SECTION 1. INTRODUCTION

1.1 BACKGROUND

A Hazard Mitigation Plan is a living document that communities use to reduce their vulnerability to hazards. It forms the foundation for a community's long-term strategy to reduce disaster losses and creates a framework for decision making to reduce damages to lives, property, and the economy from future disasters. Examples of mitigation projects include home acquisitions or elevations to remove structures from high risk areas, upgrades to critical public facilities, and infrastructure improvements. Ultimately, these actions reduce vulnerability, and communities are able to recover more quickly from disasters. Broome County has demonstrated its commitment to reducing disaster losses by initially developing its multi-jurisdictional HMP in 2006 and again in 2013, updating information upon which to base a successful mitigation strategy to reduce the impacts of natural disasters and to increase the resiliency of its communities.

In response to the requirements of the Disaster Mitigation Act of 2000 (DMA 2000), Broome County and the municipalities located therein have developed this Hazard Mitigation Plan (HMP), which represents a regulatory update to the June 2013 "Broome County Multi-Jurisdictional Hazard Mitigation Plan Update". The DMA 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) and is designed to improve planning for, response to, and recovery from disasters by requiring state and local entities to implement pre-disaster mitigation planning and develop HMPs. The Federal Emergency Management Agency (FEMA) has issued guidelines for HMPs. The New York State Division of Homeland Security and Emergency Services (NYS DHSES), formerly the NYS Office of Emergency Management (NYSOEM), also supports plan development for jurisdictions in New York State and issued the NYS DHSES Hazard Mitigation Planning Standards for HMPs developed with NYS DHSES-administered funds.

Hazard Mitigation is any sustained action taken to reduce or eliminate the long-term risk and effects that can result from specific hazards.

FEMA defines a ***Hazard Mitigation Plan*** as the documentation of a state or local government evaluation of natural hazards and the strategies to mitigate such hazards.

Specifically, the DMA 2000 requires that states, with support from local governmental agencies, develop and update HMPs on a five-year basis to prepare for and reduce the potential impacts of natural hazards. The DMA 2000 is intended to facilitate cooperation between state and local authorities, prompting them to work together. This enhanced planning better enables local and State governments to articulate accurate needs for mitigation, resulting in faster allocation of funding and more effective risk reduction projects.

Broome County has been included in 26 FEMA (major and emergency) declarations.

1.1.1 DMA 2000 Origins -The Stafford Act

In the early 1990s, a new federal policy regarding disasters began to evolve. Rather than reacting whenever disasters strike communities, the federal government began encouraging communities to first assess their vulnerability to various disasters and proceed to take actions to reduce or eliminate potential risks. The logic is that a disaster-resistant community can rebound from a natural disaster with less loss of property or human injury, at much lower cost, and, consequently, more quickly. Moreover, these communities minimize other costs associated with disasters, such as the time lost from productive activity by business and industries.

The DMA 2000 provides an opportunity for states, tribes, and local governments to take a new and revitalized approach to mitigation planning. The DMA 2000 amended the Stafford Act by repealing the previous mitigation planning provisions (Section 409) and replacing them with a new set of requirements (Section 322). Section 322

sets forth the requirements that communities evaluate natural hazards within their respective jurisdictions and develop an appropriate plan of action to mitigate those hazards, while emphasizing the need for State, tribal and local governments to closely coordinate mitigation planning and implementation efforts.

The amended Stafford Act requires that each local jurisdiction identify potential natural hazards to the health, safety, and well-being of its residents and identify and prioritize actions that the community can take to mitigate those hazards—before disaster strikes. To remain eligible for hazard mitigation assistance from the federal government, communities must first prepare and then maintain and update an HMP (this plan).

Responsibility for fulfilling the requirements of Section 322 of the Stafford Act and administering the FEMA Hazard Mitigation Program has been delegated to the State of New York, specifically to NYS DHSES. FEMA also provides support through guidance, resources, and plan reviews.

1.1.2 Benefits of Mitigation Planning

The planning process helps prepare citizens and government agencies to better respond when disasters occur. Also, mitigation planning allows Broome County as a whole, and participating municipalities, to remain eligible for mitigation grant funding for mitigation projects that will reduce the impact of future disaster events. Eligible projects include property acquisition and structure demolition, structure elevation, localized flood risk reduction projects, infrastructure retrofit, soil stabilization, wildfire mitigation, post-disaster code enforcement, wind retrofit for one- and two-family residences, and planning related activities. The long-term benefits of mitigation planning include the following:

National Benefit-Cost Ratio (BCR) Per Peril *BCR numbers in this study have been rounded	Beyond Code Requirements	Federally Funded
Overall Hazard Benefit-Cost Ratio	$4:1	$6:1
Riverine Flood	$5:1	$7:1
Hurricane Surge	$7:1	Too few grants
Wind	$5:1	$5:1
Earthquake	$4:1	$3:1
Wildland-Urban Interface Fire	$4:1	$3:1

Source: FEMA 2018; Federal Insurance Mitigation Administration 2018
Note: Natural hazard mitigation saves $6 on average for every $1 spent on federal mitigation grants.

- An increased understanding of hazards faced by Broome County and their inclusive municipalities.
- Building more sustainable and disaster-resistant communities.
- Increasing education and awareness of hazards and their threats, as well as their risks.
- Developing implementable and achievable actions for risk reduction in the and its jurisdictions.
- Financial savings through partnerships that support planning and mitigation efforts.
- Focused use of limited resources on hazards that have the biggest impact on the community.
- Reduced long-term impacts and damages to human health and structures.
- Reduced repair costs.

1.1.3 Organizations Involved in the Mitigation Planning Effort

Broome County and the participating jurisdictions intend to implement this HMP with full coordination and participation of county and local departments, organizations and groups, and relevant state and federal entities. Coordination helps to ensure that stakeholders have established communication channels and relationships necessary to support mitigation planning and mitigation actions included in Section 6 (Mitigation Strategy) and in the jurisdictional annexes in Section 9 (Jurisdictional Annexes).

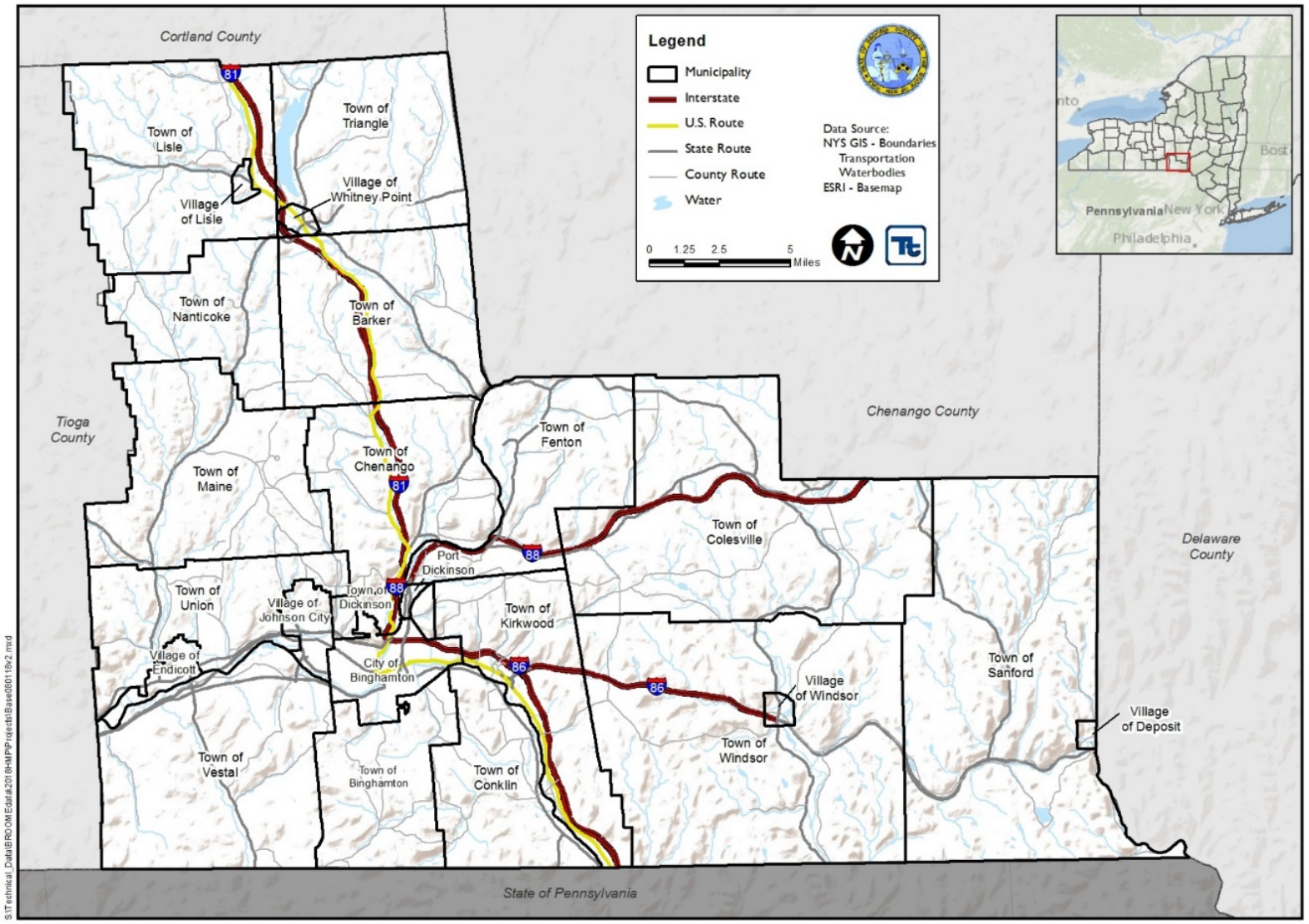
In addition to Broome County, 21 municipal governments in the County have participated in the 2019 planning process as indicated in Table 1-1 below. A map of the Broome County HMP planning area is provided in Figure 1-1 following the table.

Table 1-1. Participating Broome County Jurisdictions

Jurisdictions	
Broome County	
Barker (T)	Lisle (T)**
Binghamton (C)	Lisle (V)
Binghamton (T)	Maine (T)
Chenango (T)	Nanticoke (T)**
Colesville (T)	Port Dickinson (V)
Conklin (T)	Sanford (T)
Deposit (V)*	Triangle (T)
Dickinson (T)	Union (T)
Endicott (V)	Vestal (T)
Fenton (T)	Whitney Point (V)
Johnson City (V)	Windsor (T)
Kirkwood (T)	Windsor (V)

**The Village of Deposit is participating in the Delaware County HMP*
***Municipality is not participating in the 2019 HMP Update.*

Figure 1-1-1. Broome County, New York Mitigation Plan Area



Source: NYGI

Multiple Agency Support for Hazard Mitigation

Primary responsibility for the development and implementation of mitigation strategies and policies lies with local governments. However, local governments are not alone; various partners and resources at the regional, state, and federal levels are available to assist communities in the development and implementation of mitigation strategies. Within New York State, NYS DHSES is the lead agency providing hazard mitigation planning assistance to local jurisdictions. NYS DHSES provides guidance to support mitigation planning. In addition, FEMA provides grants, tools, guidance, and training to support mitigation planning.

Additional input and support for this planning effort was obtained from a range of agencies and through public involvement (as discussed in Section 3). The Broome County Department of Planning and Economic Development, with support from the Steering Committee, provided project management and oversight of the planning process. While participating municipalities were asked to identify a primary and alternate local Point of Contact (POC), broad participation by municipal representatives was encouraged and supported throughout the planning process. A list of Steering Committee and municipal POCs is provided in Section 3 (Planning Process), while Appendix B (Participation Matrix) provides further documentation of the broader level of municipal involvement.

This HMP was prepared in accordance with the following regulations and guidance:

- FEMA *Local Mitigation Planning Handbook*, March 2013.
- FEMA *Integrating Hazard Mitigation into Local Planning*, March 1, 2013.
- FEMA *Plan Integration: Linking Local Planning Efforts*, July 2015.
- *Local Mitigation Plan Review Guide*, October 1, 2011.
- DMA 2000 (Public Law 106-390, October 30, 2000).
- 44 Code of Federal Regulations (CFR) Parts 201 and 206 (including: Feb. 26, 2002, Oct. 1, 2002, Oct. 28, 2003, and Sept. 13, 2004 Interim Final Rules).
- FEMA *How-To Guide for Using HAZUS-MH for Risk Assessment* FEMA Document No. 433, February 2004.
- FEMA *Mitigation Planning How-to Series* (FEMA 386-1 through 4, 2002), available at: http://www.fema.gov/fima/planhowto.shtm.
- FEMA *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards*, January 2013.
- NYS DHSES *Hazard Mitigation Planning Standard*, 2017.
- NYS DHSES *Hazard Mitigation Planning Standard Guide*, 2017.
- NYS Hazard Mitigation Plan, 2014.

Table 1-2 summarizes the requirements outlined in the DMA 2000 Interim Final Rule and provides the section where each is addressed in this HMP.

Table 1-2. FEMA Local Mitigation Plan Review Crosswalk

Plan Criteria	Primary Location in Plan
Prerequisites	
Adoption by the Local Governing Body: §201.6(c)(5)	Section 2.0; Appendix A
Planning Process	
Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)	Section 3.0
Risk Assessment	
Identifying Hazards: §201.6(c)(2)(i)	Sections 5.2
Profiling Hazards: §201.6(c)(2)(i)	Section 5.4
Assessing Vulnerability: Overview: §201.6(c)(2)(ii)	Section 5.4
Assessing Vulnerability: Identifying Structures: §201.6(c)(2)(ii)(A)	Section 4.0 Section 5.4
Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)	Section 5.4
Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)	Section 4.0; Section 9 Annexes
Mitigation Strategy	
Local Hazard Mitigation Goals: §201.6(c)(3)(i)	Section 6.0; Section 9 Annexes
Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)	Section 6.0; Section 9 Annexes
Implementation of Mitigation Actions: §201.6(c)(3)(iii)	Section 6.0; Section 9 Annexes
Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)	Section 6.0; Section 9 Annexes
Plan Maintenance Process	
Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(i)	Section 7.0
Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)	Section 7.0; Section 9 Annexes
Continued Public Involvement: §201.6(c)(4)(iii)	Section 7.0

1.1.4 Organization

The Broome County HMP update is organized as a two-volume plan. Volume I provides information on the overall planning process and natural hazard profiling and vulnerability assessments, which serve as a basis for understanding risk and identifying appropriate mitigation actions. As such, Volume I is intended for use as a resource for on-going mitigation analysis. Volume II provides an annex dedicated to each participating jurisdiction. Each annex summarizes the jurisdiction's legal, regulatory, and fiscal capabilities; identifies vulnerabilities to natural hazards; records status of past mitigation actions; and presents an individualized mitigation strategy. The annexes are intended to provide an expedient resource for each jurisdiction for implementation of mitigation projects and future grant opportunities, as well as place for each jurisdiction to record and maintain their local aspect of the countywide plan.

Goals and Objectives

The planning process included a review and update of the prior mitigation goals and the addition of all new objectives as a basis for the planning process and to guide the selection of appropriate mitigation actions addressing all hazards of concern. Further, the goal development process considered the mitigation goals expressed in the New York State HMP, as well as other relevant county and local planning documents, as discussed in Section 6 (Mitigation Strategy).

The 5 Goals of the Broome County HMP

- Goal 1: Protect Life, Property, and Economy
- Goal 2: Increase Public Awareness and Preparedness
- Goal 3: Encourage Partnerships
- Goal 4: Provide for Enhanced Emergency Services
- Goal 5: Improve the resilience and strength of the built environment and communities to reduce impacts of natural hazard events.

Hazards of Concern

Broome County and participating jurisdictions reviewed the natural hazards that caused measurable impacts based on events, losses, and information available since the development of the Broome County HMP Update (2013) and the New York State Hazard Mitigation Plan - 2014 Update. Broome County and participating jurisdictions evaluated the risk and vulnerability due to each of the hazards of concern on the assets of each participating jurisdiction. While the overall hazard rankings were calculated for the county and each participating municipality, the overall hazard rankings displayed in each annex reflect municipal input. The hazard risk rankings were used to focus and prioritize individual jurisdictional mitigation strategies.

Plan Integration into Other Planning Mechanisms

Effective mitigation is achieved when hazard awareness and risk management approaches and strategies become an integral part of public activities and decision-making. Within the county there are many existing plans and programs that support hazard risk management, and thus it is critical that this HMP integrates, coordinates with, and complements those mechanisms. Comprehensive plans, codes and ordinances, local watershed plans are among the sources of information to update the county and municipal capabilities, to identify mitigation strategies, and to develop integration actions.

The "Capability Assessment" section of Section 6 (Mitigation Strategy) provides a summary and description of the existing plans, programs and regulatory mechanisms at all levels of government (federal state, county, and local) that support hazard mitigation within the county. Within each jurisdictional annex in Section 9 (Jurisdictional Annexes), the county and each participating jurisdiction identified how they have integrated hazard risk management into their existing planning, regulatory and operational/administrative framework ("existing integration"), and how they intend to promote this integration ("opportunities for future integration").

A further summary of these continued efforts to develop and promote a comprehensive and holistic approach to hazard risk management and mitigation is presented in Section 9 (Jurisdictional Annexes).

1.1.5 Implementation of Prior and Existing Local Hazard Mitigation Plans

Section 6 (Mitigation Strategy) and Section 9 (Jurisdictional Annexes) of the plan present the status of the mitigation projects identified in the 2013 Broome County HMP. Numerous projects and programs have been implemented that have reduced hazard vulnerability to assets in the planning area. The county and municipal annexes, as well as plan maintenance procedures in Section 7 (Plan Maintenance), were developed to include specific, implementable activities. Future actions include integrating hazard mitigation goals into comprehensive plan updates; reviewing the HMP during updates of codes, ordinances, zoning, and development; and ensuring

a more thorough integration of hazard mitigation, with its related benefits, will be completed within the upcoming five-year planning period.

1.1.6 Implementation of the Planning Process

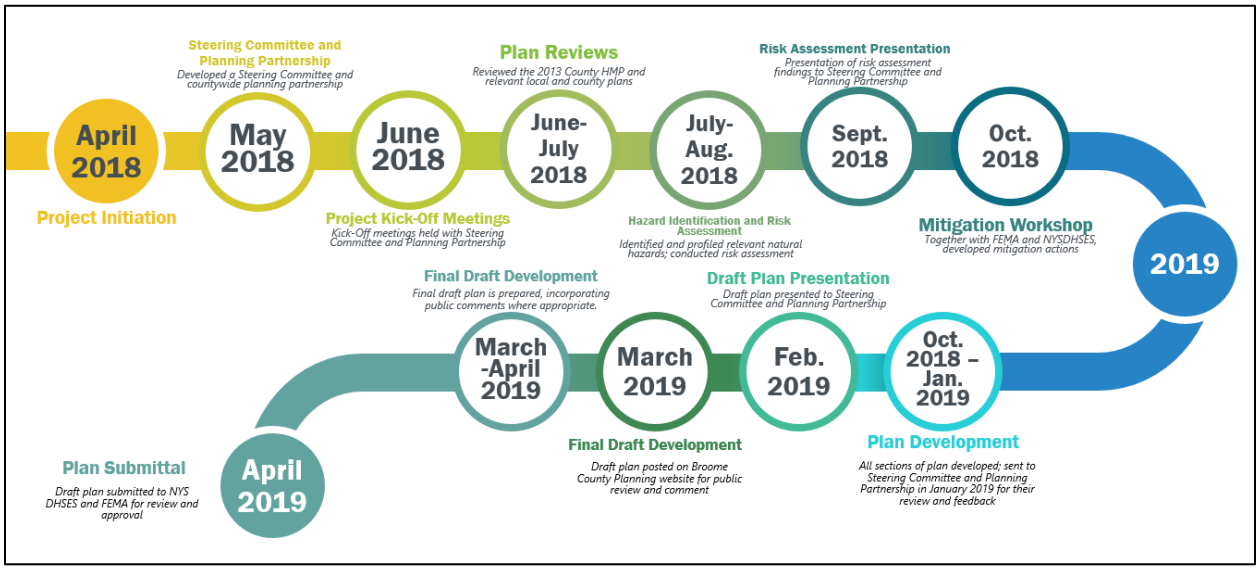
The planning process and findings are required to be documented in local HMPs. To support the planning process in developing this HMP, Broome County and the participating jurisdictions have accomplished the following:

- Developed a Steering Committee and countywide planning partnership with municipalities and stakeholders.
- Reviewed the June 2013 *Broome County Multi-Jurisdictional Hazard Mitigation Plan Update*.
- Identified and reviewed those natural hazards that are of greatest concern to the community (hazards of concern) to be included in the plan.
- Profiled the relevant natural hazards.
- Estimated the inventory at risk and potential losses associated with the relevant hazards.
- Reviewed and updated the hazard mitigation goals and added new objectives.
- Reviewed mitigation strategies identified in the 2013 Broome County HMP.
- Developed new mitigation actions to address reduction of vulnerability of hazards of concern.
- Involved a wide range of stakeholders and the public in the plan process.
- Developed mitigation plan maintenance procedures to be executed after obtaining approval of the plan from NYS DHSES and FEMA.

As required by the DMA 2000, Broome County and participating jurisdictions have informed the public and provided opportunities for public comment and input. Numerous agencies and stakeholders have participated as core or support members by providing input and expertise throughout the planning process. Refer to Appendix D (Public and Stakeholder Outreach) for copies of public service announcements, newspaper articles, and social media posts.

This HMP update documents the process and outcomes of Broome County and the jurisdictions' efforts. Section 2 (Plan Adoption) includes documentation that the prerequisites for plan approval have been met. Section 3 (Planning Process) includes additional information on the process to develop this plan.

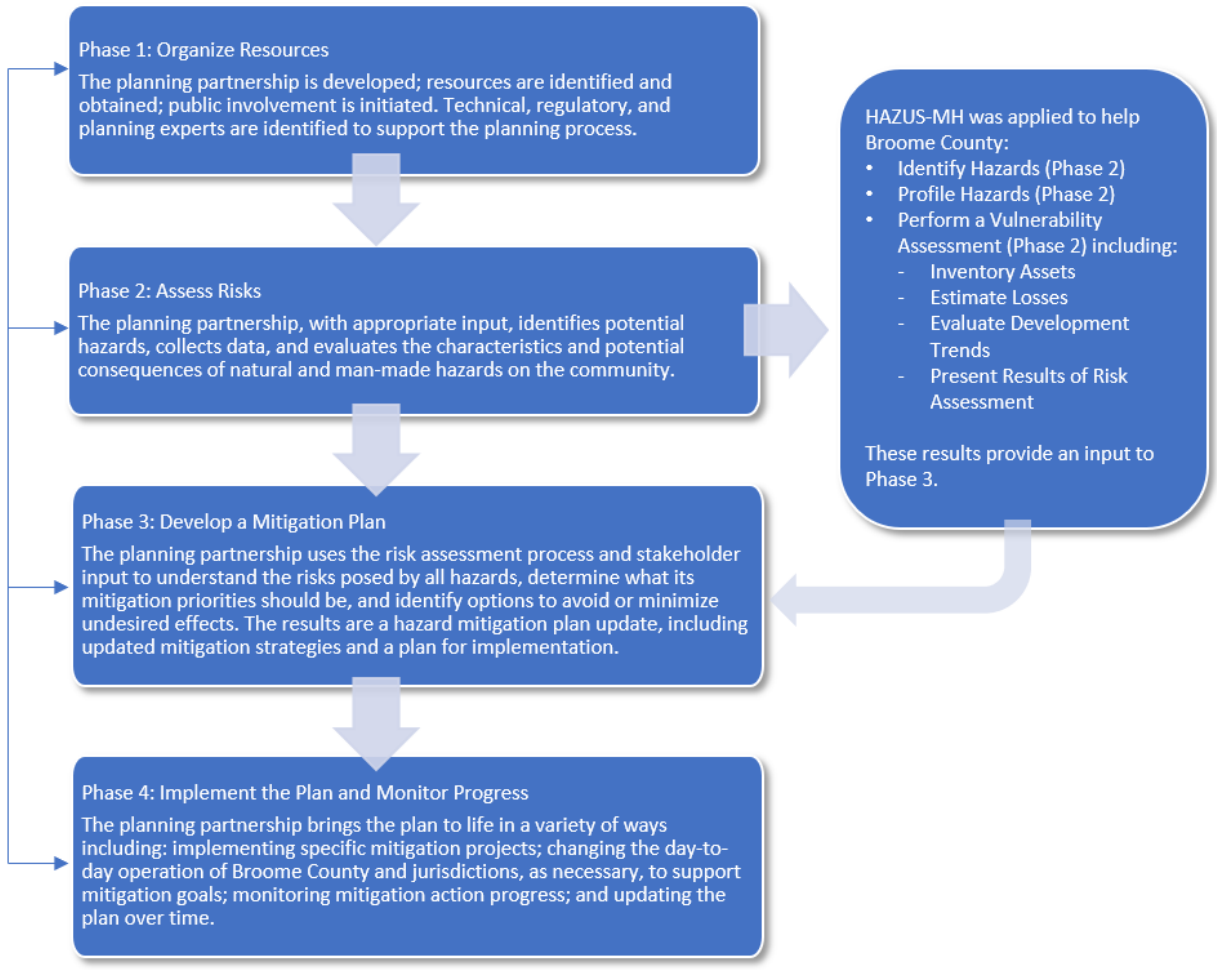
Figure 1-2. Planning Process Roadmap



1.1.7 Organization of This Mitigation Plan

This HMP is organized in accordance with FEMA and NYS DHSES guidance. The structure of this HMP follows the four-phase planning process recommended by FEMA and summarized in Figure 1-3.

Figure 1-3. Broome County Hazard Mitigation Planning Process



As noted earlier, the HMP is organized into two volumes: Volume I includes all information that applies to the entire planning area (Broome County) and Volume II includes participating jurisdiction-specific information.

Volume I of this Plan includes the following sections:

Section 1: Introduction: Overview of participants and planning process.

Section 2: Plan Adoption: Information regarding the adoption of the HMP by Broome County and each participating jurisdiction.

Section 3: Planning Process: A description of the HMP methodology and development process; Steering Committee, Planning Committee and stakeholder involvement efforts; and a description of how this HMP will be incorporated into existing programs.

Section 4: County Profile: An overview of Broome County, including: (1) general information, (2) economy, (3) land use trends, (4) population and demographics, (5) general building stock inventory, and (6) critical facilities.

Section 5: Risk Assessment: Documentation of the hazard identification and hazard risk ranking process, hazard profiles, and findings of the vulnerability assessment (estimates of the impact of hazard events on life, safety and health; general building stock; critical facilities and the economy); description of the status of local data; and planned steps to improve local data to support mitigation planning.

Section 6: Mitigation Strategies: Information regarding the mitigation goals and objectives identified by the Steering Committee in response to priority hazards of concern and the process by which county and local mitigation strategies have been developed or updated.

Section 7: Plan Maintenance Procedures: System established by the Steering Committee to continue to monitor, evaluate, maintain and update the HMP.

Volume II of this plan includes the following sections:

Section 8: Planning Partnership: Description of the planning partnership, their responsibilities, and jurisdictional annexes.

Section 9: Jurisdictional Annexes: A jurisdiction-specific annex for Broome County and each participating jurisdiction containing their hazards of concern, hazard risk ranking, capability assessments, mitigation actions, action prioritization specific only to Broome County or that jurisdiction, progress on prior mitigation activities (as applicable), and a discussion of prior local hazard mitigation plan integration into local planning processes.

Appendices include the following:

Appendix A: Resolution of Plan Adoption: Resolutions from the county and each jurisdiction will be included as they formally adopt the HMP update.

Appendix B: Participation Matrix: A matrix is presented to give a broad overview of who attended meetings and when input was provided to the HMP update. Letters of Intent to Participate as described in Section 3 are also included in this appendix.

Appendix C: Meeting Documentation: Agendas, attendance sheets, minutes, and other documentation (as available and applicable) of planning meetings convened during the development of the plan.

Appendix D: Public and Stakeholder Outreach Documentation: Documentation of the public and stakeholder outreach effort including webpages, informational materials, public and stakeholder meetings and presentations, surveys, and other methods used to receive and incorporate public and stakeholder comment and input to the plan process.

Appendix E: County Profile and Risk Assessment Supplementary Data: Details regarding critical facilities from Section 4 (County Profile) and vulnerability assessments conducted for the hazards of concern (Section 5 – Risk Assessment).

Appendix F: Critical Facilities: Critical facilities included in the risk assessment.

Appendix G: FEMA Plan Review Tools: Examples of plan review templates available to support annual plan review.

1.2 The Plan Update – What is Different?

Broome County's initial HMP was initially approved by FEMA and adopted by participating jurisdictions in 2007. The plan was subsequently updated, approved by FEMA and adopted by participating jurisdictions in 2013. The 2019 update builds on the 2013 plan and specifically includes the following changes or enhancements. This plan differed from its predecessor for a variety of reasons:

- This plan was prepared in accordance with the 2017 NYS DHSES guidance which provided a framework for a more concise and focused mitigation plan.
- Updated data and tools provided for a more detailed and accurate risk assessment. Building footprint data was now available to provide a more accurate flood vulnerability assessment. The risk assessment was prepared to better support future grant applications by providing risk and vulnerability information that would directly support the measurement of "cost-effectiveness" required under FEMA mitigation grant programs.
- There was a strong desire on the part of Broome County for this plan to be a user-friendly document that is understandable to the general public and not overly technical and provide images and text that can easily be used as tools to better communicate local hazard risk.
- The plan identified implementable actions rather than strategies, with enough information to serve as the basis for policy and funding decisions and represent measurable impacts on resiliency and mitigation progress. Strategies provide direction, but actions are fundable under grant programs.

Table 1-3. Plan Changes Crosswalk

44 CFR Requirement	2013 Plan	2019 Updated Plan
Requirement §201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: *(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;* *(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and* *(3) Review and incorporation, if appropriate, of existing plans, studies, reports and technical information.*	The 2013 plan followed an outreach strategy utilizing multiple media developed and approved by the Steering Committee. This strategy involved the following: • Public participation on an oversight Steering Committee. • Establishment of a plan informational website. • Press releases. • Use of a public information survey. Stakeholders were identified and coordinated with throughout the process. A comprehensive review of relevant plans and programs was performed by the planning team.	Building upon the success of the 2013 plan, the 2019 planning effort deployed the same public engagement methodology. The plan included the following enhancements: • Using social media. • Web-deployed survey. • Informational brochure. As with the 2013 plan, the 2019 planning process identified key stakeholders and coordinated with them throughout the process. A comprehensive review of relevant plans and programs was performed by the planning team.
§201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.	The 2013 plan included a comprehensive risk assessment of hazards of concern. Risk was defined as (probability x impact), where impact is the impact on people, property, and economy of the planning area. All planning partners ranked risk as it pertains to their jurisdiction. The potential impacts of climate change are discussed for each hazard.	The same methodology, using new, updated data, was deployed for the 2019 plan update.

44 CFR Requirement	2013 Plan	2019 Updated Plan
§201.6(c)(2)(i): [The risk assessment] shall include a] description of the … location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.	The 2013 plan presented a risk assessment of each hazard of concern. Each section included the following: • Hazard profile, including maps of extent and location, previous occurrences, and probability of future events. • Climate change impacts on future probability. • Impact and vulnerability on life, health, safety, general building stock, critical facilities, and economy. • Impact on people, property, critical facilities, and environment. • Future growth and development. • Additional data and next steps. • Overall vulnerability assessment.	The same format, using new and updated data, was used for the 2019 plan update. Each section of the risk assessment includes the following: • Hazard profile, including maps of extent and location, previous occurrences, and probability of future events. • Climate change impacts on future probability using the best available data for New York State. • Vulnerability assessment includes: impact on life, safety, and health, general building stock, critical facilities, and the economy, as well as future changes that could impact vulnerability. • The vulnerability assessment also includes changes in vulnerability since the 2013 plan. • Identified issues have been documented in each hazard profile.
§201.6(c)(2)(ii): [The risk assessment] shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i). This description shall include an overall summary of each hazard and its impact on the community.	Vulnerability was assessed for all hazards of concern. The HAZUS-MH computer model was used for the severe storm, earthquake, and flood hazards. These were Level 2 analyses using county data. Site-specific data on county-identified critical facilities were entered into the HAZUS-MH model. HAZUS-MH outputs were generated for other hazards by applying an estimated damage function to an asset inventory extracted from HAZUS-MH-MH.	The same methodology was deployed for the 2019 plan update, using new and updated data. Additional hazards of concern include the following: • Invasive species. • Wildfire
§201.6(c)(2)(ii): [The risk assessment] must also address National Flood Insurance Program insured structures that have been repetitively damaged floods.	A summary of NFIP insured properties including an analysis of repetitive loss property locations was included in the plan.	The same methodology was deployed for the 2019 plan update using new and updated data.
Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure and critical facilities located in the identified hazard area.	A complete inventory of the numbers and types of buildings exposed was generated for each hazard of concern. The Steering Committee defined "critical facilities" for the planning area, and these were inventoried by exposure. Each hazard profile provides a discussion on future development trends.	The same methodology was deployed for the 2019 plan update using new and updated data.
Requirement §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) and a description of the methodology used to prepare the estimate.	Loss estimates were generated for all hazards of concern. These were generated by HAZUS-MH for the severe storm, earthquake, and flood hazards. For the other hazards, loss estimates were generated by applying a regionally relevant damage function to the exposed inventory. In all cases, a damage function was applied to an	The same methodology was deployed for the 2019 plan update using new and updated data.

44 CFR Requirement	2013 Plan	2019 Updated Plan
	asset inventory. The asset inventory was the same for all hazards and was generated in HAZUS-MH.	
Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.	There is a summary of anticipated development in the County profile, as well as in each individual annex.	The same methodology was deployed for the 2019 plan update using new and updated data.
§201.6(c)(3):[The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.]	The 2013 plan contained a mission statement, goals, objectives and actions. The mission statement, goals and objectives were regional and covered all planning partners. Each planning partner identified actions that could be implemented within their capabilities. The actions were jurisdiction-specific and strove to meet multiple objectives. All objectives met multiple goals and stand alone as components of the plan. Each planning partner completed an assessment of its planning, regulatory, technical, and financial capabilities.	The same methodology for setting goals, objectives, and actions was applied to the 2019 plan update. The Steering Committee reviewed and reconfirmed the mission statement, goals, and objectives for the plan. Each planning partner used the progress reporting from the plan maintenance and evaluated the status of actions identified in the 2013 plan. Actions that were completed or no longer considered to be feasible were removed. The balance of the actions was carried over to the 2019 plan, and in some cases, new actions were added to the action plan.
Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.	The Steering Committee identified a mission statement, goals, and objectives targeted specifically for this hazard mitigation plan. These planning components supported the actions identified in the plan.	The same methodology for setting goals, objectives, and actions was applied to the 2019 plan update. The Steering Committee reviewed and updated the mission statement, goals, and objectives for the plan to include a focus on increased resiliency. This resulted in the finalization of five goals and 34 objectives to frame the plan.
Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.	The 2013 plan includes a hazard mitigation catalog that was developed through a facilitated process. This catalog identifies actions that manipulate the hazard, reduce exposure to the hazard, reduce vulnerability, or increase mitigation capability. The catalog further segregates actions by scale of implementation. A table in the action plan section analyzes each action by mitigation type to illustrate the range of actions selected.	The mitigation catalog was reviewed and updated by the Steering Committee for the 2019 update. As with the 2013 plan, the catalog has been included in the 2019 plan to represent the comprehensive range of alternatives considered by each planning partner. The table with the analysis of mitigation actions was used in jurisdictional annexes to the plan.
Requirement: §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program, and continued compliance with the program's requirements, as appropriate.	All municipal planning partners that participate in the NFIP identified an action stating their commitment to maintain compliance and good standing under the program.	Ongoing participation in the NFIP for municipalities was included in ongoing capabilities.
Requirement: §201.6(c)(3)(iii): [The mitigation strategy shall describe] how the actions identified in section (c)(3)(ii) will be prioritized, implemented and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits	Each recommended action was prioritized using a qualitative methodology based on the objectives the project will meet, the timeline for completion, how the project will be funded, the impact of the project, the	A revised methodology based on the STAPLEE criteria and using new and updated data was used for the 2019 plan update.

44 CFR Requirement	2013 Plan	2019 Updated Plan
are maximized according to a cost benefit review of the proposed projects and their associated costs.	benefits of the project, and the costs of the project.	
Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.		The 2019 plan details a plan maintenance strategy similar to that of the initial plan.
Requirement §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.	The 2013 plan details recommendations for incorporating the plan into other planning mechanisms.	The 2019 plan details recommendations for incorporating the plan into other planning mechanisms such as the following: • Comprehensive Plan. • Emergency Response Plan. • Capital Improvement Programs. • Municipal Code.
Requirement §201.6(c)(4)(iii): [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.	The 2013 plan details a strategy for continuing public involvement.	The 2013 plan maintenance strategy was carried over to the 2019 plan. In addition, the County will use a proprietary online tool to support the annual progress reporting of mitigation actions.
Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).	24 planning partners participated in the 2013 planning process.	The 2019 plan achieves DMA compliance for 21 planning partners. Resolutions for each partner adopting the plan can be found in Appendix A of this volume.

SECTION 2. PLAN ADOPTION

2.1 Overview

This section contains information regarding adoption of the plan by Broome County and each participating jurisdiction.

2.1.1 Plan Adoption by Local Governing Bodies

Adoption by the local governing bodies such as the County Legislature, City Council or Town/Village Board demonstrates the commitment of Broome County and each participating jurisdiction to fulfill the mitigation goals and strategies outlined in the plan. Adoption of the plan via a municipal resolution legitimizes the HHMP and authorizes responsible agencies to execute their responsibilities.

The County and all participating jurisdictions will proceed with formal adoption proceedings when FEMA has completed review of the plan and provides conditional approval of this HMP update, known as Approval Pending Adoption (APA)

Following adoption or formal action on the plan, the jurisdiction must submit a copy of the resolution or other legal instrument showing formal adoption (acceptance) of the plan to the Broome County Hazard Mitigation Coordinator in the Broome County Planning Department. Broome County will forward the executed resolutions to NYS DHSES after which they will be forwarded to FEMA for record. The jurisdictions understand that FEMA will transmit acknowledgement of verification of formal plan adoption and the official approval of the plan to the Broome County Hazard Mitigation Coordinator.

The resolutions issued by each jurisdiction to support adoption of the plan will be included in Appendix A

In addition to being required by DMA 2000, adoption of the plan is necessary because:

- It lends authority to the plan to serve as a guiding document for all local and state government officials.
- It gives legal status to the plan in the event it is challenged in court.
- It certifies the program and grant administrators that the plan's recommendations have been properly considered and approved by the governing authority and jurisdictions' citizens.
- It helps to ensure the continuity of mitigation programs and policies over time because elected officials, staff, and other community decision-makers can refer to the official document when making decisions about the community's future.

Source: FEMA. 2003. H*ow to Series: Bringing the Plan to Life* (FEMA 386-4).

SECTION 3. PLANNING PROCESS

3.1 INTRODUCTION

This section includes a description of the planning process used to update the June 2013 *Broome County All Hazards Mitigation Plan* (HMP, also referred herein as the *Hazard Mitigation Plan* or *the plan*), including how it was prepared, who was involved in the process, and how the public was involved.

To ensure that the plan meets requirements of the DMA 2000 and that the planning process would have the broad and effective support of the participating jurisdictions, regional and local stakeholders, and the public, an approach to the planning process and plan documentation was developed to achieve the following:

- The plan will be multi-jurisdictional, with the intention of including all municipalities in the County. Broome County invited all jurisdictions to join with them in the planning process. To date, 21 local municipal governments in the county participated in the 2018/19 planning process as indicated in Table 3-1. Jurisdictions that have not met participation requirements during this process will not be able to seek FEMA or NYS DHSES approval at the time of plan submittal nor will they be eligible to obtain FEMA mitigation grant funding. Those jurisdictions can choose to complete their annex and adopt at a later time, working with Broome County and NYS DHSES to ensure completeness. Any non-participating local government within the Broome County planning area can "dock" to this plan in the future following the linkage procedures defined in Appendix K (Linkage Procedures).

Table 3-1. Participating Broome County Jurisdictions

Jurisdictions	
Broome County	
Barker (T)	Lisle (T)**
Binghamton (C)	Lisle (V)
Binghamton (T)	Maine (T)
Chenango (T)	Nanticoke (T)**
Colesville (T)	Port Dickinson (V)
Conklin (T)	Sanford (T)
Deposit (V)*	Triangle (T)
Dickinson (T)	Union (T)
Endicott (V)	Vestal (T)
Fenton (T)	Whitney Point (V)
Johnson City (V)	Windsor (T)
Kirkwood (T)	Windsor (V)

**The Village of Deposit is participating in the Delaware County HMP; ** Municipality is not participating in the 2019 HMP Update.*

- The plan will consider all-natural hazards of concern facing the area, thereby satisfying the natural hazards mitigation planning requirements specified in DMA 2000.
- The plan will be developed following the process outlined by the DMA 2000, FEMA regulations, prevailing FEMA guidance and the 2017 NYS DHSES hazard mitigation planning standard. Following this process ensures that all the requirements are met and support HMP review.

The Broome County HMP update was written using the best available information obtained from a wide variety of sources. Throughout the HMP update process, a concerted effort was made to gather information from municipal and regional agencies and staff, as well as stakeholders, federal and state agencies, and the residents of the county. The HMP Steering Committee solicited information from local agencies and individuals with specific knowledge of certain natural hazards and past historical events. In addition, the Steering and Planning Committees took into consideration planning and zoning codes, ordinances, and recent land use planning decisions. The hazard mitigation strategies identified in this HMP update were developed through an extensive planning process involving local, county and regional agencies, residents, and stakeholders.

This section of the plan describes the mitigation planning process, including (1) Organization of the Planning Process; (2) Stakeholder Outreach and Involvement; (3) Integration of Existing Data, Plans, and Technical Information; (4) Integration with Existing Planning Mechanisms and Programs; and (5) Continued Public Involvement.

3.2 ORGANIZATION OF THE PLANNING PROCESS

This section of the plan identifies how the planning process was organized with the many planning partners involved and outlines the major activities that were conducted in the development of this HMP update.

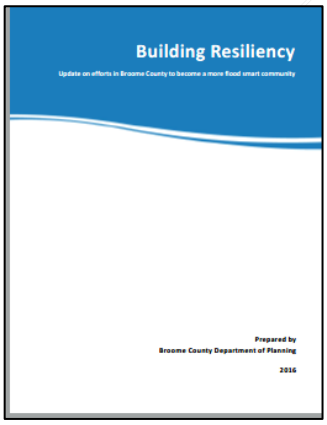
3.2.1 Organization of Planning Partnership

Broome County applied for and was awarded a multi-jurisdictional planning grant under the FEMA Pre-Disaster Mitigation program (PDMC PL- 02 - NY-2016-006), which supported the development of this update of this multi-jurisdictional HMP.

*The goal of the **PDM** program is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. Mitigation planning is a key process used to break the cycle of disaster damage, reconstruction, and repeated damage. PDM grants are funded annually by Congressional appropriations and are awarded on a nationally competitive basis.*

Source: FEMA, 2019

Project management and grant administration has been the responsibility of the Broome County Department of Planning and Economic Development. Broome County has been proactive in supporting natural hazard mitigation, having prepared a resiliency plan capturing the progress on a wide range of hazard mitigation projects. During this process the county contacted all jurisdictions to document progress of mitigation strategies as part of its *Building Resiliency-Update on efforts in Broome County to become a more flood smart community* (2016). This update supported implementation of projects, provided the basis of the initial mitigation strategy update, and formed problem statements to focus efforts on identifying high priority mitigation projects to reduce vulnerability to hazards of concern for the planning area. In addition, the county supported implementation of NY Rising resiliency projects, which provide a reduction in the impacts of flood events.



A contract planning consultant (Tetra Tech, Inc. referred herein as *Tetra Tech*) was selected to guide the county and participating jurisdictions through the HMP update process. A contract between Tetra Tech and Broome County was executed in May 2018. Specifically, Tetra Tech, the *contract consultant*, was tasked with the following:

- Assisting with the organization of a Steering and Planning Committee.

- Assisting with the development and implementation of a public and stakeholder outreach program.
- Data collection.
- Facilitation and attendance at meetings (Steering Committee, Planning Committee, municipal, stakeholder, public and other).
- Review and update of the hazards of concern, hazard profiling and risk assessment.
- Assistance with the review and update of mitigation planning goals and objectives.
- Assistance with the review of past mitigation strategies progress.
- Assistance with the screening of mitigation actions and the identification of appropriate actions.
- Assistance with the prioritization of mitigation actions.
- Authoring of the draft and final plan documents.

In July 2018, the County notified all municipalities within the county of the pending planning process and invited them to formally participate. Jurisdictions were asked to formally notify the county of their intent to participate (via a Letter of Intent to Participate) and to identify planning POCs to facilitate municipal participation and represent the interests of their respective communities. Completed Letters of Intent to Participate are provided as Appendix B (Participation Matrix), as available.

To facilitate plan development, Broome County developed a Steering Committee to provide guidance and direction to the HMP update effort and to ensure the resulting document will be embraced both politically and by the constituency within the planning area (refer to Table 3-2). All municipalities participating in the plan update authorized the Steering Committee to perform certain activities on their behalf, via the Letter of Intent to Participate (FEMA mitigation planning *combination model*). Specifically, the Steering Committee was charged with the following:

- Providing guidance and oversight of the planning process on behalf of the general planning partnership.
- Attending and participating in Steering Committee meetings.
- Assisting with the development and completion of certain planning elements, including:
  - Reviewing and updating the hazards of concern.
  - Developing a public and stakeholder outreach program.
  - Assuring that the data and information used in the plan update process are the best available.
  - Reviewing and updating the hazard mitigation goals.
  - Identifying and screening of appropriate mitigation strategies and activities.
- Reviewing and commenting on plan documents prior to submission to NYS DHSES and FEMA.

The Steering Committee provided guidance and leadership, oversight of the planning process, and acted as the point of contact for all participating jurisdictions and the various interest groups in the planning area.

Table 3-2. Broome County Hazard Mitigation Steering Committee Members

Affiliation	Name	Title
Broome County Department of Planning and Economic Development	Beth Lucas	Senior Planner
	Frank Evangelisti	Director
	Stephanie Brewer	Planner
Broome County Executive Office	Haley McCrory	Public Information Officer
Broome County Department of Public Works	Leslie Boulton	Commissioner
Broome County Engineering Division	Nazar Logvis	Engineer II

Affiliation	Name	Title
Broome County Office of Emergency Services	Neal Haight	Deputy Director
Town of Union/Village of Johnson City	Daria Golazeski	Deputy Commissioner of Public Works for Codes and Ordinances
City of Binghamton	Juliet Berling	Director of the Department of Planning, Housing and Community Development
Town of Dickinson	Ron Lake	Engineer
Village of Port Dickinson		

Each municipality received a copy of the *Planning Partner Expectations*, outlining the responsibilities of the participants and the agreement of the partners to authorize the Steering Committee to represent the jurisdiction in the completion of certain planning elements as noted above. Table 3-3 lists the current municipal members of the Planning Committee at the time of this HMP's publication. Please note that the Steering Committee members also are part of the overall project Planning Committee, fulfilling these responsibilities on behalf of Broome County. This *planning partnership* (Steering and Planning Committees) were charged with the following:

- Represent their jurisdiction throughout the planning process.
- Assure participation of all department and functions within their jurisdiction that have a stake in mitigation (e.g., planning, engineering, code enforcement, police and emergency services, public works).
- Assist in gathering information for inclusion in the HMP update, including the use of previously developed reports and data.
- Support and promote the public involvement process.
- Report on progress of mitigation actions identified in prior or existing HMPs, as applicable.
- Identify, develop, and prioritize appropriate mitigation initiatives.
- Report on progress of integration of prior or existing HMPs into other planning processes and municipal operations.
- Develop and author a jurisdictional annex for their jurisdiction.
- Review, amend, and approve all sections of the plan update.
- Adopt, implement, and maintain the plan update.

Table 3-3. Broome County Hazard Mitigation Planning Partnership Members

Jurisdiction	Primary Point of Contact	Title	Alternate Point of Contact	Title
Broome County	Nazar Logvis	Engineer	Leslie Boulton	Commissioner of Public Works
Barker, Town	David Mackey	Highway Superintendent	Jim Dedrick	Code Enforcement/Building Inspector
Binghamton, City	Juliet Berling	Planning Director	Ray Standish	City Engineer
Binghamton, Town	Nick Pappas	Building/Code Inspector	Mike Donahue	Highway Superintendent
Chenango, Town	Jim DiMascio	Deputy Supervisor	Alex Urda	Town Engineer
Colesville, Town	Bradford McAvoy	Enforcement Officer	Glenn Winsor	Supervisor
Conklin, Town	Nick Vascello	Code Enforcement Officer	John Mastronardi	Project Engineer
Deposit, Village*	Cheryl Decker	Clerk Treasurer	Not identified.	Not identified
Dickinson, Town	Steven Rafferty	Code Enforcer	Michael Marinaccio	Supervisor
Endicott, Village	Anthony Bates	Village Manager	Joseph Griswold	Chief of Fire Department
Fenton, Town	John Mastronardi	Project Engineer	Rick Armstrong	Assistant Engineer

Jurisdiction	Primary Point of Contact	Title	Alternate Point of Contact	Title
Johnson City, Village	Robert Bennett	Director of Public Services	Kim Cunningham	Mayor's Administrative Assistant
Kirkwood, Town	Chad Moran	Building and Code Inspector	John Mastronardi	Engineer
Lisle, Town	Mitch Quail Sr.	Highway Superintendent		
Lisle, Village	Gerald Mackey	Mayor	Frances Peterson	Clerk
Maine, Town	James Tokos	Supervisor	Joseph Dohnalek	Superintendent of Highways
Nanticoke, Town	Jake Slack	Highway Superintendent	Martha Walter	Secretary to the Supervisor
Port Dickinson, Village	Ron Lake	Engineer	Kevin M. Burke	Mayor
Sanford, Town	Gerald Seymour	Highway Superintendent	Alison Lang	Clerk
Triangle, Town	Charles Manasse	Supervisor	Dana Madden	Highway Superintendent
Union, Town	Daria Golazeski	DCPW-Codes & Ordinances	Louis Caforio Paul Nelson	Commissioner of Public Works Director of Planning
Vestal, Town	Vernon Myers	Town Engineer	Lincoln Ellis	Code Enforcement Officer
Whitney Point, Village	Ryan Reynolds	Mayor	Linda Murphy	Clerk
Windsor, Town	Ron Lake	Contract Engineer	David Brown	Code Enforcement Officer
Windsor, Village	David Decker	Streets and Water Superintendent	Patricia Harting	Clerk/Treasurer

**Not participating in Broome County HMP planning process. Refer to Delaware County HMP for participation.*

The jurisdictional Letter of Intent to Participate identifies the above *Planning Partner Expectations* as serving to identify those activities comprising overall participation by jurisdictions throughout the planning process. The jurisdictions in Broome County have differing levels of capabilities and resources available to apply to the plan update process, and further, have differing exposure and vulnerability to the natural hazard risks being considered in this plan. Broome County's intent was to encourage participation by all-inclusive jurisdictions and to accommodate their specific needs and limitations while still meeting the intents and purpose of plan update participation. Such accommodations have included the establishment of a Steering Committee, engaging a contract consultant to assume certain elements of the plan update process on behalf of the jurisdictions, and the provision of additional and alternative mechanisms to meet the purposes and intent of mitigation planning.

Ultimately, jurisdictional participation is evidenced by a completed municipal annex to the HMP (Section 9) wherein jurisdictions have individually identified their planning POCs; evaluated their risk to the hazards of concern; identified their capabilities to effect mitigation in their community; identified and prioritized an appropriate suite of mitigation initiatives, actions, and projects to mitigate their hazard risk; and eventually, adopted the updated plan via resolution.

Appendix B (Participation Matrix), identifies those individuals who represented the municipalities during this planning effort and indicates how they contributed to the planning process.

All municipalities in the County actively participate in the National Flood Insurance Program and have a designated National Flood Insurance Program (NFIP) Floodplain Administrator (FPA). All FPAs were informed of the planning process, reviewed the plan documents, and provided direct input to the plan update. Local FPAs are identified in the *Points of Contact* and *Administrative and Technical* portions of the jurisdictional annexes in Section 9.

3.2.2 Planning Activities

Members of the municipal and county planning partnership (individually and as a whole), as well as key stakeholders, convened and/or communicated regularly to share information and participate in workshops to identify hazards; assess risks; review existing inventories of and identify new critical facilities; assist in updating and developing new mitigation goals and strategies; and provide continuity through the process to ensure that natural hazards vulnerability information and appropriate mitigation strategies were incorporated. All members of the Steering and Planning Committees had the opportunity to review the draft plan and supported interaction with other stakeholders and assisted with public involvement efforts.

A summary of Planning and Steering Committee meetings held, and key milestones met during the development of the HMP update is included in Table 3-4 that also identifies which DMA 2000 requirements the activities satisfy. Documentation of meetings (agendas, sign-in sheets, minutes, etc.) are in Appendix C (Meeting Documentation). Table 3-4 identifies only the formal meetings held during plan development and does not reflect the planning activities conducted by individuals and groups throughout the planning process. In addition to these meetings, there was a great deal of communication between the county, committee members, and the contract consultant through individual local meetings, electronic mail (email), and by phone.

After completion of the HMP update, implementation and ongoing maintenance will become a function of the planning partnership (Steering and Planning Committees) as described in Section 7. The planning partnership is responsible for reviewing the HMP and soliciting and considering public comment as part of the five-year mitigation plan update.

This table summarizes a list of mitigation planning activities and meetings and their respective participants. A more detailed list of participants for each meeting is provided in Appendix C. Refer to DMA 2000 (Public Law 106-390) for details on each of the planning requirements (https://www.fema.gov/media-library-data/20130726-1524-20490-1790/dma2000.pdf).

Table 3-4. Summary of Mitigation Planning Activities / Efforts

Date	DMA 2000 Requirement	Description of Activity	Participants
3/27/18	-	ACOE Watershed Study Meeting	USACE, NYSDEC, Broome County Planning, other participants as documented by ACOE.
6/12/2018	1b, 2	Steering Committee #1 Planning process, data collection, review of hazards of concern, public outreach strategy.	Broome County Planning, Broome County Office of Emergency Services, Town of Union/Village of Johnson City, City of Binghamton, Town of Dickinson, Village of Port Dickinson, Town of Kirkwood, Town of Binghamton, Town of Conklin, Town of Fenton, Town of Chenango
6/12/2018	1b, 2	Planning Committee #1 – Kick-Off Planning process, data collection, hazards of concern ID.	Broome County Department of Public Works, Broome County Planning Department, Broome County Division of Engineering, Broome County Office of Emergency Services, City of Binghamton Engineering Department, City of Binghamton Building Construction & Code Enforcement, City of Binghamton Planning, Housing, & Community Development, Town of Union/Village of Johnson City, Town of Vestal, Village of Windsor, Village of Endicott, Town of Barker, Town of Chenango, Town of Triangle, Town of Binghamton, Town of Conklin, Town of Fenton, Town of Kirkwood
8/15/2018	1b, 2	Steering Committee #2 Strengths, Weaknesses, Obstacles and Opportunities (SWOO), goals and objectives	Broome County Planning, Broome County Division of Engineering, City of Binghamton, Town of Union/Village of Johnson City

Date	DMA 2000 Requirement	Description of Activity	Participants
9/19/2018	1b, 2, 3a, 3b, 3c, 3d, 3e	Planning Committee #2 Risk Assessment presentation, risk ranking input, mitigation problem statement development	NYSDHSES, Broome County Planning, Broome County Division of Engineering, City of Binghamton Engineering Department, Town of Binghamton, Town of Vestal, Town of Conklin, Town of Kirkwood, Town of Fenton, Town of Chenango, Town of Dickinson, Village of Port Dickinson, Town of Union/Village of Johnson City, Town of Sanford, Town of Windsor
9/19/2018	1b, 2, 3a, 3b, 3c, 3d, 3e	Steering Committee #3 Finalize goals and objectives, Strengths, Weaknesses, Obstacles and Opportunities (SWOO) wrap-up, risk ranking overview	Broome County Planning, Broome County Emergency Services, Broome County Division of Engineering, Town of Union/Village of Johnson City, City of Binghamton Engineering, Town of Conklin, Town of Kirkwood, Town of Binghamton, and Town of Fenton
10/17/2018	1b, 2, 4a, 4b, 4c	Mitigation Workshop	NYSDHSES, Broome County Planning, City of Binghamton Building Construction & Code Enforcement, Broome SWCD, City of Binghamton Economic Development, City of Binghamton Engineering Department, City of Binghamton Planning Department, Town of Union/Village of Johnson City, Village of Port Dickinson, Town of Dickinson, Town of Sanford, Town of Windsor, Village of Endicott, Town of Conklin, Town of Fenton, Town of Kirkwood, Town of Colesville, Town of Barker, Town of Binghamton, Town of Vestal, Town of Chenango, Town of Triangle
10/17-18/2018	2, 4a, 4b, 4c	Local Support Meetings Annex and mitigation strategy development and finalization	City of Binghamton, Town of Dickinson, Village of Whitney Point, Village of Lisle, Town of Kirkwood, Town of Triangle, Town of Colesville, Town of Barker, Village of Johnson City, Town of Chenango, Village of Endicott, Town of Binghamton, Town of Sandford, Village of Port Dickinson, Town of Union/Village of Johnson City
2/5/2019	1b, 2, 3, 4, 5	Draft Plan Review/Review of Maintenance Procedures	Broome County Planning, City of Binghamton, Town of Barker, Town of Dickinson, Town of Windsor, Village of Port Dickinson, Village of Endicott, Town of Fenton, Town of Conklin, Town of Kirkwood, Town of Binghamton, Town of Vestal, Village of Johnson City, Town of Union, Town of Triangle, Tetra Tech, NYSDHSES

Note: TBD = to be determined.
Each number in column 2 identifies specific DMA 2000 requirements, as follows:
1a – Prerequisite – Adoption by the Local Governing Body
1b – Public Participation
2 – Planning Process – Documentation of the Planning Process
3a – Risk Assessment – Identifying Hazards
3b – Risk Assessment – Profiling Hazard Events
3c – Risk Assessment – Assessing Vulnerability: Identifying Assets
3d – Risk Assessment – Assessing Vulnerability: Estimating Potential Losses
3e – Risk Assessment – Assessing Vulnerability: Analyzing Development Trends
4a – Mitigation Strategy – Local Hazard Mitigation Goals
4b – Mitigation Strategy – Identification and Analysis of Mitigation Measures
4c – Mitigation Strategy – Implementation of Mitigation Measures
5a – Plan Maintenance Procedures – Monitoring, Evaluating, and Updating the Plan
5b – Plan Maintenance Procedures – Implementation through Existing Programs
5c – Plan Maintenance Procedures – Continued Public Involvement

3.3 STAKEHOLDER OUTREACH AND INVOLVEMENT

This section details the outreach to and involvement of the many agencies, departments, organizations, non-profits, districts, authorities, and other entities that have a stake in managing hazard risk and mitigation, commonly referred to as *stakeholders*.

Diligent efforts were made to assure broad regional, county, and local representation in this planning process. To that end, a comprehensive list of stakeholders was developed with the support of the Steering and Planning Committees. Stakeholder outreach was performed early and throughout the planning process. This HMP update includes information and input provided by these stakeholders where appropriate, as identified in the references.

The following is a list of the various stakeholders that were invited to participate in the development of this plan, along with a summary of how these stakeholders participated and contributed. This summary discusses the various stakeholders that were invited to participate in the development of this HMP update and how they participated and contributed to the HMP. It should be noted that this summary listing cannot represent the sum total of stakeholders that were aware of and contributed to this HMP update, as outreach efforts were being made, both formally and informally, throughout the process by the many planning partners involved in the effort, and documentation of all such efforts is impossible. Instead, this summary is intended to demonstrate the scope and breadth of the stakeholder outreach efforts made during the plan update process.

Federal Agencies

FEMA Region II: Provided updated planning guidance, summarized and detailed NFIP data for planning area, attended meetings; conducted a Mitigation Strategy Workshop in October 2018, provided information on potential grant funding for the county and municipalities, and conducted plan review.

Information regarding hazard identification and the risk assessment for this HMP update was requested and received or incorporated by reference from the following agencies and organizations:

- National Climatic Data Center (NCDC)
- National Hurricane Center (NHC)
- National Oceanic and Atmospheric Administration (NOAA)
- National Weather Service (NWS)
- Storm Prediction Center (SPC)
- U.S. Army Corps of Engineers (USACE)
- U.S. Census Bureau

State Agencies

NYS DHSES: Headquarters and Region II: Administered planning grant and facilitated FEMA review, provided updated planning guidance, and provided review of draft and final HMP.

New York State Department of Environmental Conservation (NYSDEC): Provided data and information and supported the identification of mitigation projects.

Broome County Departments

Several County departments were represented on the Steering Committee and involved in the HMP update planning process. Appendix B (Participation Matrix) provides further details regarding regional and local stakeholder agencies. All responses to the stakeholder surveys are in Appendix D (Public and Stakeholder Outreach).

Broome County Planning Department: Beth Lucas, a Senior Planner from the Broome County Planning Department, was identified as the ongoing Broome County Hazard Mitigation Plan Coordinator in Section 7 (Plan Maintenance) and served in this role throughout the planning process. In addition, the Planning Department provided critical data, assisted with the update of events and losses in the county, updated the previous mitigation

strategy, facilitated outreach to stakeholders, contributed to the county's capability assessment and updated mitigation strategy, and reviewed draft sections of the HMP.

Broome County GIS Department: The Broome County GIS & Mapping Services Department creates and maintains the County's geospatial data inventory. The GIS Department provided critical facility inventory data and all other relevant GIS data throughout the planning process.

Broome County Office of Emergency Services (OES): The Broome County OES coordinates the County's efforts to prepare for and respond to emergency situations. In an emergency situation, the Office of Emergency Services works with County departments and external agencies to respond to the needs of citizens by helping to protect lives and property, assist those injured or whose normal lives have been disrupted by events, and to provide for the rapid restoration of normal services.

The OES Deputy Director served on the Steering Committee throughout the plan as well. Broome County OES provided data, reviewed sections, and contributed to the mitigation strategy.

Broome County Department of Public Works: The Department of Public Works maintains county-owned roadways, buildings, bridges, and other infrastructure throughout Broome County. The department also provides security for various events and venues within the county. The Department of Public Works is made up of six different divisions, including Administration, Engineering, Building and Grounds, Security, Highway, and Solid Waste Management.

A representative from the Department of Public Works served on the Steering Committee, participated in meetings, provided input on the mitigation strategy, and reviewed the county annex on behalf of the department. In addition, the Department of Public Works assisted with the update of the following components of the HMP: capability assessment, previous mitigation strategy, and updated mitigation strategy to support the county's current goals and objectives.

Broome County Division of Engineering: The Broome County Engineering Division is a unit within the Department of Public Works that provides engineering design and project management for repair, renovation, rehabilitation, and replacement projects related to county buildings, bridges, roadways, watersheds, culverts, facilities and other county infrastructure.

A representative from the Division of Engineering served on the Steering Committee, participated in meetings, provided input on the mitigation strategy, and reviewed the county annex on behalf of the department.

Broome County Health Department: The Broome County Health Department works with the community to preserve, promote, and protect the public health and quality of life of all Broome County residents. The Health Department supports the citizens of Broome County with health initiatives, including Health Promotion & Disease Prevention; Clinic Services & Disease Control; Environmental Health; Maternal Child Health & Development; Women, Infants & Children; Children with Special Needs; and Emergency Preparedness.

Regional and Local Stakeholders

Appendix B (Participation Matrix) provides further details regarding regional and local stakeholder agencies. The stakeholders listed below were directly contacted by Broome County to take a stakeholder survey, which included the identification of specific mitigation actions and projects and/or review of the draft HMP. Results of the surveys are in Appendix D (Public and Stakeholder Outreach). Feedback was reviewed by the Steering Committee and integrated where appropriate in the plan.

Local Emergency Planning Committee

All members of the Local Emergency Planning Committee (LEPC) were notified of the HMP update process, were invited via email correspondence (dated 8/20/2019) and meetings to provide input and notified of the draft HMP review period. Refer to Appendix D (Public and Stakeholder Outreach) for copies of the meeting minutes.

Academia

All school districts in the county were provided with the Academic Stakeholder survey, invited to provide input, and notified of the draft HMP review period. The following have provided input to the planning process via the county online stakeholder survey:

- Whitney Point Central School District
- Susquehanna Valley Central School District
- Binghamton City School District

Hospitals and Healthcare Facilities

All hospitals and healthcare facilities located in Broome County were invited to take the stakeholder survey and provide input to the planning process. The following have provided input to the planning process via the county online stakeholder survey:

- UHS Wilson Medical Center
- UHS Binghamton General Hospital
- Broome County Mental Health Department
- Our Lady of Lourdes Memorial Hospital

Highway and Public Works

All state, county, and local highway and public works departments were notified of the Highway and Public Work's stakeholder survey and invited to provide input on the draft HMP. In addition, many of the participating municipalities had representatives from their highway and public works departments representing them on the planning partnership. The following provided input to the planning process via the county online stakeholder survey:

- NYSDOT
- Broome County Public Works – Highway Division

Emergency Services

All state, county and local emergency service providers (police, fire, and EMS) were notified of the Emergency Services stakeholder survey and invited to provide input on the draft HMP. The following provided input to the planning process via the county online stakeholder survey:

- Broome County Sheriff's Office
- New York State Office of Mental Health Police
- Broome County Office of Emergency Services

Utilities

Utility providers in the county were notified of the Utility Stakeholder survey and invited to provide input on the draft HMP.

Business and Commercial Interests

Businesses and commercial industries in Broome County were notified of the stakeholder survey and invited to provide input on the draft HMP. The following provided input to the planning process via the county online stakeholder survey:

- Broome County Government
- Amrex Chemical Co.

Additional Stakeholders

The following stakeholders were identified by the Broome County Department of Planning that the draft HMP was available for review and comment:

- Town Supervisors, Village/City Mayors
- Village and Town Clerks
- Local Emergency Planning Committee (LEPC)
- Community Organizations Active in Disaster (COAD)

Adjacent Counties

Broome County has made an effort to keep surrounding counties and municipalities appraised of the project and allowed the opportunity to provide input to this planning process. Specifically, the following adjoining and nearby county representatives were contacted in [8/28/18] to inform them about the availability of the project website, draft plan documents, and surveys, and to invite them to provide input to the planning process.

- Tioga County, New York*
- Cortland County, New York
- Chenango County, New York*
- Delaware County, New York*
- Susquehanna County, Pennsylvania
- Wayne County, Pennsylvania

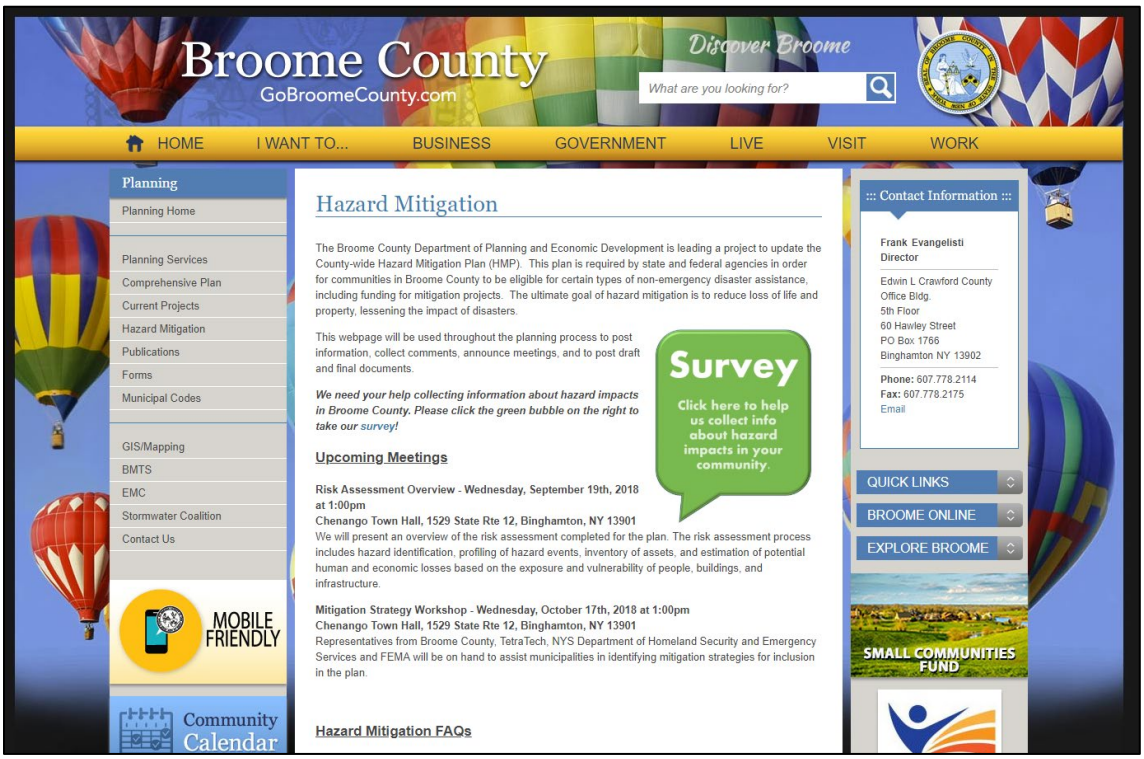
County indicated by an asterisk (*) provided input to the planning process via the county online stakeholder survey.

3.3.1 Public Outreach

The Steering Committee and Planning Committee have made the following efforts toward public participation in the development and review of the HMP:

- A public project website was developed and is being maintained to facilitate communication between the Steering Committee, planning partnership, public and stakeholders (http://www.gobroomecounty.com/planning/hazardmitigation). The public website contains a project overview, county and local contact information, access to the citizen's survey and various stakeholder surveys, and sections of the HMP for public review and comment (see Figure 3-1)

Figure 3-1. Broome County HMP Webpage



- All hazard mitigation planning meetings that were open to the public were advertised on the Broome County website.
- An on-line natural hazards preparedness citizen survey was developed to gauge household preparedness relevant to hazards in Broome County and to assess the level of knowledge of tools and techniques to assist in reducing risk and loss of those hazards. The questionnaire asks quantifiable questions about citizen perception of risk, knowledge of mitigation, and support of community programs. The questionnaire also asks several demographic questions to help analyze trends. The questionnaire was posted on the county public website on September 6, 2018 and available for over three months to facilitate public input garnering 200 responses. The survey results were sorted by municipality and provided to the Steering and Planning Committee members to use to identify vulnerabilities and develop mitigation strategies. A summary of survey results is provided in Appendix D (Public and Stakeholder Outreach) of this plan.

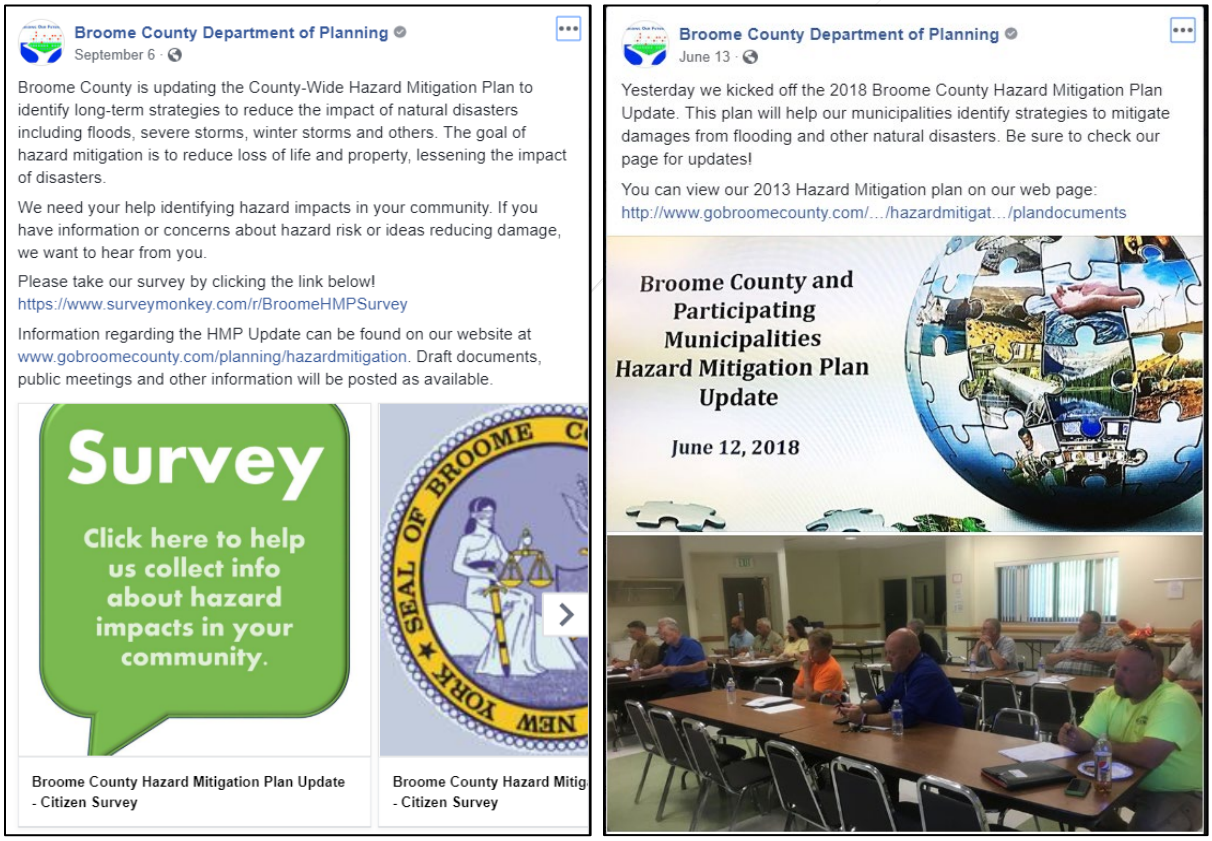
> Over 200 responses and 16 agencies provided feedback and input via the citizen and agency surveys.

- All participating municipalities were encouraged to distribute the project brochure and post the links to the project webpage and citizen and stakeholder surveys. In addition, all participating municipalities were requested to advertise the availability of the project website via local homepage links, and other available public announcement methods (e.g., Facebook, Twitter, email blasts). The following are examples of outreach provided:
    - Broome County mailed 1,000 postcards to random households located within the floodplain.
    - The Town of Windsor added an HMP page to their municipal website. They provided information about the planning process, a link to the Broome County Planning Department website, a link to the survey, and a digital copy of the County HMP brochure.

- On September 7, 2018, the Town of Chenango posted an announcement about the HMP update on their municipal website. The Town provided links to the citizen and stakeholder surveys and provided a link to the Broome Planning Department website.
- The Town of Union has information regarding the HMP under the flood information page on their municipal website. The Town also provided a link to the Broome County Planning Department website where the draft plan will be posted.
- The Town of Dickson posted the HMP brochure on their municipal website, along with a link to the Broome County Planning Department HMP webpage.
- On September 1, 2018, Greater Binghamton Today posted a link to the citizen survey on their Facebook page.

- Starting in February 2019, draft sections of the plan (as available) were posted on the project website for public review and comment.
- Once approved by NYS DHSES/FEMA, the final HMP will be available on the county website.

Figure 3-2. Broome County Facebook Posts



Source: Broome County Department of Planning Facebook Page 2018

Figure 3-3. Broome County Meeting Announcement

3.4 INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION

The Broome County HMP update strives to use the best available technical information, plans, studies, and reports throughout the planning process to support hazard profiling; risk and vulnerability assessment; review and evaluation of mitigation capabilities; and the identification, development, and prioritization of county and local mitigation strategies.

The asset and inventory data used for the risk and vulnerability assessments are presented in the County Profile (Section 4). Details of the source of this data, along with technical information on how the data was used to develop the risk and vulnerability assessment, are presented in the Hazard Profiling and Risk Assessment Section (Section 5), specifically within Section 5.3 (Data and Methodology), as well as throughout the hazard profiles in Section 5.4 (Hazard Profiles). Further, the source of technical data and information used can be found within the References Section.

Plans, reports, and other technical information were identified and provided directly by the county, participating jurisdictions, and numerous stakeholders involved in the planning effort, as well as through independent research by the planning consultant. The county and participating jurisdictions were tasked with updating the inventory of their Planning and Regulatory capabilities in Section 9 (Capability Assessment of each jurisdictional annex) and providing relevant planning and regulatory documents, as applicable. Relevant documents, including plans, reports, and ordinances were reviewed to identify the following:

- Existing municipal capabilities.
- Needs and opportunities to develop or enhance capabilities, which may be identified within the county or local mitigation strategies.
- Mitigation-related goals or objectives considered in the review and update of the overall Goals [and Objectives] in Section 6 (Mitigation Strategy).
- Proposed, in-progress, or potential mitigation projects, actions, and initiatives to be incorporated into the updated county and local mitigation strategies.

The following local regulations, codes, ordinances, and plans were reviewed during this process to develop mitigation planning goals, objectives, and strategies that are consistent across local and regional planning and regulatory mechanisms to accomplish complementary and mutually supportive strategies:

- Comprehensive/Master Plans
- Building Codes

- Zoning and Subdivision Ordinances
- NFIP Flood Damage Prevention Ordinances
- Site Plan Requirements
- Local Waterfront Revitalization Plans
- Stormwater Management Plans
- Emergency Management and Response Plans
- Land Use and Open Space Plans
- Capital Plans
- New York State Standard Multi-Hazard Mitigation Plan, 2014

A partial listing of the plans, reports, and technical documents reviewed in the preparation of this plan is included in Table 3-5.

Table 3-5. Record Review (Municipalities) - Record of the review of existing programs, policies, and technical documents for participating jurisdictions (all)

Existing plan, program or technical documents	Date	Jurisdictional Applicability
Binghamton, City of, Ordinances: 76 Infrastructure Development, 200 Building Construction, 240 Flood Damage prevention, 410 Zoning	April 21, 1986 October 5, 1970 April 20, 1987 August 7, 2006	Binghamton (C)
Binghamton, City of Action Plan and Budget	(2013-2014, 2014-2015, 2015-2016, 2016-2017)	Binghamton (C)
Binghamton, City of Comprehensive Plan-Blueprint Binghamton (2014)	August 1, 2014	Binghamton (C)
Binghamton, City of Emerald Ash Borer Preparedness Plan		Binghamton (C)
Binghamton, City of, Final Consolidated Plan (2015-2020) and Annual Action Plan September 2015 to August 2016 (FY41)	July 8, 2015	Binghamton (C)
Binghamton, Town of, Comprehensive Plan	2017	Binghamton (T)
Binghamton, Town of, Flood Damage Prevention Ordinance	April 7, 1987	Binghamton (T)
Broome County Comprehensive Plan	2014-2018	Countywide
Broome County Comprehensive Plan: Water Resources	2015	Countywide
Broome County Planning 2017 Annual report	June 1, 2004	Countywide
Broome County Regional Farmer's Market Feasibility Study	August 11, 2009	Countywide
Broome County Resiliency Plan Work Program	Unknown	Countywide
Broome County Wastewater Management Report	2002	Countywide
Broome County Watershed Flood Mitigation Plan	May 2016	Countywide
Building Resiliency-Update on efforts in Broome County to become a more flood smart community	2016	Countywide
Chenango Comprehensive Plan 2014	November 5, 2014	Chenango (T)
Chenango Code and Ordinances	Various	Chenango (T)
Colesville Comprehensive Plan	2015	Colesville (T)

Existing plan, program or technical documents	Date	Jurisdictional Applicability
Colesville Flood Damage Prevention Ordinance	October 30, 1992	Colesville (T)
Conklin Flood Damage Prevention Ordinance	April 14, 1987	Conklin (T)
Conklin Comprehensive Plan	June 2004	Conklin (T)
Dickinson Codes and Ordinances	Various	Dickinson (T)
Dickinson Comprehensive Plan	August 8, 2005	Dickinson (T)
Endicott Flood Damage Prevention Ordinance	September 28, 1998	Endicott (V)
Fenton Comprehensive Plan	2007	Fenton (T)
Fenton Ordinances	Various	Fenton (T)
Four Rivers-An Intermunicipal Waterfront Public Access Plan for Broome County Annual Report-2011		Whitney Point (V)
Johnson City Flood Damage Prevention Ordinance	May 3, 2011	Johnson City (V)
Kirkwood Comprehensive Plan	2016	Kirkwood (T)
Kirkwood Flood Damage Prevention Ordinance	2003 (Amended 2007)	Kirkwood (T)
Lisle, Village of Comprehensive Plan	2001	Windsor (V)
Maine Comprehensive Plan	2017	Maine (T)
Maine Flood Damage Prevention Ordinance	February 11, 2003	Maine (T)
NYRCR Broome NY Rising Community Reconstruction Plan	March 2014	Countywide
Port Dickinson Codes and Ordinances	Various	Port Dickinson (V)
Sanford Land Use Management Law	December 7, 1992 (Revised April 17, 2006)	Sanford (T)
Susquehanna Heritage Area Management Plan Amendment	2009	Countywide
Triangle Comprehensive Plan	2004	Triangle (T)
Union Code and Ordinances	Various	Union (T)
Union-Johnson City-Endicott Unified Comprehensive Plan-2009	2009	Endicott (V) Johnson City (V) Union (T)
Vestal Ordinance Ch 6	Unknown	Vestal (T)
Whitney Point Flood Damage Reduction Project	Unknown	Whitney Point (V)
Whitney Point Strategic Plan	2007	Whitney Point (V)
Whitney Point Comprehensive Plan (2012)	2012	Whitney Point (V)
Windsor Flood Damage Prevention Ordinance, Zoning Ordinance	June 1, 1988 April 2, 1997	Windsor (T)
Windsor, Town of, Comprehensive Plan	2006 (2015 Amendments)	Windsor (T)
Windsor, Village of, Flood Damage Prevention Ordinance	February 2, 1982	Windsor (V)
Windsor, Village of, Comprehensive Plan (2009)	2009	Windsor (V)

Notes:
*** = *this document may or may not include all jurisdictions*
T = *Town*
V = *Village*

3.5 INTEGRATION WITH EXISTING PLANNING MECHANISMS AND PROGRAMS

Effective mitigation is achieved when hazard awareness and risk management approaches and strategies become an integral part of public activities and decision-making. Within Broome County, there are many existing plans and programs that support hazard risk management, and thus it is critical that this hazard mitigation plan integrate, coordinate with, and complement, those existing plans and programs.

The *Capability Assessment* section of Chapter 6 (Mitigation Strategy) provides a summary and description of the existing plans, programs and regulatory mechanisms at all levels of government (federal, state, county and local) that support hazard mitigation within the county. Within each jurisdictional annex in Section 9, the county and each participating jurisdiction identified how they integrated hazard risk management into their existing planning, regulatory and operational/administrative framework ("integration capabilities") and how they intend to promote this integration ("integration actions").

A further summary of these continued efforts to develop and promote a comprehensive and holistic approach to hazard risk management and mitigation is presented in Section 7 (Plan Maintenance).

3.6 CONTINUED PUBLIC INVOLVEMENT

Broome County and participating jurisdictions are committed to the continued involvement of the public in the hazard mitigation process. This HMP update will be posted online at http://www.gobroomecounty.com/planning/hazardmitigation and municipalities will be encouraged to maintain links to the plan website. Further, the county will make hard copies of the HMP available for review at public locations as identified on the website.

A notice regarding annual updates of the plan and the location of plan copies will be publicized annually after the Planning Committee's annual evaluation and posted on the public website at http://www.gobroomecounty.com/planning/hazardmitigation.

Each jurisdiction's governing body shall be responsible for receiving, tracking, and filing public comments regarding this plan.

The public will have an opportunity to comment on the plan as a part of the annual mitigation planning evaluation process and the next five-year mitigation plan update. The HMP Coordinator is responsible for coordinating the plan evaluation portion of the meeting, soliciting feedback, collecting and reviewing the comments, and ensuring their incorporation in the five-year plan update as appropriate; however, members of the Planning Committee will assist the HMP Coordinator. Additional meetings may be held as deemed necessary by the Planning Committee. The purpose of these meetings would be to provide the public an opportunity to express concerns, opinions, and ideas about the plan.

Further details regarding continued public involvement are provided in Section 7 (Plan Maintenance).

After completion of this plan, implementation and ongoing maintenance will continue to be a function of the Planning Committee. The Planning Committee will review the plan and accept public comment as part of an annual review and as part of five-year mitigation plan updates.

A notice regarding annual updates of the plan and the location of plan copies will be publicized annually after the HMP Committee's annual evaluation and posted on the public web site.

Ms. Beth Lucas is identified as the Broome County HMP Coordinator in Section 7 (Plan Maintenance), and is responsible for receiving, tracking, and filing public comments regarding this plan. Contact information is:

Beth A. Lucas, Senior Planner
Broome County Planning Department
60 Hawley St, PO Box 1766, Binghamton, NY 13902
607-778-2375
Email: BLucas@co.broome.ny.us

SECTION 4 COUNTY PROFILE

This profile provides general information for Broome County (physical setting, population and demographics, general building stock, and land use and population trends) and critical facilities located within the county. Analyzing this information leads to an understanding of the study area, including economic, structural, and population assets at risk, and concerns that could be related to hazards analyzed later in this plan (e.g., low lying areas prone to flooding, high percentage of vulnerable persons in an area).

4.1 GENERAL INFORMATION

Broome County is located within the south-central part or *Southern Tier* of New York State. The Southern Tier is a geographical term that refers to the counties of New York State that lie west of the Catskill Mountains, along the northern border of Pennsylvania. Broome County occupies approximately 715 square miles and has a population of approximately 197,381 (U.S. Census Bureau, American Community Survey, 2016).

Broome County is one of the 62 counties in New York State and is comprised of one city, sixteen towns, seven villages and many hamlets. The City of Binghamton is the county seat and is located at the confluence of the Susquehanna and Chenango Rivers. With two interstates and a major state route intersecting in the City of Binghamton, the area is the crossroads of the Southern Tier. Interstates 81 and 88, as well as the future Interstate 86 (also known as New York State Highway 17, The Southern Tier Expressway), converge in Binghamton (route information maintained by New York State Department of Transportation (NYSDOT) and Pennsylvania Department of Transportation).

Broome County's population decreased by 2.9% between 2010 and 2016. The total population is decreasing, while the elderly demographic within the county is increasing. An aging population will require further consideration as there will be an increase in their socially vulnerable population. Total construction permit values in Broome County increased from 2011 to 2016 but decreased from 2016 to 2017. Residential construction permit values increased overall from 2011 to 2017, while the non-residential construction values showed an increase value from 2011 to 2016, but a loss in value in 2017.

4.2 MAJOR PAST HAZARD EVENTS

Presidential disaster declarations are typically issued for hazard events that cause more damage than state and local governments can handle without assistance from the federal government, although no specific dollar loss threshold has been established for these declarations. A presidential disaster declaration puts federal recovery programs into motion to help disaster victims, businesses and public entities. Some of the programs are matched by state programs. Review of presidential disaster declarations helps establish the probability of reoccurrence for each hazard and identify targets for risk reduction. Table 4-1 shows FEMA disaster declarations that included Broome County through 2018 (records date back to 1954).

Table 4-1. History of Hazard Events in Broome County, New York

Disaster Number	Event Date	Declaration Date	Incident Type	Title
DR-4397	August 13 – 15, 2018	10/1/2018	Flood	Severe Storms and Flooding
DR-4322	March 14 – 15, 2017	7/12/2017	Snow	Severe Winter Storm and Snowstorm
DR-4129	June 26 – July 10, 2013	7/12/2013	Flood	Severe Storms and Flooding
EM-3351	October 27 – November 8, 2012	10/28/2012	Hurricane	Hurricane Sandy
DR-4031	September 7 – 11, 2011	9/13/2011	Severe Storm(s)	Remnants of Tropical Storm Lee
EM-3341	September 7 – 11, 2011	9/8/2011	Severe Storm(s)	Remnants of Tropical Storm Lee
DR-1993	April 26 – May 8, 2011	6/10/2011	Flood	Severe Storms, Flooding, Tornadoes, And Straight-Line Winds
DR-1670	November 16 – 17, 2006	12/12/2006	Severe Storm(s)	Severe Storms and Flooding
DR-1650	June 26 – July 10, 2006	7/1/2006	Severe Storm(s)	Severe Storms and Flooding
EM-3262	August 29 - October 1, 2005	9/30/2005	Hurricane	Hurricane Katrina Evacuation
DR-1589	April 2 - 4, 2005	4/19/2005	Severe Storm(s)	Severe Storms and Flooding
DR-1565	September 16-24, 2004	10/1/2004	Severe Storm(s)	Tropical Depression Ivan
DR-1534	May 13 - June 17 2004	8/3/2004	Severe Storm(s)	Severe Storms and Flooding
EM-3186	August 14-16, 2003	8/23/2003	Other	Power Outage
EM-3184	February 17-18, 2003	3/27/2003	Snow	Snow
EM-3173	December 25, 2002 – January 4, 2003	2/25/2003	Snow	Snowstorms
DR-1391	September 11, 2001	9/11/2001	Fire	Fire and Explosions
EM-3155	May 22 - November 11, 2000	10/11/2000	Other	West Nile Virus
DR-1222	May 31-June 2, 1998	6/16/1998	Severe Storm(s)	Severe Storms and Tornadoes
DR-1095	January 19-30, 1996	1/24/1996	Flood	Severe Storms and Flooding
EM-3107	March 13-17, 1993	3/17/1993	Snow	Severe Blizzard
DR-515	July 21, 1976	7/21/1976	Flood	Severe Storms & Flooding
DR-487	October 2, 1975	10/2/1975	Flood	Storms, Rains, Landslides & Flooding
DR-338	June 23, 1972	6/23/1972	Flood	Tropical Storm Agnes
DR-290	July 22, 1970	7/22/1970	Flood	Heavy Rains and Flooding

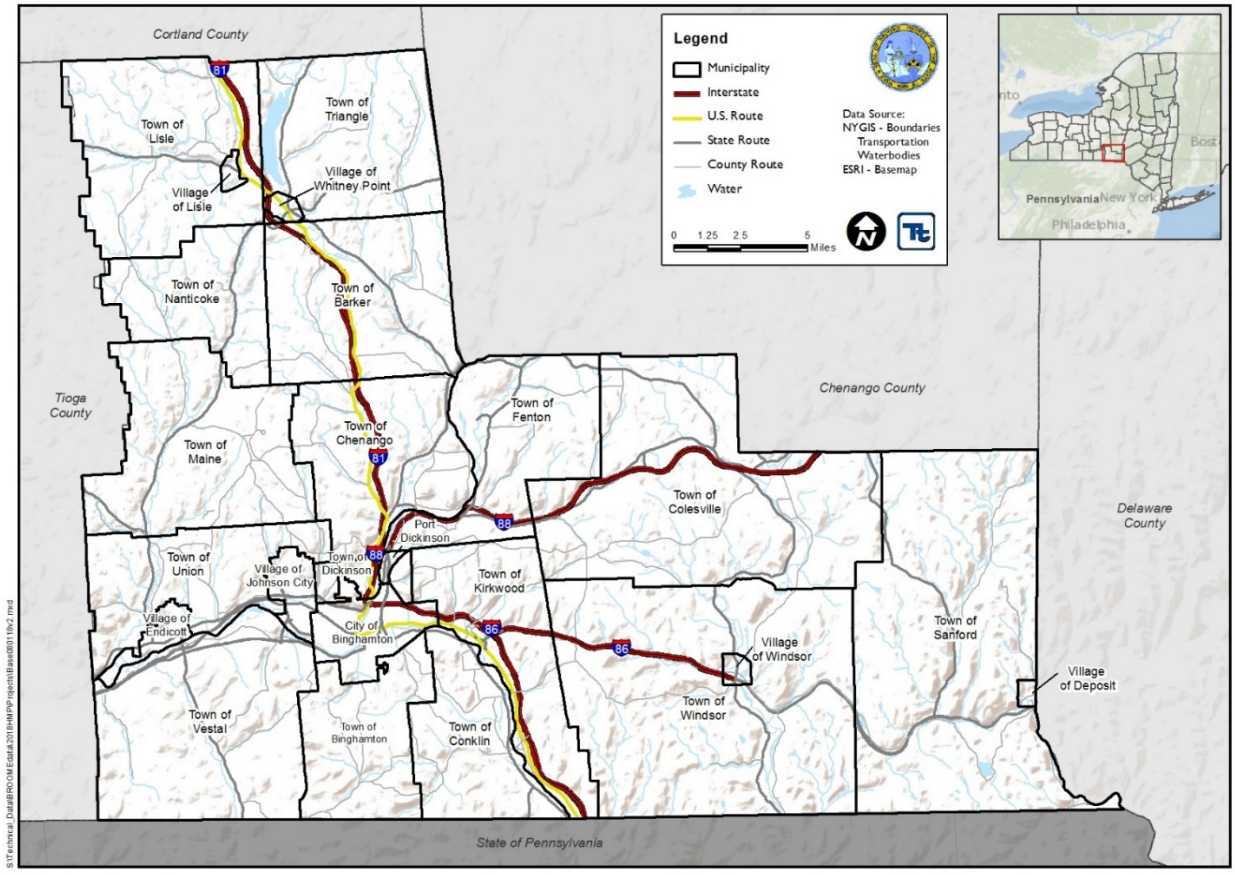
4.3 PHYSICAL SETTING

This section presents the physical setting of the county, including: location, hydrography and hydrology, topography and geology, climate, and land use/land cover.

4.3.1 Location

Broome County is located in south central New York State, on the Pennsylvania border. The county is bordered to the north by Cortland and Chenango Counties, to the south by Pennsylvania, to the east by Delaware County and to the west by Tioga County. Figure 4-1 provides the location of the county and its municipalities.

Figure 4-1. Location of Broome County, New York



4.3.2 Topography and Geology

Broome County has an overall hilly terrain with elevation ranging from 805 feet to 2,040 feet. Around the rivers, the topography becomes more level; however, there are hills located right up against the edges of the rivers (Peter J. Smith & Company 2011). Many areas in the county have steep slopes, with a majority of land having slopes of greater than 10% (Broome County Planning Department 2013). With its location in the Allegheny Plateau, Broome County's land is made up of deeply eroded, steep-sided, flat-bottomed valleys, and flat to rolling plateaus varying in relief (FEMA FIS 2010).

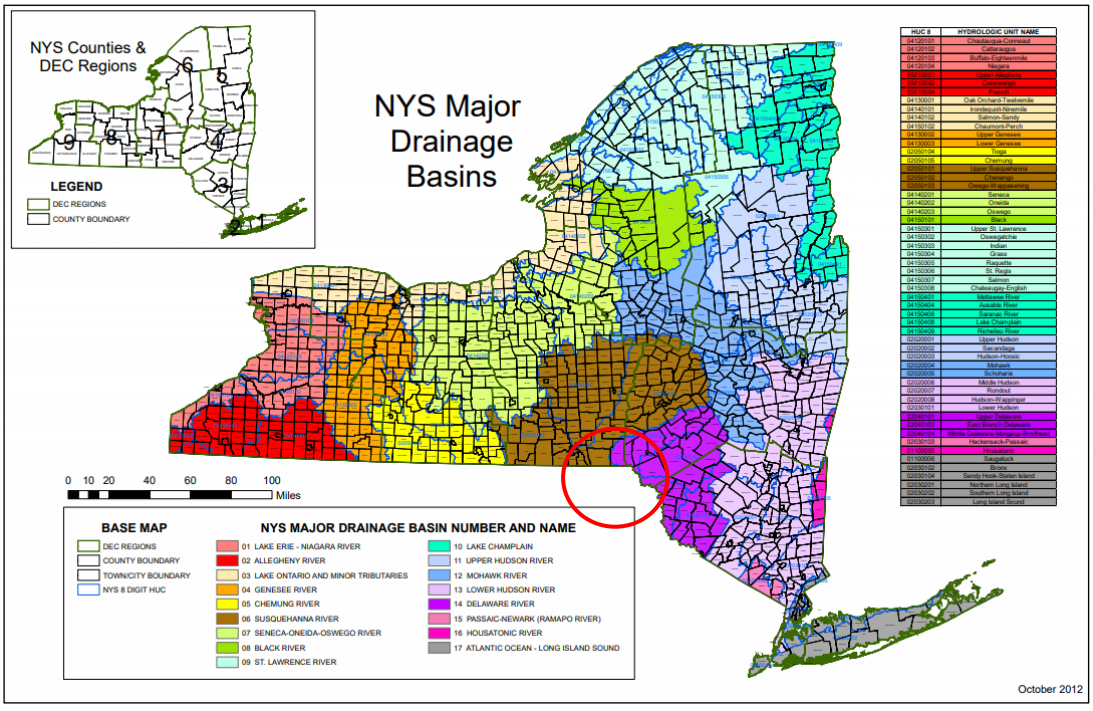
4.3.3 Hydrography and Hydrology

Numerous ponds, lakes, creeks and rivers make up the waterscape of Broome County, which lies within two major drainage basins (Susquehanna River Drainage Basin and Delaware River Drainage Basin) and four sub-basins (Chenango, Upper Susquehanna, Upper Delaware, and Owego-Wappasening) (National Atlas 2012, NYSDEC, n.d.). The major bodies of water and waterways within the county include Whitney Point Lake, Otselic River, Tioughnioga River, Chenango River, Delaware River (West Branch), Nanticoke Creek, Susquehanna River, Oquga Creek, Trout Brook, Still Creek, Brandywine Creek, Little Choconut Creek, Patterson Creek, Brixius Creek, Denton Creek, Ballyhook Creek, Honey Hollow Creek, and Horton Creek (National Atlas 2012, County Input).

Whitney Point Reservoir and Oquaga Lake are the two major lakes located in Broome County. Whitney Point Reservoir is the largest lake in the county and drains approximately 225 square miles. It is a U.S. Army Corps of Engineers flood control structure and is located on the Otselic River. Oquaga Lake is located in the eastern portion of Broome County and is approximately 134 acres. As stated above, there are numerous small lakes, ponds, and streams scattered throughout the county (Broome County Comprehensive Plan 2012).

According to Figure 4-2, Broome County is located within the Susquehanna and Delaware River Drainage Basins. The majority of the county drains into the Susquehanna River Drainage Basin (approximately 90%), the largest river basin on the Atlantic seaboard. The major tributaries part of this basin includes the Chenango, Tioughnioga, and Otselic Rivers and major streams that include the Occanum, Choconut, Nanticoke, and Castle Creeks. The remaining 10% of the county is located within the Delaware River watershed along a small portion of the county's southeast boundary. The main tributary to the Delaware River in Broome County is Oquaga Creek (Broome County Comprehensive Plan 2012).

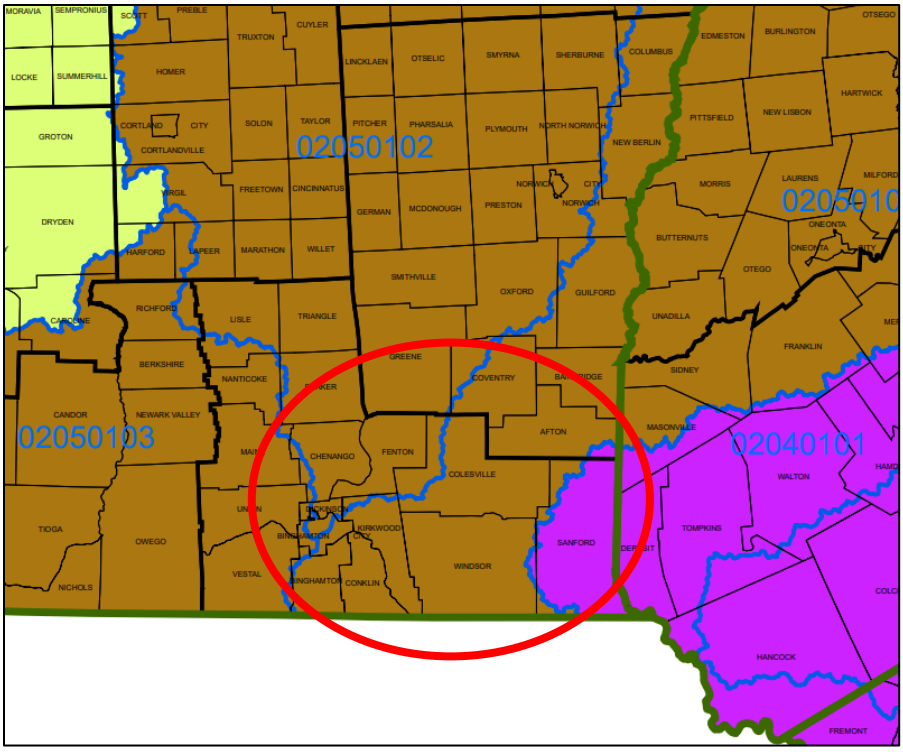
Figure 4-2. Drainage Basins of New York State



Source: NYSDEC 2012; Note: The circle indicates the approximate location of Broome County.

Within each of the major drainage basins are smaller watersheds. As seen in Figure 4-3, four watersheds are found in Broome County: Upper Susquehanna, Chenango, Owego-Wappasening, and Upper Delaware.

Figure 4-3. Watersheds of Broome County, New York



Source: *NYSDEC 2012*
Note(s): *The red outline indicates the location of Broome County*
02050101 *Upper Susquehanna*
02050102 *Chenango*
02050103 *Owego-Wappasening*
02040101 *Upper Delaware*

The Susquehanna River Basin is the largest east of the Mississippi River. The 444 miles of this basin drains 27,500 square miles covering large portions of New York State, Pennsylvania, and Maryland, before emptying into the Chesapeake Bay. The basin has 4,520 square miles of land area within New York State and over 8,185 miles of freshwater rivers and streams. The major tributaries to the Susquehanna River in New York State include the Chenango River, the Tioughnioga River, the Unadilla River, and the Owego Creek. There are 130 significant freshwater lakes, ponds, and reservoirs that make up the basin and include Otsego Lake, Canadarago Lake and Whitney Point Lake/Reservoir (NYSDEC, n.d.). The portion of Broome County that is located within the Susquehanna River Basin is federally designated by the U.S. Environmental Protection Agency as a sole source aquifer (Clinton Street-Ballpark Aquifer System) (Broome County Comprehensive Plan 2012).

The Delaware River Basin covers parts of New York State, Pennsylvania, New Jersey, and Delaware. About one-fifth of the basin lies within New York State. The headwaters for the Delaware River originate in the Catskill Mountains and eventually flow into Delaware Bay and the Atlantic Ocean. The Delaware River Basin encompasses 2,390 square miles of land within New York State and has 4,062 miles of freshwater rivers and streams. The major tributaries to the Delaware River in New York State include the East Branch Delaware, West Branch Delaware, Neversink, and Mangaup Rivers. There are 188 significant lakes, ponds, and reservoirs within this basin, which include the Pepacton, Cannonsville, and Neversink Reservoirs. The Pepacton and Cannonsville Reservoirs are both located in Delaware County (NYSDEC, n.d.).

Approximately 80% of water for public use comes from groundwater sources in Broome County. There are several aquifers located beneath the Susquehanna and Chenango Rivers, as well as their surrounding floodplains. These are referred to as unconsolidated aquifers, characterized as having frequent discharge and recharge with the streams that lie above them. Bedrock aquifers are common in rural areas of the county, which are hydrologically isolated from large streams and hold water in fractures in the bedrock. Aquifers are classified based on their importance as a public water supply, productivity, and vulnerability to pollution. The Village of Johnson City, the Town of Union, Village of Endicott, and the Town of Vestal depend on primary aquifers. There are also numerous principal aquifers, which are classified as highly productive but used by a lower percentage of population (Broome County Comprehensive Plan 2012).

4.3.4 Climate

The climate of New York State is very similar to most of the Northeast United States and is classified as Humid Continental. Differences in latitude, character of topography, and proximity to large bodies of water all have an effect on the climate across New York State. Precipitation during the warm, growing season (April through September) is characterized by convective storms that generally form in advance of an eastward moving cold front or during periods of local atmospheric instability. Occasionally, tropical cyclones will move up from southern coastal areas and produce significant quantities of rain. Both types of storms typically are characterized by relatively short periods of intense precipitation that produce substantial surface runoff and little recharge (Cornell Date, n.d.).

The cool season (October through March) is characterized by large, low-pressure systems that move northeastward along the Atlantic coast or the western side of the Appalachian Mountains. Storms that form in these systems are characterized by prolonged periods of steady precipitation in the form of rain, snow, or ice, and tend to produce less surface runoff and more recharge than the summer storms because they have a longer duration and occasionally result in snowmelt (Cornell Date, n.d.)

Broome County generally experiences seasonable weather patterns characteristic of the Northeast United States. The average precipitation for Broome County is approximately 35 inches, most of which occurs between April and October. The average snowfall amounts for the county is 50 inches with extremes of 120 inches occurring occasionally (FEMA FIS 2010). Summer temperatures typically range from about 70 degrees Fahrenheit (°F) to 82°F. Winter high temperatures are usually in the middle to upper 30°F, with minimum temperatures of 14°F expected (The Weather Channel 2012).

4.3.5 Land Use and Land Cover

Broome County has a distinctive development pattern that consists of a densely populated urban core with associated suburban fringe, narrow transportation corridors that follow the river valleys, rural village points, and open spaces found in the rural areas (Broome County Comprehensive Plan 2012).

Cole Park Trail, gobroomecounty.com (2018)

The development patterns of the county were initially defined by the county's step slopes and fertile river valleys. Native Americans and early European settlers used the rivers for navigation and used the valley soils for farming. The urban core of the community first formed around the confluence of the Chenango and Susquehanna Rivers and then spread along the river valleys (Broome County Comprehensive Plan 2012).

As development increased, roads, canals, and railroads were constructed in the river valleys that connected Broome County communities with the remainder of New York State and the developing United States. The construction of the Erie Canal, which spanned the northern tier of the state, initiated the building of a canal roughly following the Chenango River's course. The Chenango Canal operated between 1836 and 1837 and cut shipping times between the Cities of Binghamton and Albany, connecting the growing manufacturing base with the port of New York City via the Hudson River. By 1848, railroads reached the county and replaced the Chenango Canal. Industrial development in the river valleys flourished due to the rail lines. Today, rail lines remain an important means of transportation for high volume industrial users (Broome County Comprehensive Plan 2012).

The rise of the automobile in the 1950s and 1960s caused the development pattern of the county to spread further into the suburbs. The federal and state highway systems took precedence over rail for moving goods and materials. Local and county roads were linked to the state and interstate systems and the suburbanization of Broome County began (Broome County Comprehensive Plan 2012). Section 4.6.2 (Population Trends) provides further information.

The mix of land uses in the county is evolving and changing. Between 2006 and 2012, approximately 12,800 acres of agricultural land was lost. Roughly half this land is no longer farmed and is considered vacant land. Another 6,600 acres has been converted to residential use (Broome County Comprehensive Plan 2012). Section 4.6.1 (Lane Use Trends) provides further information regarding the change in agricultural land use. The changing land uses are shown in Table 4-3.

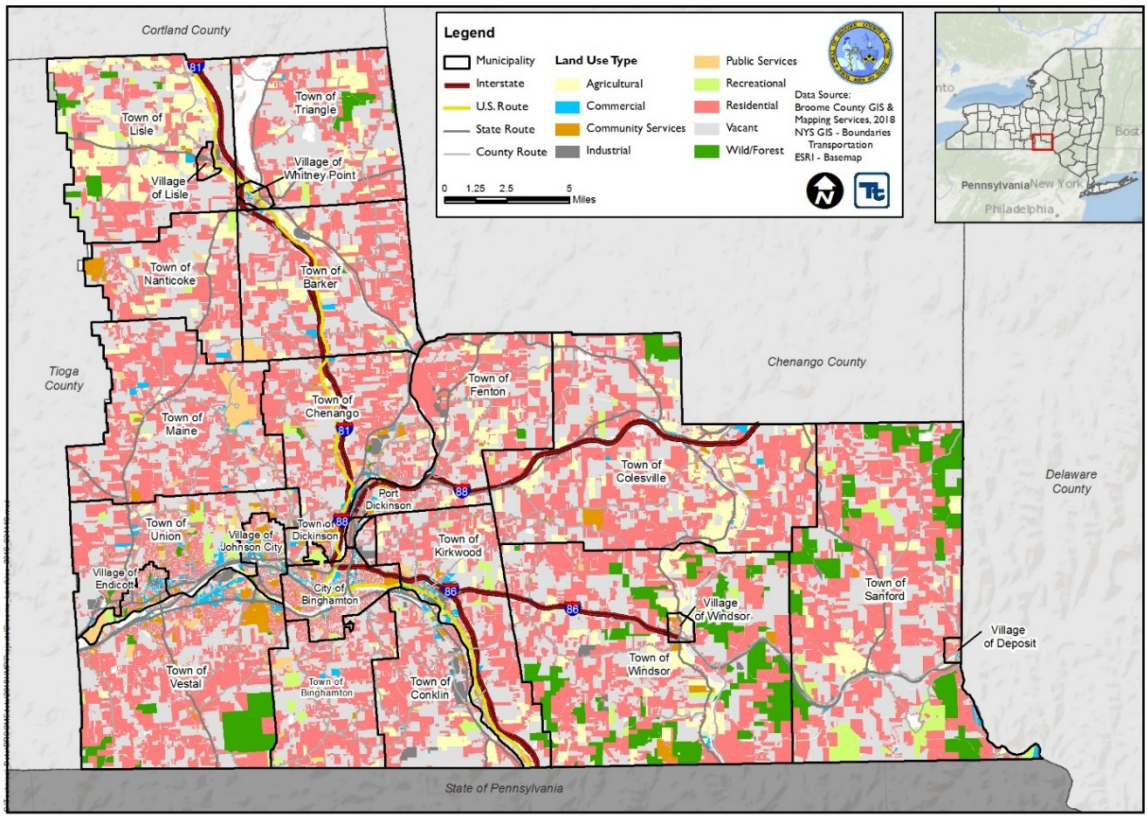
Based on tax assessor's records, currently, residential land use is the largest land use type in Broome County, which includes single family homes, apartments, mobile homes, and mobile home parks. Combined, these compose 191,411 acres of land (45% of the county). The second largest category is vacant land at approximately 150,000 acres (35% of the county) (Broome County Comprehensive Plan 2012). Table 4-2. shows the 2018 land uses and Figure 4-4. illustrates 2018 land use in Broome County.

Table 4-2. Change in Land Use Since 2013 HMP for Broome County, New York

Land Use	2013 HMP		2018 HMP	
	Acres	Percent of County	Acres	Percent of County
Agricultural	36,580	9%	32,166	7%
Residential	191,411	45%	191,609	45%
Commercial	4,991	1%	4,927	1%
Industrial	3,073	1%	3,252	1%
Community Services	6,265	1%	6,059	1%
Public Services	4,631	1%	4,944	1%
Recreational	7,682	2%	7,816	2%
Vacant	147,191	35%	152,825	36%
Wild/Forest	24,007	6%	22,959	5%

Source: Broome County Comprehensive Plan 2012; Broome County GIS & Mapping Services

Figure 4-4. 2018 Land Use in Broome County, New York



4.4 POPULATION AND DEMOGRAPHICS

An understanding of the planning area population characteristics provides a foundation for deciphering the impacts of natural hazards in the county. As noted in Section 5.1 (Methodology) of this plan, modeling of the impacts of natural hazards on the population was performed using FEMA's Hazards U.S. Multi-Hazard (HAZUS-MH) in which the available population information includes the 2010 U.S. Decennial Census data, which indicates a county population of 200,600. However, more current data, according to U.S. Census Bureau, 2016 American Community Survey 5-Year Estimate, estimates a county population of approximately 197,381, which is a decrease in population since 2010. A detailed population table for the 2010 Census is shown below in Table 4-3. A detailed table for the 2016 American Community Survey is included in Appendix E. Table 4-3 illustrates the population of each municipality as a total percentage of the county population. Figure 4-5 shows the distribution of the 2010 U.S. Census general population density (persons per square mile) by census block. Both sets of statistics are provided for context, but for the purposes of this plan, the data available in HAZUS-MH v4.2 are used (representing 2010 data)

Various Census Bureau products were used as sources for the population trends section. The Decennial Census is the official population count taken every 10 years. American Community Survey 5-Year Estimates are used to show annual population changes, but it is not an official population county. 5-Year Estimates are used because they are the most accurate form of American Community Survey with the largest sample size which allows for greater accuracy at smaller geographic areas. The American Community Survey 5-Year Estimate products were used to establish annual changes in population. The numbers provided are not official census counts, but are official estimates provided to communities so that they may have a greater understanding in population changes within their jurisdictions.

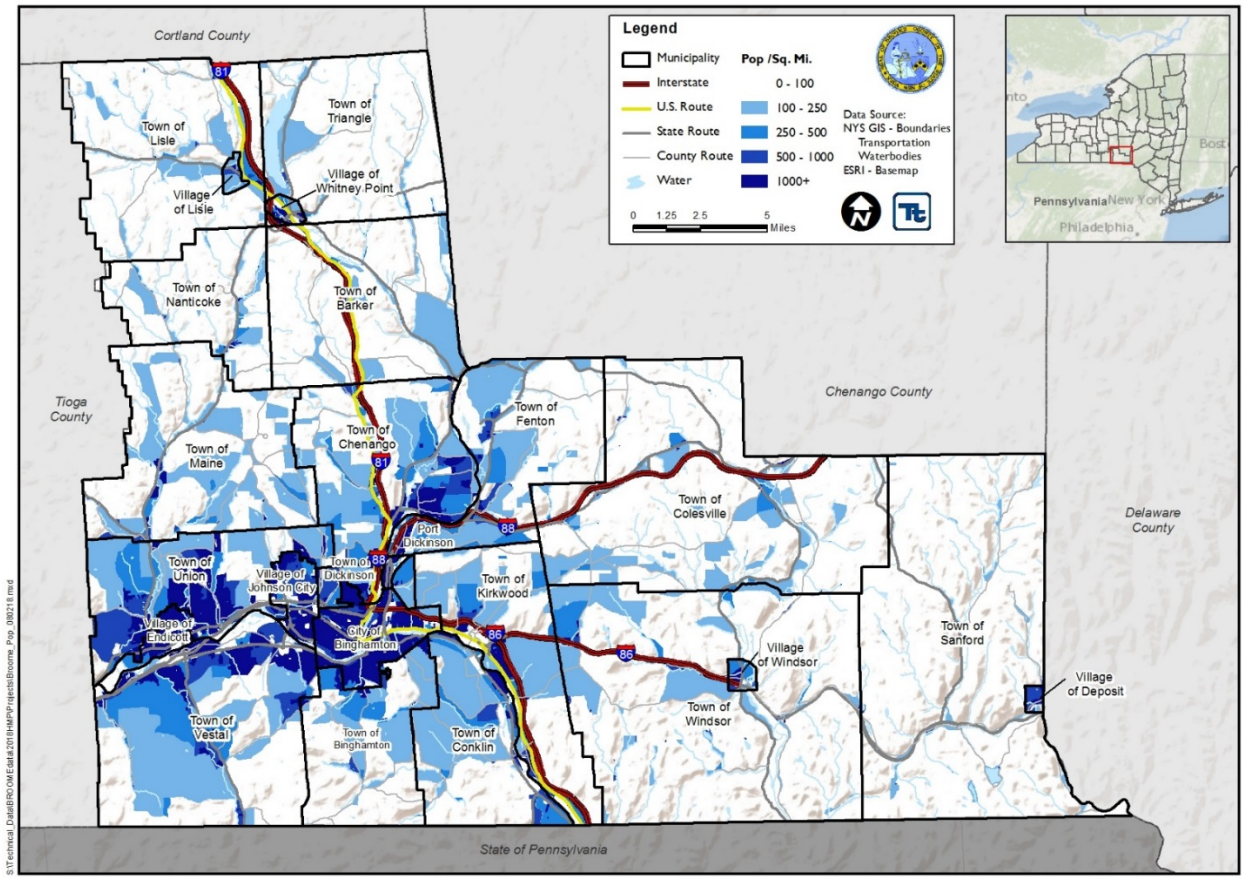
to support the analysis so the more recent data does not significantly skew the analysis.

Table 4-3. Population Statistics (2010 Census) in Broome County, New York

Municipality	U.S. Census 2010							% of County Population
	Total	Pop. 65+	% Pop. 65+	Population Under 5	% Under 5	Low-Income Pop. *	% Low-Income Pop.	
Barker (T)	2,732	331	12.1%	157	5.7%	304	11.1%	1.4%
Binghamton (C)	47,376	7,264	15.3%	2,918	6.2%	17,101	36.1%	23.6%
Binghamton (T)	4,942	760	15.4%	227	4.6%	527	10.7%	2.5%
Chenango (T)	11,252	1,930	17.2%	577	5.1%	1,308	11.6%	5.6%
Colesville (T)	5,232	732	14.0%	275	5.3%	756	14.4%	2.6%
Conklin (T)	5,441	857	15.8%	253	4.6%	800	14.7%	2.7%
Deposit (V)*	1,663	276	16.6%	119	7.2%	371	21.6%	0.4%**
Dickinson (T)	3,637	753	20.7%	123	3.4%	603	16.6%	1.8%
Endicott (V)	13,392	2,130	15.9%	875	6.5%	3,761	28.1%	6.7%
Fenton (T)	6,674	1,166	17.5%	312	4.7%	898	13.5%	3.3%
Johnson City (V)	15,174	2,484	16.4%	881	5.8%	4,547	30.0%	7.6%
Kirkwood (T)	5,857	939	16.0%	308	5.3%	858	14.6%	2.9%
Lisle (T)	2,431	341	14.0%	164	6.7%	336	13.8%	1.2%
Lisle (V)	320	35	10.9%	24	7.5%	42	13.1%	0.2%
Maine (T)	5,377	828	15.4%	274	5.1%	654	12.2%	2.7%
Nanticoke (T)	1,672	202	12.1%	107	6.4%	195	11.7%	0.8%
Port Dickinson (V)	1,641	249	15.2%	96	5.9%	306	18.6%	0.8%
Sanford (T)	1,588	333	21.0%	77	4.8%	155	9.8%	0.8%
Triangle (T)	1,982	281	14.2%	125	6.3%	237	12.0%	1.0%
Union (T)	27,780	5,582	20.1%	1,360	4.9%	3,867	13.9%	13.8%
Vestal (T)	28,043	4,501	16.1%	906	3.2%	2,870	10.2%	14.0%
Whitney Point (V)	964	136	14.1%	69	7.2%	148	15.4%	0.5%
Windsor (T)	5,358	734	13.7%	253	4.7%	471	8.8%	2.7%
Windsor (V)	916	154	16.8%	65	7.1%	190	20.7%	0.5%
Broome County	**200,600**	**32,844**	**16.4%**	**10,480**	**5.2%**	**41,138**	**20.5%**	

Source: *U.S. Census 2010*
**The Village of Deposit's total population also includes the portion of Deposit within Delaware County.*
***The Village of Deposit's population within Broome County for the 2010 Census was 819, so that value was used for the % of County Population.*

Figure 4-5. Distribution and Density of General Population for Broome County, New York



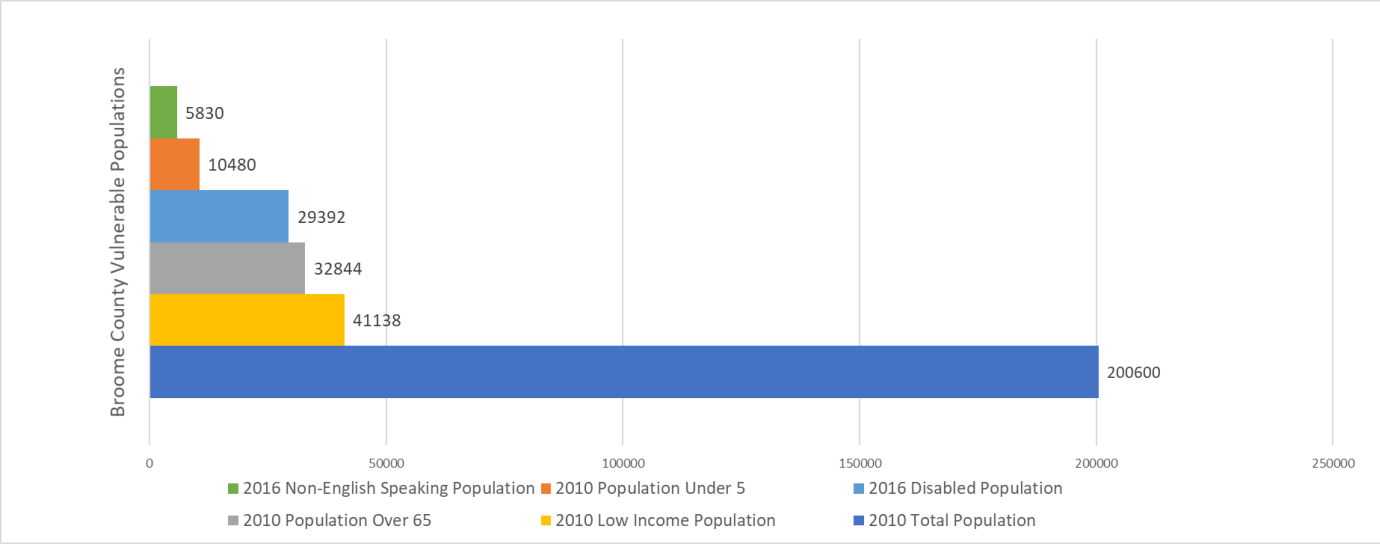
Source: HAZUS-MH 4.2

4.4.1 Vulnerable Populations

DMA 2000 requires that HMPs consider socially vulnerable populations. These populations can be more susceptible to hazard events based on a number of factors, including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. The vulnerable populations in the 2013 Hazard Mitigation Plan include (1) the elderly (persons aged 65 and over) and (2) those living in low-income households. In the current plan, additional vulnerable populations are identified including: the physically or mentally disabled, and non-English speakers. Identifying concentrations of vulnerable populations can assist communities in targeting preparedness, response and mitigation actions.

Populations with a higher level of vulnerability can be more seriously affected during the course of an emergency or disaster. Vulnerable populations have unique needs that need to be considered by public officials to help ensure the safety of demographics with a higher level of risk. Figure 4-6 provides Broome County Vulnerable Population Statistics.

Figure 4-6. Vulnerable Population Statistics in Broome County, New York



Source: U.S. Census, 2010; 2012-2016 American Community Survey
Note: The Non-English Speaking and Disabled Population statistics are only available in the American Community Survey products.

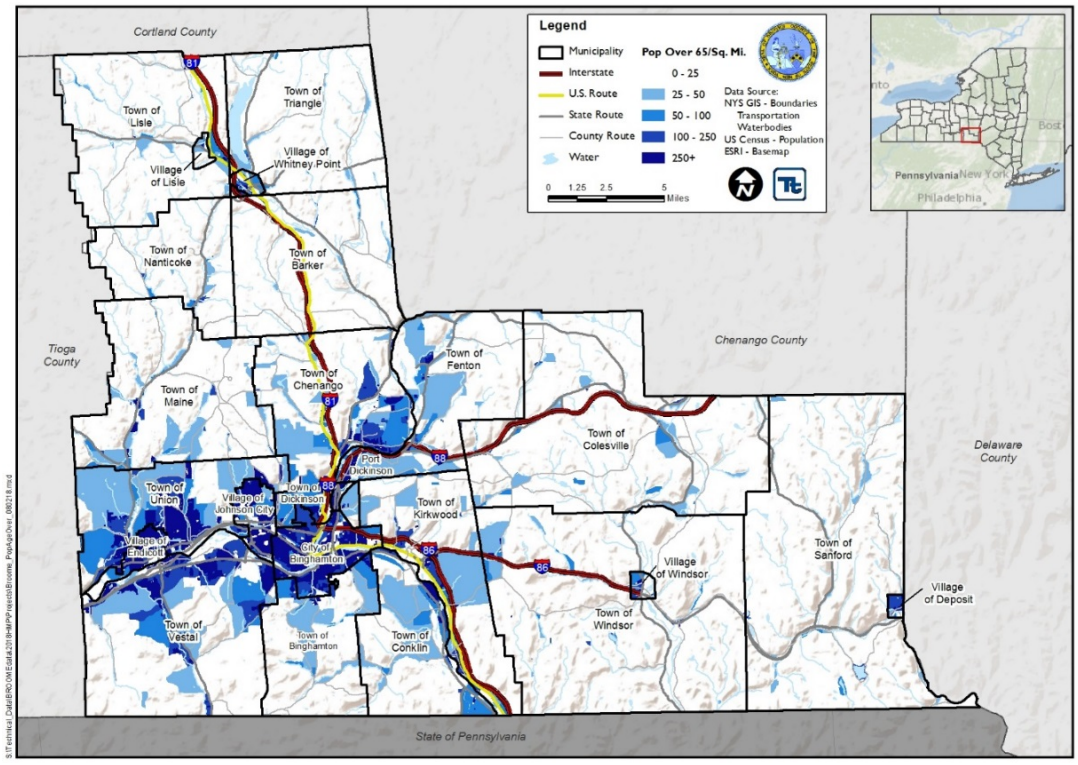
Age

Children are considered vulnerable to hazard events because they are dependent on others to safely access resources during emergencies and may experience increased health risks from hazard exposure. The elderly is more apt to lack the physical and economic resources necessary for response to hazard events and are more likely to suffer health-related consequences. Those living on their own may have more difficulty evacuating their homes. The elderly also are more likely to live in senior care and living facilities where emergency preparedness occurs at the discretion of facility operators. According to the 2012-2016 American Community Survey 5-Year Estimates, the median age in Broome County was 39.8 years.

HAZUS-MH reports 20.2 percent of the 2010 Broome County population is under the age 16. Of the 2016 population, 17.6 percent of the county's population is age 65 and older. Figure 4-7 shows the distribution of persons over age 65 and

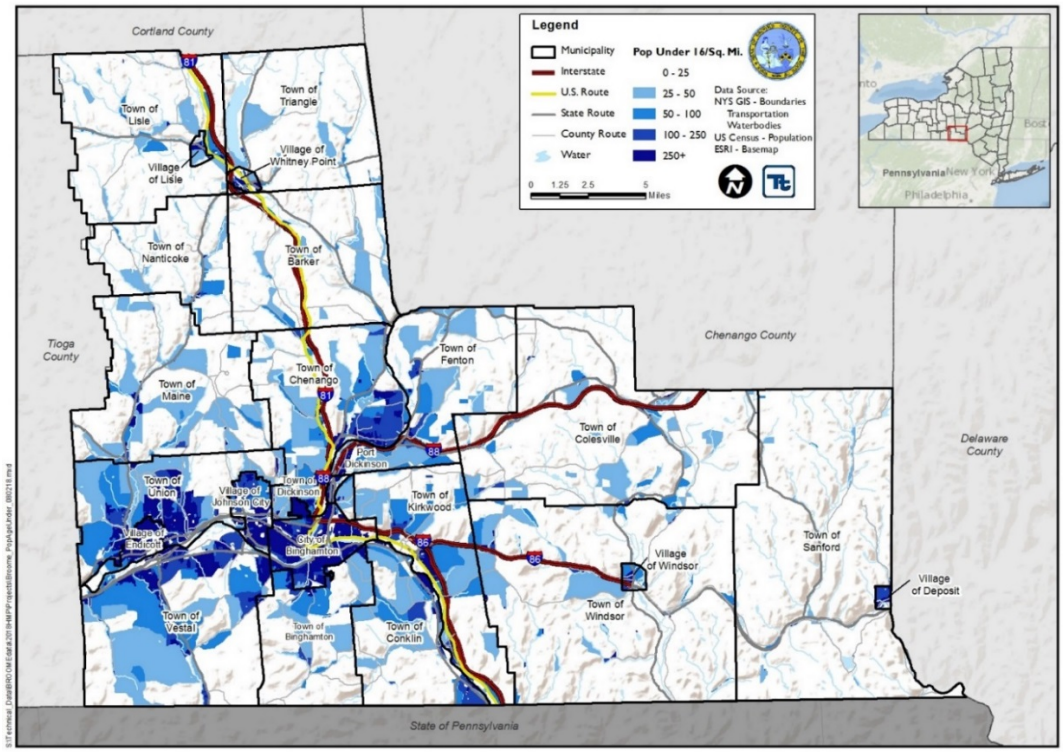
Figure 4-8 shows the distribution of persons under the age of 16 and in Broome County.

Figure 4-7. Distribution and Density of Persons over the Age of 65 in Broome County, New York



Source: HAZUS-MH 4.2

Figure 4-8. Distribution and Density of Population Under 16 in Broome County, New York



Source: HAZUS-MH 4.2

Income

The 2012-2016 American Community Survey 5-Year Estimates provides that the median household income in Broome County was $47,744, and the per capita income was $25,880. The U.S. Census Bureau identifies households with two adults and two children with an annual household income below $24,339 per year as *low income* (U.S. Census 2016). The 2012-2016 American Community Survey 5-Year Estimates indicates a total of 17.4 percent persons below the poverty level within the county.

The spatial U.S. Census data for household income provided in HAZUS-MH includes two ranges (less than $10,000 and $10,000-$20,000/year) that were totaled to provide the *low-income* data used in this study. This does not correspond exactly with the *poverty* thresholds established by the 2016 U.S. Census Bureau data. This difference is not believed to be significant for the purposes of this planning effort; therefore, for the exposure and loss estimations in the risk assessment, the 2010 U.S. Census data in HAZUS-MH is reported. Refer to Figure 4-9 below which illustrates the low-income population density in Broome County.

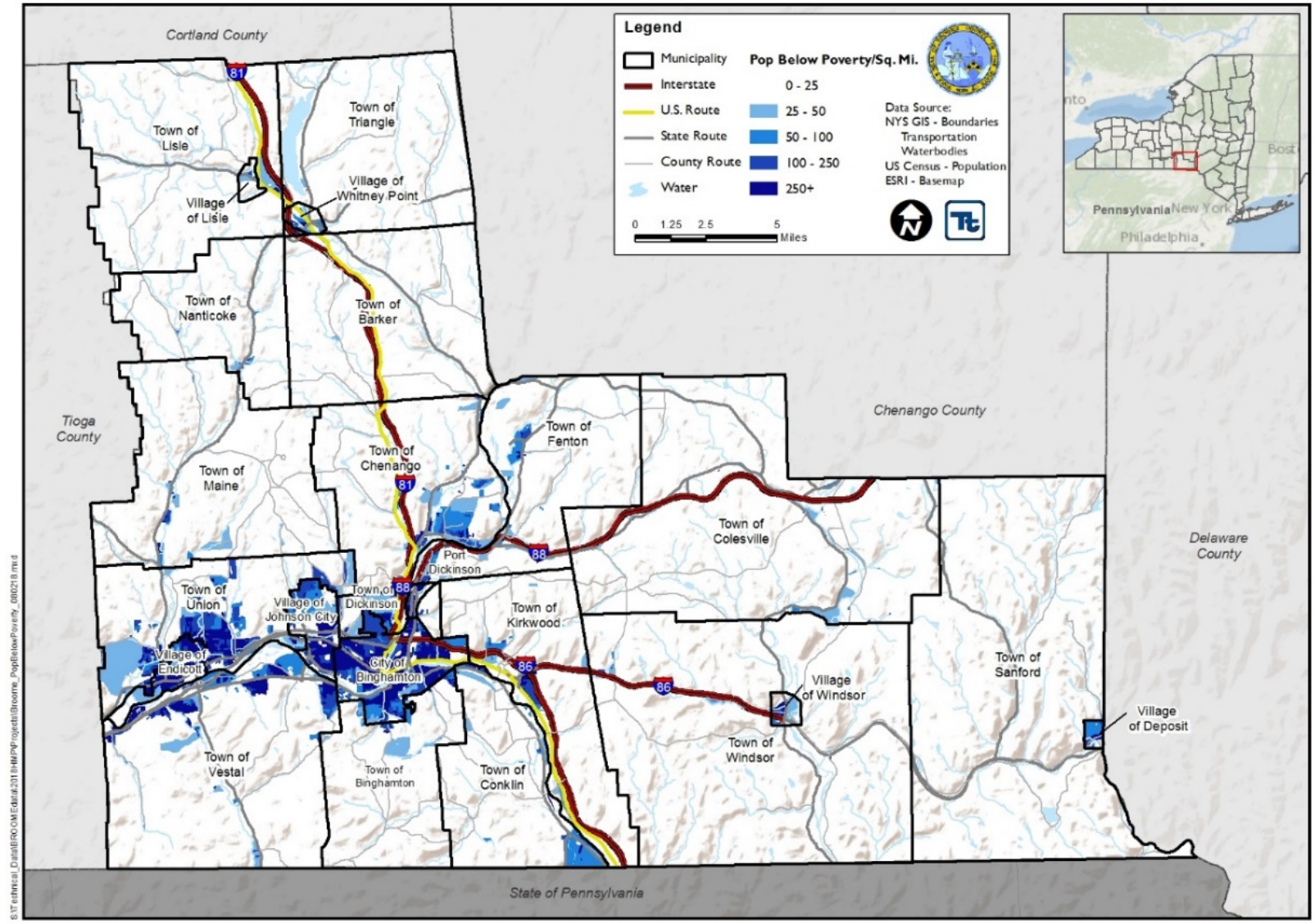
Physically or Mentally Disabled

According to the Centers for Disease Control, "Persons with a disability include those who have physical, sensory, or cognitive impairment that might limit a major life activity (Centers for Disease Control 2015)." Cognitive impairments can increase the level of difficulty that individuals might face during an emergency and reduce an individual's capacity to receive, process, and respond to emergency information or warnings. Individuals with a physical or sensory disability can face issues of mobility, sight, hearing, or reliance on specialized medical equipment. According to the 2012-2016 American Community Survey, 15.1 percent of residents in Broome County are living with a disability. Figure 4-10 shows the geographic distribution of disabled individuals throughout Broome County, including individuals living with hearing, vision, cognitive, ambulatory, self-care, and independent living difficulties.

Non-English Speakers

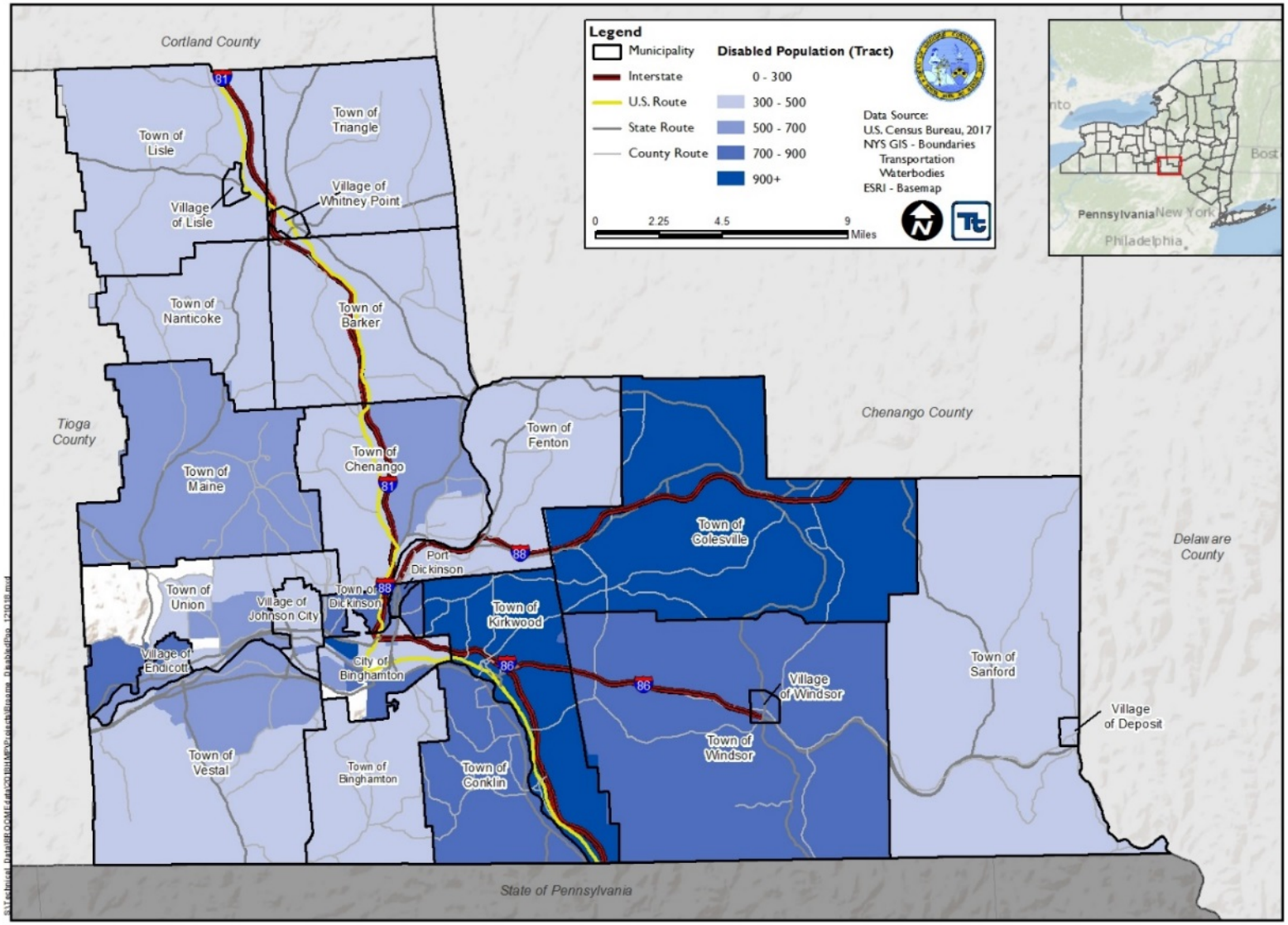
Individuals who are not fluent or working proficiency in English are vulnerable because they can have difficulty with understanding information being conveyed to them. Cultural differences also can add complexity to how information is being conveyed to populations with limited proficiency of English (Centers for Disease Control 2015). According to the 2012-2016 American Community Survey, 9.8 percent of the county's population over the age of 5 primarily speaks a language other than English at home; within that group approximately 5,830 individuals are reported as speaking English "less than very well." Of the county's population, 2.3 percent speak Spanish and 4.5 percent speak other Indo-European languages. Figure 4-11 shows the geographic distribution of individuals who speak English less than "very well."

Figure 4-9. Distribution and Density of Low-Income Population in Broome County, New York



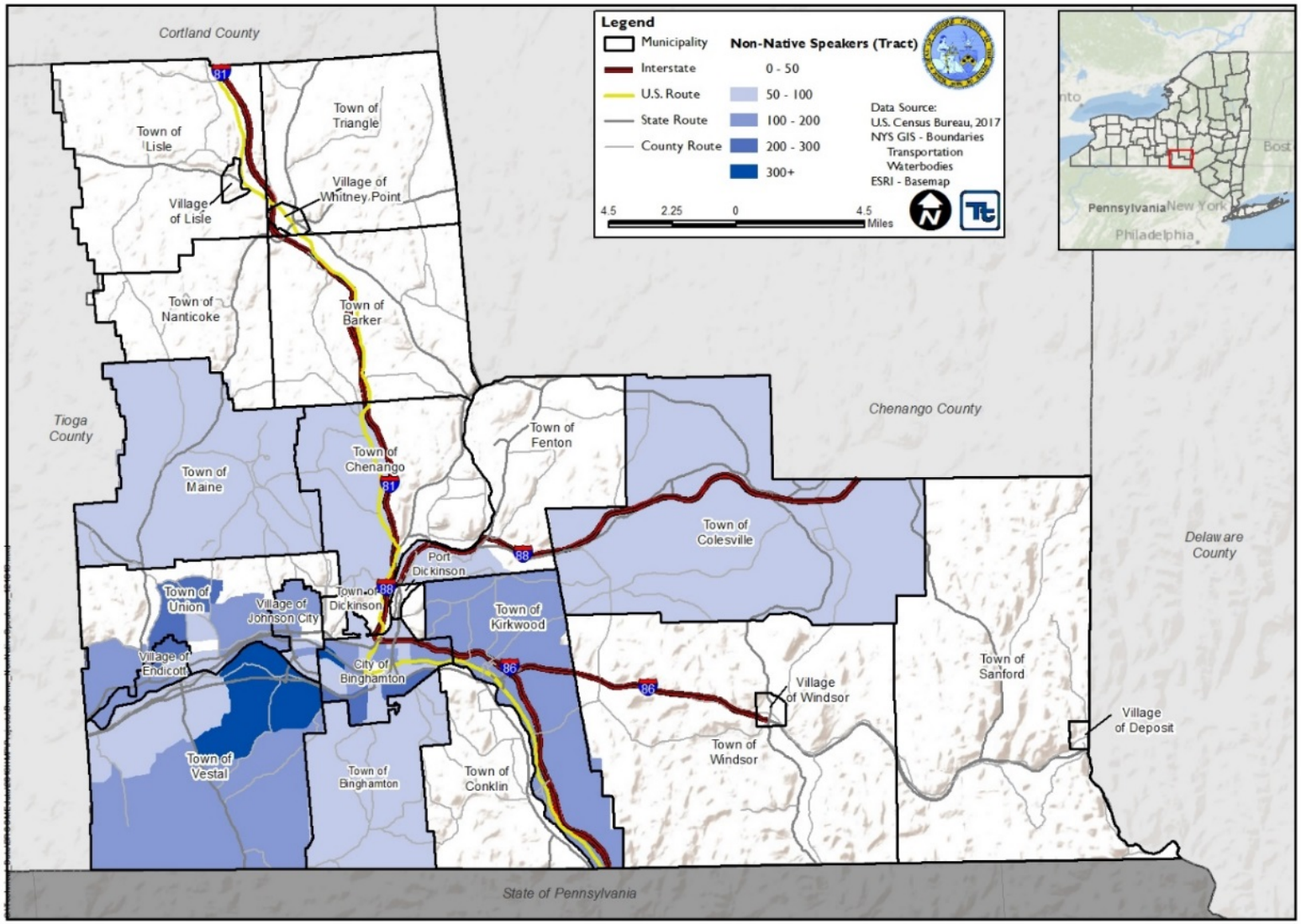
Source: HAZUS-MH 4.2

Figure 4-10. Distribution of Persons with a Disability in Broome County, New York



Source: United States Census Bureau, 2012-2016 American Community Survey; New York State GIS Department
Note: The figure indicates distribution based on Census Tract designations and does not conform to municipal boundaries.

Figure 4-11. Distribution of Persons Who Speak English Less Than "Very Well" in Broome County, New York



Source: U. S. Census Bureau, 2012-2016 American Community Survey; New York State GIS Department
Note: The figure indicates distribution based on Census Tract designations.

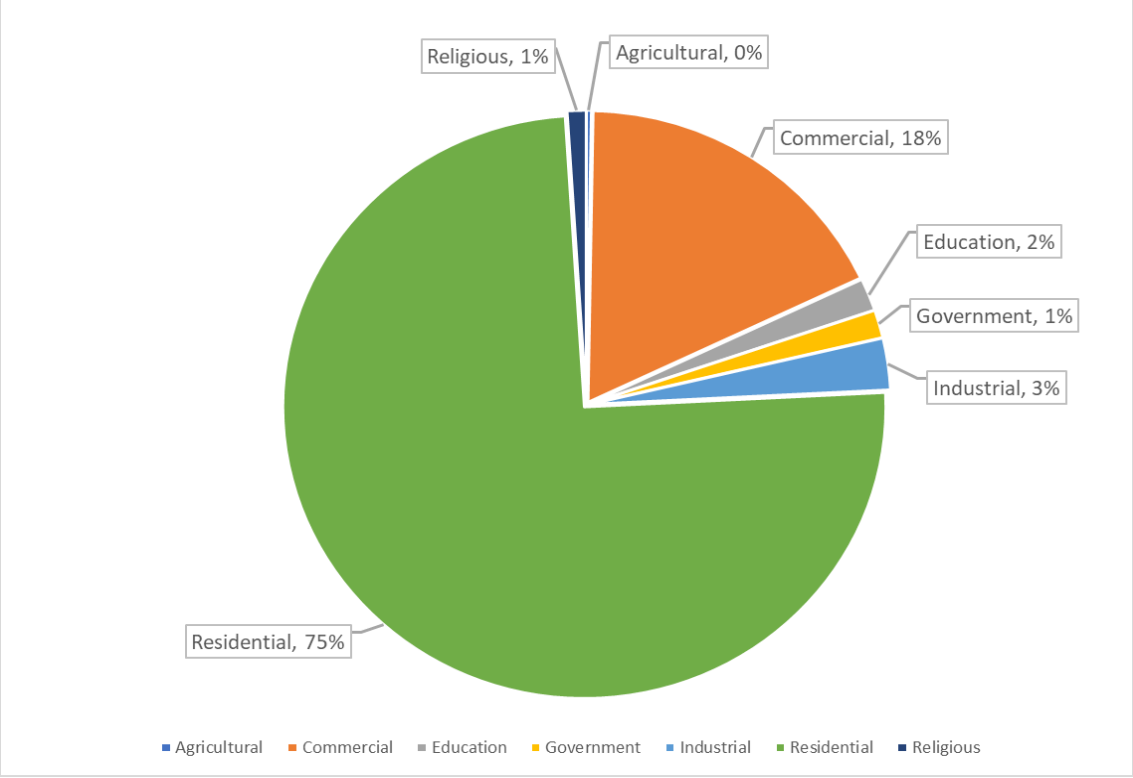
4.4.2 General Building Stock

The 2010 U.S. Census data identifies 82,167 households in Broome County. The 2016 American Community Survey data estimate that the majority of housing units (60.7 percent) in Broome County are single-family, detached units. The U.S. Census Bureau defines household as all the persons who occupy a housing unit and a housing unit as a house, an apartment, a mobile home, a group of rooms, or a single room that is occupied (or if vacant, is intended for occupancy) as separate living quarters. The median price of a single-family home in Broome County was estimated at $112,300 in 2016 (American Community Survey 2016).

For this update, the default general building stock in HAZUS-MH v4.2 was updated and replaced with a custom-building inventory for Broome County. The building inventory was developed using the most recent Broome County tax parcels, Real Property System tax data, and building footprints and 911 address points provided by the Broome County GIS & Mapping Services. Tetra Tech calculated the replacement cost values (structure and contents) using RSMeans 2018 data. Generally, contents for residential structures are valued at about 50 percent of the building's value. For non-residential facilities, the value of the content is generally about equal to the building's structural value.

The updated building inventory contains 95,114 buildings with a total building replacement value (structure and content) of greater than $199,000,000,000. This inventory was incorporated into HAZUS-MH at the structure and aggregate level. Approximately 93.4% of the buildings (88,869 buildings) and 74.8% of the building stock replacement value are associated with residential housing. Commercial buildings make up the second building classification at approximately 18% of the total building replacement value. The City of Binghamton has the greatest number of structures at with 22,243 and the Village of Lisle has the smallest number of structures with 135. Figure 4-13 below illustrates the percentage of total building replacement value by occupancy.

Figure 4-4-12 - General Building Stock by Occupancy Class, Broome County, New York

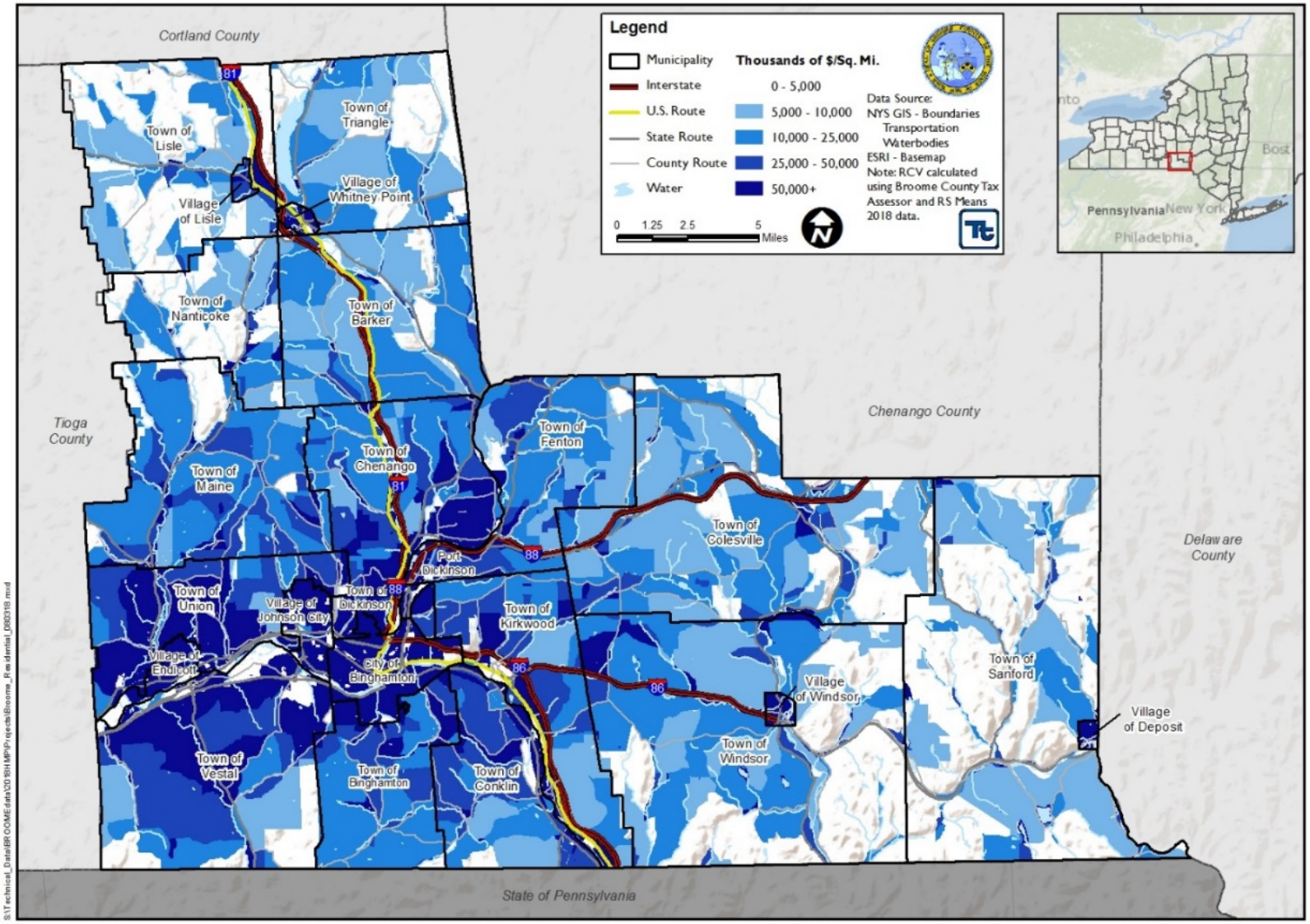


Appendix E presents Building Stock Statistics by Occupancy Class for Broome County based on HAZUS-MH provided data.

Figure 4-13 through Figure 4-15 show the distribution and exposure density of residential, commercial, and industrial buildings in Broome County. Exposure density is the dollar value of structures per unit area, including building content value. Generally, contents for residential structures are valued at about 50 percent of the building's value. For commercial facilities, the value of the contents is generally about equal to the building's structural value. The densities are shown in units of $1,000 ($K) per square mile.

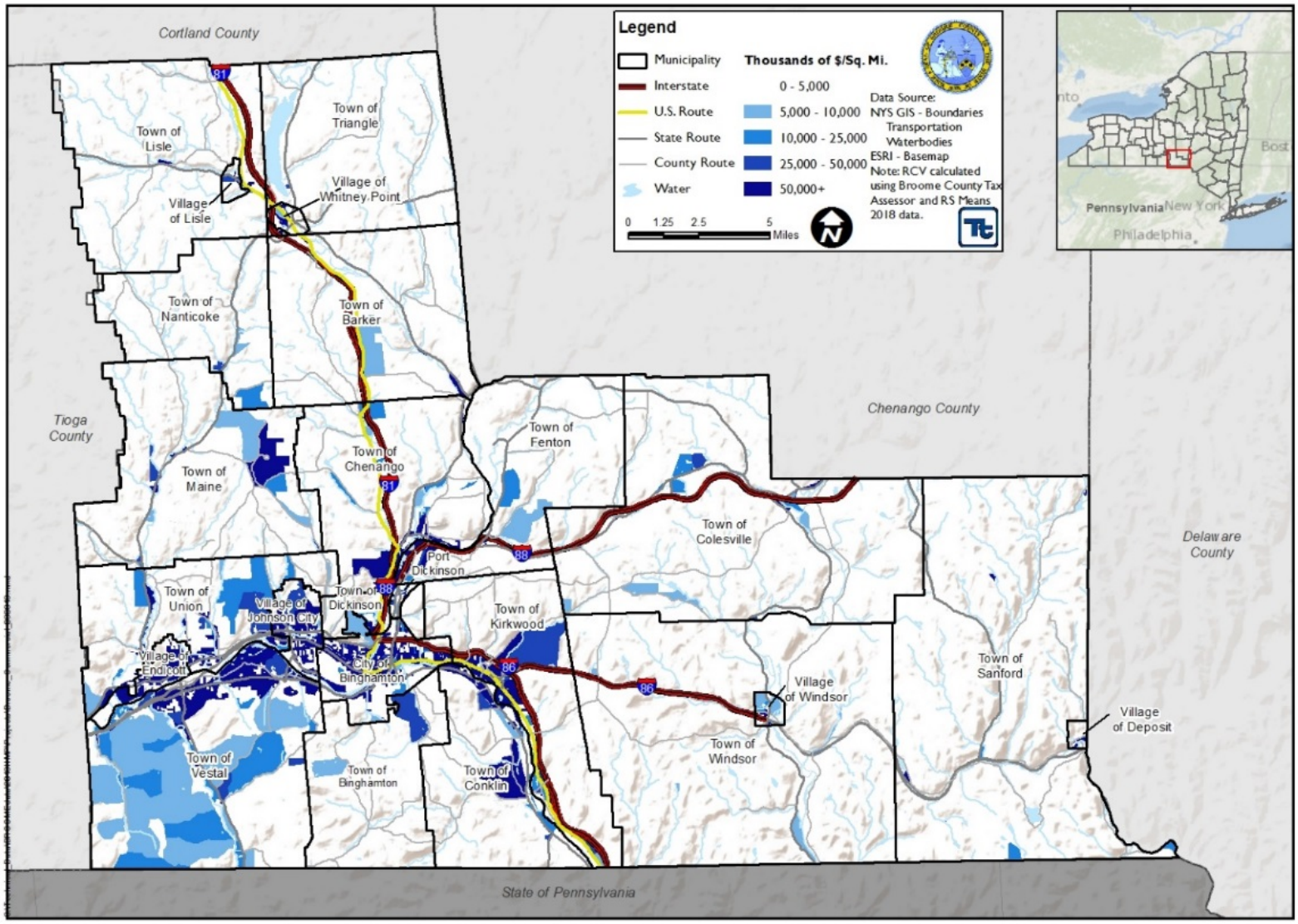
Viewing exposure distribution maps, such as Figure 4-13 through Figure 4-15 can assist communities in visualizing areas of high exposure and in evaluating aspects of the study area in relation to the specific hazard risks.

Figure 4-13. Distribution of Residential Building Stock and Value Density in Broome County, New York



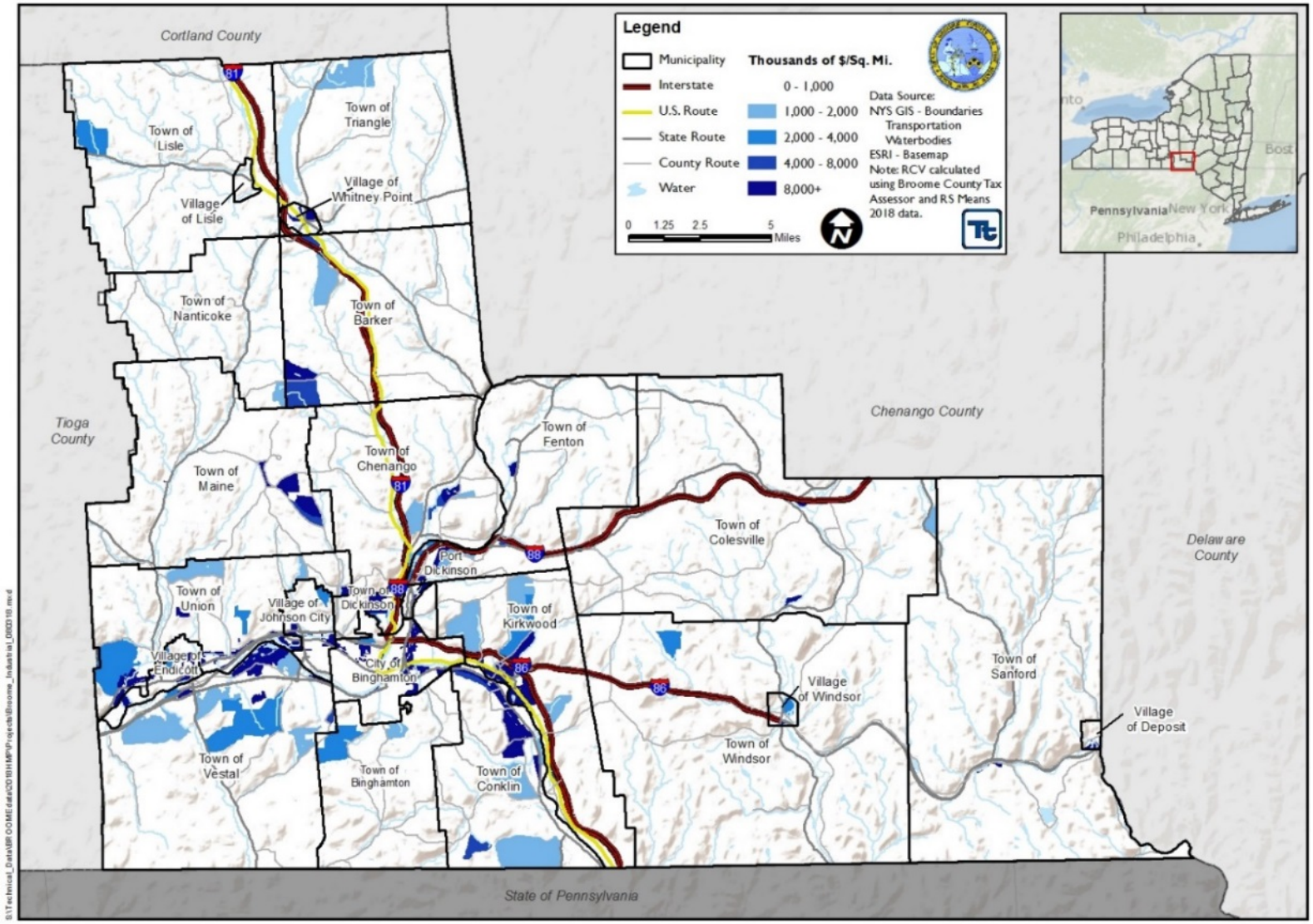
Source: HAZUS-MH 4.2

Figure 4-14. Distribution of Commercial Building Stock and Exposure Density in Broome County, New York



Source: HAZUS-MH 4.2

Figure 4-15. Distribution of Industrial Building Stock and Value Density in Broome County, New York



Source: HAZUS-MH 4.2

4.5 LAND USE AND POPULATION TRENDS

Land use regulatory authority is vested in New York State's towns, villages, and cities. However, many development and preservation issues transcend location political boundaries. DMA 2000 requires that communities consider land use trends, which can impact the need for and prioritization of mitigation options over time. Land use trends significantly impact exposure and vulnerability to various hazards. For example, significant development in a hazard area increases the building stock and population exposed to that hazard.

This plan provides a general overview of population, land use, and types of development occurring within the study area. An understanding of these development trends can assist in planning for further development and ensuring that appropriate mitigation, planning, and preparedness measures are in place to protect human health and community infrastructure.

4.5.1 Land Use Trends

According to the Broome County Comprehensive Plan, the county has a distinctive development pattern that consists of a densely settled urban core with associated suburban fringe, narrow transportation corridors that follow the river valleys, rural village nodes, and the open spaces found in rural landscapes (Broome County Comprehensive Plan 2012). The following sections present an overview of the county economy including: agriculture, retail trade, tourism, industrial, government, leisure and hospitality, and manufacturing.

Economy

The U.S. Census Bureau's County Business Pattern provides an annual series of sub-national economic data by industry covering the majority of the country's economic activity. According to the 2016 Broome County Business Pattern, the county had a total of 4,247 business establishments. The Retail Trade industry had the greatest number of establishments in the county, making up 16.6 percent of all businesses. Following Retail Trade is Accommodation and Food Services, making up 12.2 percent of all business. The third greatest industry in 2016 was Other Services (except public administration), making up 12.1-percent of all businesses. (These services include equipment and machinery repairing, providing dry cleaning and laundry services, personal care services, pet care services, death services, promoting or administering religious activities, and other similar services). Table 4-4. provides 2016 industry and employment information in Broome County.

Table 4-4. 2016 Economic Census for Broome County, New York

Industry	Number of Establishments	Annual Payroll ($1,000)	Number of Employees*
Agriculture, forestry, fishing and hunting	6	254	11
Mining, quarrying, and oil and gas extraction	2	D	a
Utilities	8	D	f
Construction	417	195,191	2,940
Manufacturing	170	401,680	7,357
Wholesale trade	198	175,855	3,721
Retail trade	703	258,923	11,006
Transportation and warehousing	97	56,724	1,553
Information	87	90,620	2,093
Finance and insurance	220	127,763	2,030
Real estate and rental and leasing	155	33,306	910
Professional, scientific, and technical services	299	167,701	3,758

Industry	Number of Establishments	Annual Payroll ($1,000)	Number of Employees*
Management of companies and enterprises	35	121,638	1,494
Administrative and support and waste management and remediation services	193	161,498	4,726
Educational services	38	17,762	901
Health care and social assistance	500	699,745	15,768
Arts, entertainment, and recreation	76	14,531	907
Accommodation and food services	520	130,719	8,324
Other services (except public administration)	516	67,947	2,882
Industries not classified	7	190	12

Source: U.S. Census, County Business Pattern 2016
** = This number only includes paid employees*
a = 0-19 employees
D = Withheld to avoid disclosing data for individual companies; data are included in higher level totals
f = 500-999 employees

Agriculture

In 2012, according to the U.S. Department of Agriculture (USDA) Census of Agriculture, there were 563 farms in Broome County, with a total land area of 79,676 acres, average size of 142 acres, and approximately 275 farm operators reporting farming as their primary occupation. The market value of agricultural products sold from county farms totaled over $30.7 million, with total sales averaging $54,553 per farm. Crop sales accounted for $7.04 million (22.9%) of total sales and livestock sales accounted for $23.7 million (77.1%) of total sales. The lead agricultural products sold were milk from cows ($18.9 million), cattle and calves ($3.93 million), and other crops and hay ($2.45 million) (U.S. Department of Agriculture National Agricultural Statistics Service 2012).

Between 2006 and 2012, approximately 12,800 acres of agricultural land were lost, with approximately half no longer farmed and now considered vacant and 6,600 acres converted to residential uses. This conversion of agricultural land to residential land uses is a concern because, on average, residential land uses do not cover their costs in municipal services (Broome County Comprehensive Plan 2012). Residential land use requires more impervious surface than agricultural land which can have an impact of flooding patterns throughout the County.

Corridors and Gateways

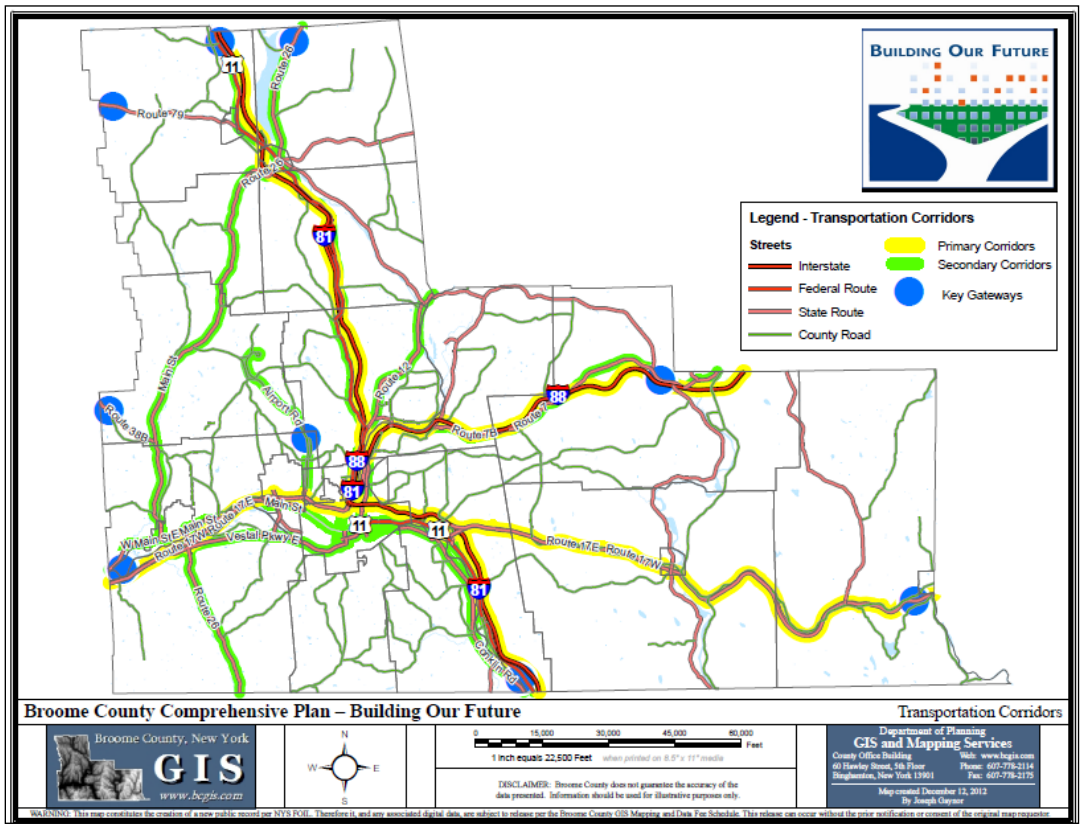
The transportation routes in Broome County created a network of corridors and gateways that impact the land use patterns. The transportation corridors favor commercial development in areas with good access to the heavily traveled roads. The primary transportation corridors within Broome County experience very high volumes of traffic due to the location of the county is at the crossroads of three major interstates—I-81, I-88, and the future I-86. These primary corridors are defined as those roadways that have a NYSDOT functional classification of interstate or expressway (Broome County Comprehensive Plan 2012). Figure 4-16 illustrates the transportation corridors in Broome County.

The secondary corridors of the county experience lower traffic volumes but are still heavily traveled. In the county, the secondary corridors have a NYSDOT functional classification of principal or minor arterial. Many local and regional travelers use these corridors and merit special attention. These secondary corridors include the following:

- Conklin Road – NYS Route 7.
- NYS Route 7 – NYS Route 363 – Brandywine Highway.

- Main Street – Court Street – NYS Route 17C – US Route 11.
- NYS Route 26.
- Front Street – Route 12.
- Vestal Parkway – NYS Route 434.
- Airport Road.

Figure 4-16. Transportation Corridors of Broome County, New York



Source: Broome County Comprehensive Plan 2012

As residents and visitors use the major and secondary corridors, they are greeted by gateways to the county and to specific portions of the urban core. Some of these gateways are located within a local municipality while others are located in an adjacent municipality. The key gateways in the county are shown on Figure 4-16 above with blue dots (Broome County Comprehensive Plan 2012).

Two of the key gateways, I-81 corridor and Airport Road, are important to Broome County. The I-81 corridor is located on the New York–Pennsylvania border and is one of the most heavily traveled north–south interstates. Over 50,000 visitors travel through the county on I-81 each day. The other important gateway is Airport Road. Over the past ten years, approximately 250,000 passengers, each year, have flown in and out of the Greater Binghamton Airport. Approximately 70% of these passengers were business travelers. Business travelers who use the airport typically drive south to their destination. Over the past five years, the Broome County Department of Aviation has made $32 million in investments to improve the function and appearance of the airport; however, those improvements did not include the end of the airport campus where there are numerous run-down and abandoned buildings (Broome County Comprehensive Plan 2012).

Flooding and Land Use Patterns

Flooding and floodplain mapping is an increasingly significant factor in shaping local land use patterns in Broome County. In 1936, the Susquehanna River valley experienced a significant flood event in New York State and Pennsylvania. At the time of the event, there was no flood protection system in place to prevent widespread damage. Through the Flood Control Act of 1936, the U.S. Army Corps of Engineers built floodwalls, levees, and the Whitney Point and East Sidney Flood Control Dams to provide flood protection for the urban core area of Broome County. This infrastructure construction was augmented by 19 flood-control structures (dams) that the county built and manages, mostly in the western portion of the county. This network protected urbanized and suburbanized areas from significant damage during the 1972 Hurricane Agnes flood event. Record-breaking flood events in 2006 and 2011 exposed the vulnerability of an infrastructure-based approach to flood control (Broome County Comprehensive Plan 2012).

FEMA responded to the 2006 flooding events by preparing new flood maps for the region. They developed preliminary flood maps intended to replace the ones that had been used since the 1970s and 1980s in the county. The Preliminary Flood Insurance Study (PFIS) and associated Digital Floodplain Rate Maps (DFIRM) were released for Public Review in February 2010. These preliminary maps dramatically shifted the boundaries of the Special Flood Hazard Area (SHFA) (or the 100-year floodplains), which placed an additional 6,190 properties in the SFHA. The greatest numbers of properties that were added were found in the county's urban core. Due to changes in the methodology that FEMA utilizes to determine floodplain areas in stream reaches with levees and floodwalls; the preliminary maps were never officially approved and released.

Recent discussions with FEMA Region 2 staff (December 2018) confirmed that the 2010 Preliminary Broome County FIS and associated DFIRM's have been officially terminated due to length of time passed since the hydrology, LiDAR mapping, and hydraulic models originally developed (2006-2009). As such, it is FEMA's intent to complete a new FIS using updated LiDAR mapping, channel survey, and hydraulic models. Currently, a contract to move the new revised Broome County FIS forward has not been executed but is anticipated to occur in 2019. A specific timeline for completion of the updated FIS has yet to be determined by FEMA, but typically takes 3-4 years to complete (Shumaker, 2018). In the interim, the effective FlS and floodplain mapping for individual municipalities in Broome County (1970's and 1980's) still serve as the official documents for flood insurance purposes; however, municipalities have been encouraged to use the newer preliminary maps for floodplain management and mitigation purposes, as they still serve as the best available information.

Flooding has had a tremendous impact on land use patterns in Broome County. Between 2000 and 2010, the Town of Conklin lost 8.4% of its population, although the county's population held steady. Flood impact was partially due to participation in the FEMA buyout program by the hardest hit communities of Conklin, Kirkwood, Union, Vestal, and the City of Binghamton. 509 homes which cover 260 acres were acquired through this program and several hundred more are proposed (Broome County, 2019). Figure 4-17. shows the FEMA buyouts in the county.

Figure 4-17. FEMA Buyouts in Broome County, New York

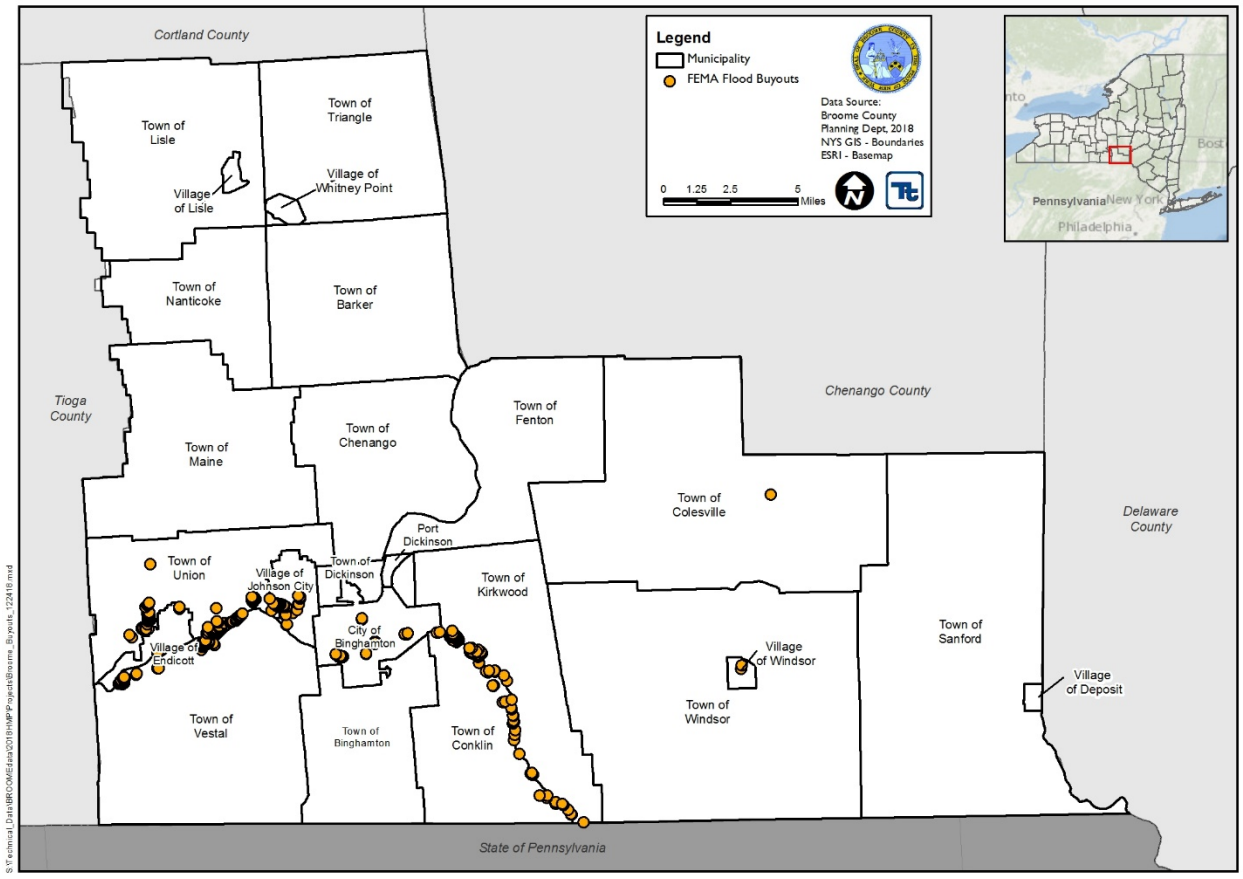


Table 4-5. FEMA Buyouts in Broome County by Municipality (Through 2018)

Municipality	Count	Total Acres
City of Binghamton	35	7.1
Town of Colesville	1	0.3
Town of Conklin	107	59.1
Town of Kirkwood	19	20.1
Town of Union	264	155.6
Town of Vestal	70	20.0
Village of Endicott	2	0.3
Village of Johnson City	9	1.5
Village of Windsor	2	1.2
Broome County	**509**	**265.1**

Source: Broome County Planning Department, 2018

With such large tracts of the urbanized area included into the Special Flood Hazard Area (SFHA), there is potential to dramatically alter development patterns. Structures in the floodplains are subject more stringent building codes and are required to carry flood insurance on all properties with a federally-backed mortgage, and lenders might not provide loans for properties in the SFHA. There may be a devaluation of properties in the urban core and the county may see an increase in suburbanization and sprawl as developers seek to build outside of the floodplains (Broome County Comprehensive Plan 2012).

Zoning

Historical land use patterns show how the community has developed over time. Zoning and related ordinances are used to guide development within the county. Traditional zoning divides a community into various districts and permits or disallows land uses by zoning district. In Broome County, 21 of the 24 municipalities have some form of zoning. Among these communities, there are over 120 different zoning districts.

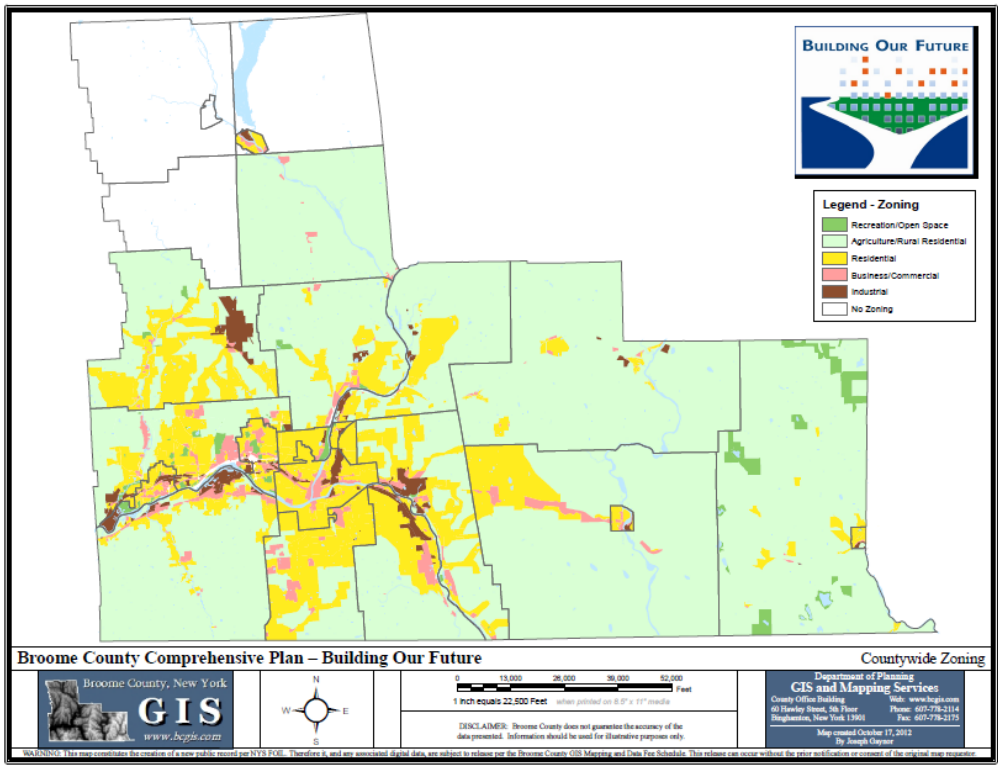
Nearly two-thirds of the county is zoned agricultural or rural residential, which allows agricultural use. Residential zoning, which includes multi-family and mobile home parks, is the next highest category of zoning and occupies 15 percent of total land area. Areas of no zoning restrictions in the county also occupy 15 percent of total land area. Business and industrial zoning districts each count for only 2 percent of total land area. Table 4-6. and Figure 4-18. display the local zoning information for Broome County.

Table 4-6. Local Zoning in Broome County, New York

Zoning Category	Acres	Percent
Agricultural/Rural Residential	284,579	66.3%
Residential	59,618	13.9%
Business/Commercial	7,044	1.6%
Industrial	6,056	1.4%
Recreation/Open Space	4,326	1.0%
No Zoning	67,489	15.7%
TOTAL	429,111	100.0%

Source: Broome County GIS & Mapping Services 2018

Figure 4-18. Countywide Zoning in Broome County, New York



Source: Broome County Comprehensive Plan 2012

4.5.2 Population Trends

Although Broome County's population has not undergone any notable change since the last hazard mitigation plan, there is a current trend of slight population decline as illustrated in Figure 4-20 below, which shows the annual population estimate from the 2010 to the 2016 American Community Survey 5 Year Estimates. Two Census Bureau products were used in the population trends section. The 2010 Census is the official population count of a municipality which is performed every ten years. The American Community Survey is performed on a more frequent basis to provide updated population and demographics information to communities.

At A Glance – Total County Population

From 2010 to 2016, Broome County population decreased by 2.9%

Largest Population Increases:

1. Village of Windsor (19.2%)
2. Village of Port Dickinson (7.4%)
3. Town of Vestal (0.8%)

Largest Population Decreases:

1. Village of Lisle (16.6%)
2. Town of Windsor (5.4%)
3. Town of Dickinson (5.2%)

Overall, most municipalities in Broome County have decreased slightly in total population from 2010 Census to the 2016 American Community Survey. Based on historical data, population projections have been created which show Broome County's population to continue to decrease over time. Broome County's total population is decreasing while their elderly demographic is increasing. The youth population, individuals age 5 and under, decreased from 2010 to 2016. This demographic trend means that further consideration may have to be given to an older demographic during planning processes to ensure capability to accommodate a higher percentage of socially vulnerable demographic groups.

Population Age 5 & Under

The 5 & Under population has decreased by 2.4% from 2010 to 2016.

Largest Increases in 5 & Under Population:

1. Town of Colesville (28.7%)
2. Town of Conklin (28.1%)
3. Town of Kirkwood (24.4%)

Largest Decreases in 5 & Under Population:

1. Town of Triangle (32.8%)
2. Town of Windsor (32.4%)
3. Town of Barker (24.2%)

The Broome County Comprehensive Plan made a note of the *Binghamton University Effect*, in which Binghamton University's (BU's) student population can affect the population statistics of some municipalities. Population and median age figures are skewed in several instances due to the phenomenal growth of Binghamton University over the past decade. Because the U.S. Census is calculated based on residence on April 1, students at BU are counted as local residents. This effect is most pronounced in the median age for Vestal, which is substantially lower than other suburban towns in Broome County (Broome County Comprehensive Plan 2012).

Population Age 65 & Over

The 65+ Population has increased by 5.7% from 2010 to 2016.

Largest Increases in 65+ Population:

1. Town of Nanticoke (55.9%)
2. Village of Whitney Point (43.4%)
3. Village of Lisle (40%)

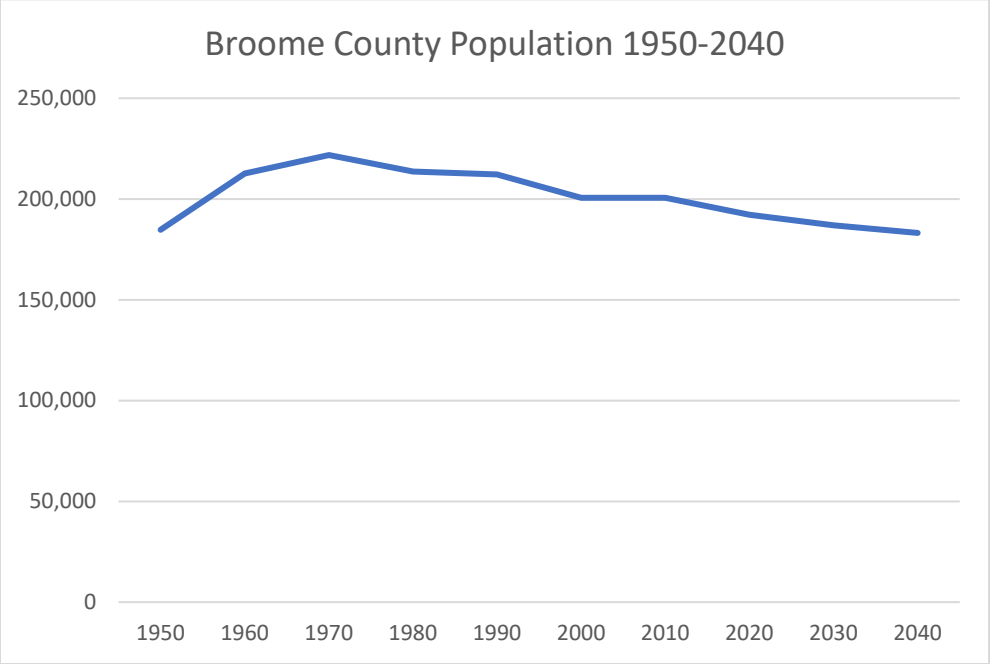
Largest Decreases in 65+ Population:

1. Town of Windsor (10.4%)
2. Village of Johnson City (4.4%)
3. Town of Conklin (3.4%)

The U.S. Census Bureau estimates that Broome County's population in 2016 was 197,381 (American FactFinder), a 1.6 percent decrease from 2010 population of 200,600 (U.S. Census). Between 1950 and 1970, the county experienced growth in population, and ultimately reached peak population in 1970. After 1970, a trend which reversed between 1980 and 2000. The largest increase in county population was seen between the years 1950 to 1960 when the county experienced

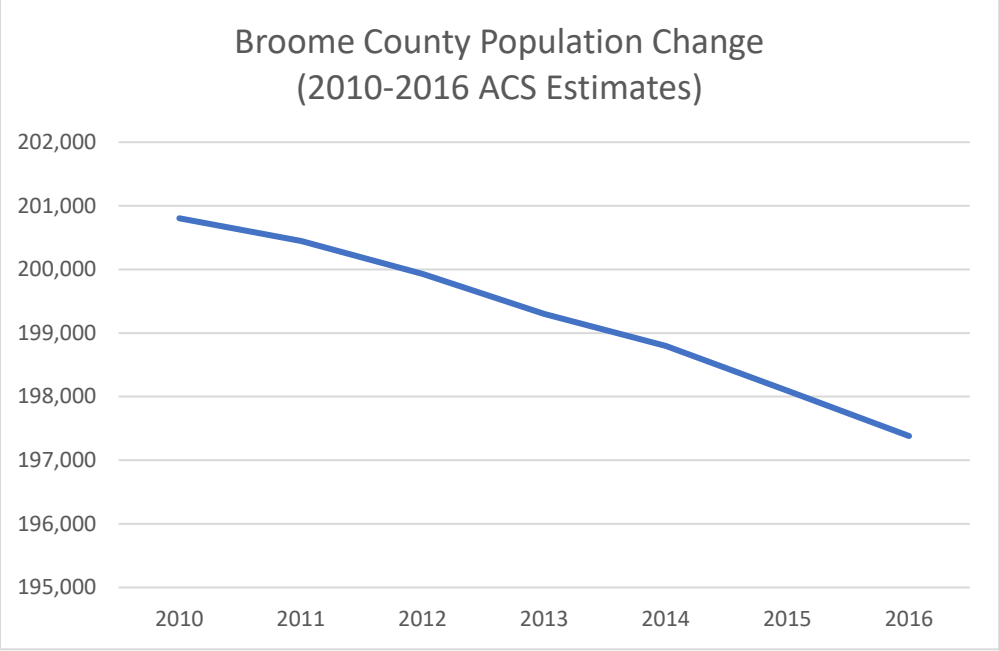
a 15.14 percent (27,963 persons) population increase. The largest decrease was seen between the years 1990 and 2000 when the county experienced a 5.48 percent (-11,624 persons) population decrease (U.S. Census 2012, University of Virginia 2007). Figure 4-19 shows the county population and its changes from 1950 to 2040 while Figure 4-20 indicates the annual estimated population change from 2010 to 2016. Figure E-1 in Appendix E (Supplementary Data) illustrates the municipal population change over this period.

Figure 4-19. Population Change 1950 to 2040 in Broome County, New York



Source: U.S. Census Bureau 2012, University of Virginia 2007, Cornell University 2018

Figure 4-20. Annual Population Change, 2010 to 2016 American Community Survey Estimates in Broome County, New York



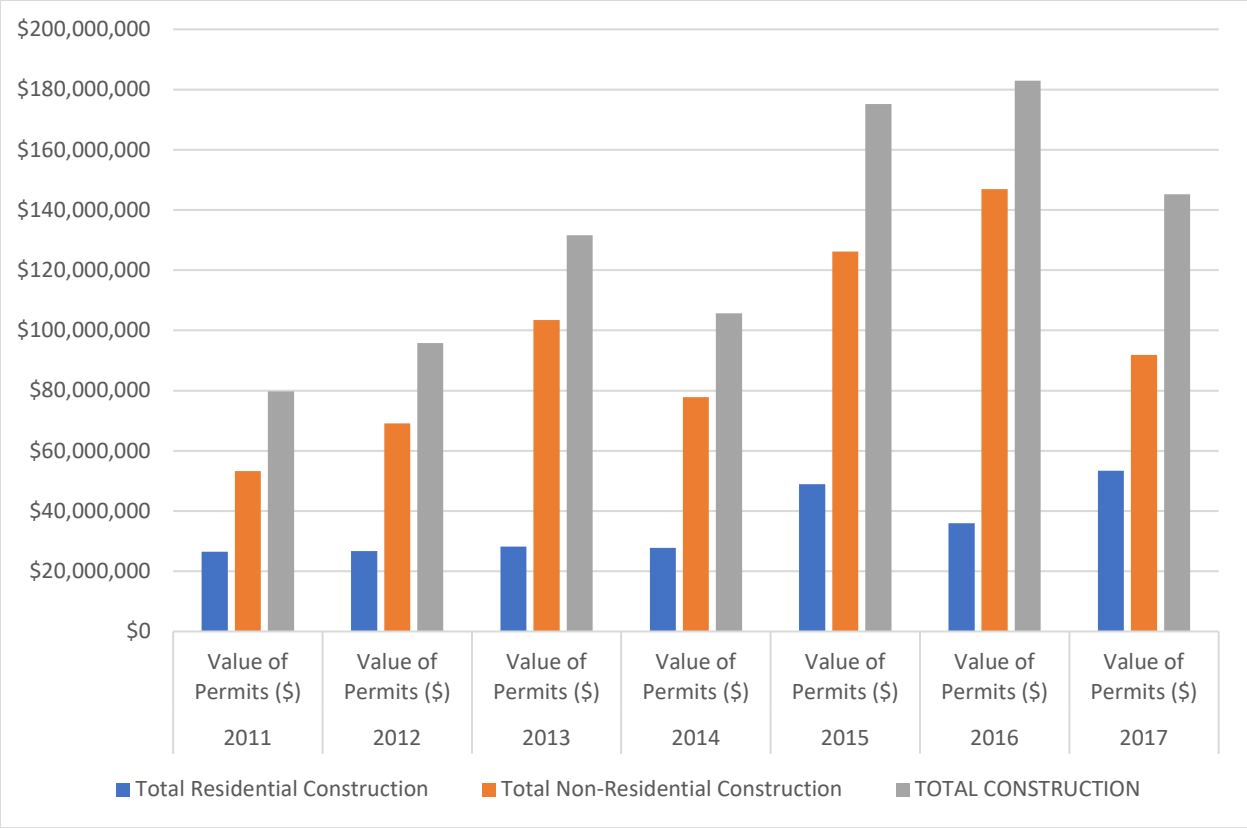
Source: U, S. Census Bureau American Community Survey; 5 Year Estimates 2010-2016

4.5.3 Future Growth and Development

There is a fair amount of new development occurring throughout Broome County. Commercial and residential development is occurring around Broome County which can bring increased capacity of population and potential economic benefit. Some municipalities have significant amounts of new development occurring, including the City of Binghamton, Town of Chenango, Town of Kirkwood, and Town of Union. Some of this development is occurring within hazard prone areas that are potentially vulnerable to natural hazards, such as flooding, wildfire, and earthquake. Increased development within floodplains or other hazard prone areas can increase the potential for greater damage occurring during natural hazard events.

As shown above in Figure 4-21, there was a general increase in construction permit values between 2011 and 2016 with a decrease in total permit values in 2017. Between 2011 and 2017, residential permit values remained relatively the same value from year to year, but the non-residential construction permit values increased from 2011-2016, with a significant reduction in value seen in 2017.

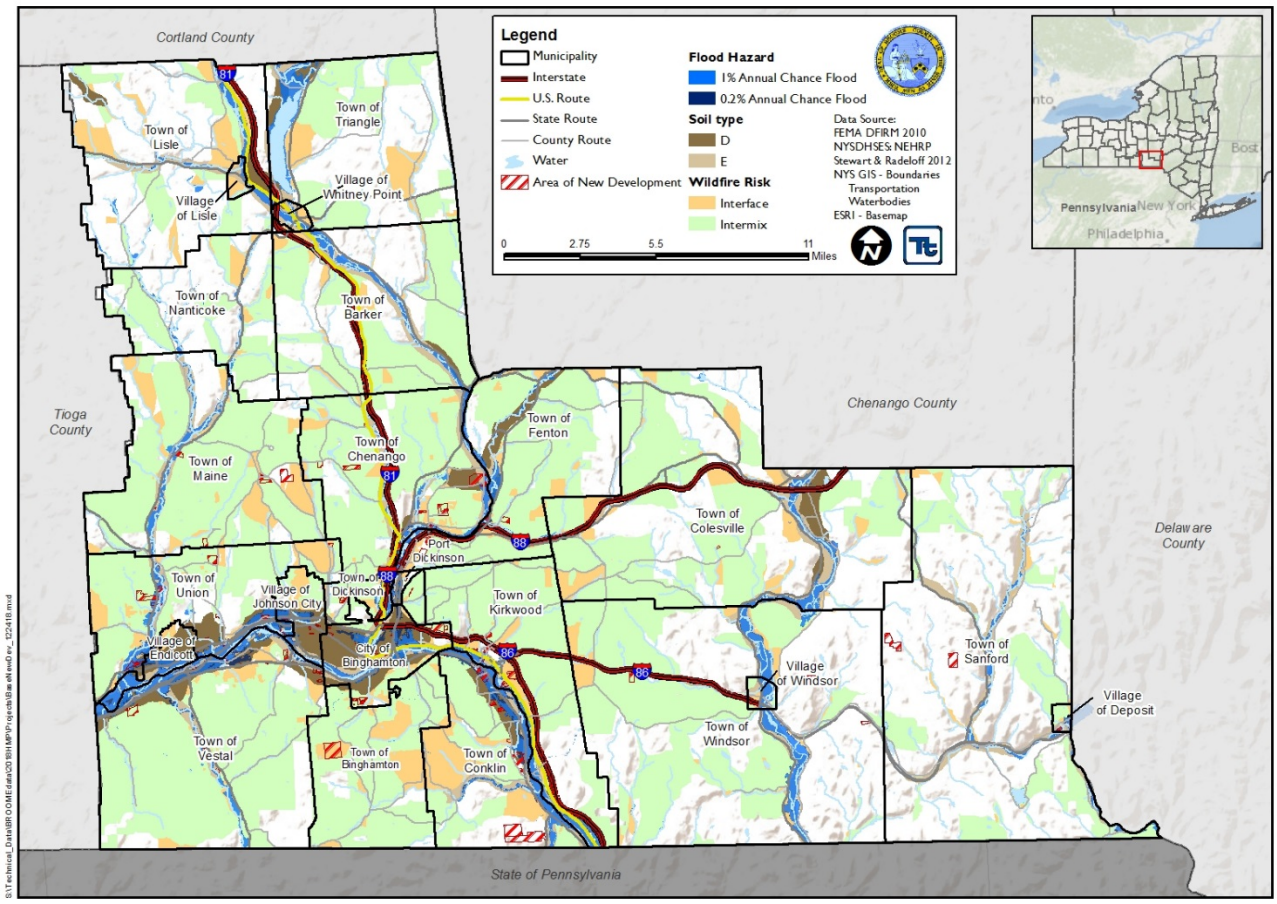
Figure 4-21. Construction Permit Value 2011-2017 in Broome County, New York



Source: Broome County Construction Reports 2011-2017

A summary of development planned within Broome County is provided in the Figure 4-22 below. Municipalities that did not identify any significant residential/commercial, or infrastructure development within the next 5 years are not included in the table. Details regarding development specific to each participating municipality is provided in Appendix E. Locations of development are indicated on the Hazard Area Extent and Location Maps included in Section 9 (Jurisdictional Annexes).

Figure 4-22. Planned Development in Broome County, New York



4.6 CRITICAL FACILITIES

Critical facilities and infrastructure are those that are essential to the health and welfare of the population. These become especially important after any hazard event. Critical facilities are typically defined to include police and fire stations, schools, and emergency operations centers. Critical infrastructure can include the roads and bridges that provide ingress and egress and allow emergency vehicles access to those in need and the utilities that provide water, electricity, and communication services to the community. Also included are Tier II facilities (hazardous materials) and rail yards; rail lines hold or carry significant amounts of hazardous materials with a potential to impact public health and welfare in a hazard event.

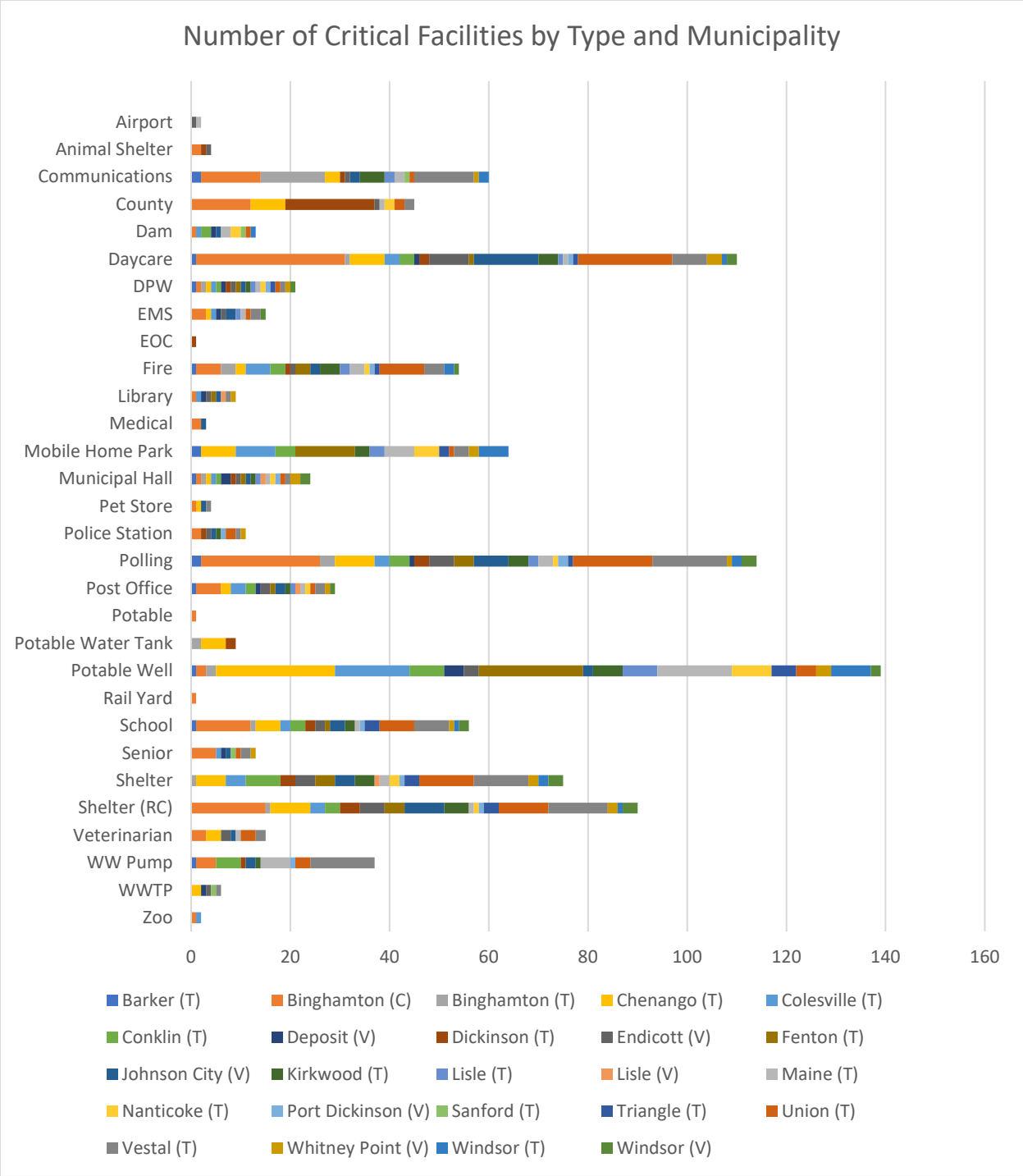
A comprehensive inventory of critical facilities in Broome County was developed from various sources, including Broome County GIS and Mapping Service and input from the Steering and Planning Committees. The inventory of critical facilities presented in this section represents the current state of this effort at the time of

Critical Facilities are those facilities considered critical to the health and welfare of the population and that are especially important following a hazard. As defined for this HMP, critical facilities include essential facilities, transportation systems, lifeline utility systems, high-potential loss facilities, and hazardous material facilities.

Essential facilities are a subset of critical facilities that include those facilities that are important to ensure a full recovery following the occurrence of a hazard event. For the county risk assessment, this category was defined to include police, fire, EMS, schools/colleges, shelters, senior facilities, and medical facilities.

publication of the draft HMP and used for the risk assessment in Section 5 (Risk Assessment). The number and type of critical facilities and infrastructure identified for this plan are indicated in Figure 4-23 and summarized in Appendix E (Supplemental Data). A complete listing of the inventory used for analysis in this plan is provided in Appendix F (Critical Facilities).

Figure 4-23. Planning Area Critical Facilities in Broome County, New York



Source: Broome County GIS & Mapping Services 2018

4.6.1 Essential Facilities

This section provides information on emergency facilities, hospital and medical facilities, schools, shelters and senior care and living facilities. For the purposes of this plan, emergency facilities include police, fire, emergency medical services (EMS), and emergency operations center. Figure 4-24 shows the location of the facilities and a list of the critical facilities is provided in Appendix F (Critical Facilities).

Emergency Facilities

The Broome County Office of Emergency Services is responsible for coordinating the county's emergency services and emergency planning. The Office of Emergency Services works with county departments and other agencies during an emergency to help protect lives and property, assist those injured, and to provide the rapid restoration of normal services. The Office is comprised of five divisions:

- Communications—this division administers the Broome County Emergency Dispatch/911 Center.
- Public Safety Systems—this division administers the Broome County Emergency Communications Systems.
- Emergency Management—this division conducts hazard vulnerability studies, provides Disaster Planning and preparedness for response and recovery. Administers the county's NY- Alert emergency public notification system.
- EMS—this division administers NYS certified emergency medical training programs. Plans for adequate delivery of emergency medical services and coordinates mutual aid among EMS providers.
- Fire Prevention & Control – this division administers New York State Outreach Fire Training program, Broome County Fire Mutual Aid Plan, Hazardous Materials Response Team, Wildland Search & Rescue Team, Water Rescue and Dive Team, Firefighter Assist and Search Teams, and Fire Investigation Team.

The Broome County Sheriff's Office, located in the Town of Dickinson, is the primary law enforcement agency in the county, and consists of several main operating divisions, including the Civil Division, Corrections Division, Detective Division, Highway Patrol Division, and Identification Division/Pistol Permits. Several municipalities have their own police departments, including the City of Binghamton, Village of Endicott, Village of Port Dickinson, and Town of Vestal. The New York State Police also control provide services within the county. Overall, Broome County identified 15 EMS stations, 54 fire stations, and 11 police stations in the county (Broome County GIS & Mapping Services 2018).

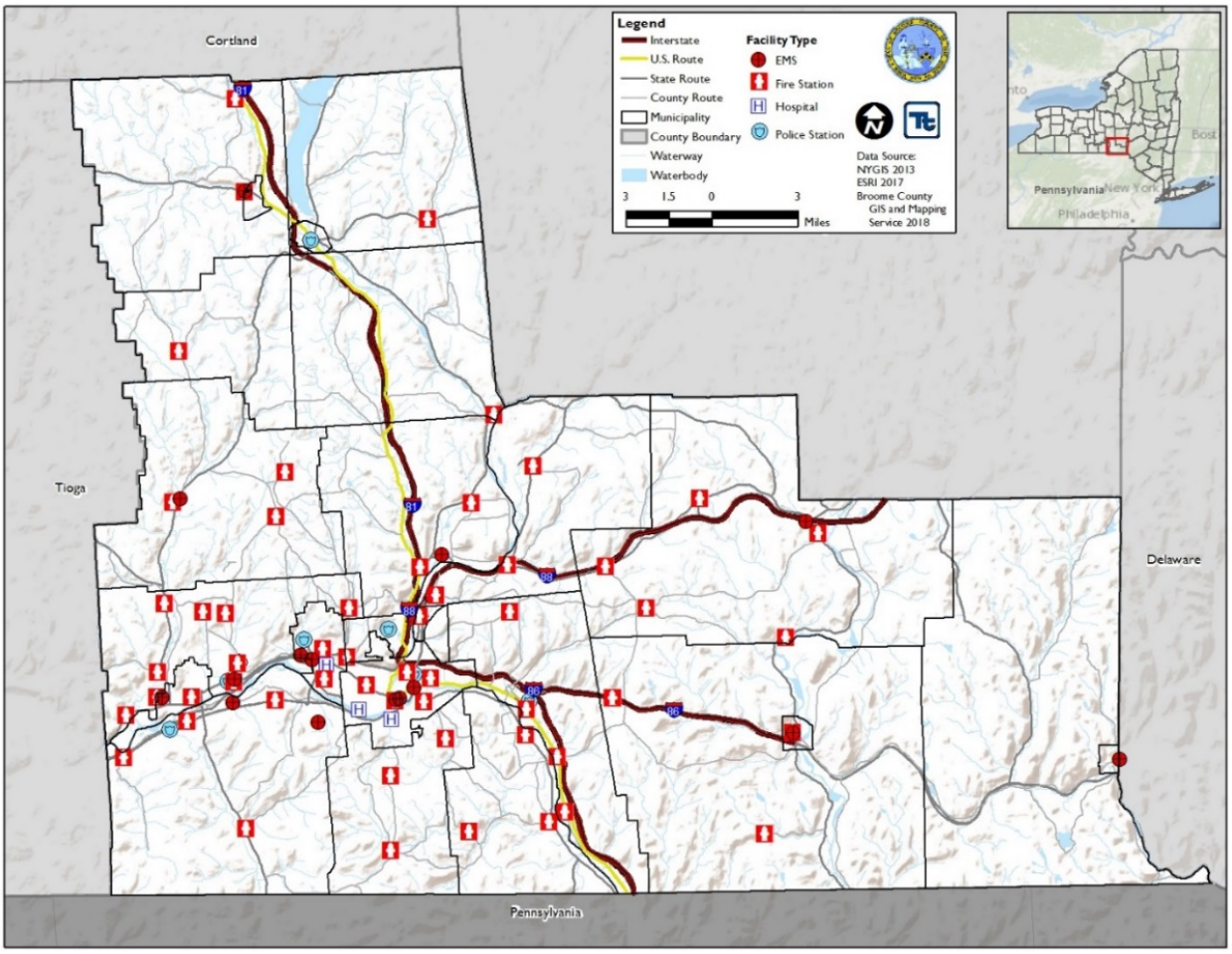
Hospitals and Medical Facilities

Hospitals and clinics located within and outside of the county serve the residents of Broome County, including the following:

- Binghamton General Hospital in Binghamton, NY.
- Chenango Memorial Hospital in Norwich, NY.
- Delaware Valley Hospital in Walton, NY (Delaware County).
- Guthrie Healthcare System with various locations in Pennsylvania and Corning, NY (Steuben County).
- Lourdes Hospital in Binghamton, NY.
- United Health Services with walk-in clinics in Vestal, Endicott, and Chenango Bridge, NY.
- Wilson Memorial Regional Medical Center in Johnson City, NY.

Of the list of hospitals above, three hospitals are in Broome County. Figure 4-24 shows the location of these three hospitals.

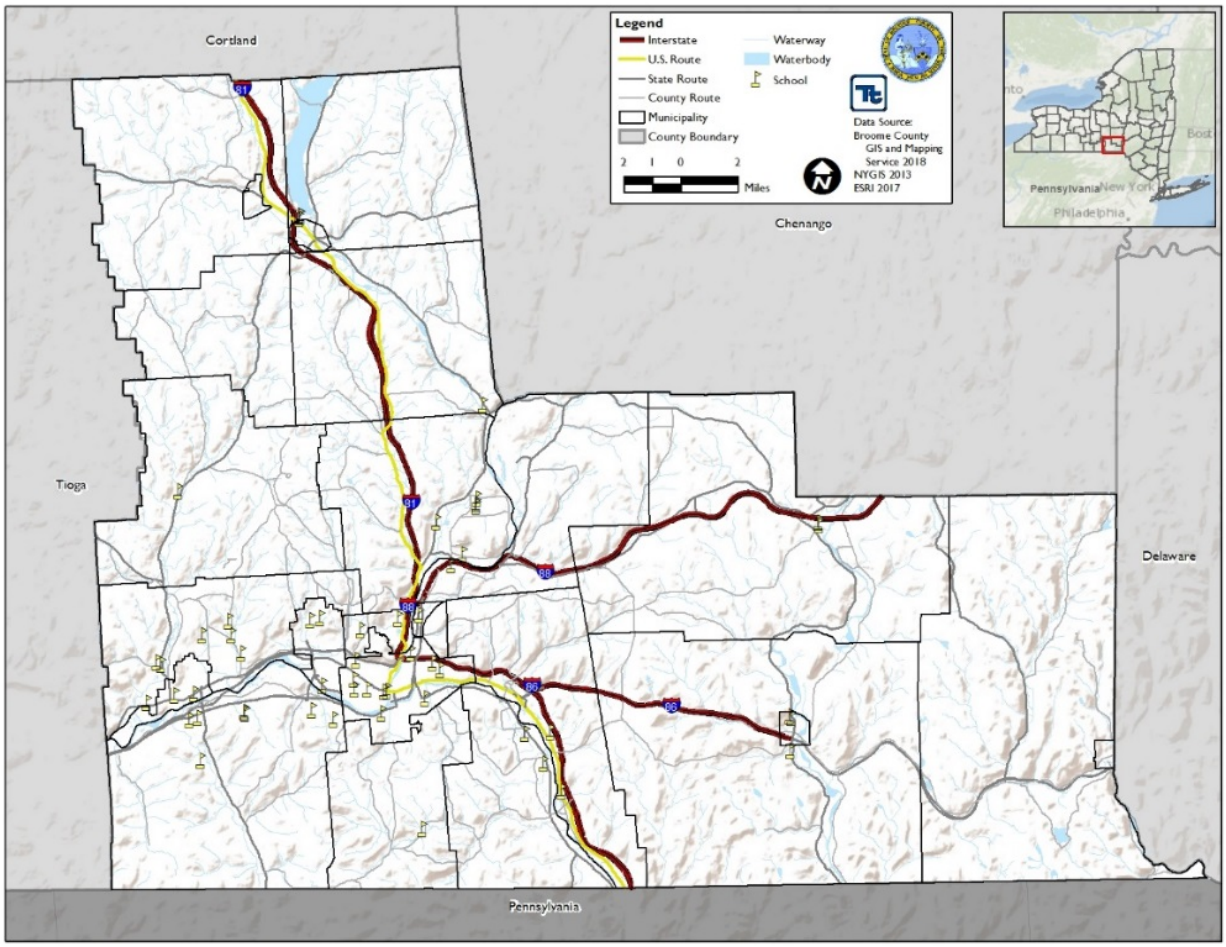
Figure 4-24. Critical Facilities in Broome County, New York



Schools

Broome County is home to 13 school districts. The Broome-Tioga Board of Cooperative Education Services also provides support and educational opportunities to students in school districts of both Broome and Tioga Counties. Ridley-Lowell Business & Technical Institute provides vocational opportunities to students in Broome County. In times of need, schools can function as shelters and are an important resource to the community. Additionally, there are several colleges & universities in the county: Binghamton University, Broome Community College, and Davis College. Figure 4-25 shows the location of schools within the county. For information regarding shelters, see the Shelters subsection below.

Figure 4-25. Schools in Broome County, New York



Shelters

Due to the variable nature of hazard events and associated sheltering needs within the county, Broome County relies on real-time outreach methods to inform the public of pending and active evacuations and available sheltering resources. Outreach methods includes variable message sign boards, media (radio, television, newspapers), and social media.

As supported by the Broome County Health Department, the county works directly with the American Red Cross, County Emergency Services, and local jurisdictions to establish and maintain an inventory of suitable shelter locations and can assist with the coordination and communication of shelter availability by the execution of the Broome County Comprehensive Emergency Management Plan (CEMP).

Sheltering needs and the location of shelters depends on the type of event, where the event is located, and what facilities will be used. Countywide sheltering policies and procedures are documented in the Broome County CEMP. The Mass Care, Emergency Assistance, Housing, and Human Services Emergency Support Function (ESF) #6 of the CEMP supports county, local, and non-governmental organizations efforts to address the non-medical mass care, emergency assistance, housing, and human services needs of individuals and families impacted by an emergency or disaster. Broome County Department of Social Services is the primary county agency for ESF #6 and is responsible for supporting mass care activities of the county government for large-scale incident management. This includes sheltering, feeding operations, emergency first aid, bulk distribution

of emergency items, and collecting and providing information on victims to family members. Broome County agencies supporting sheltering during an emergency include Broome County Health Department, Broome County Government Security Division, American Red Cross, UHS, Inc., Our Lady of Lourdes Hospital, BOCES, pharmacies and medical suppliers, and animal shelters.

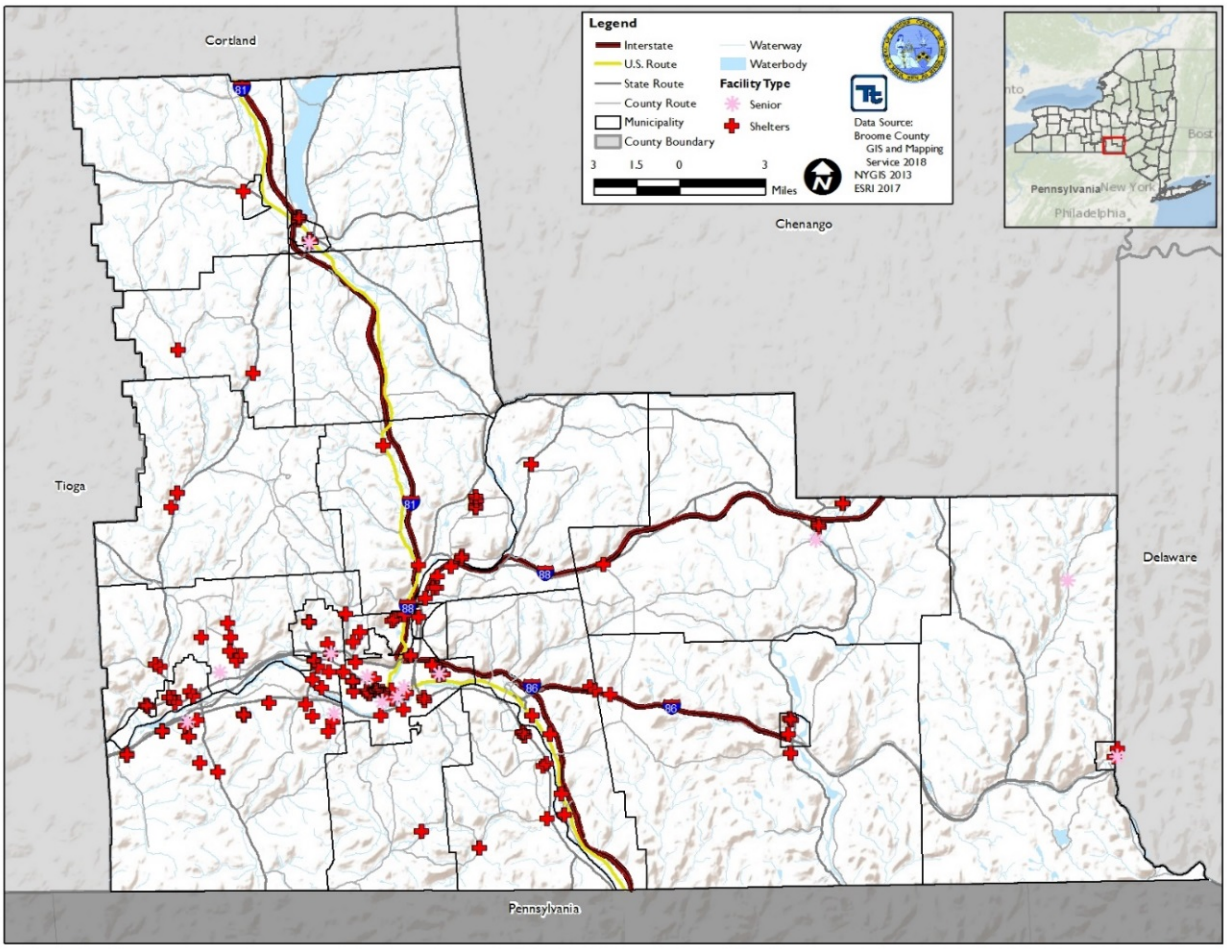
Broome County Department of Emergency Services encourages residents to subscribe for NY-Alert, New York State's Mass Notification System, to receive critical information and emergency alerts on what is happening in Broome County. This system contains critical, emergency-related information including instructions and recommendations in real-time by emergency personnel. Information can include severe weather warnings, significant highway closures, hazardous material spills, and other emergency conditions.

The county has responded to major flood disasters. The most recent event was the 2011 flood event, which underscored the need for a large evacuation center to accommodate thousands of people. With funds from the Governor's Office for Storm Recovery funds, the Planning and Emergency Services Departments are coordinating a $500,000 study to evaluate the feasibility of renovating an existing county-owned facility into a regional evacuation center for future storm events. This facility also could serve as a training facility for emergency/ public safety squads when it is not used for an emergency. (p.13, Building Resiliency Update on efforts in Broome County to become a more flood smart community, 2016, http://www.gobroomecounty.com/files/planning/_pdf/Progress%20Report%20FINAL.pdf)

Emergency Services made significant improvements into its backup communications infrastructure for 911 and public safety radio dispatching. Emergency Services regularly publicizes the NY-Alert system, which is run by NYS and is used by municipalities to broadcast alert messages to its citizens for free. (p.16, Building Resiliency Update on efforts in Broome County to become a more flood smart community, 2016, same report as above.)

Currently, to prevent misinformation during a disaster event, a listing of shelters is not provided in this plan. Figure 4-26 displays the shelters throughout the county. Please refer to each municipality's capability assessment in Section 9 (Jurisdictional Annexes) for further information on evacuation, sheltering, and temporary housing provisions within Broome County.

Figure 4-26. Senior Facilities and Shelters in Broome County, New York



4.6.2 Transportation Systems

Broome County's transportation network offers residents and employees options for transportation throughout the county and the region. Transportation throughout the county runs along Interstates 81, 86 and 88, as well as US Route 11. Broome County supports over 90 county routes and 17 state routes. State routes include 7, 12, 17, 26, 41, 79, 201, 206, 235, 363, 369, 434, 7A, 7B, 12A, 17C, and 38B. Figure 4-27 shows transportation systems in Broome County.

Highway, Roadways and Associated Systems

Travelers from the New York City area generally use Interstate 81, running through Kirkwood into Binghamton, to access Broome County from the south. Interstate 88, connecting Binghamton and Albany, runs along the eastern portion of Broome County. NYS Route 17 is a major expressway traversing east-west through the county. There are 512 bridges identified in the Broome County.

The Broome County's Department of Public Works is comprised of the following six divisions: Administration, Engineering, Building and Grounds, Security, Highway and Solid Waste Management. Through the combined

efforts of these divisions, the county maintains 17 campuses; 343.2 centerline miles of roads and is responsible for maintaining county bridges.

Airports and Heliports

The Binghamton Regional/Edwin A. Link Field, also known as the Greater Binghamton Airport, is owned and operated by the Broome County Department of Aviation. The Greater Binghamton Airport is located eight miles north of the Binghamton metropolitan area. The Tri-Cities Airport, once a public airport, is now privately owned and managed by Goodwin Aviation. The Luke Airport, Chenango Bridge, and Kirkwood Airpark are privately owned airports in Broome County.

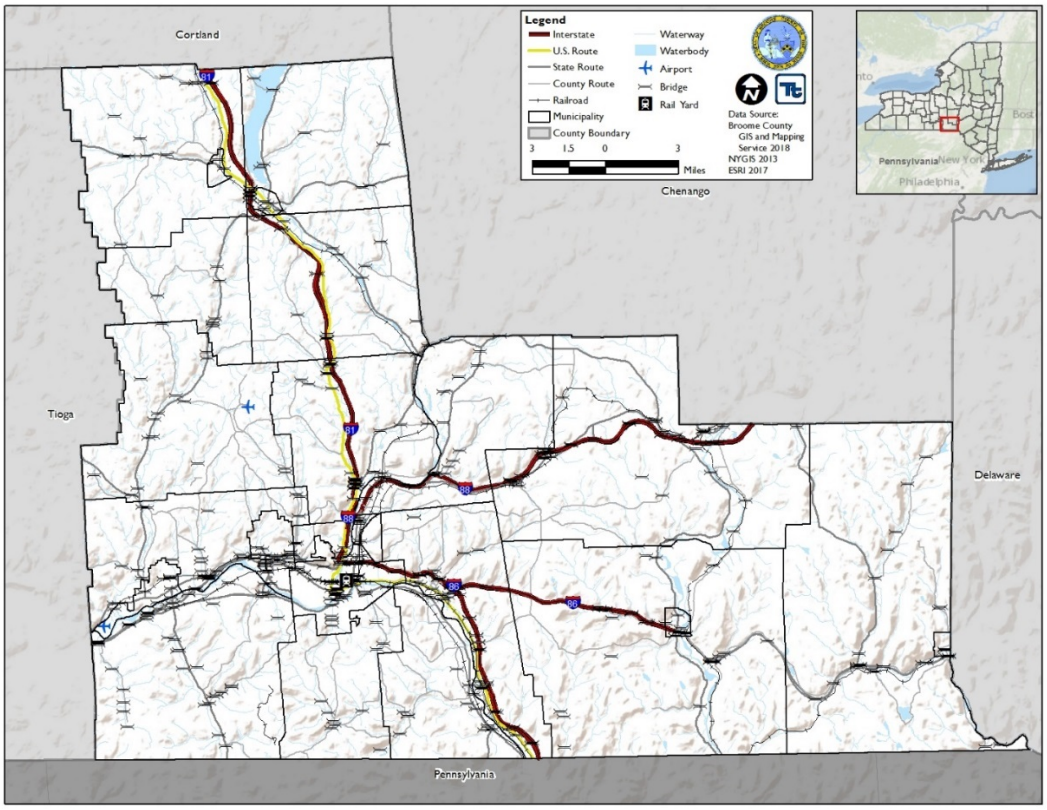
Bus and Other Transit Facilities

The Broome County Government website indicates the Broome County Department of Transportation owns and operates a fixed-route transportation system that services Broome County. This public transportation system offers the following services: B.C. Transit Route Buses, B.C. Lift, B.C. Country, and Office-For-Aging (OFA) Mini-bus. The B.C. Transit Route Bus fixed-route system serves the City of Binghamton, Village of Johnson City, Village of Endicott, and Town of Vestal. The B.C. Lift is a door-to-door bus service for individuals with disabilities in the urban areas of Broome County. The B.C. Country is a bus service that travels to the rural areas of Broome County and provides transportation to the more urban areas. B.C. Country's service area includes the Village of Whitney Point, Lisle, Kirkwood, Village of Deposit, Windsor, Maine, and certain locations in Chenango and Vestal. The OFA Mini-bus is a bus service for people 60 years of age and older that need to travel to the urban areas of Broome County. All B.C. Transit buses are wheel-chair accessible (Broome County, 2015).

Railroad Facilities

There is approximately 130 miles of railroad in Broome County, including rail owned by Canadian Pacific Railway (St. Lawrence & Hudson Railway, Delaware and Hudson Railroad), New York Susquehanna and Western Railway (Conrail Railroad, Erie Lackawanna Railroad), Norfolk Southern Railway Co. (Conrail Railroad).

Figure 4-27. Transportation Features in Broome County, New York



4.6.3 Lifeline Utility Systems

This section presents data and information on potable water, wastewater, energy resources, and communication utility systems. Due to heightened security concerns, local utility lifeline data needed to complete the analysis were only partially obtained.

Figure 4-28 through Figure 4-30 show the locations of the facilities for these various lifeline utility systems in Broome County.

Potable Water

Water resources in Broome County shaped settlement patterns in this region. Currently, Broome County relies on surface and groundwater for drinking, recreation, industry, and agriculture. In the county, approximately 80% of potable water comes from groundwater sources (Broome County Comprehensive Plan 2013).

There are several aquifers located beneath the Susquehanna and Chenango Rivers and their surrounding floodplains. Aquifers are classified based on importance as a public water supply, productivity, and vulnerability to pollution. The municipalities of Johnson City, Endwell, Endicott, and Vestal are dependent on primary aquifers (highly productive, vulnerable aquifers being used, mainly as a water supply, by a large percentage of residents). There are also a number of principal aquifers which are classified as highly productive but used by a lower percentage of the population. Additionally, all of Broome County that is contained within the Susquehanna River Watershed is federally designated by the Environmental Protection Agency (EPA) as a sole source aquifer,

the Clinton Street-Ballpark Aquifer System. Sole source aquifers are those supplying 50 percent or more of the area's drinking water (Broome County Comprehensive Plan 2013).

Wastewater Facilities

The Broome County has individual sewer systems providing service to the City of Binghamton, Village of Deposit, and Village of Whitney Point. Six towns are partially serviced, including parts of Conklin, Dickinson, Kirkwood, Sanford, Union, and Vestal, as well as parts of the Village of Johnson City. Local systems are operated, maintained, and funded by local municipalities. There are 11 wastewater treatment plants located in the county. Sewer service is dependent on the size of the treatment plant, age of the infrastructure, and quantity being produced compared to the discharge point. Table 4-7 and Figure 4-29 identify sewer service areas and wastewater facilities in Broome County.

Table 4-7. Sewer Service Areas in Broome County, New York

Area Name	Wastewater Treatment Plant	Area (Acres)
Binghamton Johnson City Service Area	Binghamton Johnson City WWTP	3,665.8
Binghamton Johnson City Service Area	Binghamton Johnson City WWTP	6,773.1
Binghamton Johnson City Service Area	Binghamton Johnson City WWTP	6,355.1
Northgate Service Area	Northgate WWTP	2,168.9
Oquaga Lake Sewer District	Oquaga Lake WWTP	550.1
Parkwood Sewer District	Parkwood Sewer District WWTP	18.1
Pennview Sewer District 10	Pennview Sewer District 10 WWTP	10.1
Pine Valley Sewer District 1	Pine Valley Sewer District 1 WWTP	4.5
Pine Valley Sewer District 2	Pine Valley Sewer District 2 WWTP	7.1
Porter Hollow Sewer District	Porter Hollow Sewer District WWTP	17.7
Village of Deposit	Village of Deposit WWTP	425.2
Village of Endicott Service Area	Village of Endicott WWTP	2,518.7
Village of Endicott Service Area	Village of Endicott WWTP	7,187.7
Village of Whitney Point Whitney Point	Whitney Point WWTP	732.4

Source: Broome County GIS & Mapping Services 2018

Energy Resources

Gas and electric power in Broome County are transmitted and distributed primarily by New York State Electric & Gas.

Communications

Broome County is served by a variety of communications systems, including traditional land line, fiber optic, and cellular service provided by multiple companies, such as Verizon, Spectrum, and Frontier. In addition to land line, fiber optic, and cellular communications systems, Broome County has an extensive radio communications network that is used by emergency services agencies, hospitals, law enforcement, public works, transportation, and other supporting organizations

Figure 4-28. Potable Water Facilities in Broome County

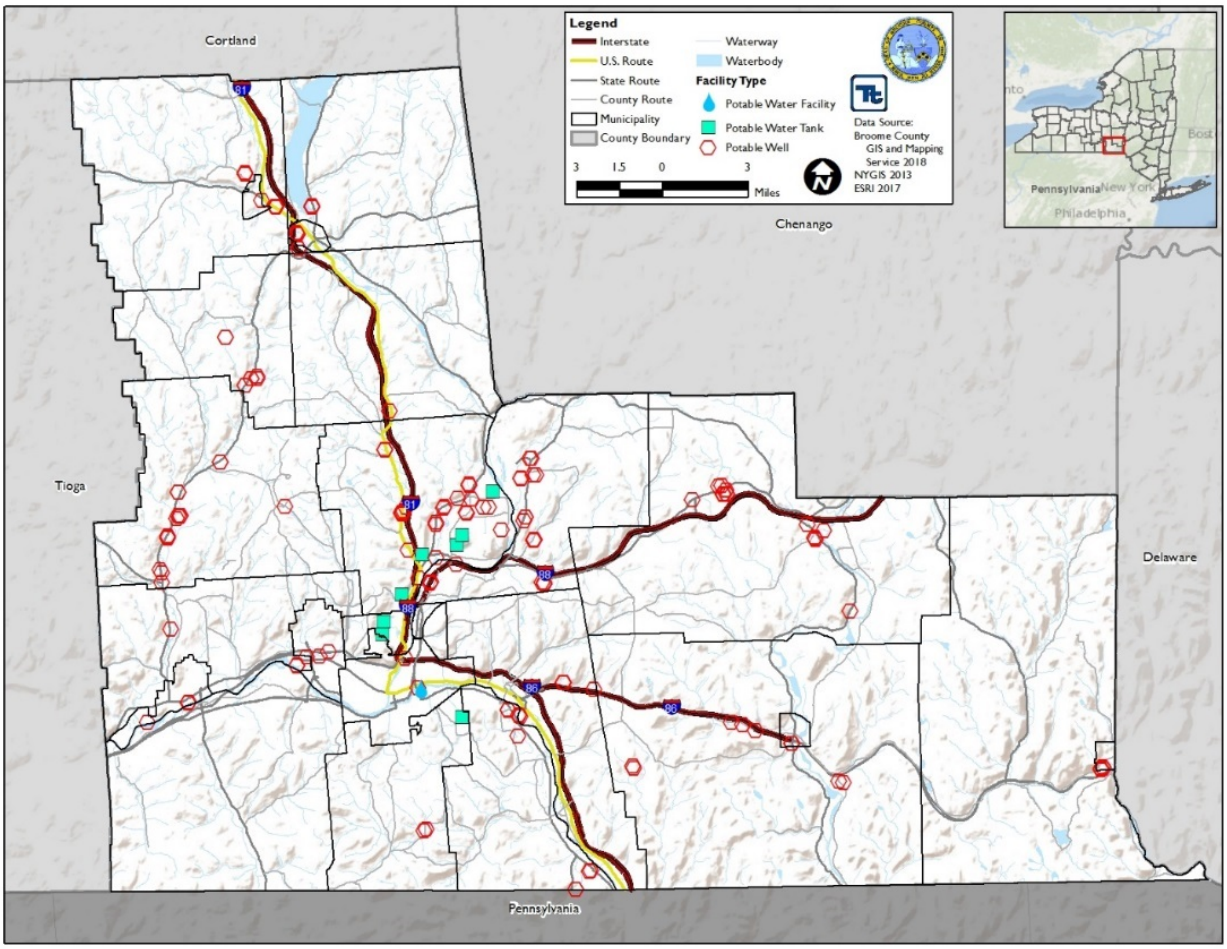


Figure 4-29. Wastewater Facilities in Broome County

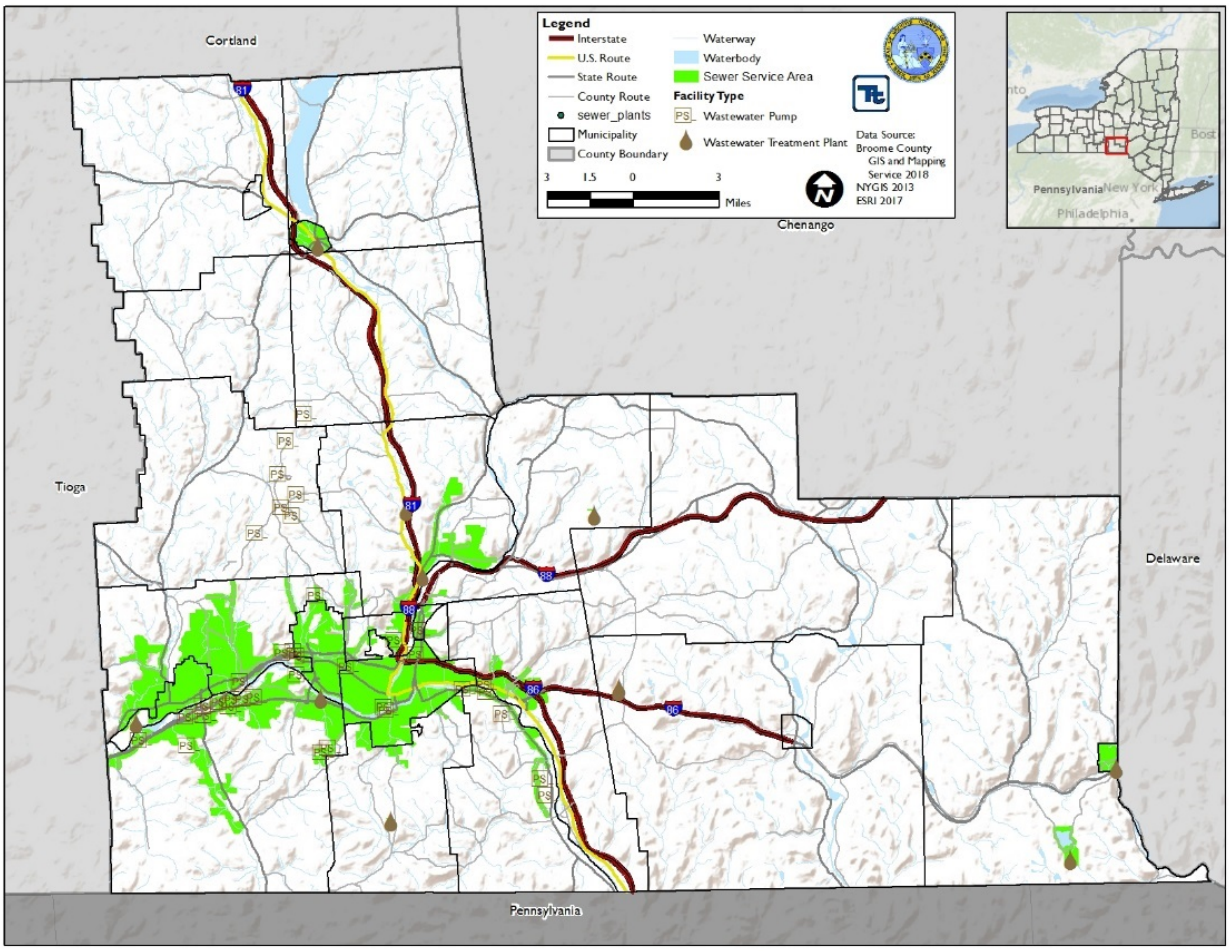
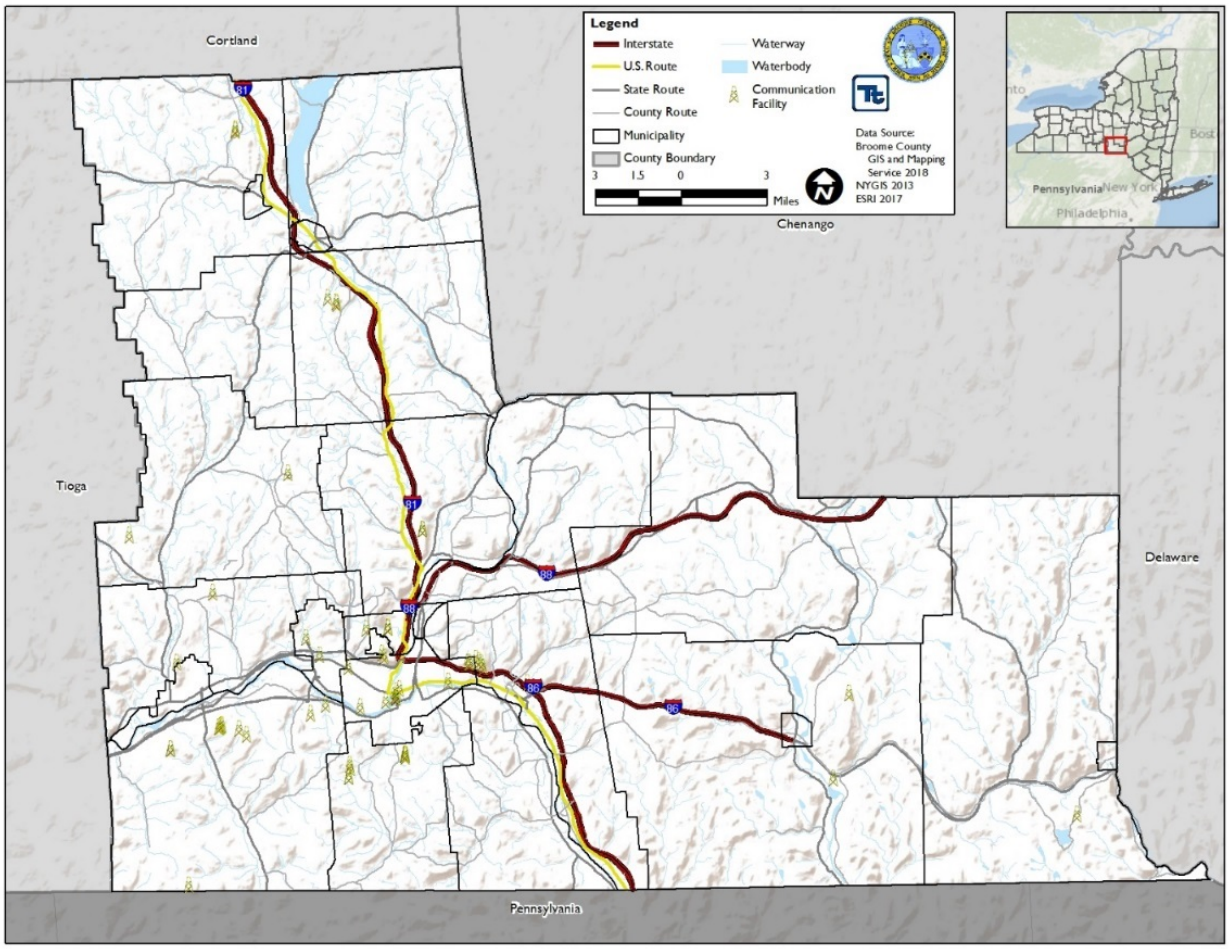


Figure 4-30. Communication Facilities within Broome County



4.6.4 High-Potential Loss Facilities

High-potential loss facilities include dams, levees, hazardous materials (HAZMAT) facilities, nuclear power plants, and military installations.

HAZMAT Facilities

A Superfund site consists of land in the United States that has been contaminated by hazardous waste and identified by the U.S. Environmental Protection Agency (EPA) as a candidate for cleanup because it poses a risk to human health or the environment. These sites are placed on the National Priorities List (NPL), the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide EPA in determining which sites warrant further investigation.

Abandoned hazardous waste sites placed on the federal NPL include those that EPA has determined present *a significant risk to human health or the environment*, with the sites being eligible for remediation under the Superfund Trust Fund Program. As of 2018, Broome County hosts six hazardous sites in the federal Superfund Program that are listed as on the NPL (CERCLIS 2018).

The EPA Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) (Superfund) Public Access Database (CPAD) reports that there are currently four archived

Superfund sites located in Broome County (CERCLIS 2018). An archived Superfund site is one that has no further interest under the Federal Superfund Program based on available information and is no longer part of the CERCLIS inventory. Archived and active Superfund sites are accessible through the same database but are differentiated by status.

In addition to the hazardous waste sites, there are numerous hazardous facilities in Broome County cataloged by the NYSDEC's Bulk Storage Program Database. The Bulk Storage Program includes three types of facilities; Petroleum Bulk Storage (PBS), Major Oil Storage Facilities (MOSF), and Chemical Bulk Storage (CBS) that require registration with NYSDEC for all facilities with a total storage capacity of petroleum products of the following:

- PBS—1,100 gallons or more
- CBS underground tanks and all stationary aboveground tanks—185 gallons or more
- MOSF sites—400,000 gallons or more.

As of December 2018, 749 sites are listed in the NYSDEC's Bulk Storage Program Database in Broome County, New York (NYSDEC 2018).

Dams and Levees

Dams

For the purpose of this hazard mitigation plan, dams are not considered critical facilities, as the Steering and Planning Committees recognizes that these facilities are covered by other regulatory instruments. However, a summary of the dams in the county is presented in this section to provide an awareness of the number and types of these structures within the county.

According to the NYSDEC Division of Water Bureau and Flood Protection and Dam Safety, there are three hazard classifications of dams in New York State. The dams are classified in terms of potential for downstream damage if the dam were to fail. The hazard classifications are as follows:

- *Low Hazard (Class A)* is a dam located in an area where failure will damage nothing more than isolated buildings, undeveloped lands, or township or county roads and/or will cause no significant economic loss or serious environmental damage. Failure or operation problems would result in no probable loss of human life. Losses are principally limited to the owner's property.
- *Intermediate Hazard (Class B)* is a dam located in an area where failure could damage isolated homes, main highways, and minor railroads; interrupt the use of relatively important public utilities; and cause significant economic loss or serious environmental damage. Failure or operation problems would result in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. Class B dams often are located in predominantly rural or agricultural areas but also can be located in areas with population and significant infrastructure.
- *High Hazard (Class C)* is a dam located in an area where failure might cause loss of human life; serious damage to homes, industrial, or commercial buildings; important public utilities; main highways or railroads; and extensive economic loss. This is a downstream hazard classification for dams in which excessive economic loss (urban area including extensive community, industry, agriculture, or outstanding natural resources) would occur as a direct result of dam failure.

The New York State Inventory of Dams, identifies 170 dams in Broome County: 106 low hazard, 13 intermediate hazard, 23 high hazard, 17 negligible or no hazard classification, and 11 with an unknown classification (NYS DEC 2018).

Levees

Within Broome County, there are nine NYSDEC levee and floodwall systems in place intended to reduce flood risk in historically flood vulnerable areas. Basic information on the systems in the county was gathered to integrate components of the levee accreditation process with this HMP and identify ways the hazard mitigation process can help to establish a path forward for the levee accreditation process.

Information from a combination of the National Levee Database (NLD), FEMA Flood Mapping Products website, NYSDEC Region 7 project details and maps website, and the United States Geological Survey StreamStats website was compiled and presented in the following tables that present summaries of the levee system features and associated risks. Further information regarding the criteria for meeting levee certification, including discussion of a phased approach and initial cost estimates of the work, is provided in Section 6 (Mitigation Strategy), Section 9 (Jurisdictional Annexes), and Appendix H (Levee Data Summary and Checklist). Table 4-8 through Table 4-10 present data about levee systems collected from the NLD and FEMA. Figure 4-31 through Figure 4-33 show levees in select locations.

Table 4-8. Levee System Feature Information from the NLD in Broome County, New York

System	Year Complete	Levee (miles)	Floodwall (miles)	Pump Stations (#)	Gravity Drains (#)	Closures (#)
Deposit	1985	0.82	0.30	0	0	0
Endicott	1961	2.10	0.42	3	30	1
Johnson City	1961	1.89	0.09	2	21	3
Lisle	1948	0.73	0.21	0	9	3
Northeast Binghamton	1942	1.70	1.90	6	34	7
Northwest Binghamton	1940	0.25	0.30	2	4	0
South Binghamton	1941	1.67	0.41	2	19	4
Vestal	1961	2.95	0.04	4	26	2
Whitney Point Village	1948	1.36	0.00	0	14	1

Source: U.S. Army Corps of Engineers, 2018

Table 4-9. Levee System Risk Information from the NLD in Broome County, New York

System	LSAC*	Overtopping ACE**	People at Risk	Structures at Risk	Property Value
Deposit	N	N	562	266	$89.1M
Endicott	Low	0.005	7,470	2,355	$398M
Johnson City	N	N	1,884	454	$306M
Lisle	Low	0.002	202	88	$7.1M
Northeast Binghamton	Moderate	N	14,743	3,550	$2.2B
Northwest Binghamton	Moderate	0.005	2,034	815	$227M
South Binghamton	Moderate	0.005	4,195	1,599	$569M
Vestal	Low	0.005	2,191	879	$199M
Whitney Point Village	Low	0.002	351	204	$51.6M

Source: U.S. Army Corps of Engineers, 2018
** LSAC - Levee Safety Action Classification Rating by the U.S. Army Corps of Engineers*
***ACE - Annual Chance Exceedance*
N - No Data Entered or LSAC In Progress

Table 4-10. Levee System FEMA Accreditation in Broome County, New York

Levee System Name	Effective FIS ID	Total Length (miles)	Leveed Area (sq. miles)	Levee System Summary in NLD	Levee System Accreditation Status*
Deposit	360043V000	0.85	0.230	NO	Non Accredited
Endicott	360045V000	2.52	1.590	YES	Non-Accredited
Johnson City	2305130002	1.98	0.490	NO	Non-Accredited
Lisle	2305190001	0.92	0.093	YES	Pending**
Northeast Binghamton	2305060001	3.53	2.200	YES	Non-Accredited
Northwest Binghamton	2305060003	0.55	0.370	YES	Non-Accredited
South Binghamton	2305060002	2.08	0.790	YES	Non-Accredited
Vestal	2305130003	2.99	1.080	YES	Non-Accredited
Port Dickinson***	-	0.72	-	-	Pending**
Whitney Point Village	2305310001	1.36	0.210	YES	Pending**

* Based on LAMP DFIRM status as reported in the Broome County Floodplain Mapping Fact Sheet (FEMA 2018)
** Could possibly be accredited even though they are shown as SFHAs on the DFIRM
*** Information from Levee Analysis and Mapping Plan Village of Deposit Levees (FEMA TBD 2018)

Figure 4-31. Levees in the Villages of Lisle and Whitney Point

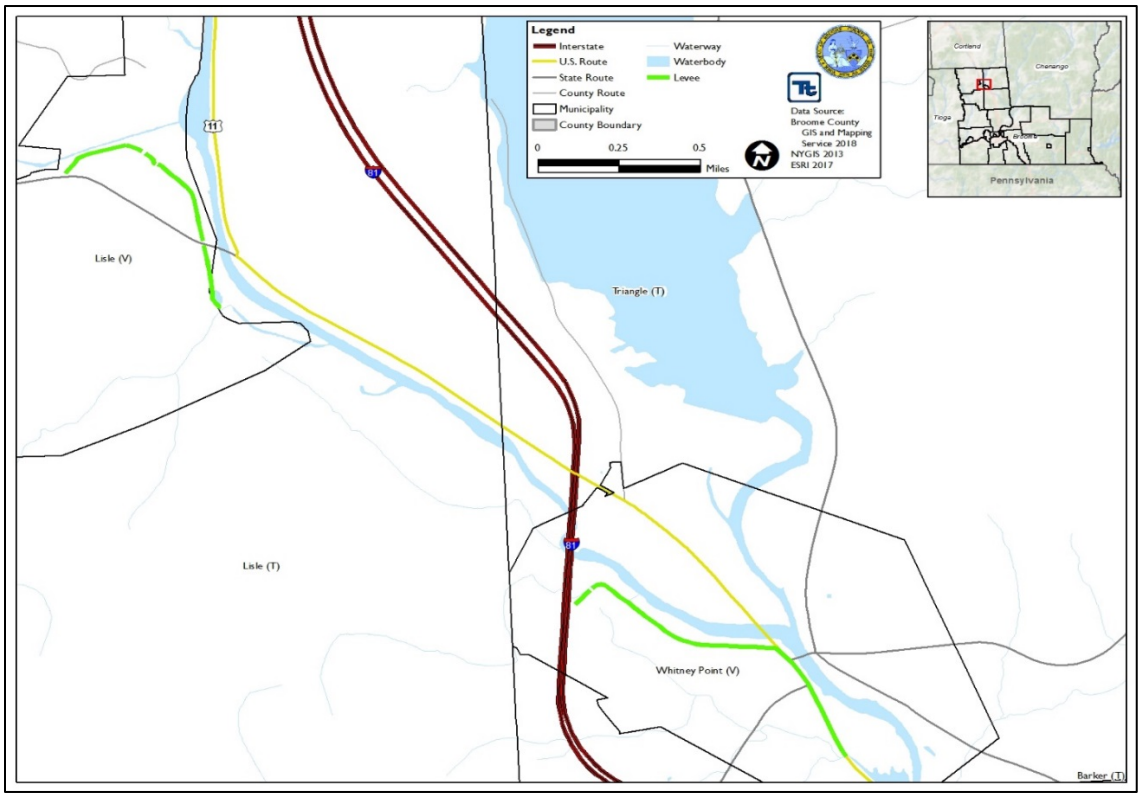


Figure 4-32. Levees in The Village of Endicott and the Towns of Union and Vestal

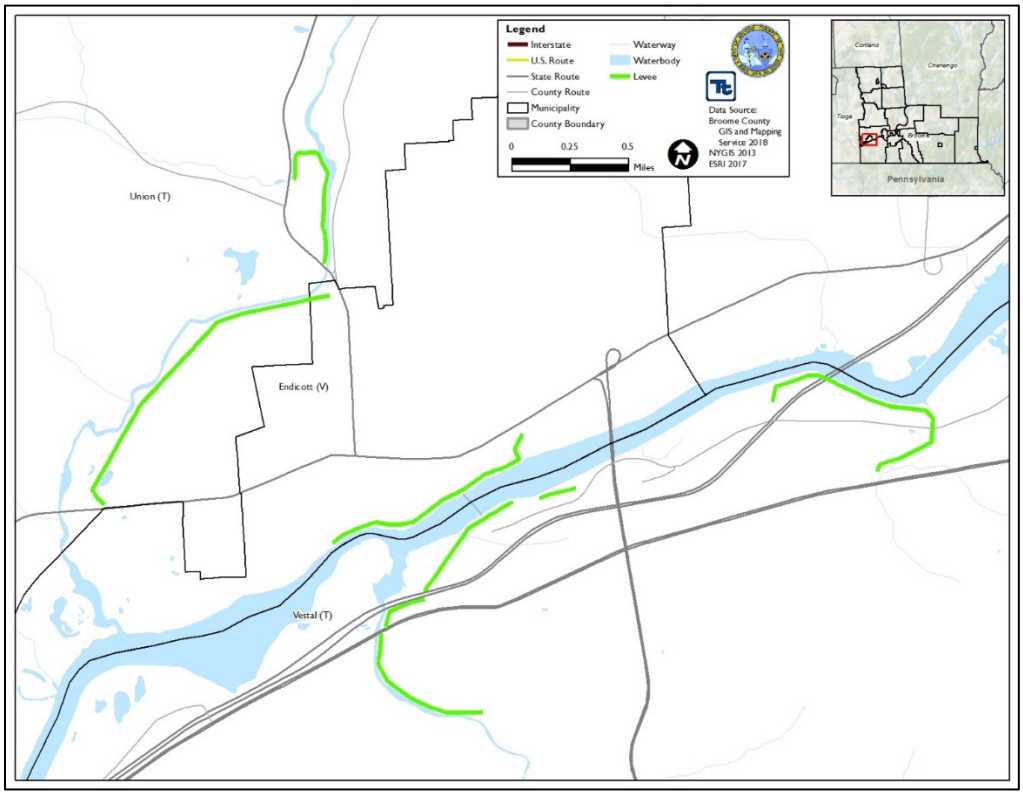
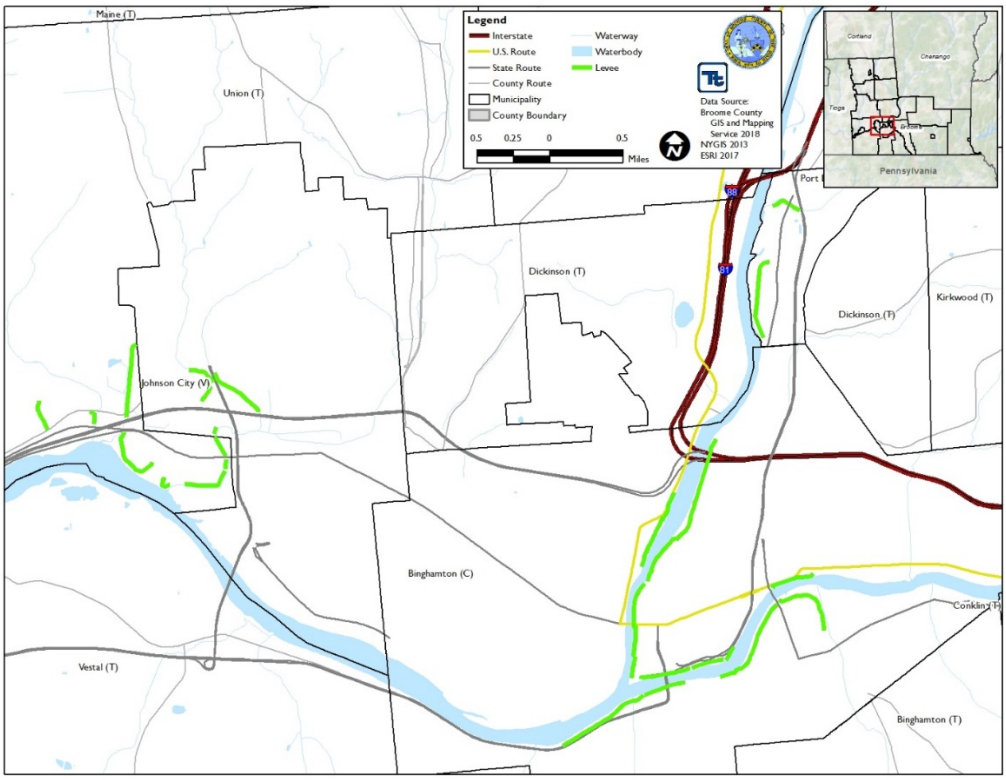


Figure 4-33. Levees in The City of Binghamton, Village of Johnson City, Towns of Dickinson and Union



4.6.5 Housing and Relocation

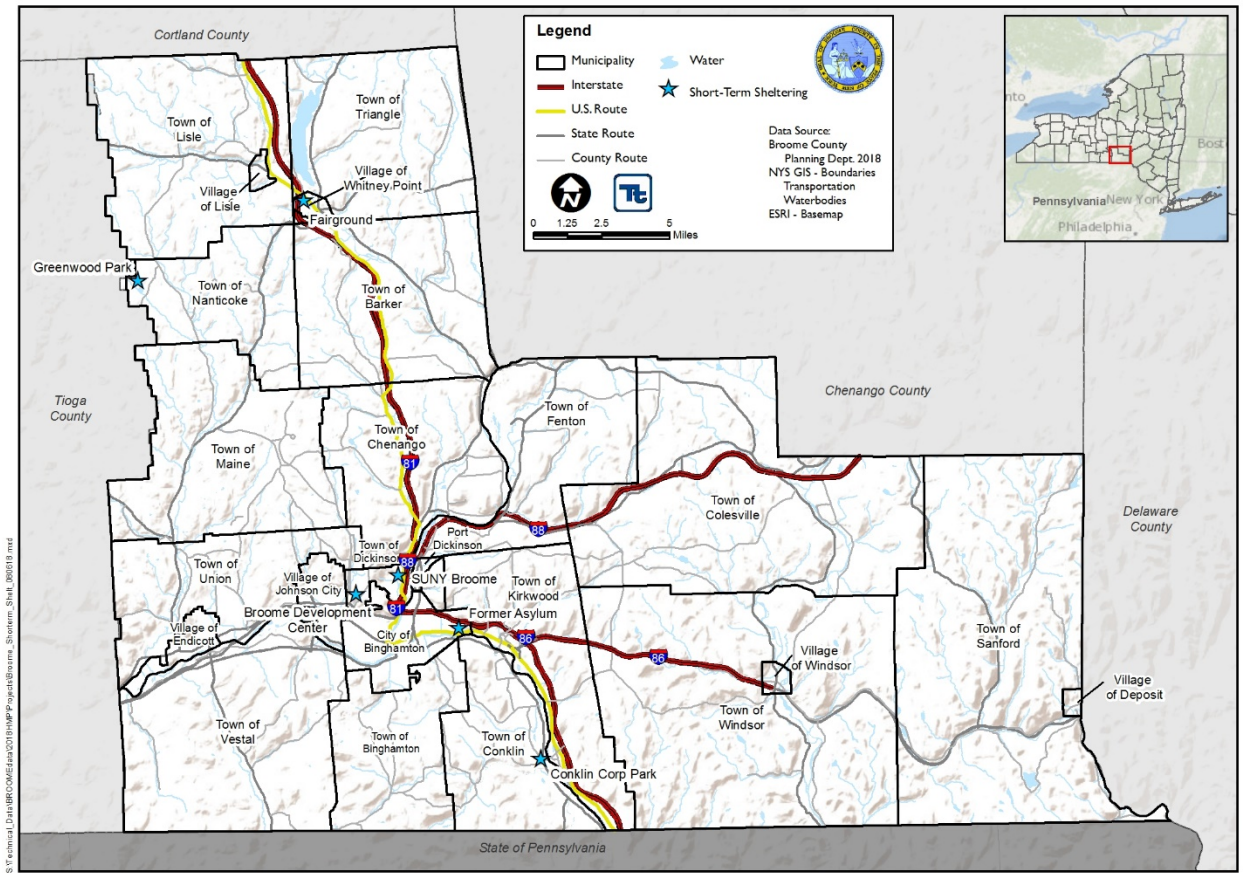
Broome County and municipalities recognize the need to identify potential sites for temporary housing and relocation and ensuring residents are aware of these facilities is critical. The County Department of Social Services provides financial and social services to eligible county residents through program development, application of the law, and encouragement of responsibility. Programs and services provided include adult and adolescent services unit, assistance programs, child protective services and preventive services unit, child support enforcement, employment services, foster care, and adoption & home finding.

Temporary Housing

With regard to natural hazard events, Broome County identified potential locations to be used as temporary housing for residents displaced by a disaster. A summary of key site attributes related to use of the locations for temporary housing is provided below after which a map illustrating the locations is provided in Figure 4-34.

- **Broome Developmental Center** (249 Glenwood Rd, Binghamton, NY 13905) – The Broome Developmental Center (BDC) was previously used as a center for people with developmental disabilities including long-term housing units. The center is approximately 365,000 gross square feet in size, with five major building areas. 52,000 square feet has been repurposed for a rehabilitation center, but most remains vacant and usable for temporary housing. The site is connected to all utilities and municipal services.
- **Binghamton Psychiatric Center** (Former NYS Inebriate Asylum) (425 Robinson St, Binghamton, NY 13904) – This site includes a significant amount of vacant lands that can be utilized for temporary housing. Approximately 15 acres are likely to be suitable, with capacity for 150 units of 0.1acres, but if other areas are found to be suitable, capacity may be higher. The site is connected to all utilities and municipal services, but housing units will need to be connected to the existing system. There may also be capacity at some of the vacant buildings on site, but more analysis would be needed to make that determination.
- **Conklin Corporate Park** (Broome Corporate Parkway, Conklin, NY 13748) – This site is comprised of about 45 acres of vacant land as part of the Conklin Corporate Park. Further assessment is needed to determine the number of units that may fit on the site due to vegetation and slopes. Broome Corporate Parkway is serviced by all public utilities and services and connections would have to be established to the specific sites.
- **Greenwood Park** (153 Greenwood Road, Lisle, NY 13797) – This is a Broome County Park that has an existing campground. The campground includes 50 sites that could serve as temporary housing locations. In addition, there is a one acre camping overflow area that could house an additional 10 units at 0.1 acres each. The park utilizes private water and sewer with capacity for the existing capacity of the campground. There may be additional capacity at other County Parks including Cole and Dorchester Parks, but more analysis is needed to determine the capacity of utilities at those sites.
- **SUNY Broome** (907 Front St, Binghamton, NY 13905) – This site is comprised of 8 acres of green areas with a capacity for 80 units sized at 0.1 acres each. The site has access to all utilities, but housing units will need to be connected to the existing system.

Figure 4-34. Potential Temporary Housing Locations in Broome County



It is noted that while a community might identify suitable sites, the use (including transfer of ownership) of suitable private property would be at the discretion of the property owner.

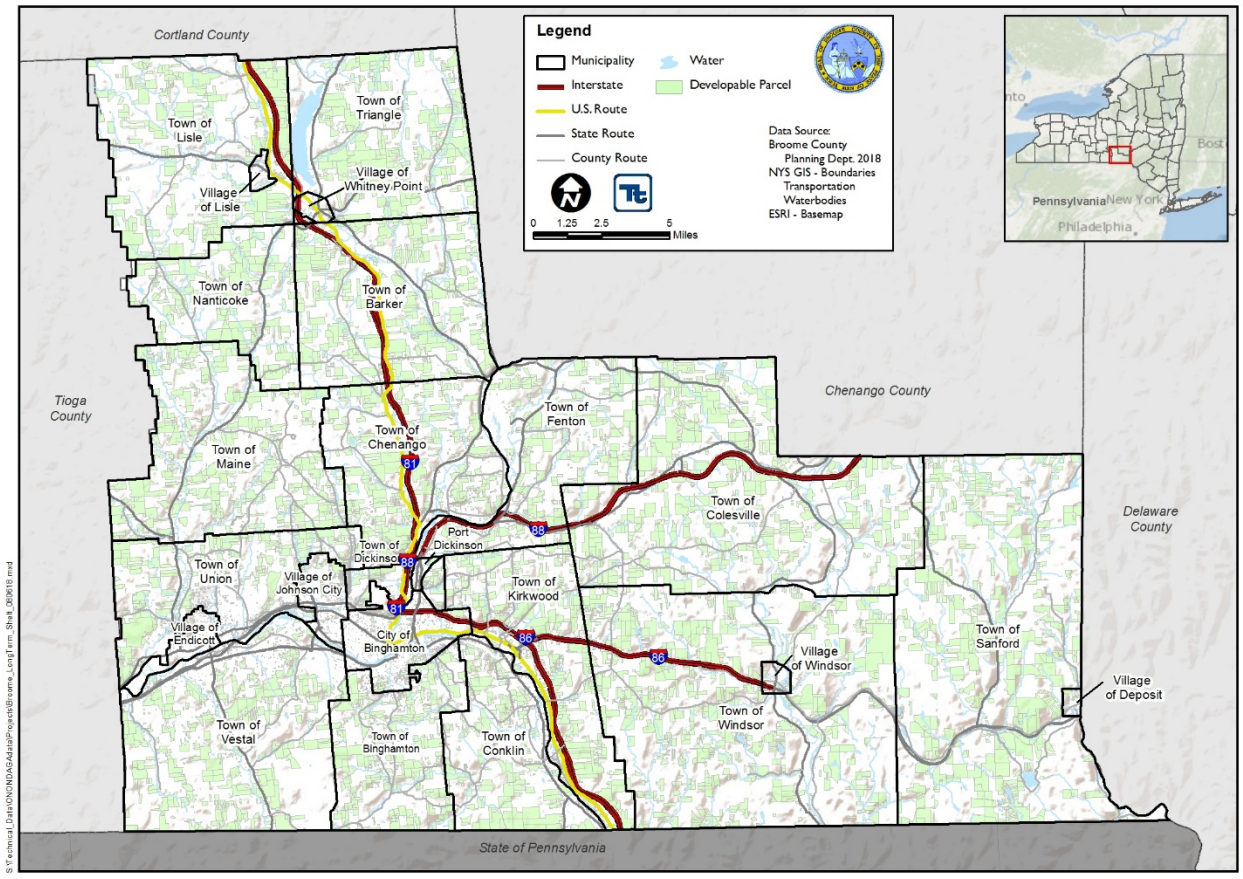
Long-Term Housing

To support identification of potential sites suitable for relocating houses out of hazard areas (i.e., the floodplain) or building new homes once properties in hazard areas or the floodplain are acquired, the county performed a buildable parcel analysis. The analysis identified potential areas for post-disaster development in accordance with the 2017 NYSDHSES Hazard Mitigation Planning Standards Guide requirement "to identify long-term housing options for relocating displaced residents to maintain post-disaster social and economic stability". The county analysis provides an indication of vacant land suitable for development. In this case, vacant land is defined as a parcel that is classified as vacant and is located outside the following hazard areas:

1) FEMA floodplain.
2) wetlands.
3) federal, state and county park land.
4) land that has steep slopes (>20% gradient) without consideration of ownership or availability.

Figure 4-35 provides potential long-term housing locations in Broome County.

Figure 4-35. Potential Long-Term Housing Locations in Broome County, New York



Source: Broome County GIS & Mapping Services 2018

Evacuation Routes

As stated in the 2013 CEMP, New York State law provides broadly stated authority that permits fire and law enforcement officers to take actions necessary to protect public safety. This authority is often applied when immediate action is necessary to evacuate citizens from a hazardous or potentially unsafe area. In situations where an evacuation is of significant scope, magnitude, and duration and requires extensive support from multiple services, it is then best to carry out the evacuation using an emergency order by the chief executive (Broome County Legislature Chairman).

The primary roads and highways are the evacuation routes for Broome County. The route used depends on the location of the incident. The geography of the county is not conducive to having established evacuation routes. Figure 4-36 illustrates the major roadways in Broome County that would be used as evacuation routes in and out of the county in the event of an emergency that results in an evacuation.

Other than evacuation plans based on the geographically-specific risks, evacuations are conducted on an event-specific basis. Due to the variable nature of such events, Broome County Emergency Services, working with local municipalities, assists with the coordination and communication of evacuation routing for the county. The county relies on real-time outreach methods, such as variable message sign boards, media (radio, newspaper, and television), and social media, to inform the public of pending and active evacuations.

Figure 4-36. Evacuation Routes in Broome County