartments above); approximate construction year = 1901 (indicative of third major historic era of Muncy's construction, 1885-1905); local owner; basement = unknown; adjacent to floodplain; located in the "Lesser Needs" flood investment zone ($0 total insurance funds paid since at least 1979); located in the *proposed* Core Preservation District.
    - http://lycomingpa.devnetwedge.com/view/RE/38+0020041300000+

Alternative #4: typical Contributing commercial structure



- ***111 W Water Street***: wood frame construction/metal siding; 2-story, 5-unit apartment building; approximate construction year = 1901 (indicative of third major historic era of Muncy's construction, 1885-1905); local owner; basement = unknown; located in the floodplain; located in the "maximum mitigation" flood investment zone ($8,245 total insurance funds paid due to flooding, years: 1997, 2004); located in the *proposed* Outer Preservation District.
    - http://lycomingpa.devnetwedge.com/view/RE/39+0010011700000+

Alternative #5: 'Other' – Muncy Historical Association building demonstration project

- ***40 North Main Street***: the "Kittoe House"; Greek Revival style; approximate construction year = 1820 (indicative of first major historic era of Muncy's construction, 1790-1830); 2-story, basement = yes; located in the floodplain; located in the "maximum mitigation" flood investment zone ($8,653 total insurance funds paid due to flooding, year: 1996); located in the *proposed* Core Preservation District.

Risk Reduction and Flood Insurance

Not only will the adaptation and mitigation treatments reduce flood risk for historic properties, but they will also help reduce flood insurance premiums. FEMA's National Flood Insurance Program (NFIP) recognizes implemented flood mitigation strategies and incentivizes property owners to do so by providing flood insurance premium discounts when mitigation is implemented. The NFIP is administered by FEMA and implemented by state and local governments. The program is responsible for providing flood insurance, improving floodplain management, and developing Flood Insurance Rate Maps (FIRM). There are several ways property owners can reduce their flood insurance. One way is to actually reduce your flood risk through the implementation of verified flood mitigation strategies (e.g., building elevation). See Figure X. below for additional information.

The second way is to get an elevation certificate that verifies the exact elevation at which flood water would start impacting and damaging a building (e.g., window and door opening elevation). See **Appendix C** for more information. [http://www.fema.gov/media-library-data/1428941960043-a8f37b7e3af25f47396bbff04e7bf036/FEMA-HFIAA_ECFActSheet_040715.pdf]

The third way is for an entire community to work together to reduce flood risk. This is an approach managed through the Community Rating System and would benefit both owners of historic buildings and non-historic buildings.

The National Flood Insurance Program is constantly changing and iterating to reflect the dynamic changes in flood risk for many communities throughout the country. One such related aspect is the relationship between flood risk reduction measures and their recognition as "substantial improvements." As of April 2020, according to FEMA, substantial improvements made to historic buildings should not trigger substantial improvements requirements (e.g., building elevation). Historic buildings are limited to those buildings formally "listed or preliminarily determined to be eligible for listing in the National Register of Historic Places, structures certified or preliminarily determined as contributing to the historical significance of a registered historic district, or structures individually listed on a State inventory of historic places or on local inventories in communities with certified historic preservation programs." [https://www.fema.gov/media-library-data/1541603833704-2b9800c9c287c373db595cb2789ea78a/FEMA_P213_FINAL_08232018_508.pdf]

According to the August 2018 FEMA *Answers to Questions About Substantially Improved Substantially Damaged Buildings* Bulletin 213:

> "Provided historic structures retain their designations as historic structures, the requirement to bring them into compliance does not apply if they will be substantially improved or have been substantially damaged. Although compliance is not required for substantial improvement of historic structures, owners should carefully consider the benefits of implementing measures to minimize flood damage. Guidance for minimizing the impacts of flooding on historic structures is found in Floodplain Management Bulletin: Historic Structures (FEMA P-467-2). Permit applications for improvements (including additions) or repairs of historic structures should be accompanied by two pieces of evidence: (1) documentation that confirms the structure is designated a historic structure, and (2) documentation that confirms the proposed work will not preclude the structure's continued designation. Communities may elect to use one of two approaches to handle historic structures. One approach is to grant variances, requiring evaluation of individual requests and consideration of conditions to make the structures more resistant to flood damage. The other approach is to exclude historic structures from the definition of substantial improvement. Whichever approach is selected, it should be used in all cases when improvements or repairs are proposed for historic structures." [https://www.fema.gov/media-library-data/1541603833704-2b9800c9c287c373db595cb2789ea78a/FEMA_P213_FINAL_08232018_508.pdf]

Local Context, Local Solutions: PHARE Grant Program

The Pennsylvania Housing Affordability and Rehabilitation Enhancement Fund (PHARE) is a statewide fund that provides funding for the creation, rehabilitation, and support of affordable housing in Pennsylvania. The PHARE Program is administered by Pennsylvania Housing Finance Authority (PHFA)

and was established by Act 105 of 2010 (the "PHARE Act").

Since 2012, the PHARE program has gained funds through Impact Fees imposed on natural gas companies by the Commonwealth. This Marcellus Shale Fund (Act 13) provides an annual allocation of $5 million into the PHARE Program with the potential for additional revenues when funds remain following eligible disbursements to qualifying municipalities. These funds are made available to counties experiencing natural gas well drilling through a competitive application process. The amount available to each county is based on natural gas production in that county. Since 2012, Lycoming County has secured $8.7 million in PHARE funds through this process.

Lycoming County PHARE Funds Secured: $7,600,000 Total			
2012	$1,100,000	2015	$1,600,000
2013	$1,300,000	2016	$1,100,000
2014	$2,100,000	2018	$400,000
2019	$1,150,000	2020	$990,000**
** Note: no funds were awarded in 2017 due to a change in PHFA program timing.*			
*** Note: Pending PHFA approval, Applied for on 11/15/19.*			

Examples of eligible uses under the PHARE program include homeowner or rental rehabilitation, home buyer assistance, rental and utility assistance, housing accessibility, new construction, pre-construction costs, emergency home repairs, blight removal, transitional housing, and homeless prevention. The funding requirement for the distribution of PHARE funds is as follows:

- A minimum 30% of funds to assist households below 50% of the median area income (MAI) for Lycoming County
    - 2019 MAI = $64,000
    - 50% MAI = $32,000
- No portion of the funds can be distributed to households with an income greater than 200% of the MAI for Lycoming County
    - 200% MAI = $128,000

There are several designated eligible PHARE sub-recipients to help distribute PHARE funds appropriately and provide localized discretion regarding the specific use of the funds. The eligible sub-recipients are Lycoming County municipalities, non-profit organizations, and for-profit housing service providers. Since 2012, Lycoming County (as sub-recipient) has leveraged PHARE funds to support affordable housing projects and related initiatives throughout the county. Some PHARE-funded projects are:

- Lycoming County Flood Mitigation Program
- Muncy Greene Senior Housing Development
- City of Williamsport Historic Properties Rehabilitation Program

Outside of Lycoming County other Pennsylvania communities have used PHARE funding in creative ways to support projects that further housing health and affordability. For example:

- Roof and heating system replacement program for seniors
- Blight removal
- Construction rehabilitation loans

A potential future use of PHARE funds in Muncy could weave a number of goals together, like housing affordability, flood mitigation, and historic preservation. For example, Muncy could use PHARE funding to support projects like:

- Utility elevations
- Historic property renovations that combine flood risk reduction strategies (e.g., moving utilities, basement fill-in, green infrastructure, dry floodproofing, etc.)
- Historic property renovations that combine flood risk reduction strategies and the preservation of affordable or low-income housing.

Lycoming County has unallocated 2014 and 2015 PHARE funds to be dedicated to flood mitigation. These funds, estimated at $350,000, are available to run a new program. One confirmed use of the funds so far will be to fund a utility elevation project to help homeowners in the floodplain move their utilities from their basements or above the base flood elevation. There are some general income limitations on the funding, but there is also flexibility. To build upon the utility elevation project, an extra incentive could be included for owners of eligible historic homes to participate in the program. Priority could be given to income-qualifying owners of either Outstanding or Contributing historic homes in the Muncy National Historic District that are also located in Zones 1, 2, or 3. The County, STEP, or possibly SEDA-Council of Governments could administer any new PHARE programs relevant to Muncy's historic buildings.

Appendix D outlines a sample draft program for the use of PHARE funds to support historic affordable housing projects that integrate flood risk reduction in a preservation-sensitive way.

In addition to PHARE funds, there are several other potential ideas (some related to PHARE, some not) for subsidizing flood protection and adaptation for Muncy's historic buildings.

1. One example is borrowing from a successful grant program in New Orleans called the Front Yard Initiative (FYI). This program is in response to excessive yard paving often found in New Orleans' historic neighborhoods and is managed locally by Urban Conservancy, a non-profit organization. Eligible program participants receive a $2.50 per square foot of paving removed reimbursement, up to 500 square feet, for a maximum reimbursement of $1,250. In addition to the removal of impervious surface (e.g., concrete paving), FYI supports installation of rain barrels, native plants, and other green infrastructure elements to reduce the property's stormwater runoff. [https://www.urbanconservancy.org/project/fyi/]

2. A second idea is to adapt the PHARE program to serve as a Community Adaptation Fund (CAF) that provides grants and/or low-cost loans to projects that achieve low-income or affordable

housing preservation and effectively reduce the property's flood risk in a way that is sensitive to the historic character preservation of the structure. In other words, grant and loan recipients would use the funds to complete flood mitigation projects in line with the County's overall resilience and adaptation goals, including home elevations, first floor retrofits, green infrastructure, and basement fill-ins. The CAF could assist homeowners, businesses, institutions, and other property owners with retrofits and investments. If the low-cost loan option is pursued, there is potential that this Fund could be adapted as a type of revolving fund that self-regenerates through successful repayment of each loan. A CAF in Muncy would be a valuable resource for the resident and business community and would ultimately strengthen the Historic District by creating a stronger network of solutions across all Muncy historic building typologies.

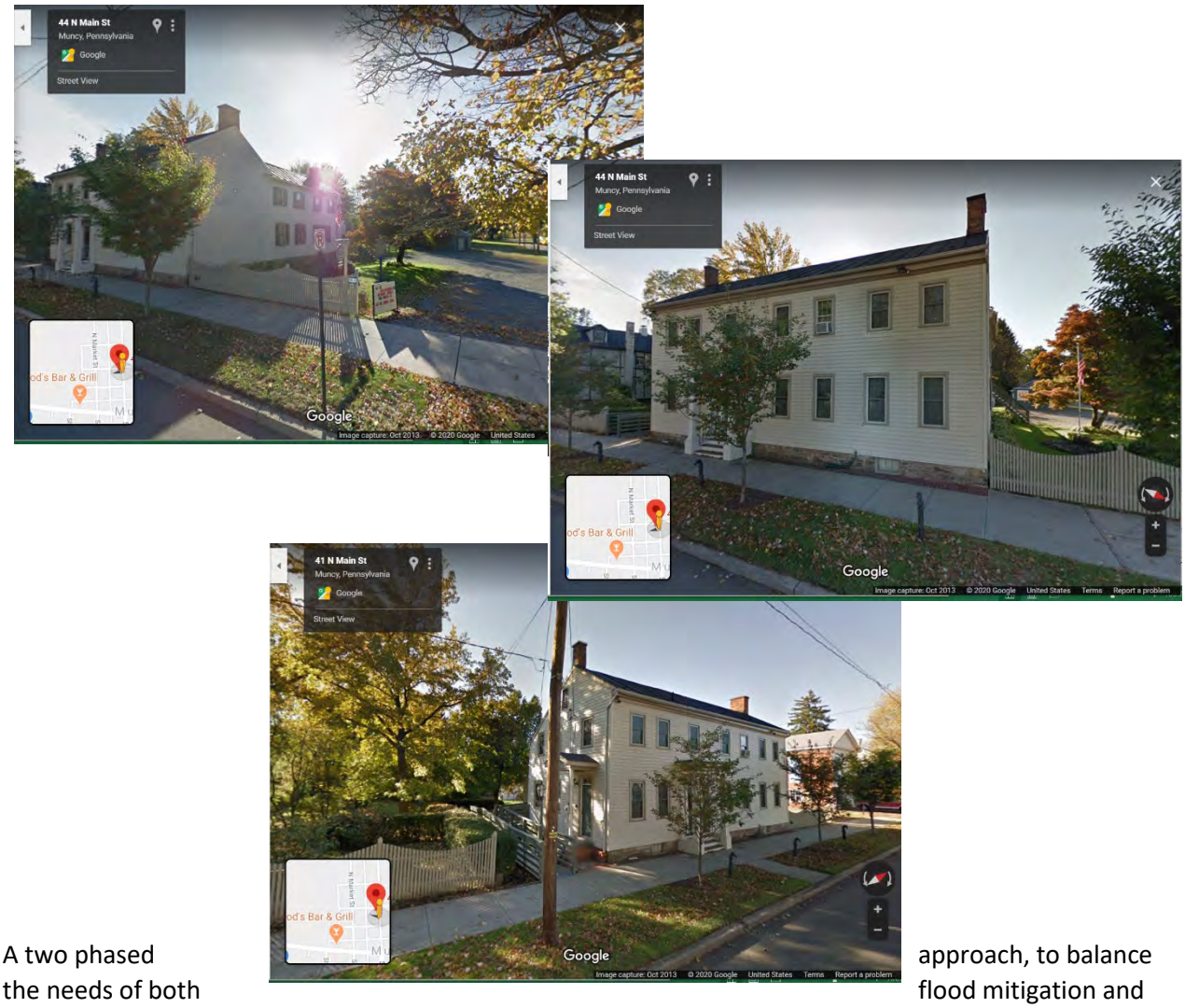
3. A third option is to adapt the existing Lycoming County Homes-in-Need (HIN) home repair program managed by STEP. Since 2005, "HIN has provided critical homeowner-occupied rehabilitation services throughout all county municipalities, serving more than 3,500 households. Services provided have included the correction of code deficiencies and health/safety concerns; improved energy efficiency; and enhanced accessibility for those with disabilities. For over a decade, the HIN has been a bedrock for improving and maintaining affordable housing in Lycoming County." [source: HIN Comprehensive Plan] STEP runs the HIN program using their own in-house contractors, which possibly saves time and money. The HIN program could be adapted to target owners of historic properties (either Outstanding or Contributing) in the Muncy National Historic District that also fall into the Strategic Non-Reinvestment or the Maximum Mitigation Flood Reinvestment Zones. Perhaps the funds could be eligible to be used to support historic building relocations and prioritized for properties located in Zone 1.

4. A fourth idea is to recreate the City of Williamsport Historic Property Rehabilitation Program for Muncy's National Historic District. Currently, the Williamsport Program provides a 0% interest, 10-year forgiveness grant and requires a minimum 15% property owner funding participation. Additionally, there are owner-occupant and/or tenant income requirements. [https://www.cityofwilliamsport.org/departments/community-economic-development/house-repair#:~:text=Historic%20Properties%20Rehabilitation%20Program&text=year%20forgiveness%20grant.-,The%20program%20requires%20a%20minimum%2015%25%20property%20owner%20funding%20participation,at%20570%2D327%2D7514.] This approach could work in Muncy. Again, this would simultaneously further the historic rehabilitations of historic properties in Muncy while also ensuring the strengthening of flood resilience and risk reduction. Together, these two priorities will support resilient preservation in Muncy.

Resilient Preservation Demonstration Project: Muncy Historical Society

The Muncy Historical Society is located at 40 North Main Street, just north of the heart of Muncy's National Historic District. The building is locally and historically known as "The Kittoe House," a Greek

Revival architectural style constructed in approximately 1820. The construction year of the Kittoe House makes the building indicative of Muncy's first wave of construction which took place between 1790-1830 during a time in Muncy when the town was first platted, and the standard street grid was selected to determine town growth. This was also a point in Muncy's history before the boom of the merchants and the transition from being a central and convenient stopping point (with taverns and hotels) for travelers along the Susquehanna to a merchant-dominated town. The building has two above-grade stories with a below-grade basement. The property is located in the designated 100-year floodplain and has therefore been categorized as Flood Reinvestment Zone 2, "Maximum Mitigation." According to the 2015 County of Lycoming Historic Structures Survey, 40 North Main Street is located in the *proposed* Core Preservation District.



A two phased approach, to balance the needs of both flood mitigation and

historic preservation, to increase the resilience of the Muncy Historical Society building is recommended:

Phase 1 – Short-Term

- Add permeable pavement in the current parking lot and sidewalk space.
- Introduce rain gardens and/or bioswales to increase on-site water storage to reduce structure flooding during flooding events.
- Relocate the HVAC and other relevant utility infrastructure above the previously documented flood levels and out of sight from the sidewalk or street view (to maintain consistency with historic preservation standards).
- Relocate all remaining important historic collections to the second story.
- Fill the basement (confirm masonry construction, only).
- Elevate the interior floor to BFE, if possible. Creativity and flexibility may be required depending upon the height of the first-floor ceiling.

Figure X.
No Flood Mitigation Measures: cross-section

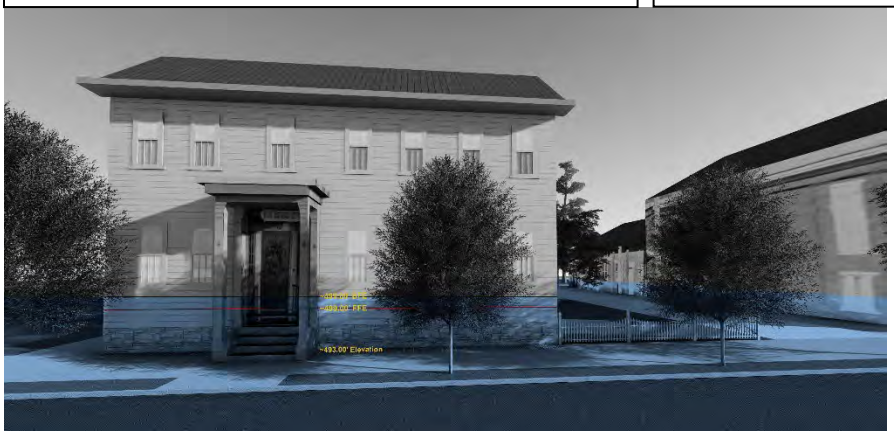


Figure X.
Proposed First Floor Elevation: cross-section

Figure X.
Flood Conditions:
Muncy Historical Society
[40 N Main Street]

No flood mitigation measures in- place

Figure X.
Proposed Site and Landscape Adaptations: street view

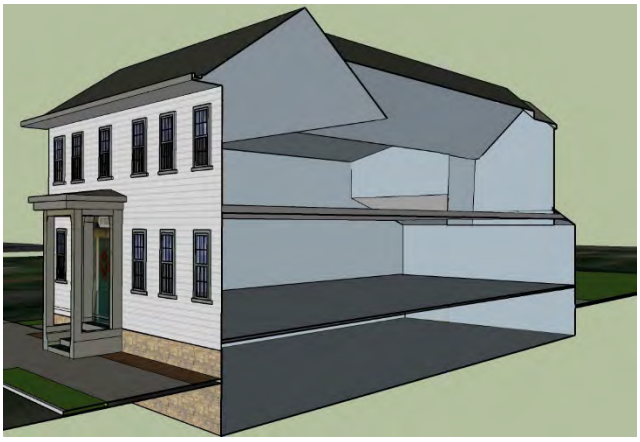
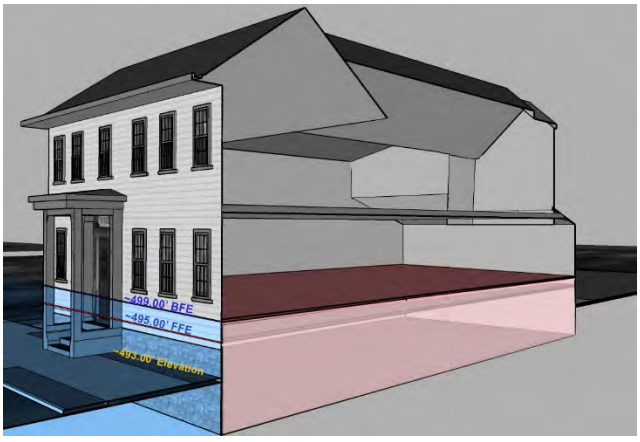


Figure X.
Proposed Site and Landscape Adaptations: side



Phase 2 -- Future Long-Term

- Abandon first story. This is something that would happen gradually, over time, with a move of operations upstairs. Eventually, the Historical Society could re-interpret the use of the first floor.
- Wetproof historic materials could remain on the first floor, if they could take on some water from time to time without sustaining permanent damage.
- Introduce a new series of revolving exhibits that tell the story of Muncy's history as it relates to water. These exhibits could include, but are certainly not limited to, the history of flooding in Muncy, waterways as contributors to opportunities for business, growth, and economy of Muncy, and water as a source of recreation, etc.

Visualizing Resilient Preservation: Additional Historic District Typologies

In addition to the Muncy Historical Society building, there are two more resilient preservation visualizations of common typologies in Muncy's Historic District: typical commercial Main Street structure and typical 2-story residential structure: *see below*

13 S Main Street

Figure X.
No Flood Mitigation Measures In-Place: street view

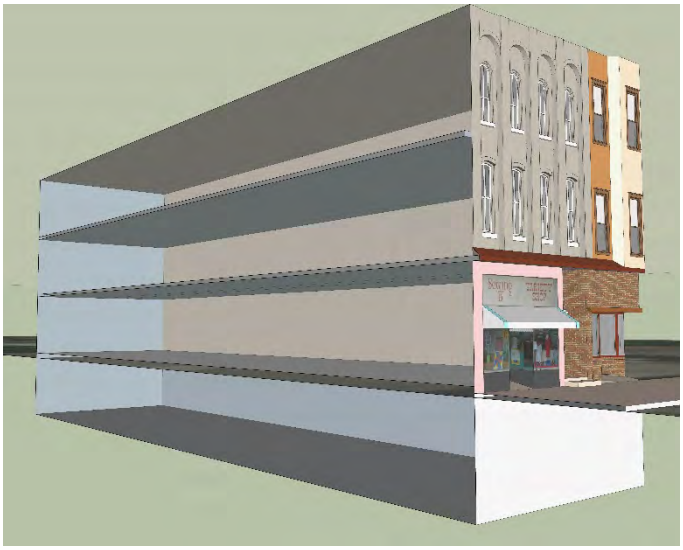


Figure X.
No Flood Mitigation Measures In-Place: cross-section

Figure X.
Flood Conditions (street view): *Proposed* Temporary Flood Barriers

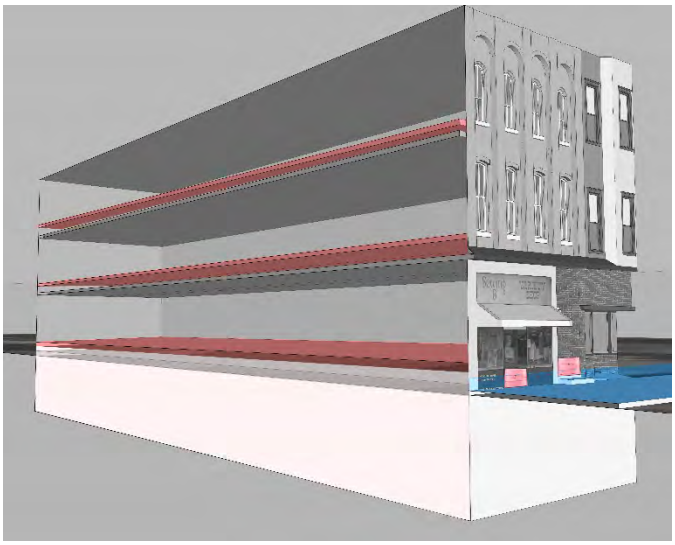


Figure X.
Flood Conditions (cross-section): *Proposed* Temporary Flood Barriers

107 N Market Street

Figure X.
No Flood Mitigation Measures In-Place: street view

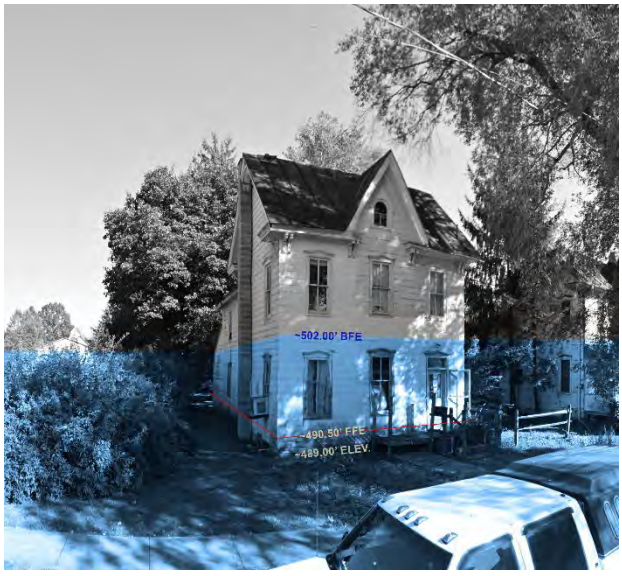


Figure X.
Flood Conditions (street view): No Flood Mitigation Measures In-Place

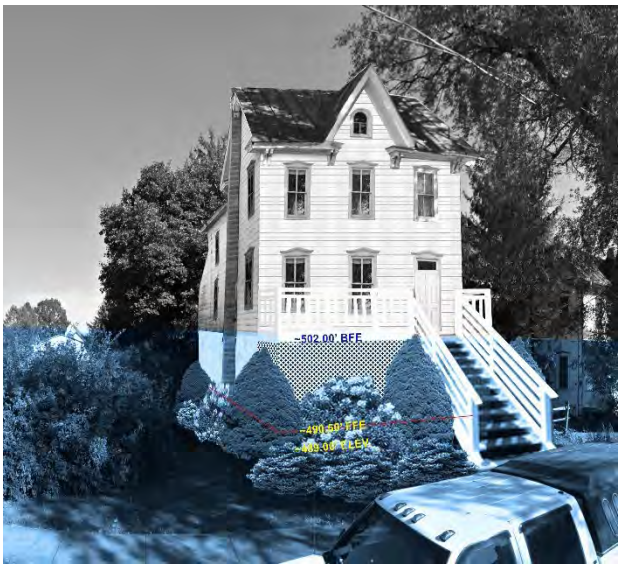


Figure X.
Flood Conditions (street view): *Proposed* Preservation-Sensitive Elevation with Compatible Landscaping

Figure X.
Sunny Day (street view): *Proposed* Preservation-Sensitive Elevation with Compatible Landscaping

Lycoming County – Muncy National Historic District

Resilient Preservation (RP) Housing Rehabilitation Program Guidelines

Resilient Preservation Program funding is provided to income eligible county residents for homeowner occupied rehabilitation. Applications are processed on a first come-first served basis.

Income Guidelines

Income is based on HUD's median income limits by county. These limits range from very low-to-moderate.

Resilient Preservation PHARE – Lycoming County	
Maximum 200% AMI for Lycoming County	
50% AMI	200% AMI
$28,200	$112,800

*Note: 100% AMI is $54,400 based on 2014 AMI (program funding year)

Program Stipulations

Each program beneficiary could be eligible to receive up to a maximum allocation of $25,000 in program funds (amount received will be determined by auditor's inspection). Assistance will be in the form of a grant. Prior to improvements, the property owner will be required to participate in a pre-construction conference to discuss the scope of work, historic preservation considerations, environmental issues, and to sign the construction agreement documentation.

- Project design and the overall flood mitigation strategy must be approved by Lycoming County's Department of Planning and Community Development to confirm compatibility with historic preservation design guidelines.

Criteria to Apply

- Property must be located in the Muncy Historic District and/or at least 50 years old
- Property must be occupied by an income-eligible homeowner
- Must be the owner's principal residence; and
- Taxes must be current
- The property may not be in foreclosure, for sale or put on the market for sale anytime during acceptance into the program or during renovations
- The property owner must possess a deed, mortgage, or a fee simple title

Eligible Property Types

Properties must meet several eligibility criteria to participate in the RP PHARE program. These include construction year, Outstanding or Contributing property, and located in the floodplain.

Historic building typologies common to or built during Muncy's three historic eras of significance:

a. Significant Period #1: 1790-1830
b. Significant Period #2: 1840-1875
c. Significant Period #3: 1885-1905

Historic Property Type, per the Muncy National Historic District

a. Outstanding
b. Contributing

Priority will be given to those applicants who:

- Have annual household incomes below 50% AMI - *see the above table*
- Seniors age 62 or older

Restrictions or non-eligible modifications include:

- Rehabilitations inconsistent with historic preservation guidelines as per the *Secretary of Interior's Standards* and the National Park Service (NPS) *Guidelines on Flood Adaptation for Rehabilitating Historic Buildings*
- Additions to existing buildings
- Rehabilitation of out buildings not attached to the home (sheds, garages, etc.)
- Properties categorized as 'Intrusions' in the Historic District

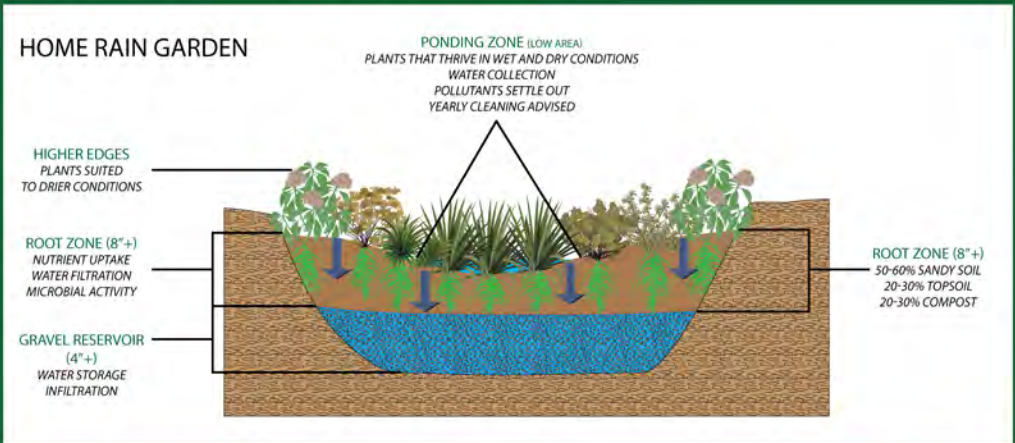
Appendix B: Green Infrastructure

Green Infrastructure Toolkit

Complete and Green Streets

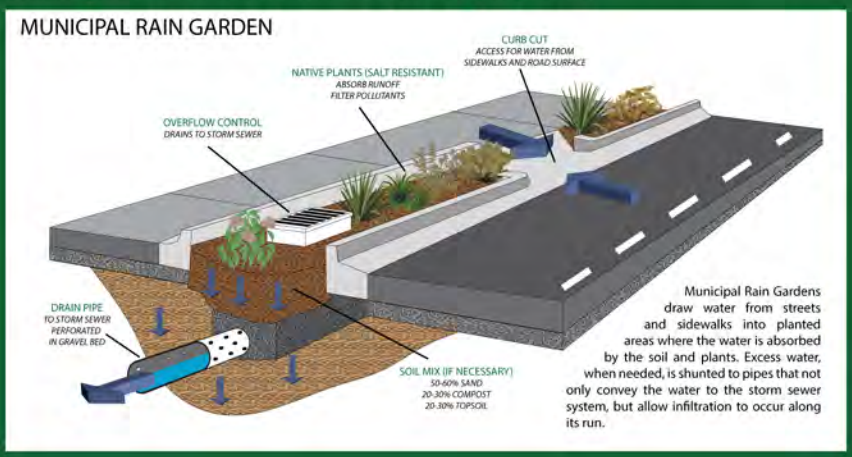
Rain Gardens — GREEN INFRASTRUCTURE TOOLKIT

A rain garden is a garden of native shrubs, perennials, and flowers planted in a small depression, which is generally formed on a natural slope. It is designed to temporarily hold and soak in rain water runoff that flows from roofs, driveways, patios or lawns. Rain gardens are effective in removing up to 90% of nutrients and chemicals and up to 80% of sediments from the rainwater runoff. Compared to a conventional lawn, rain gardens allow for 30% more water to soak into the ground.



A rain garden is not a water garden. Nor is it a pond or a wetland. Conversely, a rain garden is dry most of the time. It typically holds water only during and following a rainfall event. Because rain gardens will drain within 12-48 hours, they prevent the breeding of mosquitoes. (https://www.groundwater.org/action/home/raingardens.html)

These structures are not limited to municipal use only; homeowners are encouraged to build their own rain gardens to manage and control stormwater on their properties.



Applicability

In natural landscapes there's very little stormwater runoff because most rainwater filters down through the soil or evaporates back into the atmosphere. In developed landscapes' compacted soils, impervious surfaces and the removal of vegetation result in a huge increase in stormwater runoff. Runoff flows over developed surfaces, enters storm drains and is piped to the nearest stream. The fast-flowing polluted runoff scours away stream banks, widens and deepens the channel, and blankets downstream areas with

the dislodged sediment. The deepened stream channel lowers the water table so that nearby vegetation may suffer drought or even death. Rain gardens try to re-create the natural water cycle and reduce water quality problems.

Maintenance Considerations

They adapt well to their natural surroundings, and don't need fertilizers or pesticides. While your natives are establishing their roots, water them every other day or so for two to three weeks, or until you see that they're thriving. After that, you'll never need to water them except during a prolonged dry spell

Cost Considerations

Rain gardens cost about the same as other perennial flower gardens, and are less expensive than replanting annuals every year. Do-it-yourselfers can put in a garden for $3–5/square foot. Use a landscaper to plan and install, and you're looking at $10–15/square foot or more. Plants are the single most expensive item.

PLANT VARIETIES SUITABLE FOR RAIN GARDENS

The Penn State Extension has the following reccomendations regarding planting and plant species. This information and much more is available on their website: *https://extension.psu.edu/rain-gardens-the-plants , (from 12/12/2014.)*

This plant list provides a good starting point to help you become familiar with some native plants that are good for rain gardens. Most of the plants listed below are native specifically to the Mid-Atlantic region, although there are some that are native more to the mid-western region of the United States. This list is not a comprehensive planting guide, as the exact plants for each rain garden will vary depending on how much water the garden will hold, the exposure (sun or shade) and the soil conditions.

The woody plants listed are for the most part shrubs and smaller trees. There are a good number of larger trees that will easily withstand wet conditions (such as river birch, sweet gum, and black gum). However, this list was developed with the average size residential rain garden in mind, which would typically be using smaller scale plant material.

The perennials and grasses selected for this list were chosen for their ability to withstand fluctuating water levels in primarily sun to partial sun exposure. There are many native plants that are typically found in more shaded environments in soil with a high amount of organic matter. Such plants would not be suitable for a rain garden unless the exposure and soil conditions can match the needs of those plants.

Also, there are other plants (trees, shrubs, and herbaceous) suitable for rain gardens that just didn't make it onto this list. Remember, plants are dynamic and the water level that a plant can withstand is variable, even for plants that are very water tolerant. Be sure to consider sun/shade exposure as well as the depth of the raingarden when making plant selections.

ZONE 1-WET ZONE

This area will be the deepest and hold the most water for the most amount of time. The plants listed below are tolerant of inundated (flooded) conditions upwards of six inches, meaning that they can tolerate standing water for a period of time. The rain garden should be designed so that water infiltrates within 24 hours.

SHRUBS

Black chokeberry *(Aronia melanocarpa)**
Buttonbush *(Cephalanthus occidentalis)**
Elderberry *(Sambucus canadensis)**
Ninebark *(Physocarpus opulifolius)**
Possumhaw *(Viburnum nudum)**
St. Johnswort *(Hypericum densiflorum)**
Silky dogwood *(Cornus amomum)**
Smooth alder *(Alnus serrulata)**
Spicebush *(Lindera benzoin)**
Swamp azalea *(Rhododendron viscosum)*
Swamp rose *(Rosa palustris)*
Wild raisin *(Viburnum cassinoides)**
Winterberry *(Ilex verticillata)**

PERENNIALS AND FERNS

Blue flag iris *(Iris versicolor)*
Blue vervain *(Verbena hastata)**
Boneset *(Eupatorium perfoliatum)**
Cardinal flower *(Lobelia cardinalis)**
Cinnamon fern *(Osmunda cinnamomea)**
Golden ragwort *(Senecio aureus)**
Goldenrod *(Solidago patula, S. rugosa)**
Great blue lobelia *(Lobelia siphlitica)**
Green bullrush *(Scirpus atrovirens)*
Horsetail *(Equisetum species)*
Marsh marigold *(Caltha palustris)**
Monkey flower *(Mimulus ringens)*
New England aster *(Aster novae-anglia)**
New York aster *(Aster novi-belgii)*
Royal fern *(Osmunda regalis)*
Seedbox *(Ludwigia alternifolia)*
Sensitive fern *(Onoclea sensibilis)*
Sneezeweed *(Helenium autumnale)*
Soft rush *(Juncus effusus)*
Swamp milkweed *(Asclepias incarnata)*
Swamp rose mallow *(Hibiscus moscheutos)*
Swamp sunflower *(Helianthus angustifolius)*
Switchgrass *(Panicum virgatum)*
Tussock sedge *(Carex stricta)*
White turtlehead *(Chelone glabra)*
Woolgrass *(Scirpus cyperinus)*

TREES

Bald cypress *(Taxodium distichum)**
Birch *(Betula lenta, Betula nigra)**
Black gum *(Nyssa sylvatica)**
Black willow *(Salix nigra)**
Hemlock *(Tsuga canadensis)**
Pin oak *(Quercus palustris)*
Pond pine *(Pinus palustris)**
Red maple *(Acer rubrum)*
Swamp oak *(Quercus bicolor)*
Sweet gum *(Liquidambar styraciflua)**
Sycamore *(Plantanus occidentalis)**

*Note: Species noted with an asterisk (*) are also typically suitable for Zone 2 of the rain garden.

Rain Gardens Cont. — GREEN INFRASTRUCTURE TOOLKIT

ZONE 2-MESIC (MIDDLE) ZONE

This area will hold water but will drain much sooner than Zone 1. This zone is likely to hold several inches of water during and immediately after a rain event, depending on construction of the raingarden.

SHRUBS

American beautyberry *(Calicarpa americana)*
Broad-leaved meadowsweet *(Spirea latifolia)*
Inkberry *(Ilex glabra)*
Narrow-leaved meadowsweet *(Spirea alba)*
Red-osier dogwood *(Cornus sericea)*
Sweet pepperbush *(Clethra alnifolia)*
Virginia sweetspire *(Itea virginica)*

PERENNIALS

Blue false indigo *(Baptisia australis)*
Blue star (Amsonia tabernaemontana)
Boltonia *(Boltonia asteroides)*
Bottlebrush grass *(Hystrix patula)*
Broomsedge *(Andropogon virginicus)**
Culvers root *(Veronicastrum virginicum)*
Mistflower *(Eupatorium colestinum)*
Obedient plant *(Physotegia virginiana)*
Threadleaf coreopsis *(Coreopsis verticillata)*

TREES

Fringetree *(Chionanthus virginicus)*
Ninebark *(Physocarpus opulifolius)*
Paw paw *(Asmina triloba)*
Red maple *(Acer rubrum)*
Serviceberry *(Amelanchier arborea, A.canadensis and A. laevis)*

Note: See also the plants listed in Zone 1 marked with an asterisk (*).

ZONE 3-TRANSITION ZONE

The upper or transition zone between the rain garden and the non-garden area. This area will receive water infrequently; during very heavy rain events and will drain the fastest. It will be the most similar to typical garden areas, depending on the individual's watering practices. Almost any typical garden plant will work in this zone. Just be sure to use native plants to enhance wildlife habitat.

SHRUBS

American cranberry bush *(Viburnum trilobum)*
Black chokeberry *(Aronia melanocarpa)*
Bush cinquefoil *(Potentilla fruticosa)*
Fragrant sumac *(Rhus aromatica)*
Gray Dogwood *(Cornus racemosa)*
New Jersey tea *(Ceanothus americanus)*
St. Johnswort *(Hypericum densiflorum)*
Sweet pepperbush *(Clethra alnifolia)*
Virginia sweetspire *(Itea virginica)*
Witch hazel *(Hammamelis virginiana)*
Yellow root *(Xanthorhizza simplicissima)*

PERENNIALS

Anise hyssop *(Agastache foeniculum)*
Blazing star *(Liatris spicata)*
Blue star *(Amsonia tabernaemontana)*
Boltonia *(Boltonia asteroides)*
Butterfly weed *(Asclepias tuberosa)*
Calico aster *(Aster lateriflorus)*
Evening primrose *(Oenothera speciosa)*
Golden aster *(Chrysopsis mariana)*
Green and gold *(Chrysogonum virginianum)*
Mistflower *(Eupatorium colestinum)*
Threadleaf coreopsis *(Coreopsis verticillata)*

TREES

Buckeye *(Aesculus pavia and A. parviflora)*
Carolina silverbell *(Halesia caroliana)*
Staghorn sumac *(Rhus typhina)*

Rain Barrels

Rain barrels can effectively capture and store the runoff from small to moderate storms. The stored water then can be used to irrigate lawns and landscaped areas in between storm events.

The effectiveness of rain barrels (or cisterns) is a function of their storage volume in comparison to the size of the roof. In a simple residential example, a 1,200 square foot roof could utilize 55-gallon barrels to store runoff from downspouts at the four corners of the house. The resultant storage is equivalent to about 0.3 inches of runoff.

While this volume will not substantially reduce flooding from large storms, it can considerably reduce direct runoff from smaller storms and divert water from the combined sewer system. The actual effectiveness of this approach will depend on the regular draining of rain barrels (such as for irrigation) between storm events. In that respect, rain barrels are most effective when used during the growing season.

Applicability

Effective downspout disconnection requires that there be adequate landscaping or vegetation available to accept the water. Rain barrels are appropriate where vegetation is limited, provided that the collected water can overflow to open green space areas. Diversion and/or storage of roof runoff with rain barrels or cisterns is applicable to most residential, commercial and institutional properties in the City.

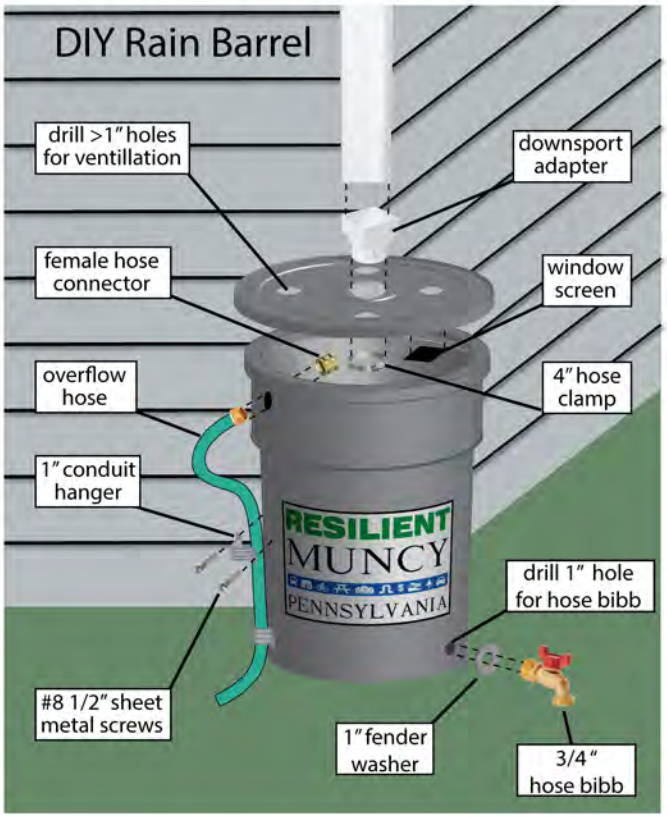
Maintenance Considerations

Occasional cleaning may be necessary to remove debris, such as leaves, coming off the rooftop. A mesh filter can be inserted at the top of a rain barrel. The barrel must be sealed during the warm months of the year to avoid mosquito breeding. To avoid freezing, the rain barrel should be drained prior to winter.

Cost Considerations

Typical costs for a ready-made rain barrel range from $20 to $150. Homeowners can reduce costs by making their own.

https://www.chicago.gov/city/en/depts/water/supp_info/conservation/green_design/downspouts_rain_barrelsandcisterns.html



Bioswales — GREEN INFRASTRUCTURE TOOLKIT

A swale is a broad, vegetated channel used for the movement and temporary storage of runoff. Swales also can move a portion of the runoff into the ground and filter out runoff pollutants. Drainage swales that are planted with native vegetation are commonly called bioswales.

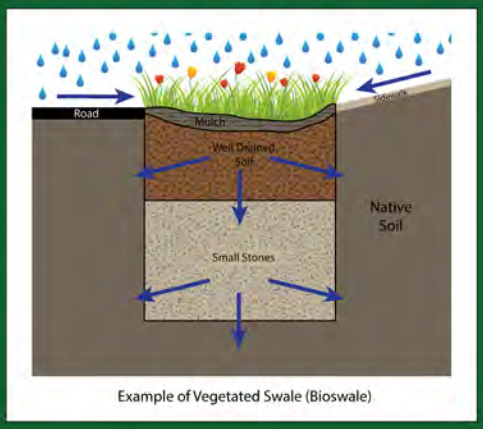
In contrast to conventional curb-and-gutter/storm sewer systems, swales can reduce both the rate and volume of stormwater runoff on a site. Since this is achieved via absorption of runoff into the soil, swales in sandy soils will be much more effective than swales in clay soils. Swales are most effective in reducing runoff volumes for small storm events and on an annual basis can reduce storm runoff volumes by up to 15 percent in clay soils.

Pollutant removal rates in swales are highly variable depending on the condition of the swale, particularly its slope, soils and vegetation. Estimated removal rates range from 30 percent to 70 percent of suspended solids and metals (such as cadmium and lead) and 10 percent to 30 percent of nutrients (such as phosphorus and nitrogen), biochemical oxygen demand and other organic compounds.

Swales can provide limited wildlife habitat when planted with native vegetation. Preserving existing drainageways on a development site also protects aquatic habitat.

Applicability

Drainage swales are applicable on virtually all development sites. In dense urban settings swales generally will be used in conjunction with storm sewers, rather that in lieu of storm sewers. Suggested applications include: office campus, commercial, industrial, multi-family residential, parking lots, and residential parkways. One type of swale is a depressed median – a recessed, landscaped area within paved surfaces. Depressed medians can be used as an alternative to raised parking lot islands, allowing water to flow into them from the surrounding pavement. Using vegetation is important in order to filter contaminants that may enter the median from the surrounding pavement.



Example of Vegetated Swale (Bioswale)

Maintenance Considerations

Drainage swales may require periodic cleaning but this cost should be minimized if upstream sources of sediment, particularly from construction activities, are well controlled. In comparison, storm sewer catch basins need to be cleaned periodically and manholes, storm sewer pipes, and curbs will need occasional repair.

Cost Considerations

Roadside swales in residential settings achieve substantial documented cost savings over conventional curb and gutter and storm sewers. In a suburban example, a savings of about $800 per residence was estimated. Although periodic cleaning may be required, swales should never need to be replaced, in contrast to storm sewers.

https://www.chicago.gov/city/en/depts/water/supp_info/conservation/green_design/drainage_swales.html/green_design/downspouts_rain_barrelsandcisterns.html

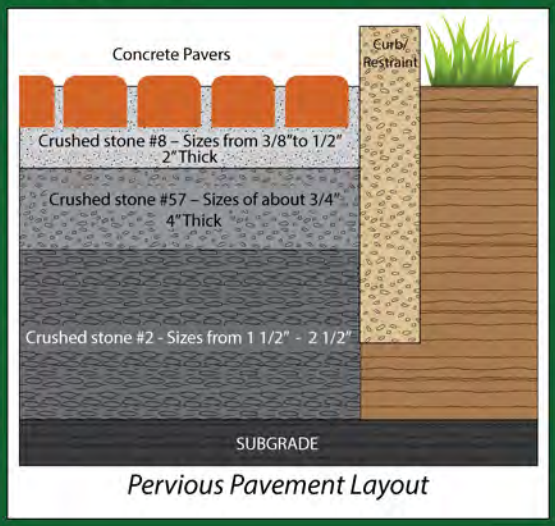
Permeable Pavement — GREEN INFRASTRUCTURE TOOLKIT

Permeable paving refers to paving materials - typically concrete, stone or plastic - that promote absorption of rain and snowmelt. The discussion that follows focuses primarily on one form of permeable pavement - paving blocks and grids, as they are the most common and available type of permeable paving. These modular systems contain openings that are filled with sand and/or soil. Some can support grass or other suitable vegetation, providing a green appearance. A portion of rainfall is trapped in the block's depressions and infiltrates into the underlying soil.

Permeable paving is effective in reducing the quantity of surface runoff, particularly for small to moderate-sized storms. It also reduces the runoff pollutants associated with these events. Effectiveness can be improved by designs that:

A. maximize the openings in the paving material and
B. provide an effective permeable sub-layer (e.g., at least 12 inches).

Permeable paving may have aesthetic and marketing advantages over conventional paving, depending on the materials selected. Vegetated pavers, in particular, could substantially improve the aesthetic appeal of paved areas. Vegetated pavers also can be effective in reducing the "urban heat island" effect.



Pervious Pavement Layout

An alternative form of permeable paving is porous pavement that relies on larger particles in the aggregate to rapidly infiltrate precipitation into an underlying stone "reservoir." Porous pavement may be a suitable option for certain low-impact application such aas parking lots and recreational spaces such as basketball courts. Porous pavement may be prone to clogging, be adversely affected by the freeze/thaw cycle and can have higher maintenance requirements than permeable paving. However, some recent reports - mostly from warmer climates - conclude that porous pavement may be a reliable, cost-effective alternative. One key consideration when using porous pavement is to ensure that the aggregate is sufficiently durable

Applicability

Permeable paving is particularly appropriate for the following applications: overflow and special event parking, driveways, utility and access roads, emergency access lanes, fire lanes and alleys.

Maintenance Considerations

Vegetated paving blocks may require occasional mowing. Snow plowing may require special care due to the slightly uneven surface of the pavement.

Cost Considerations

Installation costs for permeable paving can be as much as two to three times greater than conventional concrete or asphalt. However, there are indications that permeable paving requires less frequent replacement. Also, because it substantially reduces runoff quantities, permeable paving can substantially reduce related stormwater engineering and infrastructure (e.g., curbs, gutters and storm sewer) costs. These savings can at least partially offset the higher installation costs.
https://www.chicago.gov/city/en/depts/water/supp_info/conservation/permeable_alleys.html

Green Parking

Many green infrastructure elements can be seamlessly integrated into parking lot designs. Permeable pavements can be installed in sections of a lot and rain gardens and bioswales can be included in medians and along the parking lot perimeter. Benefits include mitigating the urban heat island and a more walkable built environment. https://www.epa.gov/green-infrastructure/what-green-infrastructure#raingardens

Applicability

There are several parking lots in the downtown area that serve as heat islands and also contribute to stormwater runoff. Green parking initiatives have the potential to turn these negative effects into positive ones.

Maintenance Considerations

As with permeable paving, vegetated paving blocks may require occasional mowing. Snow plowing may require special care due to the slightly uneven surface of the pavement.

Cost Considerations

As with permeable paving, installation costs for permeable paving can be as much as two to three times greater than conventional concrete or asphalt. However, there are indications that permeable paving requires less frequent replacement. Also, because it substantially reduces runoff quantities, permeable paving can substantially reduce related stormwater engineering and infrastructure (e.g., curbs, gutters and storm sewer) costs. These savings can at least partially offset the higher installation costs

Shade Trees

GREEN INFRASTRUCTURE TOOLKIT

Trees contribute to the public health, safety, and welfare. Among the benefits of trees, shrubs, and other plants are: improved air quality; beneficial climate modification; reduction of glare, noise, odors and dust; reduction of storm water runoff and flooding; screening of undesirable views; provision of buffers between incompatible land uses; shelter and food for birds and other wildlife; and the aesthetic enjoyment provided by the diversity and dynamism of the planted landscape. All of these benefits contribute to a higher quality of life, enhancing the appeal and economic value of both residential and business properties in the GMA.
http://www.richlandcountysc.gov/Portals/0/Departments/Planning/LandscapingStandards.pdf

Applicability
Trees reduce and slow stormwater by intercepting precipitation in their leaves and branches. They also provide the tree canopy that is a feature of the southern portion of Main St. while reducing the heat island effect of the urban sections of the GMA.
As these stately old trees age out it is necessary to replace them with properly selected new trees. The northern, eastern, and western gateways to the GMA do not feature the same tree coverage as does the southern gateway. These "corridors" can be replanted in areas where elevated infrastructure allows.

Maintenance Considerations
Little maintenance is necessary aside from some seasonal trimming.

Complete and Green Streets

Resilient Muncy: Muncy Borough Complete and Green Streets Resolution and Policy

Background

This document was prepared by Tetra Tech for the Local Advisory Committee as part of creation of the Greater Muncy Resilience Plan to provide support for Green Infrastructure (GI) implementation.

Complete and Green Streets Resolution and Policy

The model used to develop these tools for Muncy Borough is the Complete & Green Streets for All: Model Complete Streets Policy & Guide - Making New Jersey's Communities Healthy, Equitable, Green & Prosperous published in July 2019 and available on New Jersey Department of Transportation's website at: https://www.state.nj.us/transportation/eng/completestreets/pdf/CS_Model_Policy_2019.pdf. The resolution is presented first, followed by the policy which implements the resolution.

The resolution is intended for review and adoption by the Borough Council and is generally the first step to implementing complete and green streets policies. Policies can be enacted in different ways, such as through legislation, executive order, or a separate policy document. The Muncy Borough policy was prepared as legislation to be reviewed by the Local Advisory Committee and Borough Council for adoption into Muncy Borough Code in Chapter 236 Streets and Sidewalks.

A RESOLUTION OF MUNCY BOROUGH ESTABLISHING AND ADOPTING A COMPLETE AND GREEN STREETS POLICY

Resolution No. _____ Recommended adoption in Chapter 236 Streets and Sidewalks

WHEREAS, safe, convenient, accessible, equitable, healthy, and environmentally and economically beneficial transportation for all users is a priority of Muncy Borough; and

WHEREAS, Complete and Green Streets are a means to provide a comprehensive, integrated, connected multi-modal network of transportation options through planning, design, construction, maintenance, and operation of new and retrofit transportation facilities along the entire right-of-way for all users of all ages and abilities. "All users" include pedestrians, bicyclists, persons with disabilities, motorists, movers of commercial goods, and transit vehicle users; and

WHEREAS, Complete and Green Street policies support the goals of the Greater Muncy Resilience Plan and supporting elements; and

WHEREAS, Complete Streets allow for safe, accessible, and convenient travel, reducing serious injuries and fatalities for all users of the roadway, including pedestrians, bicyclists, children, older adults, people with disabilities, non-drivers, transit riders, and those who cannot afford a car or choose to reduce their car usage; and

WHEREAS, Complete and Green Streets address the issue identified in the 2018 Lycoming Countywide Comprehensive Plan priority issue #1 that "infrastructure does not meet the needs of all areas of the County" to improve connections and multi-modal access; and

WHEREAS, installing green infrastructure is a strategy identified to address regional issues in the Greater Muncy Resiliency Plan and identified in the 2017 Muncy Creek Multi-Municipal Comprehensive Plan; and

WHEREAS, traffic crashes are preventable and the only acceptable number of traffic deaths for Muncy Borough is zero; and

WHEREAS, Complete Streets that incorporate sustainable Green Streets design elements, such as green stormwater infrastructure, traffic calming treatments, shade trees, and the use of recycled materials, protect and create a healthier natural and social environment, improve air and water quality, and reduce localized flooding; and

WHEREAS, Complete and Green Streets implementation enhances access to local businesses, encourages reinvestment, increases property values and employment, and stimulates private investment, especially in retail districts, downtowns, and tourist areas; and

WHEREAS, Complete and Green Streets encourage an active lifestyle through increased physical activity, social connectivity, and sense of community belonging, thereby lowering risk of obesity, reducing chronic disease, improving mental health, and promoting wellness; and

WHEREAS, Complete and Green Streets implementation provides opportunity to enhance the historic character of Muncy Borough and our understanding of our shared history in a way that promotes the

economic and social vitality of the community and should be considered in the design of infrastructure improvements; and

WHEREAS, procedures should be implemented that ensure fair treatment, equitable funding and resource distribution, and meaningful involvement of all communities in all phases from selection, planning, and design to construction and long-term maintenance; and

WHEREAS, a balanced and flexible transportation system where all people can easily and safely walk and bicycle to everyday destinations — such as schools, shops, restaurants, businesses, parks, transit, and jobs — enhances neighborhood economic vitality and livability; and

WHEREAS, low- and moderate-income areas, whether in rural, urban, or suburban communities, are typically the least safe for pedestrians and bicyclists, especially for children walking and biking to school, due to long-standing infrastructure disparities and higher concentration of streets with faster-moving and higher-volume traffic; and

WHEREAS, implementation of the Complete and Green Streets policy should not negatively impact the affordability of the neighborhood for current residents; and

WHEREAS, the Complete and Green Streets policy applies to new, reconstruction, retrofit, and resurfacing projects, including design, planning, construction, maintenance and operations, for the entire right-of-way; and

WHEREAS requests for all exceptions must be submitted in writing, with supporting documentation, and made publicly available with a minimum of 30 days allowed for public input; and

WHEREAS, all initial planning, concept and design studies of infrastructure projects consider design elements that improve public health, environment, economy, equity, and safety.

NOW THEREFORE, BE IT RESOLVED, by Muncy Borough Council that Muncy Borough adopts the Muncy Borough Complete and Green Streets Policy attached hereto, and made part of this Resolution;

BE IT FURTHER RESOLVED, that copies of this Resolution shall be forwarded to all Muncy Borough and Lycoming County departments within thirty (30) days of the adoption of this Resolution.

Borough Council President:

_____

Date: _____

Mayor:

_____

Date: _____

ATTEST:

_____

Date: _____

Chapter 236 Streets and Sidewalks

Article VII Complete and Green Streets

236-40 Definitions

COMPLETE STREETS: An integrated transportation network designed to enable safe and convenient travel and access along and across streets for all users of all ages and abilities, including pedestrians, bicyclists, motorists, movers of commercial goods, and transit riders.

ENVIRONMENTAL JUSTICE: Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies.

MEANINGFUL INVOLVMENT:

1. People have an opportunity to participate in decisions about activities that may affect their environment and/or health.

2. The public's contribution can influence a regulatory agency's decision.

3. Community concerns will be considered in the decision-making process; and

4. Decision makers will seek out and facilitate involvement of those potentially affected.

GREEN INFRASTRUCTURE: An approach to stormwater management that uses plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspirate stormwater and reduce flows to sewer systems or to surface waters. Green infrastructure is a cost-effective, resilient approach to managing wet weather impacts that provides many community benefits. While single-purpose gray stormwater infrastructure—conventional piped drainage and water treatment systems—is designed to move urban stormwater away from the built environment, green infrastructure reduces and treats stormwater at its source while delivering environmental, social, and economic benefits.

GREEN STREETS: Streets with landscaped features installed in the rights-of-way that capture and allow stormwater runoff to soak into the ground, while still preserving the primary function of a street as a conduit for pedestrians, bicyclists, motorists, and transit riders.

STORMWATER RUNOFF: Excess water generated from rain and snowmelt events that flow over impervious surfaces, such as paved streets, parking lots, and building rooftops, and does not soak into the ground.

1. Green Stormwater Infrastructure: An approach to managing stormwater by infiltrating it in the ground where it is generated using vegetation or porous surfaces, or by capturing it for later reuse. Infiltration is when water falls to the earth as precipitation and seeps into the soil.

2. Green Street Stormwater Infrastructure Practices: Types of green infrastructure techniques used to manage stormwater, including but not limited to:

a. Street tree trenches/boxes: utilize soil, gravel, and plants to infiltrate and filter stormwater runoff from impervious surfaces.

b. Bioswales: shallow channels that convey, slow down, and infiltrate stormwater runoff.

c. Vegetated curb bump outs: a vegetated curb extension that protrudes into the street either mid-block or at an intersection, creating a new curb some distance from the existing curb.

d. Permeable pavement: a stormwater drainage system that allows rainwater and runoff to move through the pavement's surface to a storage layer below, with water eventually seeping into underlying soil. Types of permeable pavement include pervious concrete, porous asphalt, interlocking concrete pavers, and grid pavers.

236-41 Program Implementation

Muncy Borough shall develop an integrated and connected multimodal transportation system of Complete and Green Streets that serve all neighborhoods and populations. Towards this end:

1. All transportation projects shall result in Complete and Green Streets that allow safe, environmentally healthy, economically sound, equitable, accessible, and convenient travel along and across streets for users of all ages and abilities and for all modes of transportation, including motorists, bicyclists, public transportation vehicles and their passengers, and pedestrians and strive to meet the following goals:

a. Environment: Improve air and water quality, reduce flooding, mitigate traffic congestion.

b. Safety: Eliminate all road fatalities, significantly reduce crash severity and injury, and improve personal safety through increasing the number of people of walking and bicycling.

c. Economic: Stimulate economic prosperity.

d. Health: Increase physical activity and social connectivity with the goal of lowering the risk of obesity, reducing chronic disease and promoting wellness.

e. Equity: Implement policies and distribute funding and other resources equitably and responsibly in all neighborhoods; improve non-motor vehicle transportation systems.

2. This section shall apply to all public and/or private transportation projects, including those using funds awarded by, federal, state, regional, county, municipal, or any other public agency. This shall include new construction, reconstruction, private development projects, and maintenance of highways, roads, and streets.

3. The Borough Council, Borough Engineer, and Lycoming County Planning Department shall routinely work in coordination with each other and adjacent jurisdictions, and any relevant advisory committees/teams, to create Complete and Green Streets and to ensure consistency with the Comprehensive Plan and Elements and any other existing Pedestrian/Bicycle/Multimodal Plans, Stormwater Management Plans, Pollution Prevention Plans, and Historic Preservation Plans.

4. Within two years of the effective date of this Policy, the Borough Council shall inventory and audit procedures, policies, plans, documents, training programs, performance measures and other guidance documents to be consistent with this policy. The purpose of this audit is to identify areas where tenets of this policy will need to be incorporated. This includes, but is not limited to, funding, planning, designing, operating, and maintaining transportation infrastructure. The Borough Council will use this audit to incorporate this policy as updates to its procedures, plans, policies, etc. as they are scheduled.

5. Transportation projects and Capital Plans shall include, when appropriate, sustainable design elements, including, but not limited to:

a. Green Infrastructure practices, including shade trees and other vegetation.

b. Traffic Calming.

c. Permeable pavements, including those made from recycled materials, such as rubber, concrete, glass, and plastic.

6. Transportation projects and Capital Plans shall include, where appropriate, pedestrian and bicycle design elements and transit amenities, including but not limited to: curb extensions, sidewalks, radar feedback signs, pedestrian countdown signals, pedestrian refuge islands, road diets, lane width reductions, chicanes, roundabouts, bike lanes, protected bike lanes, bike parking, lighting, wayfinding, seating, trash receptacles, and transit amenities.

7. The Borough shall utilize the most current editions of guides, manuals, and best practices on street design, historic preservation construction, operations, and maintenance that apply to bicycle, pedestrian, transit, stormwater and highway facilities. All manuals, standards, and guidelines shall be made publicly available online.

236-42 Public Participation

1. The Local Advisory Committee will serve to implement the Complete and Green Streets Policy.

2. The Local Advisory Committee should coordinate with Lycoming Planning and Community Development Department, Pennsylvania Department of Transportation, and other stakeholders for public roads.

236-43 Exceptions

1. A transportation project may not be required to accommodate the needs of a particular user group if the Municipal Engineer determines in writing that:

a. The use of the transportation facility by the particular user group is prohibited by law;

b. Regulatory compliance requirements preclude accommodations;

c. There is a demonstrated absence of both a current and future need to accommodate the category of user (absence of future need may be shown via demographic, school, employment, and public transportation route data that demonstrate, for example, a low likelihood of bicycle, pedestrian, or transit activity in an area over the next 20 years); or

d. The adverse impacts of implementing this Complete Streets Policy significantly outweigh the benefits.

2. However, every effort to work within the flexibility allowed should be made, including Design Exceptions for roadway projects.

3. An exception shall be granted only if:

a. Request for an exception is submitted in writing, with supporting documentation, and made publicly available with a minimum of 30 days allowed for public input; and

b. The exception is approved in writing by the Borough Council and the written approval is made publicly available.

236-44 Program Reporting

1. The Local Advisory Committee shall establish benchmarks reflecting the ability of all users to travel safely and conveniently along highways, roads and streets within the agency's jurisdiction.

2. The Local Advisory Committee shall also develop plans and set goals to ensure the successful implementation of the Complete and Green Streets Policy. On or before [end of the fiscal year] the Local Advisory Committee shall prepare an initial report to identify barriers and propose solutions to successful implementation of the Complete and Green Streets Policy.

3. Each such agency shall provide a report on an annual basis to the Borough Council to allow the Borough Council to evaluate implementation of the Complete and Green Streets policy. Each annual report shall include the data collected pursuant to Program Reporting, as well as a list of ongoing and completed transportation projects during that fiscal year. If any exceptions are applied to transportation projects pursuant to 236-43 Exceptions, such projects and the relevant exceptions should be identified in the annual report. All benchmarks and reports shall be made publicly available online.

4. Benchmarks shall include but are not limited to:

a. Mileage of new and existing bicycle infrastructure (e.g., bicycle lanes, bike parking, paths, and boulevards).

b. Linear feet (or mileage) of new and existing pedestrian infrastructure (e.g., sidewalks, trails, transit amenities).

c. Number of new and existing ADA-compliant infrastructure (e.g., curb ramps, pedestrian buttons).

d. Number of new street trees.

e. Number of green street practices (e.g., rain gardens, bioswales, permeable pavement).

f. Number of pedestrian and bicycle lighting improvements.

g. Bicycle and pedestrian counts.

h. Commute mode percentages (e.g., drive alone, carpool, transit, bicycle, walk).

i. The number and percentage of designated transit stops accessible via sidewalks and curb ramps.

j. The number, locations, and causes of collisions, injuries, and fatalities by each mode of transportation.

k. The percentage of children walking or bicycling to school.

5. All benchmarks established by Muncy Borough shall be disaggregated by race/ethnicity, neighborhood, and vehicle ownership when feasible.

236-45 Adoption of Complete Streets Checklists

1. The Borough Council shall develop and adopt one or more Complete and Green Streets Checklists to be used during the project selection, planning, designing, construction, funding and maintenance of all transportation projects.

2. Each item in the checklist must include an area to provide a brief description of how the item is addressed, not addressed, or not applicable to the Complete and Green Streets policy.

3. The checklist shall explain the process for granting exceptions and indicate who is responsible for approving any exceptions before they are granted.

4. The Project Manager shall be responsible for completing the checklists and the Borough Engineer shall be responsible for reviewing the checklists.

5. A complete streets checklist shall entail but is not limited to:

a. Existing pedestrian, bicycle, transit, motor vehicle, and truck/freight accommodations (facilities) and operations.

b. Traffic volumes.

c. Existing safety and/or access issues and ADA compliance.

d. Land use within the study area, including trip generators.

e. Existing and proposed streetscape elements including furniture, trees or other environmental and stormwater enhancements.

f. Review of existing plans.

g. Proposed pedestrian, bicycle, transit, motor vehicle, and truck/freight accommodations (facilities) and desired future operations.

h. Compatibility with the surrounding land use and density.

i. Consistency with applicable design standards and guidelines.

j. Opportunities to improve public health through physical activity and mobility options.

k. Opportunities to manage stormwater through green infrastructure.

6. All Complete Streets checklists shall be made accessible online and available to the Complete and Green Streets Advisory Body.

236-46 Effective Date

The Complete Streets Act shall take effect on [date], provided that it shall not apply to any transportation project for which a preliminary design has been completed on or before [date].

Appendix C: LERTA

Local Economic Revitalization Tax Assistance (LERTA)

LERTA (Local Economic Revitalization Tax Assistance) Definition

LERTAs are geographically defined areas that provide local tax incentives to property owners to allow them to make improvements to their properties. The LERTA allows municipalities to exempt a pre-determined portion of the value of all improvements made to a property from local, county and school taxes for a pre-defined length of time, not to exceed 10 years.

While the property owner still pays taxes on the property, they receive a discount on the increase taxable value of the property due to improvements. This creates an incentive for reinvestment on existing structures or properties.

LERTA Components

1. Each local taxing authority may exempt real property taxation on the assessed value of improvements to deteriorated properties or the assessed valuation of new construction for a period not to exceed ten years
2. The local taxing authority may grant this exemption by ordinance or resolution.
3. Prior to the adoption of the ordinance or resolution the boundaries of the area to be granted tax exemptions must be defined as a designated deteriorated area.
4. A minimum of one public hearing must be held for the purposes of defining the boundary.
5. Recommendations for the location of the boundaries of the deteriorated area must be provided any public or private agencies knowledgeable and interested in the improvements of the deteriorated area (planning commission, taxing authorities, redevelopment authority).
6. Boundaries for the deteriorated area must be defined and recommended utilizing criteria set forth in the PA Urban Redevelopment Law for the determination of redevelopment areas and for criteria set in the Neighborhood Assistance Act (repealed by Act of June 16, 1994, P.L. 279) for determining impoverished areas.
7. Taxes shall be exempted in accordance with established and approved schedule.
8. Tax exemptions do not terminate upon sale or exchange of property.
9. Persons requesting tax exemption shall notify the taxing authorities in writing through submittal of pre-approved form at the time building permits are secured. If permits are not required, then the form must be submitted at the time construction begins.

Sample Schedule for a LERTA District			
Example #1 Residential Use/Commercial Use		**Example #2 Residential Use/Commercial Use**	
# of Year*	**Exemption Amount***	**# of Year***	**Exemption Amount***
First year	100%	First year	80%
Second year	90%	Second year	60%
Third year	80%	Third year	40%
Fourth year	70%	Fourth year	20%
Fifth year	60%	After 5 years the exemption terminates, and the property owner pays the full taxes on the improvement.	0%
Sixth year	50%	*These are flexible and can vary based on municipal, county and school district interest.	
Seventh year	40%		
Eighth year	30%		
Ninth year	20%		
Tenth year	10%		
After 10 years	The exemption terminates, and the property owner pays the full taxes on the improvement.		

How to Define a LERTA

The area defined within the LERTA boundaries must meet one or more of the criteria described below.

1. Unsafe, unsanitary, inadequate or overcrowded condition of the dwellings therein
2. Inadequate planning of the area
3. Excessive land coverage by the buildings thereon
4. Lack of proper light and air and open space
5. Defective design and arrangement of the buildings thereon
6. Faulty street or lot layout
7. Economically or socially undesirable land uses.