



SECTION 1. INTRODUCTION

2016 Plan Update Changes

- Section 1, Introduction, was updated to reflect the organization of the 2016 Hazard Mitigation Plan (HMP) update.

1.1 BACKGROUND

In response to the requirements of the Disaster Mitigation Act of 2000 (DMA 2000), Sussex County, and the city, towns, townships, and boroughs located therein, have developed this Multi-Jurisdictional HMP, which is an update of the 2011 Sussex County New Jersey All-Hazards Pre-Disaster Mitigation Plan. DMA 2000 amends the 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 Jersey Office of Emergency Management (NJOEM) also supports plan development for jurisdictions in New Jersey.

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

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.

1.1.1 DMA 2000 ORIGINS -THE ROBERT T. STAFFORD DISASTER RELIEF AND EMERGENCY ASSISTANCE ACT

FEMA estimates that for every dollar spent on damage prevention (mitigation), twice that amount is saved through avoided post-disaster damage repair.

In the early 1990s, a new federal policy regarding disasters began to evolve. Rather than simply 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 simply 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, other costs associated with disasters are minimized, such as the time lost from productive activity by business and industries.

DMA 2000 provides an opportunity for states, tribes, and local governments to take a new and revitalized approach to mitigation planning. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act by repealing the previous mitigation planning provisions (Section 409) and replacing them with a new set of requirements (Section 322). This section 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 can be taken by the community to



mitigate those hazards—before disaster strikes. For communities to remain eligible for hazard mitigation assistance from the federal government, they 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 Jersey, specifically to NJOEM. FEMA also provides support through guidance, resources, and plan reviews.

1.1.2 BENEFITS OF MITIGATION PLANNING

The planning process will help prepare citizens and government agencies to better respond when disasters occur. In addition, mitigation planning allows Sussex County as a whole, as well as the participating municipalities, to remain eligible for mitigation grant funding for mitigation projects that will reduce the impact of future disaster events. The long-term benefits of mitigation planning include:

- An increased understanding of hazards faced by Sussex County communities;
- A more sustainable and disaster-resistant community;
- 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; and
- Reduced long-term impacts and damages to human health and structures and reduced repair costs.

1.1.3 ORGANIZATIONS INVOLVED IN THE MITIGATION PLANNING EFFORT

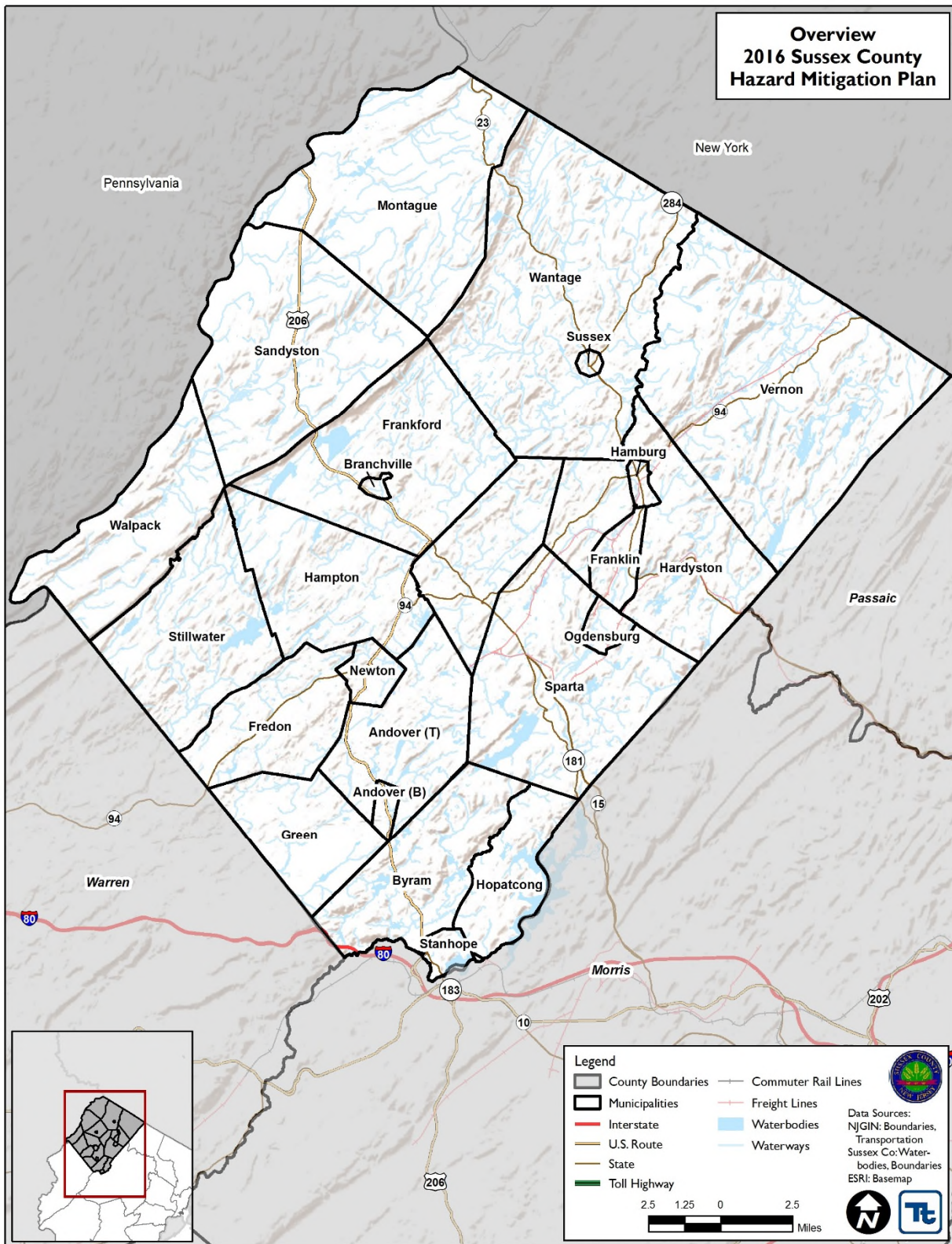
Sussex County and the participating jurisdictions intend to implement this HMP with full coordination and participation of county and local departments, organizations and groups, as well as by coordinating with relevant state and federal entities. Coordination helps to ensure that stakeholders have established communication channels and relationships necessary to support mitigation planning and mitigation actions included in Section 6 and in the jurisdictional annexes presented in Section 9. In addition to Sussex County, all municipalities have participated in the planning process (Table 1-1 and Figure 1-1).

Table 1-1. Participating Jurisdictions in Sussex County

Jurisdictions		
Andover Borough	Hamburg Borough	Sandyston Township
Andover Township	Hampton Township	Sparta Township
Branchville Borough	Hardyston Township	Stanhope Borough
Byram Township	Hopatcong Borough	Stillwater Township
Frankford Township	Lafayette Township	Sussex Borough
Franklin Borough	Montague Township	Vernon Township
Fredon Township	Town of Newton	Walpack Township
Green Township	Ogdensburg Borough	Wantage Township
Sussex County		



Figure 1-1. Sussex County, New Jersey



Source: New Jersey Geographic Information Network (NJGIN), Sussex County



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 Jersey, NJOEM is the lead agency providing hazard mitigation planning assistance to local jurisdictions. NJOEM 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). Under the project management of the Sussex County Sheriff's Office/Office of Emergency Management, oversight for the preparation of this HMP was provided by the Sussex County Hazard Mitigation Steering and Planning Committees. Details regarding the roles and responsibilities of the Steering and Planning Committee are also further discussed in Section 3. The Steering Committee, consisting of representatives from county departments, has been formed to plan, guide, expedite, and implement the planning process. A list of Steering Committee and Planning Committee members is provided in Section 3.

This HMP update 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 2013
- 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: <https://www.fema.gov/media-library/collections/6>.

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

Table 1-2. FEMA Local Mitigation Plan Review Crosswalk

Plan Criteria	Primary Location in HMP
Prerequisites	
Adoption by the Local Governing Body: §201.6(c)(5)	Volume I, Section 2.0; Appendix A
Planning Process	
Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)	Volume I, Section 3.0
Risk Assessment	
Identifying Hazards: §201.6(c)(2)(i)	Volume I, Section 5.2
Profiling Hazards: §201.6(c)(2)(i)	Volume I, Section 5.4
Assessing Vulnerability: Overview: §201.6(c)(2)(ii)	Volume I, Section 5.4
Assessing Vulnerability: Identifying Structures: §201.6(c)(2)(ii)(A)	Volume I, Section 4.0 Volume I Section 5.4
Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)	Volume I, Section 5.4



Plan Criteria	Primary Location in HMP
Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)	Volume I, Section 4.0; Volume II, Section 9 Annexes
Mitigation Strategy	
Local Hazard Mitigation Goals: §201.6(c)(3)(i)	Volume I, Section 6.0; Volume II, Section 9 Annexes
Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)	Volume I, Section 6.0; Volume II, Section 9 Annexes
Implementation of Mitigation Actions: §201.6(c)(3)(iii)	Volume I, Section 6.0; Volume II, Section 9 Annexes
Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)	Volume I, Section 6.0; Volume II, Section 9 Annexes
Plan Maintenance Process	
Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(i)	Volume I, Section 7.0
Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)	Volume I, Section 7.0; Volume II, Section 9 Annexes
Continued Public Involvement: §201.6(c)(4)(iii)	Volume I, Section 7.0

Organization

The Sussex County Multi-Jurisdictional HMP update has been organized into a two-volume plan to facilitate use of this plan as a resource for each participant. This HMP update provides a detailed review and analysis of hazards of concern, resources, and demographics of Sussex County and participating municipalities.

Volume I is intended for use as a resource for on-going mitigation analysis. Volume II consists of an annex dedicated to each participating jurisdiction. Each annex summarizes the jurisdiction's legal, regulatory, and fiscal capabilities; vulnerabilities to natural hazards; status of past mitigation actions; and provides 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.

Hazards of Concern

Sussex County and participating jurisdictions reviewed the natural hazards that caused measurable impacts in the planning area, and updated the list of hazards of concern based on events, losses, and information available since the 2011 HMP. In addition, human-caused hazards were included. Sussex County and participating jurisdictions evaluated the risk and vulnerability due to each of the hazards of concern on the assets of each participating jurisdiction. Although the resulting hazard risk rankings varied for each jurisdiction, the summary risk rankings corresponded with that of Sussex County and are indicated in each jurisdictional annex. The hazard risk ranks were used to focus and prioritize individual jurisdictional mitigation strategies.

Goals and Objectives

The plan has incorporated mitigation goals and objectives as a basis for the planning process and to guide the selection of appropriate mitigation actions addressing all hazards of concern. This HMP update has revised the 2011 goals and objectives, as identified in Section 6.

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 integrate and coordinate with, and complement, those mechanisms.



The “Capability Assessment” in 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, Sussex County and each participating jurisdiction have identified how they have 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.

1.1.4 IMPLEMENTATION OF THE 2011 HAZARD MITIGATION PLAN

The status of the mitigation projects in the 2011 HMP are provided in Sections 6 and 9 of this updated HMP. Numerous projects and programs have been implemented that have reduced hazard vulnerability to assets in the planning area. The municipal annexes and plan maintenance procedure have been developed to encourage specific activities such as review of the HMP during update of codes, ordinances, zoning, and development to ensure that a more thorough integration, with its related benefits, will be completed within the upcoming five-year planning period.

1.1.5 IMPLEMENTATION OF THE PLANNING PROCESS

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

- Developed a Steering Committee and Mitigation Planning Committee
- Reviewed the 2011 Sussex County All-Hazards Pre-Disaster Mitigation Plan
- Identified/reviewed hazards that are of greatest concern to the county (hazards of concern) to be included in the update
- Profiled these hazards
- Estimated the inventory at risk and potential losses associated with these hazards
- Reviewed and updated the mitigation goals and objectives
- Reviewed the 2011 mitigation strategy and actions to indicate progress
- 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 update process
- Developed mitigation plan maintenance procedures to be executed after obtaining approval of the plan from NJOEM and FEMA

As required by DMA 2000, Sussex County and participating jurisdictions have informed the public and provided opportunities for public comment and input. In addition, numerous agencies and stakeholders have participated as core or support members, providing input and expertise throughout the planning process.

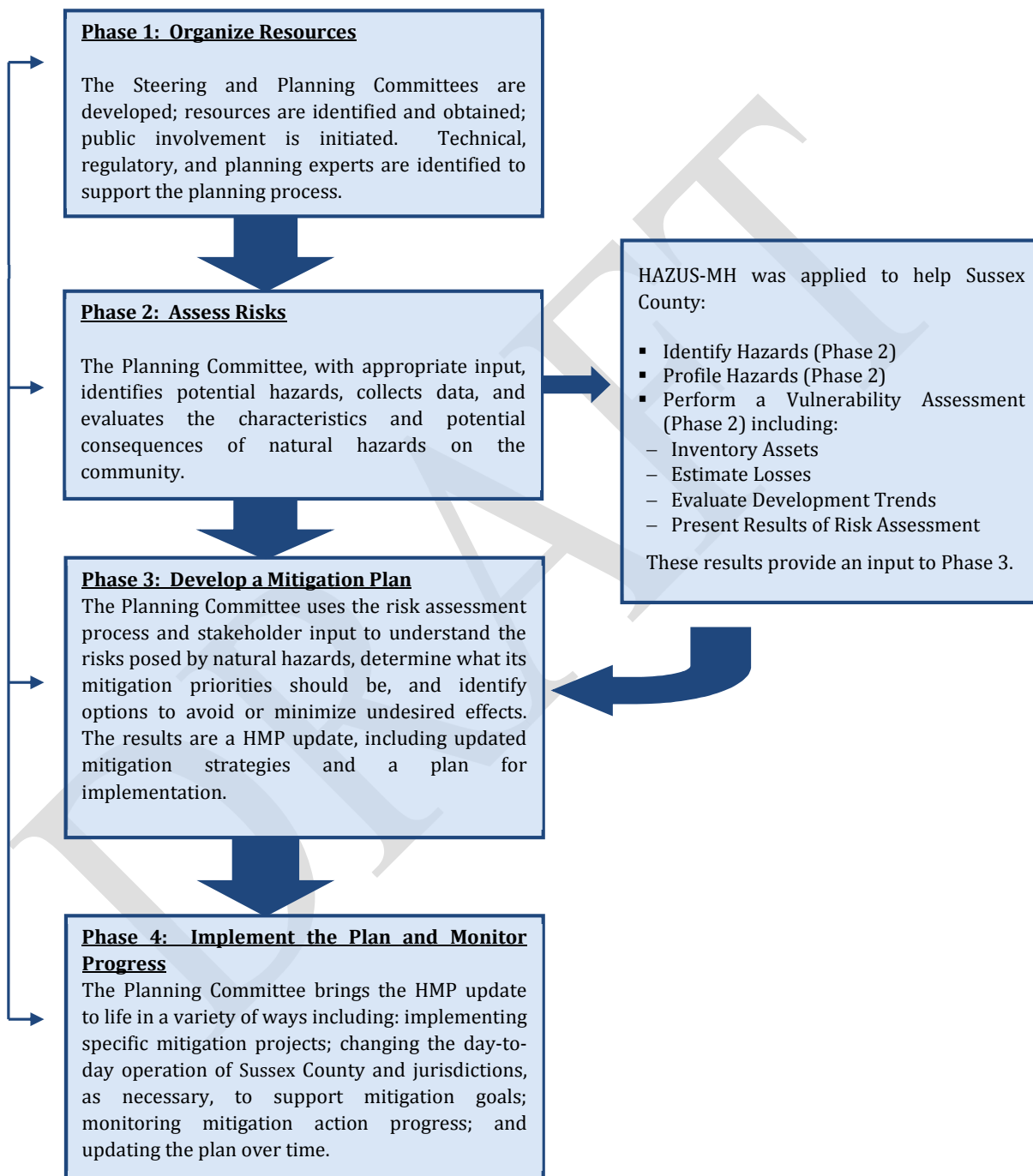
This HMP update documents the process and outcomes of Sussex County and the jurisdictions’ efforts. Additional information on the HMP update process is included in Section 3, Planning Process. Documentation showing the prerequisites for plan approval have been met is included in Section 2, Plan Adoption.



1.1.6 ORGANIZATION OF THIS MITIGATION PLAN

This HMP update was organized in accordance with FEMA and NJOEM guidance. The structure of this HMP update follows the four-phase planning process recommended by FEMA and summarized in Figure 1-2.

Figure 1-2. Sussex County Hazard Mitigation Planning Process



The HMP is organized into two volumes: Volume I includes all information that applies to the entire planning area (Sussex County); and Volume II includes participating jurisdiction-specific information.



Volume I of this HMP includes the following sections:

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

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

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

Section 4: County Profile: An overview of Sussex 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 Sussex County in response to priority hazards of concern.

Section 7: Plan Maintenance Procedures: The system established by Sussex County to continue to monitor, evaluate, maintain, and update the HMP.

Volume II of this HMP includes the following sections:

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

Section 9: Jurisdictional Annexes: A jurisdiction-specific annex for each participating jurisdiction and Sussex County containing their hazards of concern, hazard risk ranking, capability assessments, mitigation actions, action prioritization specific only to Sussex County or that jurisdiction, progress on 2011 mitigation actions, and an overview of 2011 plan integration into local planning processes.

Appendices include:

Appendix A: Resolutions of Plan Adoption: Documentation that supports the plan approval signatures included in Section 2 of this HMP. Resolutions from each jurisdiction will be included as they formally adopt the HMP update.

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

Appendix C: Participation Matrix: A matrix is presented to give a broad overview of who attended meetings and when input was provided to the HMP update.

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 update process.

Appendix E: Detailed information on historic events and losses in Sussex County.



Appendix F: Mitigation Action Worksheet Template and Instructions.

Appendix G: FEMA 386-4 Guidance Worksheets: Examples of plan review templates available to support annual plan review.

DRAFT



SECTION 2. PLAN ADOPTION

2016 HMP Update Changes

- Section 2 now contains information regarding HMP adoption. In the 2011 HMP, this was discussed in Section 1.
- The resolutions issued to support adoption of the plan by each jurisdiction are included in Appendix A.

2.1 OVERVIEW

This section contains information regarding adoption of the HMP update by Sussex County and each participating jurisdiction.

2.1.1 PLAN ADOPTION BY LOCAL GOVERNING BODIES

Adoption by the local governing bodies demonstrates the commitment of Sussex County and each participating jurisdiction to fulfill the mitigation goals and objectives outlined in the HMP. Adoption legitimizes the HMP and authorizes responsible agencies to execute their responsibilities.

Each participating jurisdiction will proceed with formal adoption proceedings when FEMA provides conditional approval of this HMP update, known as Approval Pending Adoption (APA) and each participating jurisdiction understands that a conditional approval of the HMP will be provided for those municipalities that meet the planning requirements with the exception of the adoption requirement as stated above. The sample resolution to support adoption of the plan by each jurisdiction is included on the following page.

Following adoption or formal action on the HMP, each participating jurisdiction must submit a copy of the resolution or other legal instrument showing formal adoption (acceptance) of the HMP update to the Sussex County Hazard Mitigation Coordinator. Sussex County will forward the executed resolutions to the NJOEM – Mitigation Division, and they will be subsequently forwarded to FEMA. Each participating jurisdiction understands that FEMA will transmit acknowledgement of verification of formal plan adoption and the official approval of the plan to the County Hazard Mitigation Plan Coordinator

The resolutions issued to support adoption of the plan by each jurisdiction will be included as Appendix A, to be entitled Resolutions of Plan Adoption.

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; and
- 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. "How to Series"-*Bringing the Plan to Life* (FEMA 386-4).



Resolution # _____

WHEREAS the **XXXXXX**, New Jersey, has experienced natural hazards that result in public safety hazards and damage to private and public property;

WHEREAS the hazard mitigation planning process set forth by the State of New Jersey and the Federal Emergency Management Agency offers the opportunity to consider natural hazards and risks, and to identify mitigation actions to reduce future risk;

WHEREAS the New Jersey Office of Emergency Management is providing federal mitigation funds to support development of the mitigation plan;

WHEREAS a *Hazard Mitigation Plan* (HMP) has been developed by the Mitigation Steering and Planning Committees;

WHEREAS the *Hazard Mitigation Plan* includes a prioritized list of mitigation actions including activities that, over time, will help minimize and reduce safety threats and damage to private and public property, and

WHEREAS the draft plan was provided to each participating jurisdiction and was posted on the County Office of Emergency Management's website so as to introduce the planning concept and to solicit questions and comments; and to present the Plan and request comments, as required by law, and

NOW THEREFORE BE IT RESOLVED by the **XXXX** of the **XXXX**:

1. The Sussex County Multi-Jurisdictional *Hazard Mitigation Plan*, as submitted to the New Jersey Office of Emergency Management and the Federal Emergency Management Agency on **XXXX** by the Sussex County Sheriff's Department Office of Emergency Management is hereby adopted as an official plan of the **XXXXXX**; minor revisions recommended by the Federal Emergency Management Agency and/or the New Jersey Office of Emergency Management may be incorporated without further action.
2. The **XXXXXX** departments identified in the HMP are hereby directed to pursue implementation of the recommended high priority activities that are assigned to their departments.
3. Any action proposed by the HMP shall be subject to and contingent upon budget approval, if required, which shall be at the discretion of the **XXXX**, and this resolution shall not be interpreted so as to mandate any such appropriations.
4. The County Hazard Mitigation Coordinator is designated to coordinate with other offices and shall periodically report on the activities, accomplishments, and progress, and shall prepare an annual progress report to be submitted to the Sussex County Office of Emergency Management. The status reports shall be submitted on a yearly basis by a predetermined date as agreed upon by all stakeholders.

PASSED by the **XXXX** of the **XXXXXX**, this _____ day of _____, 2016.



SECTION 3. PLANNING PROCESS

3.1 Introduction

This section includes a description of the planning process used to update the Sussex County HMP, including how it was prepared, who was involved in the process, and how the public was involved.

To ensure that the HMP met the requirements of the DMA 2000, as well as to support the long term goal of having all jurisdictions in the County covered under a comprehensive and cohesive county-wide DMA 2000 plan, an approach to the planning process and plan documentation was developed to achieve the following:

- The HMP will be multi-jurisdictional and consider natural and human-caused hazards facing Sussex County, thereby satisfying the natural hazards mitigation planning requirements specified in DMA 2000. Sussex County invited all municipalities in the county to join with them in the preparation of the Sussex County HMP. Sussex County and all its municipalities are participating in the HMP as indicated in Table 3-1 below.
- The HMP shall be developed following the process outlined by DMA 2000, FEMA regulations, and prevailing FEMA and NJOEM guidance. Following this process ensures all the requirements are met and support HMP review.

Table 3-1. Participating Sussex County Jurisdictions

Jurisdictions		
Andover Borough	Hamburg Borough	Sandyston Township
Andover Township	Hampton Township	Sparta Township
Branchville Borough	Hardyston Township	Stanhope Borough
Byram Township	Hopatcong Borough	Stillwater Township
Frankford Township	Lafayette Township	Sussex Borough
Franklin Borough	Montague Township	Vernon Township
Fredon Township	Town of Newton	Walpack Township
Green Township	Ogdensburg Borough	Wantage Township
Sussex County		

The Sussex 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 and Planning Committees solicited information from local agencies and individuals with specific knowledge of certain natural hazards and past historical events, as well as considering planning and zoning codes, ordinances, and other recent planning decisions. The hazard mitigation strategies identified in this HMP have been developed through an extensive planning process involving local, county and regional agencies, county residents and stakeholders.

This section of the HMP describes the mitigation planning process, including (1) Planning Partnership – Organization and Activity; (2) Stakeholder Outreach and Involvement; (3) Public Participation – Citizen



Involvement; (4) Integration and Coordination with Existing Mitigation Efforts and Programs; and (5) Continued Public and Stakeholder Involvement.

3.2 Planning Partnership - Organization and Activity

Many parties supported the preparation of this HMP update: the Steering Committee, Planning Committee, stakeholders and planning consultant. This planning process does not represent the start of hazard risk management in the county; rather it is part of an ongoing process that various state, county and local agencies and individuals have continued to embrace. A summary of the past and ongoing mitigation efforts is provided in Section 6, as well as in Volume II Section 9, to give an historical perspective of the county and local activities implemented to reduce vulnerability to hazards in the planning area.

This section of the HMP 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

Recognizing the need to manage risk within the county, and to meet the requirements of the DMA 2000, the Sussex County’s Sheriff’s Office, Division of Emergency Management (DEM) led the update to the 2011 Sussex County Multi-Jurisdictional Hazard Mitigation Plan. On January 21, 2014 Sussex County was notified by NJOEM that their application for a planning grant to update their 2011 HMP under FEMA’s Hazard Mitigation Grant Program (HMGP 4086) was approved. The County selected a contract planning consultant (Tetra Tech Inc. – Morris Plains, NJ) to guide the County and participating jurisdictions through the HMP update process. A contract between Tetra Tech Inc. (Tetra Tech) and the County was executed in December 2014. Specifically Tetra Tech, the “contract consultant”, was tasked with:

- 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, stakeholder, public and other);
- Review and update of the hazards of concern, and hazard profiling and risk assessment;
- Assistance with the review and update of mitigation planning goals and objectives;
- Assistance with the review of progress of past mitigation strategies;
- Assistance with the screening of mitigation actions and the identification of appropriate actions;
- Assistance with the prioritization of mitigation actions; and
- Authoring of the draft and final HMP documents

In January 2015, Sussex County’s Sheriff’s Office DEM notified all 24 municipalities within the county of the pending planning process and invited them to formally participate. Municipalities were provided with a copy of the Planning Partner Expectations and asked to formally notify the county of their intent to participate (via a Letter of Intent) and to identify a planning point of contact to serve on a Planning Committee and represent the interests of their respective community. All 24 municipalities returned their Letter of Intent to Participate (refer to Appendix C).

To facilitate HMP development, with support from their contract planning consultant, Sussex County developed a Steering Committee to provide guidance and direction to the planning effort, and to ensure the resulting document will be embraced both politically and by the constituency within the planning area. 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”). Steering Committee members are identified in Table 3-2. The Steering Committee was charged with:

- Providing guidance and overseeing 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 the data and information used in the plan update process is best available;
 - Reviewing and updating the hazard mitigation planning goals and objectives;
 - Identifying and screening of appropriate mitigation strategies and activities;
 - Reviewing and updating the plan maintenance procedures; and
- Reviewing and commenting on plan documents prior to submission to NJOEM and FEMA.

A Planning Committee was assembled to represent each of the municipalities participating in the HMP update, with one primary representative and an alternate point of contact from each of the 26 participating municipalities. Each municipality received a copy of the “Planning Partner Expectations” which outlined the responsibilities of the participants and the agreement of the partners to authorize a Steering Committee to represent the jurisdiction in the completion of certain planning elements. Table 3-2 lists the current municipal members of the Planning Committee at the time of this HMP’s publication. Please note that the Steering Committee members are also part of the overall project Planning Committee, fulfilling these responsibilities on behalf of Sussex 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, etc.);
- 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; and
- Adopt, implement and maintain the plan update.

Table 3-2. Steering and Planning Committee Members

Organization	Name	Title	Municipal POC	
			POC	Alternate POC
Sussex County Sheriff’s Office, Division of Emergency Management	Sheriff Michael F. Strada	Sheriff, Emergency Management Coordinator	Steering Committee	
Sussex County Sheriff’s Office, Division of Emergency Management	Corporal Mark Vogel	Deputy Emergency Management Coordinator	Steering Committee	
Sussex County	Scott House	Director	Steering Committee	



Organization	Name	Title	Municipal POC	
Division of Public Works				
Sussex County County Administrator	Ronald Tappan	County Administrator	Steering Committee	
Sussex County Engineering Department	William J. Koppenaar	Assistant County Engineer	Steering Committee	
Sussex County Department of Central and Shared Services	Ronald L. Tappan	Administrator	Steering Committee	
Sussex County Division of Planning	Eric Snyder	Planning Director	Steering Committee	
Sussex County EMS	Rourke Day	EMS Coordinator	Steering Committee	
Andover Borough	John Hoag	Deputy OEM	X	
	Beth Brothman	Municipal Clerk/Registrar		X
Andover Township	Chief Eric Danielson	Emergency Management Coordinator	X	
	Ptl. Georgios Laoudis	Deputy Coordinator		X
Branchville Borough	Jeff Lewis	OEM Coordinator	X	
	Christopher Franek	Deputy OEM		X
Byram Township	Joseph Sabatini	Township Manager	X	
	James Oscovitch	Mayor		X
Frankford Township	Patricia Bussow	Municipal Clerk	X	
	TBD			
Franklin Borough	Jim Williams	OEM Coordinator	X	
	Brian VanDenBroek	DPW Supervisor		X
Fredon Township	John A. W. Richardson	Township Committeeman/OEM Coordinator	X	
	Virgil Rome	Deputy OEM		X
Green Township	Linda Peralta	Clerk/Administrator	X	
	Peg Phillips	Mayor		X
Hamburg Borough	Keith Sukennikoff	OEM Coordinator	X	
	Michael Schneider	DPW/Road Supervisor		X
Hampton Township	Eileen Klose	Township Administrator	X	
	Edward Hayes	OEM Coordinator		X
Hardyston Township	William Hickerson	OEM Coordinator	X	
	Marianne Smith	Township Manager		X
Hopatcong Borough	Sylvia Petillo	Mayor/OEM Coordinator	X	
	Robert Elia	Borough Administrator		X
Lafayette Township	Rich Hughes	OEM Coordinator	X	
	Bill Macko	Deputy OEM Coordinator		X
Montague Township	Jesse Brace-Revak	OEM Coordinator	X	
	Eileen DeFabiis	Municipal Clerk		X
Town of Newton	Kenneth Teets	OEM Coordinator	X	
	Debra Millikin	Deputy Town Manager		X
Ogdensburg Borough	Steven Ciasullo	Mayor	X	
	Phyllis Drouin	RMC		X
Sandyston Township	Stanley J. Dukus	Deputy OEM Coordinator	X	
	Amanda F. Lobban	Municipal Clerk		X



Organization	Name	Title	Municipal POC	
Sparta Township	Ernest Reigstad	Police Chief	X	
	Eric Powell	Municipal Engineer		X
Stanhope Borough	Brian McNeilly	Borough Administrator	X	
	Eric Keller	Borough Engineer		X
Stillwater Township	George Scott	Mayor	X	
	Lynda Knott	Municipal Clerk		X
Sussex Borough	Floyd Southard	OEM Coordinator	X	
	Mark Zsack	Borough Administrator		X
Vernon Township	Harry Shortway	Mayor	X	
	Ken Clark	OEM Coordinator		X
Walpack Township	Victor Maglio	Mayor	X	
	N/A			
Wantage Township	TBD	Clerk/Administrator	X	
	Joseph Konopinski	OEM Coordinator		X

Notes: OEM = Office of Emergency Management

It is noted that the 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. It is recognized that the jurisdictions in Sussex County have differing levels of capabilities and resources available to apply to the planning process, and further have differing exposure and vulnerability to the natural hazard risks being considered in this Plan. It was Sussex County’s intent to encourage participation by all-inclusive jurisdictions, and to accommodate their specific needs and limitations while still meeting the intents and purpose of Plan participation. Such accommodations have included the establishment of a Steering Committee and engaging a contract consultant to assume certain elements of the Planning process on behalf of the jurisdictions, and to provide additional and alternative mechanisms to meet the purposes and intent of mitigation planning.

Ultimately, jurisdictional participation is evidenced by a completed annex (chapter) of the HMP update (Section 9) wherein the jurisdiction has identified their planning points of contact, evaluated their risk to the hazards of concern, identified their capabilities to effect mitigation in their community, and identified and prioritized an appropriate suite of mitigation initiatives, actions, and projects to mitigate their natural hazard risk; and eventually by the adoption of the HMP update via resolution.

Appendix C identifies those individuals who represented their municipalities during this planning effort, and indicates how they contributed to the planning process. This matrix is intended to give a broad overview of who attended meetings and when input was provided. All participants were encouraged to attend the Kick-off Meeting, Jurisdictional Annex Workshop and FEMA/NJOEM Mitigation Workshop. During the planning process the planning consultant contacted each participant to offer support, explain the process, and to facilitate the submittal and review of critical documents.

It is noted that all municipalities actively participate in the National Flood Insurance Program (NFIP), and have a designated NFIP Floodplain Administrator (FPA). All FPAs have been informed of the planning process, reviewed the plan documents, and provided direct input to the plan update. Local FPAs are identified in the “Administrative and Technical” portion of the local Capability Assessments presented within the jurisdictional annexes in Section 9, as well as in Appendix C.



3.2.2 PLANNING PARTNERSHIP ACTIVITIES

Members of the 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 planning partnership 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 3-3. It also identifies which DMA 2000 requirements the activities satisfy. Documentation of meetings (agendas, sign-in sheets, minutes, etc.) may be found in Appendix B. This summary table 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 Planning 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, solicit and consider public comment as part of the five year mitigation plan update.

Table 3-3. Summary of Planning Outreach

Date	Activity/ DMA 2000 Requirement	Key Outcomes/Purpose	Attendees
November 25, 2014	1b, 2	Sussex County Board of Chosen Freeholders award contract for hazard mitigation plan update (public meeting).	Sussex County Board of Chosen Freeholders
January 8, 2015	1b, 1c, 2, 3a, 4a	<u>Pre-Kick Off Meeting #1</u> : Meeting with Sussex County Sheriff's Office DEM to discuss the hazard mitigation planning process, municipal participation expectations, schedule, Steering Committee, and upcoming meetings.	Sussex County DEM: Corporal Mark Vogel, Deputy OEM Coordinator; Tetra Tech: Paul Miller and Alison Miskiman
January 22, 2015	1b, 1c, 2, 3a, 4a	<u>Steering Committee Meeting #1</u> : The Steering Committee guidelines were addressed, hazards of concern exercise conducted, public/stakeholder outreach was discussed and data collection (spatial data and planning data) initiated.	Refer to Appendix B for sign-in sheet and meeting agenda.
April 1, 2015	1c, 2, 3a-c, 3e, 4a, 4b	<u>Planning Committee Meeting #1 / Municipal Kick-Off Meeting</u> : Presentation and discussion on the planning process, and discussion regarding municipal participation expectations. Initial data and information gathering including distribution of worksheets on a CD for completion to each municipality.	Refer to Appendix B for sign-in sheet and meeting agenda.
April 15, 2015	2, 4a	<u>Steering Committee Meeting #2 (Conference Call)</u> : Discussion and revision of 2011 goals and objectives	Refer to Appendix B for sign-in sheet and meeting agenda.
April 23, 2015	2, 3b, 3c, 3e, 4a, 4b	<u>Annex Workshop #1 (morning and afternoon session)</u> : The updated goals and objectives were presented to the Planning Committee for review and comment. A Strengths, Weaknesses, Opportunities and Obstacles (SWOO) exercise and mitigation strategy workshop was conducted. Tools and resources were distributed. The	Refer to Appendix B for sign-in sheet and meeting agenda.



Date	Activity/ DMA 2000 Requirement	Key Outcomes/Purpose	Attendees
		workshop guided participants on how to identify and prioritize a comprehensive range of mitigation alternatives as a result of historic losses, current risk; and discuss integration of mitigation. Worksheet-focus sessions were held after the main workshop to allow plan participants to obtain further guidance on worksheets distributed at the kick-off meeting.	
May 21, 2015	4b	<u>FEMA/NJOEM Mitigation Strategy Meeting</u> : NJOEM and presented on mitigation strategy development, plan maintenance, and plan integration.	Refer to Appendix B for the sign-in sheet and agenda.
September 9, 2015	2, 4b	<u>Mitigation Action Webinar</u> : A webinar/conference call was open to all plan participants to provide SWOO results and further assist with the identification and documentation of new mitigation actions.	Byram and Wantage. Refer to Appendix B for the agenda.
September 15, 2015	2, 4b	<u>Municipal Annex Support Meeting</u> : Local data collection support meeting to assist with the completion of worksheets and the municipal annexes: Andover, Frankford, Franklin, Fredon, Montague, and Stillwater.	Refer to Appendix B for the sign-in sheet.
October 28, 2015	2, 4b	<u>Municipal Annex Support Meeting</u> : Local data collection support meeting to assist Ogdensburg with the completion of worksheets and the municipal annex.	Refer to Appendix B for the sign-in sheet.
October 30, 2015	2, 4b	<u>Municipal Annex Support Meeting</u> : Local data collection support meeting to assist Lafayette with the completion of worksheets and the municipal annex.	Refer to Appendix B for the sign-in sheet.
November 9, 2015	2, 4b	<u>Steering Committee Meeting #3</u> : A status update on municipal participation was discussed; county worksheets were worked as a committee; public and stakeholder outreach was discussed; and next steps.	Refer to Appendix B for the sign-in sheet and agenda.
December 15, 2015	1b, 2	<u>Emergency Management Coordinators Meeting</u> : The hazard mitigation plan status and stakeholder outreach was discussed as part of the agenda to the quarterly emergency management coordinators meeting.	Refer to Appendix B for the sign-in sheet.
January 14, 2016	1b, 2	<u>Local Emergency Planning Committee/County Working Group Meeting</u> : The hazard mitigation plan status and stakeholder outreach was discussed as part of the agenda to the quarterly emergency management coordinators meeting.	Refer to Appendix B for the sign-in sheet.
January 2016	3d	Results of the critical facility exposure analysis for the flood hazard were provided to plan participants via email to assist with the identification of new mitigation actions. Draft annexes were also distributed via email for review and sign-off.	
April 8, 2016	5a-c	<u>County Draft Plan Review Meeting (Conference Call)</u> : Discuss draft Plan comments; discuss plan maintenance review and discussion; next steps to post the Draft Plan for public review and comment	Refer to Appendix B for the agenda.
XXX 2016	2	Draft Plan posted to County website	Public and Stakeholders
TBD		<u>Board of Chosen Freeholders Meeting</u> : Public meeting to announce the draft plan available for public review and comment.	
TBD	4b, 4c, 5b	All jurisdictions receive public and stakeholder comments for consideration and update mitigation strategy as needed; jurisdictional annexes finalized	All plan participants
TBD	2	Plan submitted to NJOEM and FEMA Region II	NJOEM, FEMA Region II



Date	Activity/ DMA 2000 Requirement	Key Outcomes/Purpose	Attendees

Note: DEM = Division of Emergency Management

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 presents (1) municipal involvement, (2) state and regional agency involvement, (3) public participation – citizen involvement, and outreach to business, utility, educational, transportation, non-profits, and other 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 Committee. Stakeholder outreach was performed early on, and continually throughout, the planning process. Information and input provided by these stakeholders has been included throughout this HMP update where appropriate, as identified in the references.

This summary discusses the various stakeholders that were invited to participate in the development of this HMP update, and how these stakeholders participated and contributed to the HMP. It should be noted that this summary listing cannot possibly represent the sum total of stakeholders that were aware of and/or 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.

The municipal OEM Coordinators, the Local Emergency Planning Committee (LEPC) members, and members of the County Working Group (CWG) are key stakeholders to this HMP update. These stakeholders are experts in their field and enhance Sussex County's emergency management capabilities. The Sussex County Deputy Emergency Management Coordinator presented at these meetings (December 2015 and January 2016) to encourage participation and solicit input. Meeting sign-in sheets may be found in Appendix B.

- New Jersey State Police
- County Departments
 - DEM
 - Administrator





- County Counsel
- Engineer
- Health
- Sheriff's Department
- County Freeholders
- Local OEM Coordinators
- Law enforcement
- Fire services
- EMS
- Keogh-Dwyer Correctional Facility
- Atlantic Health/Newton Medical Center

Sussex County is governed by a five-member Board of Chosen Freeholders. The members are elected at large to serve three-year terms. The Freeholders are the center of legislative and administrative responsibility in Sussex County. As legislators they draw up and adopt a budget, and in the role of administrators, they are responsible for spending the funds they have appropriated. On November 2015, the Sussex County Board of Chosen Freeholders awarded the contract for hazard mitigation plan update (public meeting).

Sussex County published an article in the December 1, 2015 County Email Newsletter regarding the HMP update. It provides information on the planning process and encourages citizen and stakeholder participation and input by taking the on-line surveys available. Refer to Appendix D.

In November 2015, the HMP website was updated to include a dedicated page to the stakeholder and public survey (<http://www.sussex.nj.us/Cit-e-Access/webpage.cfm?TID=7&TPID=15483>). In April 2015, focused stakeholder group response surveys were sent to the stakeholders indicated below. The surveys were designed to garner information from a range of specific stakeholders and community members across the county, with unique questions directed towards each user group. The outreach emails also requested the stakeholders' wider participation in the development of the HMP Update, and provided links to the HMP website for further information. For more information on the focused stakeholder surveys, see **Appendix D – Public and Stakeholder Outreach**.

- Posted on County HMP web page
- Email blasts to:
 - All municipal OEM Coordinators
 - County EMS contacts
 - All fire chiefs
 - All police chiefs
 - All school districts
 - JCP&L
 - Sussex County Rural Electric
 - Sussex County Community College
 - Atlantic Health - Newton Medical Center
 - Sussex County Chamber of Commerce
 - Sussex County Office of Transit
- Facebook posts



On DATE PLACEHOLDER, the Sussex County DEM sent a request to all neighboring county emergency management offices via email and letter indicating that the draft HMP update was available for review and requesting input and comments as appropriate. Letters and emails were sent to the following counties: Morris, Passaic, and Warren Counties, New Jersey; Orange County, New York; Pike County, Pennsylvania. In addition, the County notified engaged stakeholders that the draft HMP update was also available for review and comment. These letters may be found in Appendix D.

The following subsection identifies those stakeholders that were invited to participate in the planning process, identifies the nature of their involvement, and indicates how their input was incorporated in this plan as applicable.

Federal Agencies

Please see Appendix C (Participation Matrix) for further details regarding federal agency participation. All responses to the surveys may be found in Appendix D.

FEMA Region II: Provided updated planning guidance; provided summary and detailed NFIP data for planning area; presented at the May 2015 Mitigation Strategy Workshop; conducted plan review.

Information regarding hazard identification and the risk assessment for this HMP update was also 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
- U.S. Department of Agriculture (USDA)
- U.S. Environmental Protection Agency (USEPA)
- U.S. Geological Survey (USGS)

State Agencies

Please see Appendix C (Participation Matrix) for further details regarding state agency participation. All responses to the surveys may be found in Appendix D.

New Jersey Office of Emergency Management (NJOEM): Administered planning grant; provided updated planning guidance; attended meetings including presenting at the May 2015 Mitigation Strategy workshop; provided review of the draft HMP update.

New Jersey Office of Homeland Security and Preparedness (NJ OHSP): Attended the County LEPC/CWG meetings.



Regional, County and Local Stakeholders

Delaware River Basin Commission

The Delaware River Basin Commission (DRBC) was contacted several times to meet and discuss the Sussex County HMP update. Unfortunately, a mutually convenient date could not be determined. The DRBC was contacted via letter requesting review and comment on the draft HMP.

New Jersey Highlands Council

The New Jersey Highlands Council was contacted via letter requesting review and comment on the draft HMP.

County

As mentioned above, Sussex County reached out to all County departments to take the stakeholder survey. The list of these departments area presented below. In addition, each OEM Coordinator in the county was asked to distribute the stakeholder surveys via email or mailing groups. Many of the municipal OEM Coordinators are members of the Planning Committee as well as the LEPC/CWG. Their responses are listed below their stakeholder entity later in this subsection.

- PLACEHOLDER

Health

The following hospitals and health agencies/organizations were contacted directly by Sussex County DEM to take a stakeholder survey which included the identification of specific mitigation actions/projects. In addition, other areas of involvement in the planning process are noted below.

- Atlantic Health/Newton Medical Center – member of LEPC/CWG

Utilities

The following utilities were contacted directly by Sussex County DEM to take a stakeholder survey which included the identification of specific mitigation actions/projects. In addition, other areas of involvement in the planning process are noted below.

- PLACEHOLDER

Fire and Emergency Medical Services

The following were contacted directly by Sussex County DEM to take a stakeholder survey which included the identification of specific mitigation actions/projects. In addition, other areas of involvement in the planning process are noted below.

- PLACEHOLDER

Business Commerce / Non-Profit Organizations

The following were contacted directly by Sussex County DEM to take a stakeholder survey which included the identification of specific mitigation actions/projects. In addition, other areas of involvement in the planning process are noted below.

- PLACEHOLDER



Law Enforcement

The following were contacted directly by Sussex County DEM to take a stakeholder survey customized for law enforcement which included the identification of specific mitigation actions/projects. In addition, other areas of involvement in the planning process are noted below.

- PLACEHOLDER

Academia

PLACEHOLDER

-
-

Transportation

Other Stakeholders

-

3.4 Public Participation - Citizen Involvement

In order to facilitate better coordination and communication between the Planning Committee and citizens and to involve the public in the planning process, it was determined that draft documents will be made available to the public via the Sussex County website dedicated to the HMP update. The participating partners also feel that community input on the HMP will increase the likelihood of hazard mitigation becoming one of the standard considerations in the evolution and growth of the county.

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

- Sussex County Emergency Management has created a dedicated website to hazard mitigation. This public website is being maintained as a way to facilitate communication between the Planning Committee and county residents (<http://www.sussex.nj.us/Cit-e-Access/webpage.cfm?TID=7&TPID=11091>). The website went live in October 2014 and was continuously updated throughout the planning process.
The public website contains a project overview, project announcements, meeting materials, draft documents for review and comment, and links to the county resident and stakeholder surveys. See Figures 3-1 and 3-2 for a screenshot of this public website.
- All municipalities with a public website were requested to post a link to the County HMP website to provide ongoing public outreach. Links to the public website have been established by the following municipalities (refer to Appendix D for screenshots):
 - Green Township
- An on-line natural hazards preparedness citizen survey was developed to gauge household preparedness that may impact the county and to assess the level of knowledge of tools and techniques to assist in reducing risk and loss of those hazards (<https://www.surveymonkey.com/r/SUSSEXCOUNTYCITIZENSURVEY>). The questionnaire asked quantifiable questions about citizen perception of risk, knowledge of mitigation, and support of community programs. The questionnaire also asked several demographic questions to help analyze trends. The questionnaire has been available on the public website since January 2015, and further



advertised via county and municipal social media outlets. Responses were collected and provided back to plan participants for consideration in the mitigation action development. Response rates to date are considered good. Appendix D summarizes public input received through the website, the online survey, and other sources.

- Public meetings were held in the following municipalities to discuss the HMP update, and more specifically the jurisdictional annexes prepared by each community. Refer to Appendix D for meeting minutes where available.
 - Fredon Township – April 23, 2015 http://www.twp.fredon.nj.us/2015/04_2015tcminutes.html
 - Lafayette Township – November 4, 2015
 - Sandyston Township – February 9, 2016
 - Township of Wantage - January 28, 2016
- The hazard mitigation plan update and its upcoming availability for public review was presented at the XXX Freeholders meeting.
- A hazard mitigation planning tri-fold brochure (see Appendix D) was developed to inform the public of the planning process, provide local contact information, and encourage the public to review the plan and provide input.
 - Numerous copies of the brochure were provided to all municipalities and County participants to distribute in their communities and at their offices.
 - This brochure was also distributed via email to each OEM Coordinator in the County who were asked to send out using their local email distribution lists.
 - Several communities posted the brochure on their website:
 - Byram Township:
<http://byramtwp.org/useruploads/files/Sussex%20HMP%20update%20tri-fold%20011515.pdf>
- Sussex County used their Facebook account to announce and encourage plan participation through surveys. Screenshots of the social media public outreach efforts are presented in Appendix D.
- On INSERT DATE the Draft HMP update was posted to the public website

Screenshots and pictures of public outreach efforts are presented in Appendix D. Public comments that have been received to date are documented in Appendix D as well.

The community had an opportunity to comment on the draft HMP before submittal to FEMA. The HMP was posted on the public website on INSERT DATE for review.



Figure 3-1. Screenshot of the Sussex County Hazard Mitigation Webpage

The screenshot shows the Sussex County New Jersey website. At the top, there is a banner with the text "Sussex County New Jersey" and a search bar. Below the banner, there is a navigation menu with links to County Government, Departments, Municipalities, and County Directory. A date stamp indicates "May 06, 2015 12:10 PM". On the left side, there is a sidebar with links to various services like Sheriff, Home, Directions, County Tourism, Economic Development, Events Calendar, Newsletters & Alerts, News & Information, Meeting Schedules, Service Requests, Contact Information, Form Center, Links, F.A.Q.s, Employment Opportunities, Skylands Ride/Public Transportation, and a Page Navigation dropdown. The main content area is titled "General Information" and features a section for the "Sussex County, New Jersey All-Hazards Pre-Disaster Mitigation Planning Project". This section includes a list of topics: 1. What is Hazard Mitigation?, 2. What is a Hazard Mitigation Plan?, 3. Purpose & Need for The Plan, 4. Outcomes: Identifying Mitigation Projects & Other Benefits, 5. Participation, and 6. Process Overview. The first item, "What is Hazard Mitigation?", is expanded, showing a paragraph about natural hazards and their potential impacts. To the right of the main content, there is a "Page Navigation" dropdown menu with links to Pre-Disaster Mitigation General Information, Planning Group Information, Participating Jurisdictions, Meeting Schedule, The Draft Plan, Useful Links, and Contact Information.

Sussex County New Jersey

Search this site: Translate: [\(Disclaimer\)](#) Select Language

May 06, 2015 12:10 PM

County Government Departments Municipalities County Directory

[Print this page](#) [Email this page](#)

Sheriff

Page Navigation

Home

Directions

County Tourism

Economic Development

Events Calendar

Newsletters & Alerts

News & Information

Meeting Schedules

Service Requests

Contact Information

Form Center

Links

F.A.Q.s

Employment Opportunities

Skylands Ride/Public Transportation

General Information

Sussex County, New Jersey All-Hazards Pre-Disaster Mitigation Planning Project

1. [What is Hazard Mitigation?](#)
2. [What is a Hazard Mitigation Plan?](#)
3. [Purpose & Need for The Plan](#)
4. [Outcomes: Identifying Mitigation Projects & Other Benefits](#)
5. [Participation](#)
6. [Process Overview](#)

Natural hazards have the potential to cause property loss, loss of life, economic hardship, and threats to public health and safety. While an important aspect of emergency management deals with disaster recovery – those actions that a community must take to repair damages and make itself whole in the wake of a natural disaster – an equally important aspect of emergency management involves hazard mitigation.

Hazard mitigation actions are efforts taken before a disaster happens to lessen the impact that future disasters of that type will have on people and property in the community. They are things you do today to be more protected in the future. Hazard mitigation actions taken in advance of a hazard event are

Pre-Disaster Mitigation General Information

Planning Group Information

Participating Jurisdictions

Meeting Schedule

The Draft Plan

Useful Links

Contact Information

Source: <http://www.sussex.nj.us/Cit-e-Access/webpage.cfm?TID=7&TPID=11091>



Figure 3-2. Screenshot of Sussex County Hazard Mitigation Stakeholder and Public Surveys

Sussex County New Jersey

March 25, 2016 2:25 PM

Search this site: Translate: (Disclaimer) Select Language

County Government Departments Municipalities Directories Alerts

Sheriff Pre-Disaster Mitigation - Surveys

Print this page Email this page

Page Navigation

- Pre-Disaster Mitigation General Information
- Planning Group Information
- Participating Jurisdictions
- Meeting Schedule
- The Draft Plan
- Useful Links
- Contact Information
- Stakeholder and Public Surveys

Stakeholder and Public Surveys

Sussex County, New Jersey All-Hazards Pre-Disaster Mitigation Planning Project

Residents, we would like your input! Please take the Citizens Preparedness Questionnaire if you are a resident of Sussex County.

<https://www.surveymonkey.com/r/SUSSEXCOUNTYCITIZENSURVEY>

Stakeholders, we would like your input! Please take the survey appropriate for your organization:

- Academia: <https://www.surveymonkey.com/r/sussexacademia>
- Business: <https://www.surveymonkey.com/r/sussexbusinesssurvey>
- EMS: <https://www.surveymonkey.com/r/sussexemssurvey>
- Fire: <https://www.surveymonkey.com/r/sussexfiresurvey>
- Law Enforcement: <https://www.surveymonkey.com/r/sussexlawenforcementsurvey>
- Medical: <https://www.surveymonkey.com/r/sussexhospitalsurvey>
- Social Service: <https://www.surveymonkey.com/r/sussexsocialservicesurvey>
- Transportation: <https://www.surveymonkey.com/r/sussextransportationsurvey>
- Utilities: <https://www.surveymonkey.com/r/sussexutilitysurvey>

Home | County Government | Departments | Municipalities | Directories | Directions | County Tourism | Economic Development | Events Calendar | Newsletters & Alerts | News & Information | Meeting Schedules | Service Requests | Contact Information | Form Center | Links | F.A.Q.s | Employment Opportunities

Source: <http://www.sussex.nj.us/Cit-e-Access/webpage.cfm?TID=7&TPID=15483>



3.5 INCORPORATION OF EXISTING PLANNING EFFORTS AND PROGRAMS

The Sussex County HMP update strived to use the best available technical information, plans, studies and reports throughout the plan 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 is 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, is 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. Further, the source of technical data and information used may 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 (see Capability Assessment section of each jurisdictional annex in Section 9), and providing relevant planning and regulatory documents as applicable. Relevant documents, including plans, reports, and ordinances were reviewed to identify:

- 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 during the development of the overall Goals [and Objectives] (see Section 6);
- 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 plan process in an effort to develop mitigation planning goals, objectives and mitigation strategies that are consistent across local and regional planning and regulatory mechanisms; and thus develop complementary and mutually supportive plans, including:

- Comprehensive/Master Plans
- Building Codes
- Zoning and Subdivision Ordinances
- NFIP Flood Damage Prevention Ordinances
- Site Plan Requirements
- Stormwater Management Plans
- Emergency Management and Response Plans
- Land Use and Open Space Plans
- Capital Plans
- State of New Jersey 2014 State Hazard Mitigation Plan Update

The “Legal and Regulatory” capability assessment of each participating jurisdiction is included in Section 9, Jurisdictional Annexes, and provides a listing of the local codes, ordinances, regulations, and planning mechanisms available in the jurisdictions and reviewed during this planning process.



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 of the Review of Existing Programs, Policies, and Technical Documents for Participating Jurisdictions

Existing Plan, Program or Technical Document	Date	Jurisdictional Applicability
Andover Borough Housing Plan 2008	12/8/08	Andover Borough
Andover Township Master Plan Reexamination 2007	12/8/2007	Andover Twp
Andover Township Open Space and Recreation Plan 2008	3/1/2008	Andover Twp
Andover township Evaluation of Groundwater Resources	12/17/2009	Andover Twp
Andover Township Master Plan Reexamination 2010	3/22/2010	Andover Twp
Andover Township Master Plan Amendment 2010	3/22/2010	Andover Twp
Andover Township Master Plan Reexamination 2011	5/17/2011	Andover Twp
Byram Smart Growth Plan	2002	Byram Twp
Byram Master Plan 2004	12/16/2004	Byram Twp
Byram Highlands ERI	5/2011	Byram Twp
Byram Master Plan Highlands Element	10/2/2014	Byram Twp
Sussex County Comprehensive Farmland Preservation Plan	5/2008	Sussex County
Sussex County Mobility Study	Unk.	Sussex County
Sussex County OSRP	9/30/2003	Sussex County
Sussex County Strategic Growth Plan Update	11/2014	Sussex County
Sussex County Solid Waste Management Plan Amendment 2007	8/23/2007	Sussex County
Sussex County NRI	Unk.	Sussex County
Frankford Master Plan Reexamination Report 2005	3/30/05	Frankford Twp
Frankford Municipal Self Assessment Report	12/07	Frankford Twp
Franklin Borough MP Reexamination 2009	10/6/2009	Franklin Borough
Franklin Borough Housing Plan and Fair Share Plan 2010	5/13/2010	Franklin Borough
Franklin Borough Transportation Vision Plan	4/2009	Franklin Borough
Franklin Borough Main Street Revitalization	3/2006	Franklin Borough
Franklin Borough Master Plan	2003	Franklin Borough
Fredon Master Plan 2007	4/1/2007	Franklin Borough
Hampton Twp Master Plan	9/26/2002	Hampton Twp
Hardyston MP Reexamination 2014	5/2014	Hardyston Twp
Hardyston Stormwater Management Plan	3/2005	Hardyston Twp
Hardyston Highlands Preservation Area MP Element	11/2011	Hardyston Twp
Hardyston Highlands ERI	11/2011	Hardyston Twp
Hopatcong MP Reexamination 2014	4/2014	Hardyston Twp
Hopatcong Highlands ERI	4/24/2013	Hopatcong Borough
Hopatcong Env. Commission Annual Report 2013	7/30/2014	Hopatcong Borough
Hopatcong Highlands MP Element	12/2012	Hopatcong Borough
Hopatcong OSRP 2011	5/2011	Hopatcong Borough
Montague Township Master Reexamination	9/11	Montague Twp
Montague Township Opportunities and Constraints Analysis	4/19/10	Montague Twp
Newton McGuire Redevelopment Plan 2015	2/19/2015	Newton Town
Newton Annual Report 2013	2013	Newton Town
Newton Area in Need of Redevelopment Study for Newton Armory and ShopRite	6/2012	Newton Town
Newton Hicks Ave Redevelopment Plan Amendment	7/2014	Newton Town
Newton Area in Need of Redevelopment Study for McGuire Cherolet Site and Surrounding Parcels	10/2013	Newton Town



Existing Plan, Program or Technical Document	Date	Jurisdictional Applicability
Newton Merriam Gateway Redevelopment Plan	11/09/2010	Newton Town
Newton Community Forestry Management Plan 2010-2014	Unk.	Newton Town
Newton Master Plan	8/2008	Newton Town
Newton Urban Design Plan	2007	Newton Town
Newton Sparta Avenue Redevelopment Plan	3/23/2009	Newton Town
Ogdensburg Highlands ERI	8/2011	Ogdensburg Borough
Sandyston Township Vision Statement 2010	7/10	Sandyston Twp
Sparta Twp Highlands ERI	11/2011	Sparta Twp
Sparta Twp Highlands MP Element	11/2011	Sparta Twp
Stanhope Borough Highlands ERI	2009	Stanhope Borough
Stanhope Borough Highlands MP Element	4/2012	Stanhope Borough
Stillwater Twp ERI	6/11/2014	Stillwater Twp
Stillwater MP Reexamination 2012	11/2012	Stillwater Twp
Sussex Borough Redevelopment Plan	11/26/2013	Sussex Borough
Sussex Borough master Plan	11/21/2009	Sussex Borough
Vernon Twp Master Plan	7/2010	Vernon Twp
Vernon Twp Highlands ERI	8/2012	Vernon Twp
Vernon Twp Highlands MP Element	5/2013	Vernon Twp
Wantage Twp MP Reexamination 2009	10/24/2009	Wantage Twp
Wantage Twp Housin Element and Fair Share Plan Amendment to Master Plan	12/2008	Wantage Twp
Wantage Fire Rescue Service Report	Unk.	Wantage Twp

Reex = Re-examination; Unk. = Unknown



3.6 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 the county there are many existing plans and programs that support hazard risk management, and thus it is critical that this hazard mitigation plan integrate and coordinate with, and complement, those mechanisms.

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 have identified how they have 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.

3.7 Continued Public Involvement

Sussex County and participating jurisdictions are committed to the continued involvement of the public in the hazard mitigation process. Therefore, copies of the HMP update will be made available for review on their HMP public website. Each jurisdiction’s main point of contact identified earlier in this section (Table 3-2) shall be responsible for receiving, tracking, and filing public comments regarding this HMP update.

The public will have an opportunity to comment on the HMP update as a part of the annual mitigation planning evaluation process and the next five-year mitigation plan update. The HMP Coordinator (currently Corporal Mark W. Vogel, Deputy OEM 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 5-year plan update as appropriate; however, members of the Planning Committee will assist the HMP Coordinator. Additional meetings may also 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 HMP.

Further details regarding continued public involvement are provided in Section 7.

After completion of this HMP update, 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 will be publicized annually after the HMP Committee’s annual evaluation and posted on the public web site.

Corporal Mark W. Vogel has been identified as the ongoing County Hazard Mitigation Plan Coordinator (see Section 7), and is responsible for receiving, tracking, and filing public comments regarding this HMP Update. Contact information is:

Mailing Address: Sussex County Sheriff’s Office, Division of Emergency Management, 135 Morris Turnpike, Newton, NJ 07860
Contact Name: Corporal Mark W. Vogel, Deputy OEM Coordinator
Email Address: mitigation@sussexcountysheriff.com



SECTION 4 COUNTY PROFILE

This profile describes the general information of the County (physical setting, population and demographics, general building stock, and land use and population trends) and critical facilities located in Sussex County. In Section 5, specific profile information is presented and analyzed to develop an understanding of the study area, including the economic, structural, and population assets at risk and the particular concerns that may be present related to hazards analyzed (for example, a high percentage of vulnerable persons in an area).

2016 HMP Update Changes

- The County Profile contains updated information regarding the County's physical setting, population and demographics and trends, general building stock, land use and trends, and critical facilities. Additionally, future development trends in the County are now included in Section 4.

4.1 GENERAL INFORMATION

Sussex County is the northern most county in the State of New Jersey. It is bordered to the north by New York State, to the south by Warren and Morris Counties, to the east by Passaic County and to the west by the Delaware River and Pennsylvania. Historically, the County has been a scenic, rural county with small municipalities, plenty of open space, and agriculture.

4.1.1 Physical Setting

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

Hydrography and Hydrology

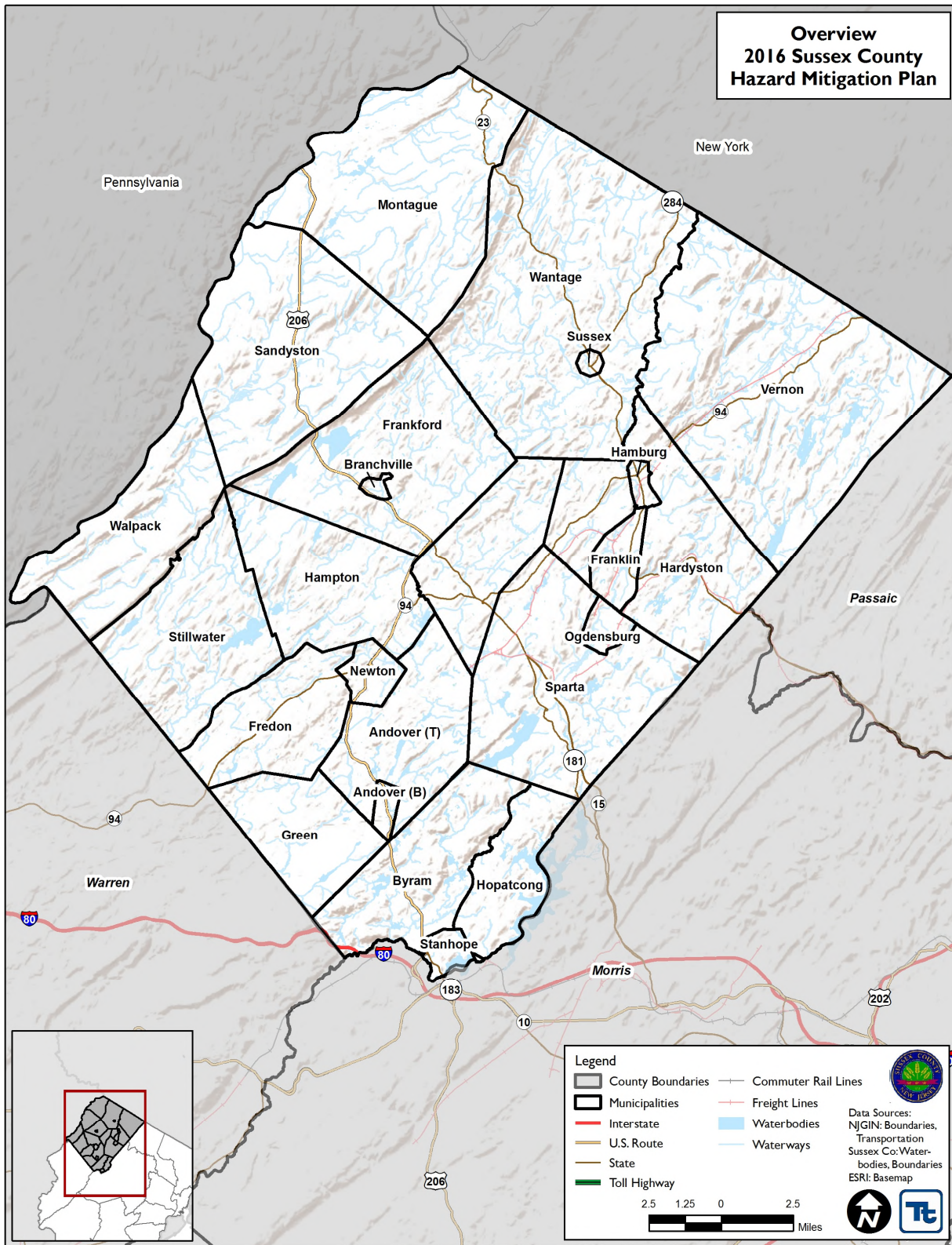
Numerous ponds, lakes, creeks, and rivers make up the waterscape of Sussex County. Most of the lakes in the County are found generally in two areas: along the eastern slope of the Kittatinny Ridge and in the Highlands province of eastern Sussex County. These areas are where topography and geology support the development of lakes. Most of the lakes serve recreational purposes and were developed as vacation areas in the past. The most prominent lakes in Sussex County include Lake Hopatcong (largest in New Jersey), Culvers Lake, Lake Owassa, Big Swartswood Lake, Lake Mohawk, Highland Lake, and Wawayanda Lake. Rivers and streams in Sussex County include: Delaware River, Wallkill River, Flat Brook, Paulins Kill, Pequest River, Musconetcong River, Clove Brook, Mill Brook, Kymer Brook, Lubbers Run, Papakating Creek, Pochuck Creek, Waywayanda Creek, Black Creek, Pequannock River, Pacack Brook, Russia Brook, and Rockaway River. Figure 4-2 shows the location of these waterbodies in the County.

Delaware River Basin

The Delaware River is the longest un-dammed river in the United States east of the Mississippi River. It extends 330 miles from the confluence of its east and west branches at Hancock, New York to the mouth of the Delaware Bay where it meets the Atlantic Ocean. The River is fed by 216 tributaries. Overall, the Delaware River Basin contains 13,359 square miles, draining parts of Pennsylvania, New Jersey, New York, and Delaware. Included in the total area is the 782 square mile Delaware Bay (Delaware River Basin 2013).



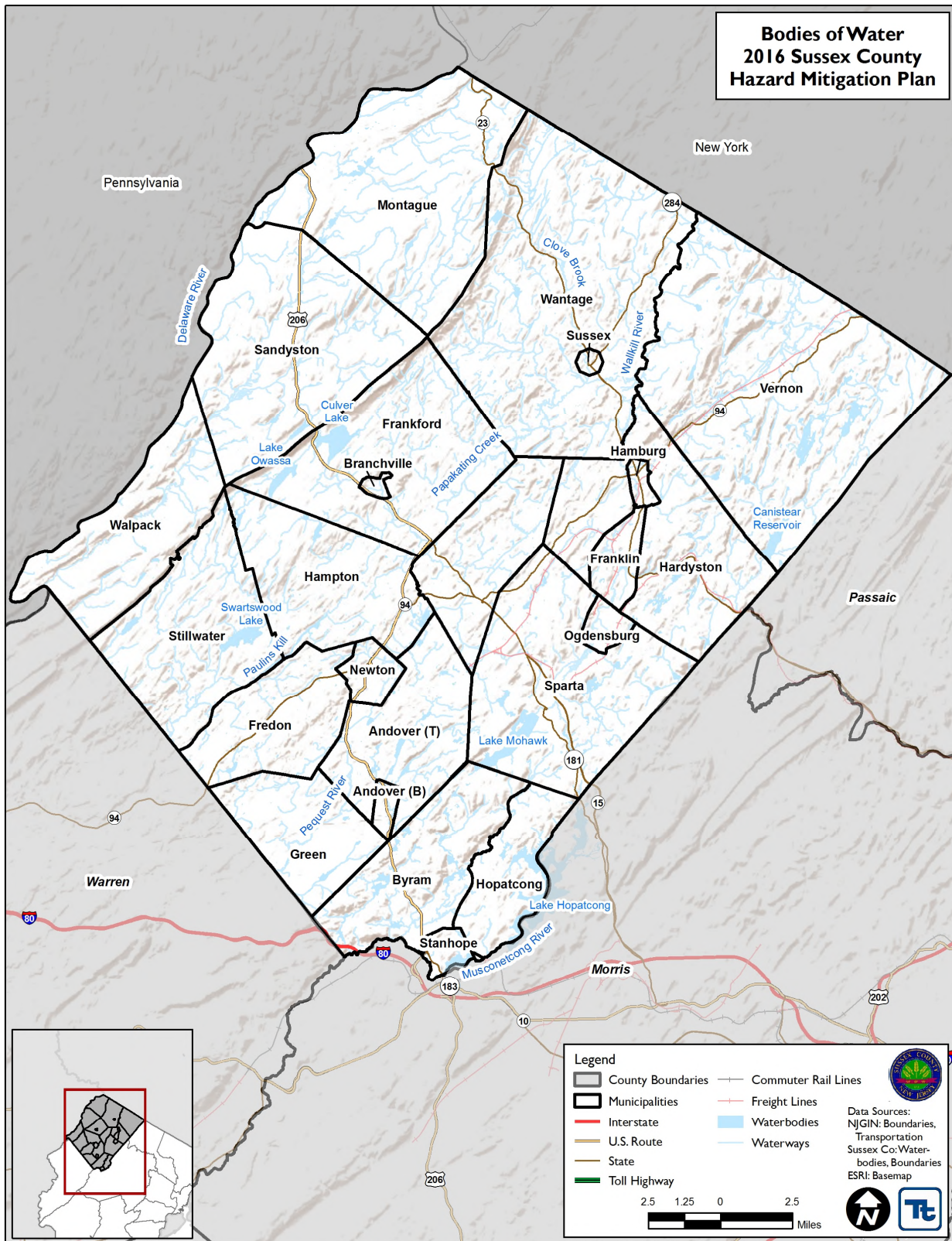
Figure 4-1. Overview Map Sussex County, New Jersey



Source: NJGIN, Sussex County



Figure 4-2. Bodies of Water in Sussex County



Source: NJGIN, Sussex County





Watersheds

A watershed is the area of land that drains into a body of water such as a river, lake, stream, or bay. It is separated from other systems by high points in the area such as hills or slopes. It includes not only the waterway itself but also the entire land area that drains to it. Drainage basins generally refer to large watersheds that encompass the watersheds of many smaller rivers and streams.

In New Jersey, the State is divided into 20 Watershed Management Areas (WMA), which are made up of smaller watersheds. Sussex County is located in four of the 20 WMAs that are discussed further below: Upper Delaware (WMA 1); Wallkill (WMA 2); Pompton, Pequannock, Wanaque, Ramapo (WMA 3) and Upper Passaic, Whippany and Rockaway (WMA 6).

Watershed Management Area 1: Upper Delaware

WMA 1 includes portions of Sussex, Morris, and Hunterdon Counties and all of Warren County. This area is also known as the Upper Delaware River Watershed and encompasses 746 square miles in the northwest corner of New Jersey. Within WMA 1, there are six major drainage basins: Delaware River, Flat Brook, Paulins Kill, Pequest River, Lopatcong and Pohatcong River Drainage, and the Musconetcong River (NJDEP 2012).

In Sussex County, WMA 1 is located in the western and southern sections of the County and encompasses greater than half of the County's land area. Principal waterways in Sussex County's portion of WMA 1 include: Flat Book, Paulins Kill, Pequest River, and a short stretch of the Musconetcong River (NJDEP 2012).

Watershed Management Area 2: Wallkill River Watershed

This WMA is also known as the Wallkill River Watershed and includes 11 townships in Sussex County. The Wallkill River Watershed is unique in that its headwaters begin at Lake Mohawk in Sparta Township and then flow north into New York, eventually emptying into the Hudson River. Within WMA 2, there are four subwatersheds: the Wallkill River, Pochuck Creek, Papakating Creek and Rutgers Creek Tributaries (NJDEP 2012).

The Wallkill Watershed is approximately 208 square miles in area, and is comprised of a variety of land uses including rural and centralized residential development, agriculture, commercial, recreational and industrial usage. Also located within this watershed area is the Wallkill National Wildlife Refuge. The refuge watershed/wetlands complex provides migratory and nesting habitats for numerous birds and waterfowl and is home to several endangered species (NJDEP 2012).

WMA 2 occupies the northern and northeastern parts of Sussex County, extending south through Sparta and northern Byram Townships. The Wallkill River flows northeast into New York State, where it empties into the Hudson River near Kingston, New York. Major tributaries of the Wallkill River include Papakating Creek which begins its run in Frankford Township and Clove Brook which flows south from northern Wantage Township. Pochuck Creek is another major tributary which drains part of Vernon and Hardyston Townships east of Pochuck Mountain and enters the Wallkill River several miles into New York State (NJDEP 2012).

Watershed Management Area 3: Pompton, Pequannock, Wanaque, Ramapo Watersheds

WMA 3 is located within the Highlands Province of New Jersey. The Pequannock, Wanaque and Ramapo Rivers all flow into the Pompton River. The Pompton River is, in turn, a major tributary to the Upper Passaic River. WMA 3 contains some of the State's major water supply reservoir systems including the Wanaque Reservoir which is the largest surface water reservoir in New Jersey. There are four watersheds in WMA 3:



Pompton, Ramapo, Pequannock and Wanaque River Watersheds. WMA 3 lies mostly in Passaic County but also includes parts of Bergen, Morris and Sussex Counties (NJDEP 2012).

The Pequannock River Watershed occupies a small area of eastern Sussex County. It flows south out of Vernon Township and continues into Hardyston Township where it turns southeast, forming the border between Morris and Passaic Counties. The Pequannock's confluence with the Passaic River occurs at the eastern end of the Great Piece Meadows, where Morris, Passaic and Essex Counties meet. For most of its run in Sussex County, the Pequannock River flows through Newark's water supply management lands (NJDEP 2012).

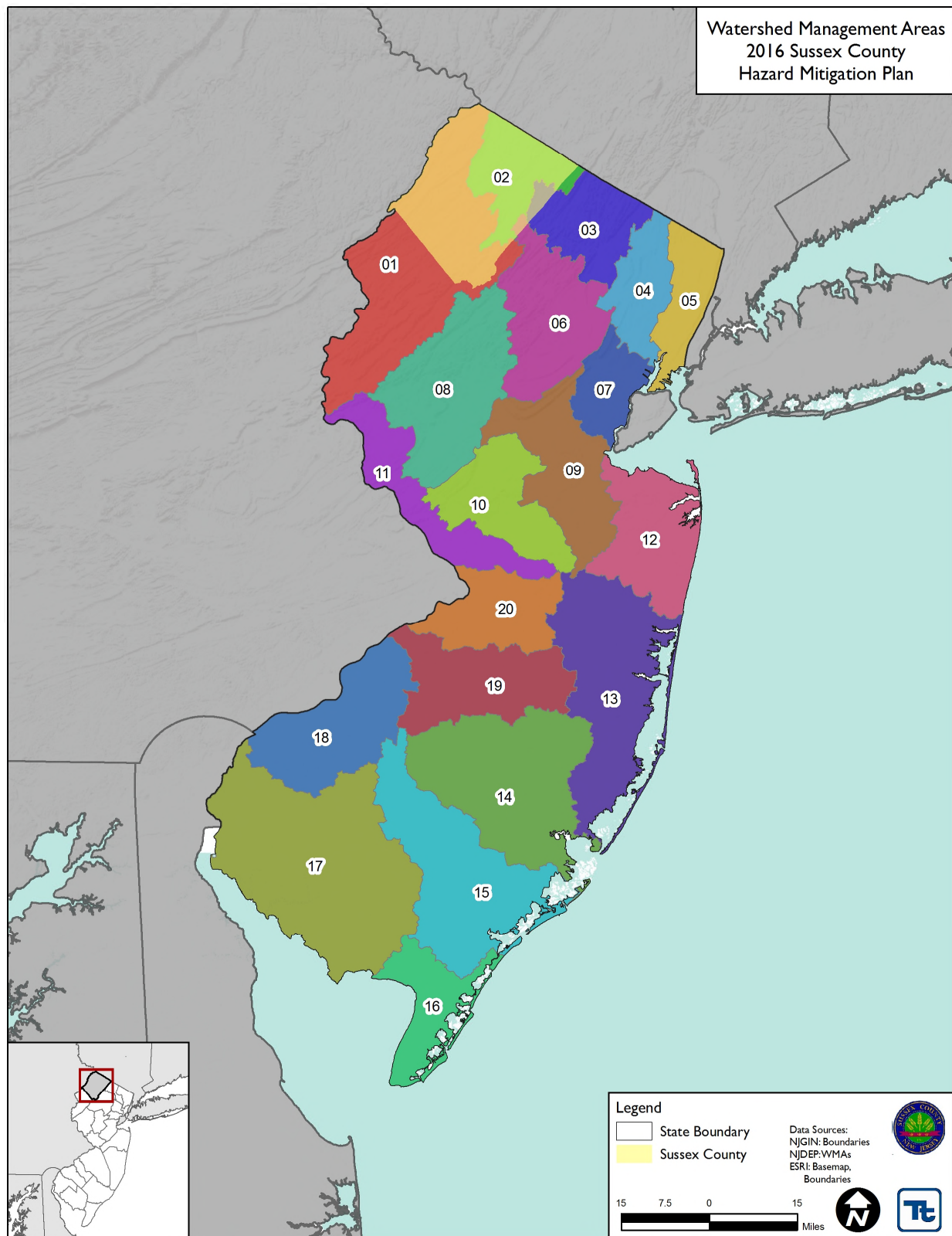
Watershed Management Area 6: Upper and Mid Passaic, Whippany, Rockaway Watersheds

WMA 6 represents the area drained by waters from the upper reaches of the Passaic River Basin including the Passaic River from its headwaters in Morris County to the confluence of the Pompton River. WMA 6 is characterized by extensive suburban development and reliance upon ground water sources for water supply. WMA 6 lies in portions of Morris, Somerset, Sussex and Essex Counties and includes the Upper and Middle Passaic River, Whippany River and Rockaway River Watersheds (NJDEP 2012).

The Rockaway River begins in Jefferson Township and its system's upper reaches are in eastern Sparta Township, where several streams merge to form Russia Brook. Russia Brook flows into Jefferson Township where it meets the Rockaway River below Lake Swannanoa. From there, the Rockaway River flows into the Passaic River (NJDEP 2012).



Figure 4-3. Watersheds of New Jersey





Topography and Geology

The topography of Sussex County is among the most diverse in the State of New Jersey. The eastern two-thirds of the County lies within the Highlands physiographic province which runs in a northeast belt from Reading, Pennsylvania, across New Jersey, and into southern New York State and western Connecticut. This province is characterized by forested ridges and glacially sculpted valleys. It also contains significant water resources affecting over 11 million residents. The remainder of Sussex County lies within the Ridge and Valley physiographic province. This province is characterized by parallel northeast-southwest trending ridges with fertile valleys in between. The capstone of the Ridge and Valley is the Kittatinny Ridge which runs approximately 40 miles through the County. The Ridge has elevations between 1,200 and 1,500 feet above sea level, and an average width of five miles. At High Point, the northernmost extent of the Kittatinny Ridge, has an elevation of 1,803 feet which is the highest point in New Jersey (County Natural Resources Inventory 2015).

The lowest points in Sussex County are found along the Delaware River at the mouth of Flat Brook (300 feet) and along the Wallkill River at the New York State line (380 feet). Located between the Highlands and Kittatinny Ridge, the Kittatinny Valley has elevations between 600 and 700 feet.

Climate

The State of New Jersey is located approximately halfway between the equator and the North Pole, resulting in a climate that is influenced by wet, dry, hot and cold airstreams, making a highly variable environment. The dominant feature of the atmospheric circulation over North America, including New Jersey, is the broad, undulating flow from west to east across the middle latitudes of the continent. This pattern exerts a major influence on the weather throughout the State (Office of the New Jersey State Climatologist [ONJSC], Date Unknown).

The State of New Jersey is divided into five distinct climate zones. Distinct variations in the day-to-day weather between each of the climate zones is due to the geology distance from the Atlantic Ocean, and prevailing atmospheric flow patterns. The five climate zones in New Jersey are: Northern, Central, Pine Barrens, Southwest, and Coastal (ONJSC Date Unknown). Sussex County is located in the Northern Climate Zone, described below.

The Northern Climate Zone covers approximately one-quarter of New Jersey and consists mainly of elevated highlands and valleys which are part of the Appalachian Uplands. This zone can be characterized by having a continental type of climate with minimal influence from the Atlantic Ocean, except when the winds contain an easterly component. Annual snowfall averages 40 to 50 inches. During the warmer months, thunderstorms are responsible for most of the rainfall. The climate zone has the shortest growing season, about 155 days (ONJSC Date Unknown).

Sussex County has a temperate climate with warm summers and cold winters. The average temperatures range from approximately 25 degrees in January to 72 degrees in July, with extremes common in the summer and winter months. The average precipitation yearly is approximately 43 inches (FEMA FIS 2011).

Land Use, Land Cover, and Land Use Trends

In 2007, the majority or 55.7 percent of the land in Sussex County was designated as forested land. The 2012 figures show that there was a slight increase in forested land, indicating that approximately 55.9 percent of the County was forested. In 2007 15.6 percent was urban land; 13.6 percent was wetlands land; 0.6 percent was barren land; and 10.5 percent was agricultural lands. When compared with the land use land cover data set from 2012, there has been a slight increase in urban land (1.7%) and wetlands (0.1%), while there has been a



slight decrease in agricultural land (-3.8 percent) and in barren land (-4.7 percent). Refer to Table 4-1 and Figure 4-4 below.

Table 4-1. Land Use Summary for Sussex County, 2007 & 2012

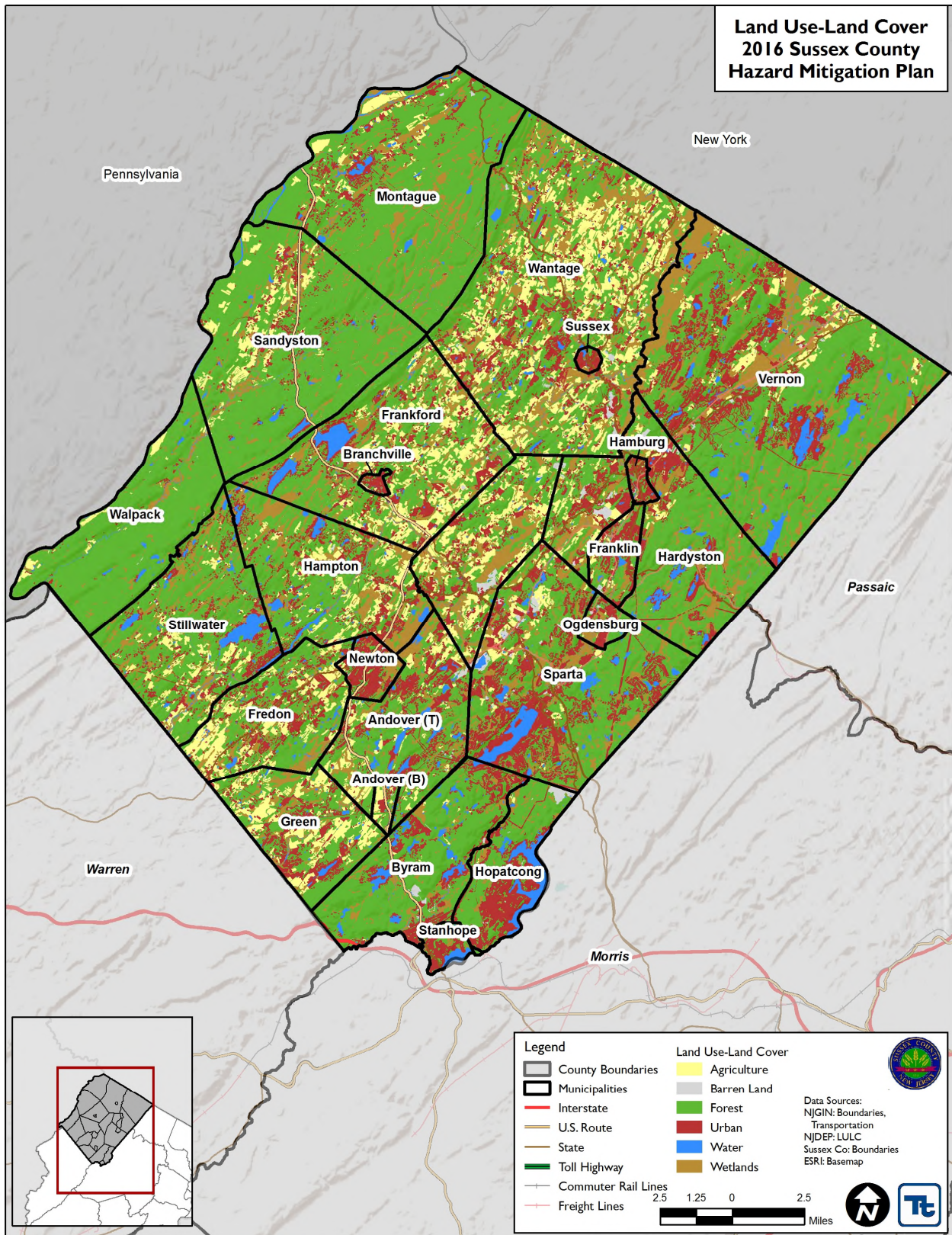
Land Use Category	2007 Data		2012 Data	
	Acreage	Percent of Passaic County	Acreage	Percent of Passaic County
Agriculture	36,153	10.5%	34,778	10.1%
Barren	2,156	0.6%	2,054	0.6%
Forest	190,902	55.7%	191,495	55.9%
Urban	53,420	15.6%	54,334	15.9%
Wetlands	46,591	13.6%	46,645	13.6%

Source: NJDEP (2012 LULC)

Note: Urban land includes residential, industrial, transportation, and recreational land. Water is excluded from the table above.



Figure 4-4. 2012 Land Use Land Cover for Sussex County



Source: NJDEP 2012





Open Space and Parkland

Large portions of Sussex County are permanently set aside as public/conservation space. This includes the Delaware Water Gap National Recreation Area, state parks and forests (High Point and Stokes), and wildlife refuges (Wallkill). Public and conservation open space accounts for more than one-third of the County's total land area. Overall, open space in Sussex County includes federal, state, county, municipal, and water supply management land.

The National Park Service manages 21,771 acres (federal land) in western Sussex County in the municipalities of Montague, Sandyston and Walpack. This area is known as the Delaware Water Gap National Recreation Area, a 55,857 acre unit of the National Park System located in New Jersey and Pennsylvania. The Fish and Wildlife Service manages 4,635 acres of land in County, known as the Wallkill River National Wildlife Refuge located in the Townships of Vernon and Wantage.

For state land, the New Jersey Division of Fish and Wildlife manages 12 Wildlife Management Areas in Sussex County, totaling 13,775 acres. The New Jersey Division of Parks and Forestry oversees state parks and trail corridors (Paulinskill Valley Trail, Sussex Branch Trail and Appalachian Trail) throughout New Jersey. In Sussex County, there are six state parks, one state forest, and three long-distance trails, totaling 55,135 acres. Additionally, the New Jersey Natural Lands Trust is an independent agency within NJDEP in which properties are comparatively small relative to other state land. Management of this type of state land focuses on fish and wildlife habitat conservation, with less of a focus on public recreation. There are 28 Natural Lands Trust properties in Sussex County totaling 1,064 acres.

As for county-owned open space, Sussex County owns one acre of parkland in the Town of Newton. On the municipality level, there are 1,521 acres of Recreation and Open Space Inventory (ROSI) property in the County. A ROSI is a document filed with the New Jersey Green Acres program that lists all municipal recreation and/or conservation lands in that municipality. A municipality must complete a ROSI when it accepts Green Acre funding for land acquisition or recreation development. Lastly, there are 6,639 acres of water supply management land in Sussex County. A majority of this land is found in Hardyston and Vernon Townships and is owned by the City of Newark. This type of land cannot be sold for development without state review (Sussex County Open Space and Recreation Plan 2003). Refer to Table 4-2 below for a summary of open space in Sussex County.

Table 4-2. Open Space in Sussex County

Name of Facility	Federal, State, County or Municipal Owned	Size (acres in Sussex County)	Municipality
Wallkill River National Wildlife Refuge	Federal	4,635	Hardyston, Vernon, Wantage
Delaware Water Gap National Recreation Area	Federal	21,771	Walpack, Sandyston, Montague
Bear Swamp Wildlife Management Area (WMA)	State	2,036	Frankford and Hampton
Culvers Brook Access WMA	State	4	Frankford
Flatbrook WMA	State	2,090	Sandyston, Walpack
Little Flatbrook Access WMA	State	4	Sandyston
Hainesville WMA	State	281	Montague, Sandyston
Hamburg Mountain WMA	State	2,737	Hardyston, Vernon
Paulinskill River WMA	State	777	Fredon, Hampton



Section 4: County Profile

Name of Facility	Federal, State, County or Municipal Owned	Size (acres in Sussex County)	Municipality
Sparta Mountain WMA	State	1,602	Hardyston, Ogdensburg, Sparta
Trout Brook WMA	State	1,098	Stillwater
Walpack WMA	State	387	Walpack
Weldon Brook WMA	State	829	Sparta
Whittingham WMA	State	1,930	Green, Fredon
Allamuchy Mountain State Park	State	5,000	Byram, Green, Stanhope
High Point State Park (includes AT west of Wallkill)	State	15,278	Wantage, Montague, Frankford
Hopatcong State Park	State	4	Hopatcong
Kittatinny Valley State Park	State	1,313	Andover Borough, Andover Township
Paulinskill Valley Trail/Sussex Branch Trail	State	556	Andover Borough, Andover Township, Byram, Frankford, Fredon, Hamburg, Hampton, Lafayette, Newton, Ogdensburg, Stillwater, Sparta
Stokes State Forest	State	15,734	Montague, Sandyston, Frankford, Hampton, Stillwater
Swartswood State Park	State	2,250	Hampton, Stillwater
Wawayanda State Park (includes AT east of Wallkill)	State	15,000	Vernon
Newark-Pequannock Watershed Easemen	State	3,896	Vernon
Congleton -CLC Partners/Smith (easement)	State	15	Hardyston
Congleton - Violante (easement)	State	16	Hardyston, Wantage
Congleton Wildlife Sanctuary	State	79	Hardyston, Wantage
Congleton Wildlife Sanctuary - CCK Realty)	State	127	Hardyston, Wantage, Lafayette
Congleton - Ferra (easement)	State	14	Hardyston
Congleton - Padula (easement)	State	18	Hardyston
Congleton - Williams (easement)	State	12	Hardyston
Congleton - Wildlife Sanctuary - Farm Association - Marx	State	100	Hardyston, Wantage
Crooked Swamp Caves	State	18	Lafayette
Elm Spring Preserve	State	11	Wantage
Lubbers Run	State	35	Byram
Lubbers Run - Vanderbilt	State	28	Byram
Lubbers Run - Vanderbilt II	State	28	Byram
McCarthy	State	4	Hopatcong
Papakating Creek	State	11	Frankford
Quarryville Brook	State	44	Wantage
Reinhardt - Weber	State	5	Montague
Reinhardt Preserve	State	240	Montague
Reinhardt Preserve - Bunnell (easement)	State	34	Montague
Reinhardt Preserve - Coss	State	6	Montague
Reinhardt Preserve - Layne (easement)	State	24	Montague



Name of Facility	Federal, State, County or Municipal Owned	Size (acres in Sussex County)	Municipality
Reinhardt Preserve - Reinhardt I	State	14	Montague
Wallkill - May/Green Acres	State	13	Ogdensburg
Wallkill River	State	10	Sparta
Wallkill River Addition -NJCF	State	80	Ogdensburg
Wallkill River Addition - Predmore/Bennett	State	4	Ogdensburg
Wallkill River - Pope John High School	State	40	Sparta
Wallkill River Preserve - NJDOT	State	34	Sparta
Sussex County Park	County	1	Newton
Andover Township	Municipal	278	Andover Township
Byram	Municipal	92	Byram
Frankford	Municipal	9	Frankford
Fredon	Municipal	69	Fredon
Hamburg	Municipal	2	Hamburg
Hopatcong	Municipal	172	Hopatcong
Lafayette	Municipal	250	Lafayette
Newton	Municipal	49	Newton
Stanhope	Municipal	15	Stanhope
Stillwater	Municipal	242	Stillwater
Sussex Borough	Municipal	63	Sussex Borough
Vernon	Municipal	123	Vernon
Wantage	Municipal	157	Wantage

Source: Open Space and Recreation Plan 2003

The Highlands Region

The Highlands Region of New Jersey encompasses an area of 859,358 acres located in the northwest part of New Jersey. This Region includes 88 municipalities and parts of seven counties – Bergen, Hunterdon, Morris, Passaic, Somerset, Sussex, and Warren. In the Highlands Water Protection and Planning Act (Highlands Act), the Legislature designated specific boundaries within the Highlands Region as the Preservation Area and the Planning Area. The difference between the two is that municipal and county conformance with the Regional Master Plan is required in the Preservation Area and is voluntary in the Planning Area.

In Sussex County, there is a total of 129,865 acres of land located within the Highlands Region (planning area and preservation area combined). The following municipalities are located in the Highlands: Byram Township (both areas), Franklin Borough (planning), Green Township (both areas) Hamburg Borough (planning), Hardyston Township (both areas), Hopatcong Borough (both areas), Ogdensburg Borough (both areas), Sparta Township (both areas), Stanhope Borough (planning), and Vernon Township (both areas). Table 4-X summarizes the acreage of the highlands region in Sussex County.

Table 4-X. Acreage of the Highlands Region in Sussex County

Municipality	Planning Area	Preservation Area	Total
Byram Township	233	14,272	14,505



Municipality	Planning Area	Preservation Area	Total
Franklin Borough	2,843	0	2,843
Green Township	10,198	281	10,479
Hamburg Borough	753	0	753
Hardyston Township	8,254	12,557	20,811
Hopatcong Borough	5,346	2,607	7,953
Ogdensburg Borough	1,232	199	1,431
Sparta Township	13,359	11,538	24,897
Stanhope Borough	1,404	0	1,404
Vernon Township	15,470	29,319	44,789
Total Acres For Sussex County	59,092	70,773	129,865

Source: Highlands Regional Master Plan (excerpt of Table 1.1).

Metropolitan Statistical Area

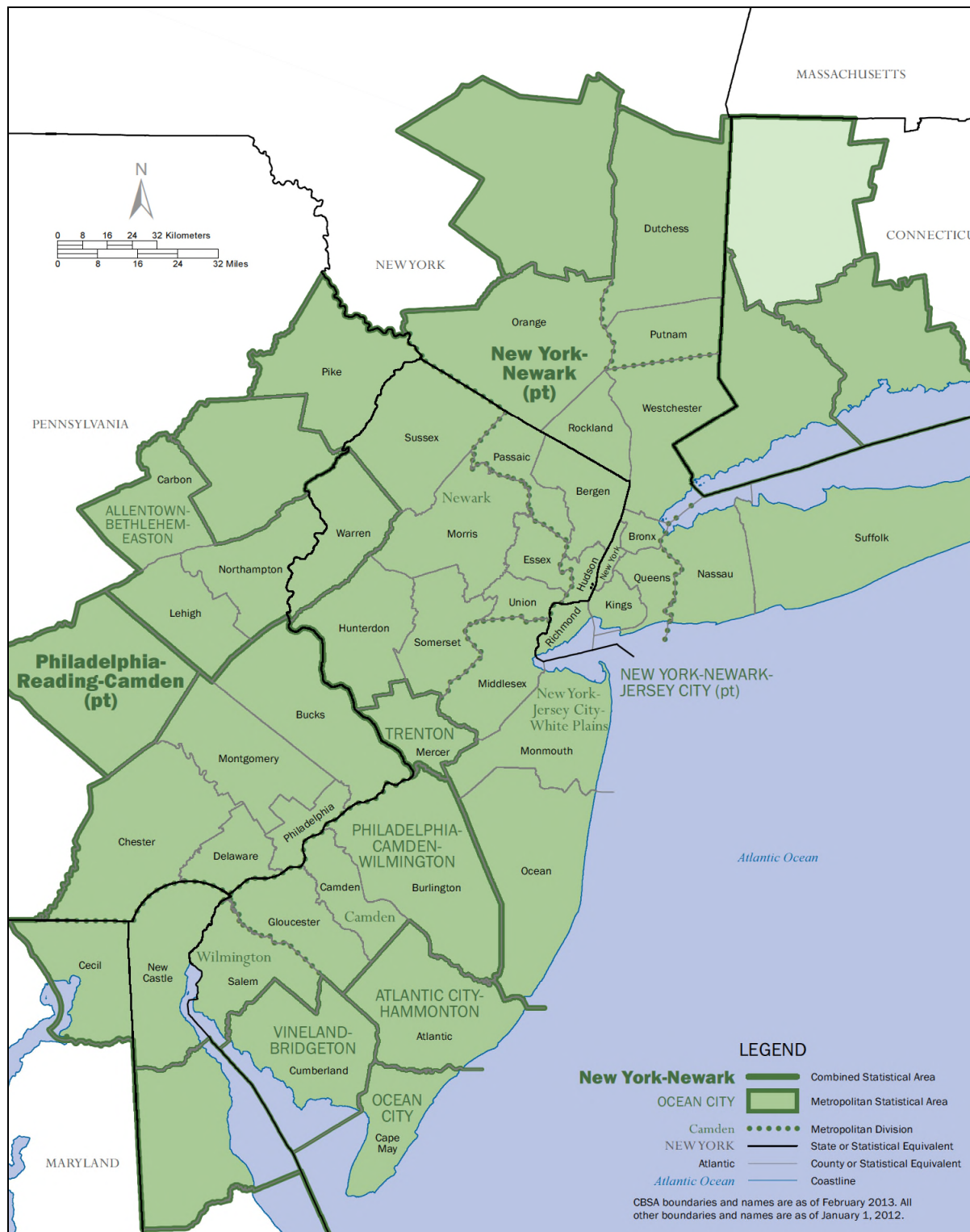
Metropolitan statistical areas are geographic entities delineated by the New Jersey Office of Management and Budget (OMB) for use by Federal statistical agencies in collecting, tabulating, and publishing Federal statistics. The general concept of a metropolitan area is that of a large nucleus, together with adjacent communities, having a high degree of social and economic integration with that core (Census 2014).

Northeast New Jersey and portions of New York State are located in the New York-Newark Combined Statistical Area. This area is broken down into smaller metropolitan statistical areas (MSA). Sussex County is located within the New York-Newark Combined Statistical Area and the New York-Newark-Jersey City Metropolitan Statistical Area U.S. Census 2014).

Due to the size of the New York-Newark-Jersey City Metropolitan Statistical Area, it is further divided into four metropolitan divisions which are separately identifiable employment centers within the MSA. Sussex County is part of the Newark, NJ-PA Metropolitan Division labor market. Figure 4-5 illustrates the different statistical areas in New Jersey and parts of New York State.



Figure 4-5. New York Combined Statistical Area



Source: U.S. Census 2014



4.2 POPULATION AND DEMOGRAPHICS

DMA 2000 requires that HMPs consider the risk and vulnerability of socially vulnerable populations to natural hazards. 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. For the purposes of this study, vulnerable populations shall include (1) the elderly (persons aged 65 and over) and (2) those living in low-income households.

4.2.1 Population Characteristics

According to the 2010 U.S. Census, Sussex County had a population of 149,265 people which represents a slight increase from the 2000 U.S. Census population of 144,166 people. Table 4-3 presents the population statistics for Sussex County based on the 2000 and 2010 U.S. Census data. Figure 4-6 shows the distribution of the general population density (persons per square mile) in 2010 by Census block. Population density has a strong correlation with hazard vulnerability and loss. Urban areas tend to have larger populations and numbers of structures; therefore, these areas tend to experience greater loss during hazard events.



Table 4-3. Sussex County Population Statistics

Municipality	U.S. Census 2010			U.S. Census 2000*						
	Total	Pop. 65+	% Pop. 65+	Total	Pop. 65+	% Pop. 65+	Pop Under 16	% Pop Under 16	Low-Income Pop.*	% Low-Income Pop. of Total
Borough of Andover	606	73	12.0%	658	65	9.9%	108	16.4%	16	2.4%
Township of Andover	6,319	1,012	16.0%	6,033	950	15.7%	1,359	22.5%	90	1.5%
Borough of Branchville	841	141	16.8%	845	153	18.1%	170	20.1%	68	8.0%
Township of Byram	8,350	843	10.1%	8,254	501	6.1%	2,130	25.8%	124	1.5%
Township of Frankford	5,565	921	16.5%	5,420	703	13.0%	1,134	20.9%	240	4.4%
Borough of Franklin	5,045	659	13.1%	5,160	603	11.7%	1,350	26.2%	317	6.1%
Township of Fredon	3,437	469	13.6%	2,860	266	9.3%	679	23.7%	38	1.3%
Township of Green	3,601	388	10.8%	3,220	193	6.0%	828	25.7%	39	1.2%
Borough of Hamburg	3,277	385	11.7%	3,105	252	8.1%	766	24.7%	109	3.5%
Township of Hampton	5,196	768	14.8%	4,943	547	11.1%	1,131	22.9%	195	3.9%
Township of Hardyston	8,213	1,194	14.5%	6,171	630	10.2%	1,371	22.2%	211	3.4%
Borough of Hopatcong	15,147	1,489	9.8%	15,888	1,073	6.8%	3,762	23.7%	423	2.7%
Township of Lafayette	2,538	325	12.8%	2,300	213	9.3%	588	25.6%	32	1.4%
Township of Montague	3,847	536	13.9%	3,412	378	11.1%	847	24.8%	251	7.4%
Town of Newton	7,997	1,481	18.5%	8,244	1,284	15.6%	1,701	20.6%	756	9.2%
Borough of Ogdensburg	2,410	275	11.4%	2,638	212	8.0%	709	26.9%	92	3.5%
Township of Sandyston	1,998	234	11.7%	1,825	244	13.4%	416	22.8%	90	4.9%
Township of Sparta	19,722	2,198	11.1%	18,080	1,491	8.2%	5,035	27.8%	457	2.5%
Borough of Stanhope	3,610	374	10.4%	3,584	268	7.5%	808	22.5%	111	3.1%
Township of Stillwater	4,099	459	11.2%	4,267	360	8.4%	1,061	24.9%	105	2.5%
Borough of Sussex	2,130	261	12.3%	2,145	273	12.7%	446	20.8%	183	8.5%
Township of Vernon	23,943	2,019	8.4%	24,686	1,566	6.3%	6,750	27.3%	637	2.6%
Township of Walpack	16	4	25.0%	41	11	26.8%	0	0.0%	6	14.6%
Township of Wantage	11,358	1,342	11.8%	10,387	916	8.8%	2,727	26.3%	302	2.9%
Sussex County Total	149,265	17,850	12.0%	144,166	13,152	9.1%	35,876	24.9%	4,892	3.4%



Source: *Census 2010 (U.S. Census Bureau); HAZUS-MH (for 2000 U.S. Census data)*

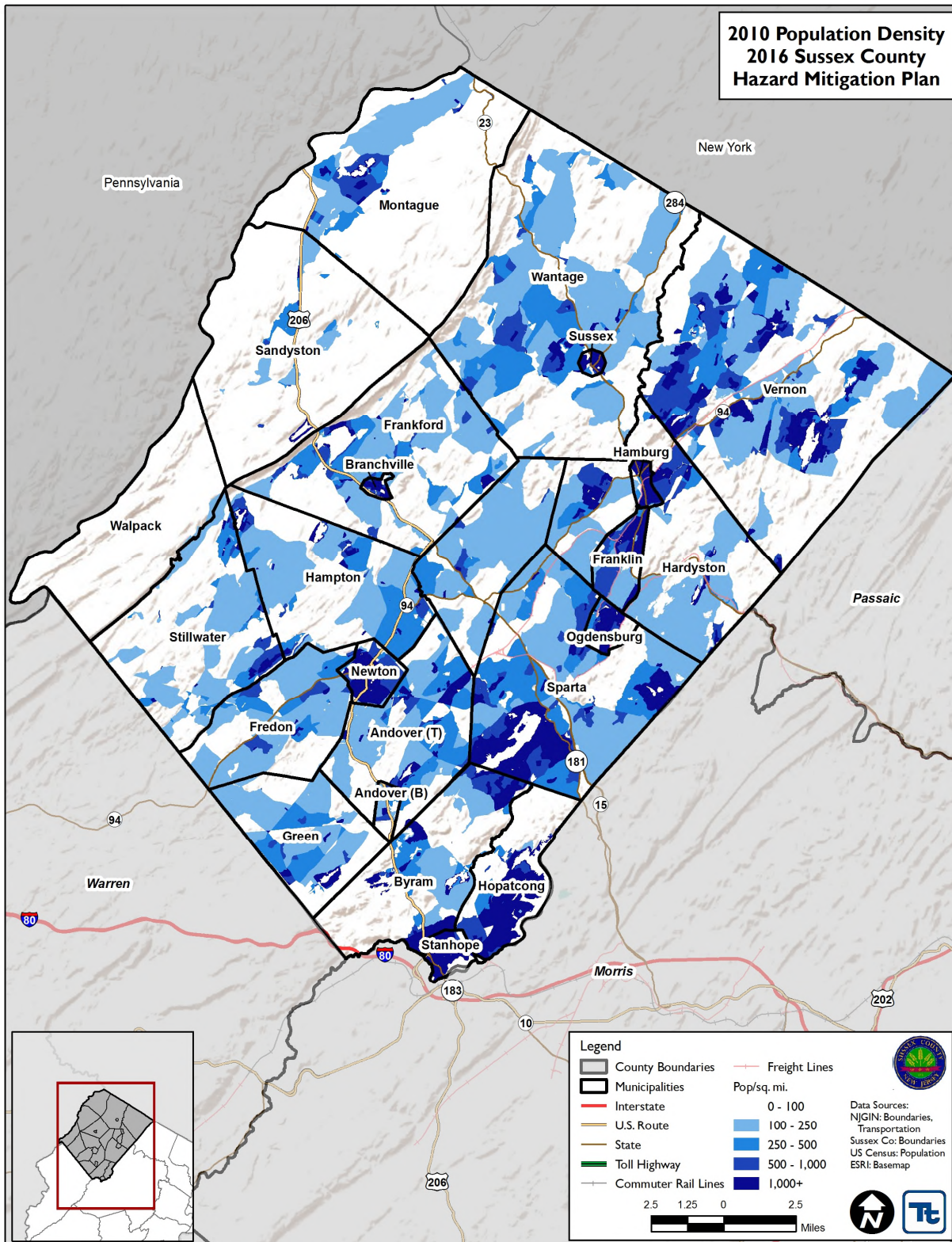
Note: *Pop. = population*

** Individuals below poverty level (Census poverty threshold for a 3-person family unit is approximately \$18,522)*

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Figure 4-6. Distribution of General Population for Sussex County, New Jersey



Source: U.S. Census 2010

Note: The figure indicates distribution based on Census Block designations.



4.2.2 Vulnerable Populations

Identifying concentrations of vulnerable populations can assist communities in targeting preparedness, response and mitigation actions. For the purposes of this planning process, vulnerable populations in Sussex County include children, elderly, low-income, the physically or mentally disabled, non-English speakers and the medically or chemically dependent.

Age

Children are considered vulnerable because they are dependent on others to safely access resources during emergencies. The elderly are more apt to lack the physical and economic resources necessary for response to hazard events and are more likely to suffer health-related consequences making recovery slower. Those living on their own may have more difficulty evacuating their homes. The elderly are also more likely to live in senior care and living facilities (described in Section 4.6) where emergency preparedness occurs at the discretion of facility operators.

According to the 2010 Census, the median age in Sussex County was 42 years. Of the 2010 population, 17,850 (12.0 %) of the County's population is age 65 and older. According to the 2000 Census, 9.1% of the County's total population (or 13,152 persons) were age 65 and older. Figure 4-7 shows the distribution of persons over age 65 in Sussex County. According to the 2000 Census, 35,876 (24.9%) people were age 16 or younger. Figure 4-8 shows the distribution of persons under the age 16 in Sussex County.

Income

Of the total population, economically disadvantaged populations are more vulnerable because they are likely to evaluate their risk and make decisions based on the major economic impact to their family and may not have funds to evacuate. Based on the 2009-2013 American Community Survey five-year estimates, per capita income in Sussex County was estimated at \$37,949 and the median household income for Sussex County is \$100,066 (in 2013 inflation-adjusted dollars). It is estimated that over 15.6% of households receive an income between \$50,000 and \$74,999 per year and 10.6% of households receive over \$200,000 annually.

The 2009-2013 Survey estimates approximately 7.9% (2,524 households) of the households in Sussex County make less than \$25,000 per year and are therefore below the poverty level. According to the Census' 2013 poverty thresholds, the weighted average thresholds for a family of four in 2013 was \$23,834; for a family of three, \$18,552; for a family of two, \$15,142, and for unrelated individuals, \$11,888. Figure 4-8 shows the distribution of low income persons.

It is noted that the 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 2013 U.S. Census Bureau, which identifies households with two adults and two children with an annual household income below \$23,624 per year as "low income" for this region. This difference is not believed to be significant for the purposes of this planning effort.

Physically or Mentally Disabled

Based on the 2009-2013 American Community Survey, the total non-institutionalized population of Sussex County is 146,518, which is approximately 98.2% of the total population. Approximately 13,443 of those residents are living with a disability. About 8.4% of these residents are under the age of 18 and about 39.1% are 65 years or older.



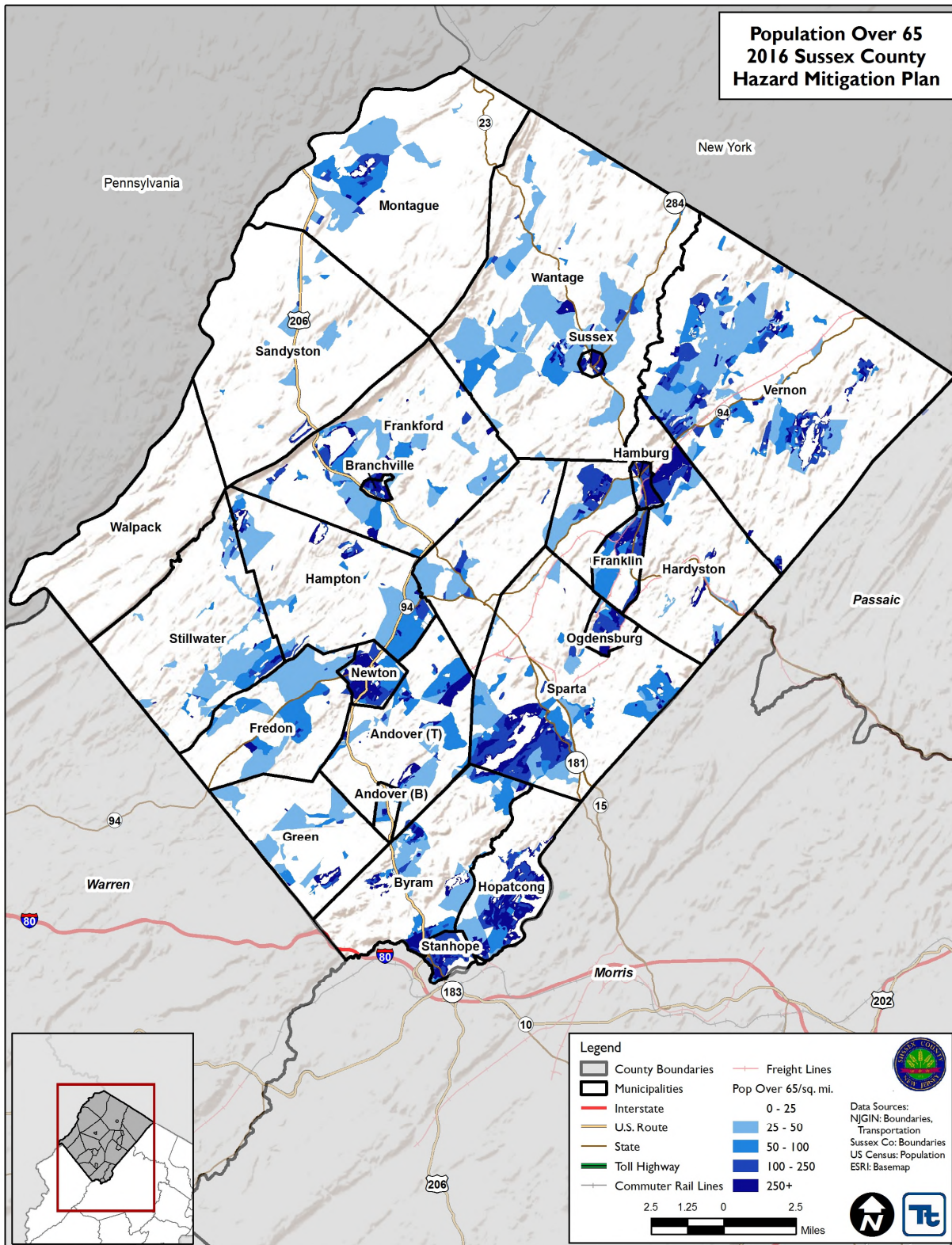
Non-English Speakers

According to the 2009-2013 American Community Survey, 9.9% of the County's population over the age of 5 primarily speaks a language other than English at home; this is significantly less than the State average of 30.0%. Of the County's population, 4.2% speak Spanish, 4.3% speak other Indo-European languages, 0.9% speak Asian and Pacific Islander languages, and 0.6% speak other languages.

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Figure 4-7. Distribution of Persons over the Age of 65 in Sussex County, New Jersey

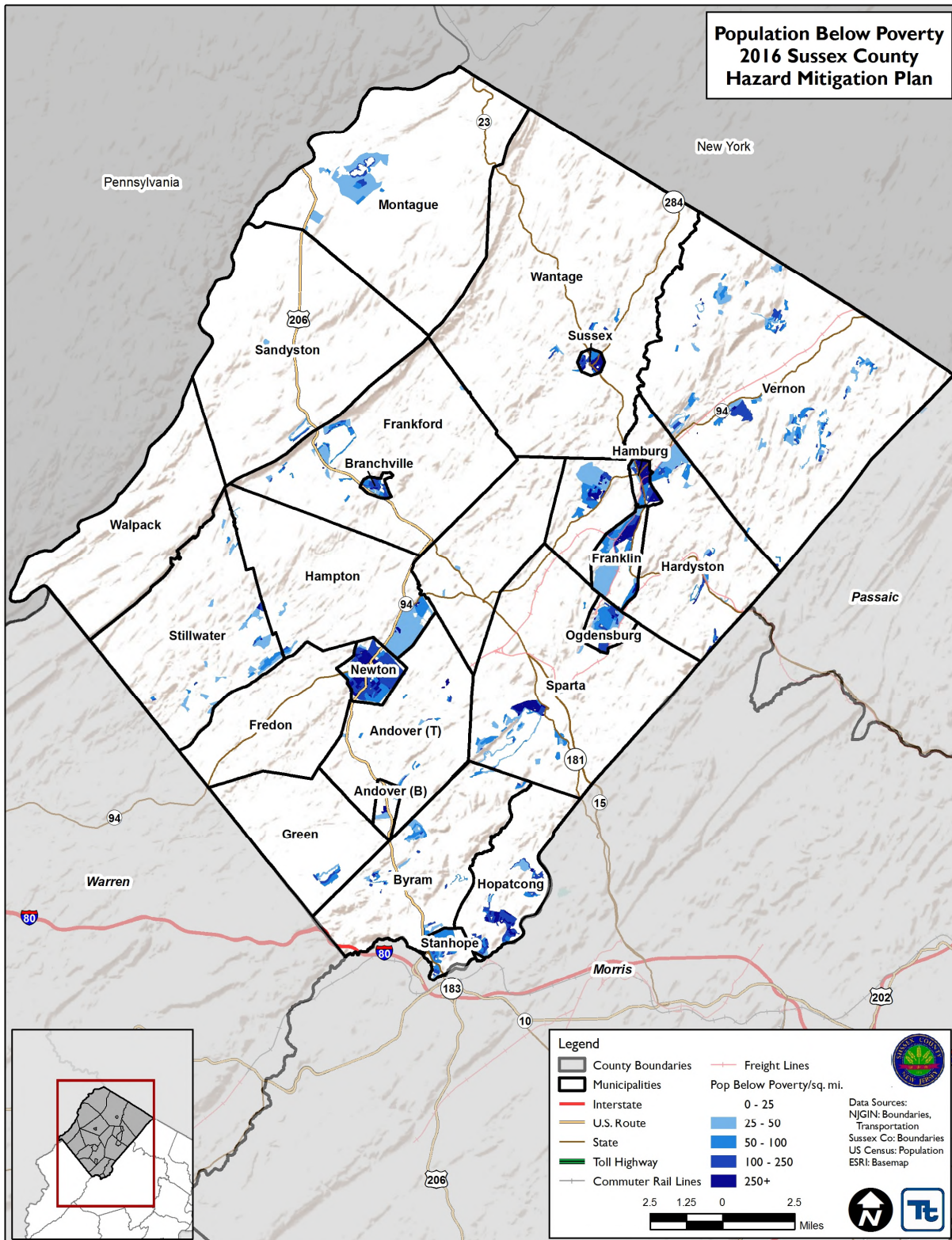


Source: U.S. Census 2010

Note: The figure indicates distribution based on Census Block designations.



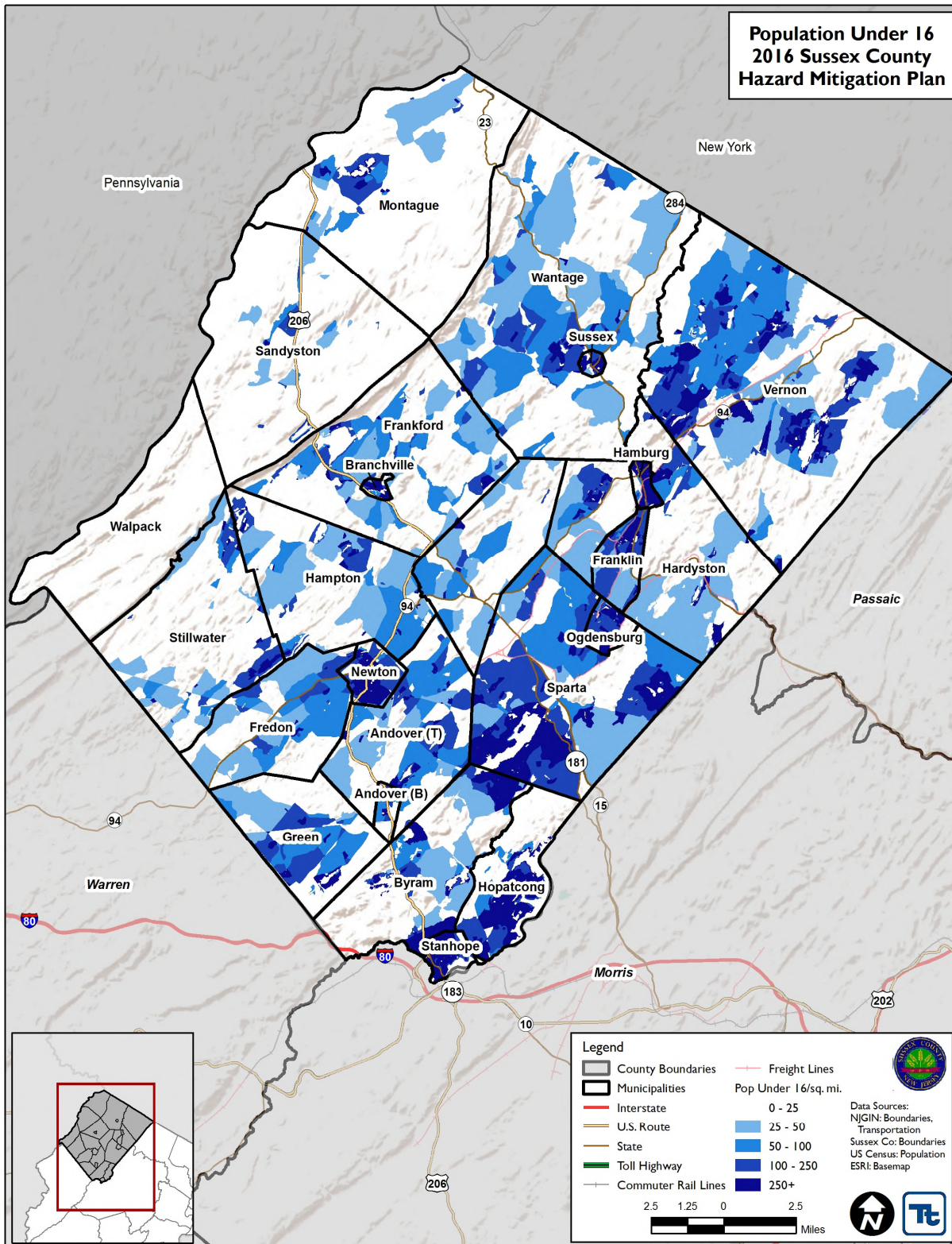
Figure 4-8. Distribution of Low-Income Population in Sussex County, New Jersey



Source: U.S. Census 2010
Note: The figure indicates distribution based on Census Block designations.



Figure 4-9. Distribution of Children Under Age of 16 in Sussex County, New Jersey



Source: U.S. Census 2010

Note: The figure indicates distribution based on Census Block designations



4.2.3 Population Trends

This section discusses population trends to use as a basis for estimating future changes of the population and significantly change the character of the area. Population trends can provide a basis for making decisions on the type of mitigation approaches to consider and the locations in which these approaches should be applied. This information can also be used to support planning decisions regarding future development in vulnerable areas.

According to the U.S. Census Bureau Sussex County's 2010 population was 149,265 persons, which is 3.5% increase from the 2000 Census population of 144,166. Between 1900 and 2010, the County has experienced an overall growth. Between 1960 and 1970, the County saw its largest increase, 57.4%. The County saw its smallest increase between 2000 and 2010, when there was only a 3.5% increase in population. Between 1910 and 1920, the County experienced its largest decrease in population, 7% loss (New Jersey Department of Labor and Workforce Development 2014). Table 4-4 displays the population and change in population from 1900 to 2010 in Sussex County.

Table 4-4. Sussex County Population Trends, 1900 to 2014

Year	Population	Change in Population	Percent (%) Population Change
1900	24,134	N/A	N/A
1910	26,781	2,647	11.0
1920	24,905	-1,876	-7.0
1930	27,830	2,925	11.7
1940	29,632	1,802	6.5
1950	34,423	4,791	16.2
1960	49,255	14,832	43.1
1970	77,528	28,273	57.4
1980	116,119	38,591	49.8
1990	130,943	14,824	12.8
2000	144,166	13,223	10.1
2010	149,265	5,099	3.5
2014	146,888	-2,377	-1.6

Source: U.S. Census Bureau, 2014

Note: Change in population and percent in population change was calculated from available data

Table 4-5 displays the ten largest municipalities in Sussex County. According to this 2011 data, Vernon Township was the most populous municipality, comprising 16.4% of the County's total population. According to the Sussex County edition of the Northern Regional Community Fact Book, from 1970 to 2009, 10 of the County's municipalities more than doubled in size. The fastest growing municipality was Vernon Township who saw an over increase of 309.7% between 1970 and 2009. Walpack Township saw the largest decrease in population during this time frame, from 384 in 1970 to 34 in 2009 (New Jersey Department of Labor and Workforce Development 2011).

Table 4-5. Ten Largest Municipalities in Sussex County

Rank	Municipality	2009 Population
1	Vernon, Township of	24,825

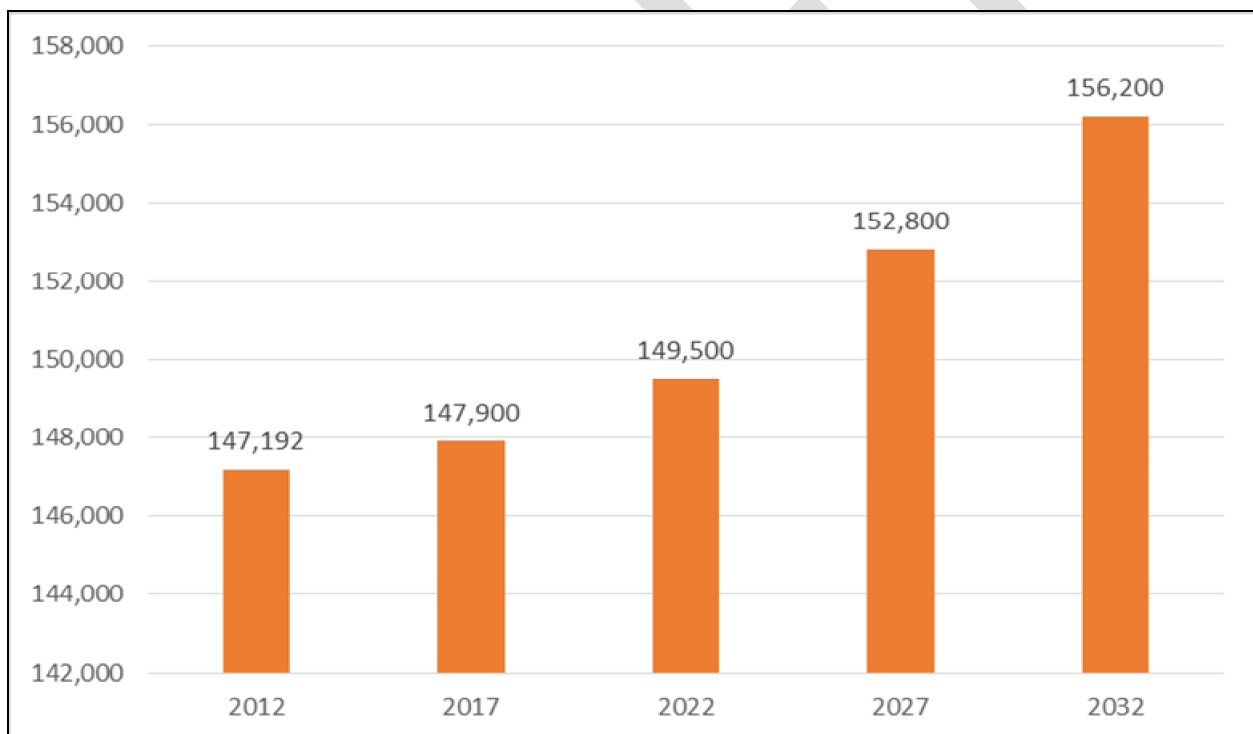


Rank	Municipality	2009 Population
2	Sparta, Township of	19,225
3	Hopatcong, Township of	15,518
4	Wantage, Township of	11,600
5	Byram, Township of	8,477
6	Hardyston, Township of	8,325
7	Newton, Town of	8,123
8	Andover, Township of	6,533
9	Frankford, Township of	5,594
10	Hampton, Township of	5,126

Source: New Jersey Department of Labor and Workforce Development 2011

Over the next fifteen years, from 2017 to 2032, Sussex County has a projected population growth of 5.6% percent. Based on New Jersey Department of Labor population projections, the County population is expected to reach 147,900 by 2017 and 156,200 by 2032 (Figure 4-10).

Figure 4-10. Sussex County Population Projections, 2012 to 2032



Source: New Jersey Department of Labor and Workforce Development 2014

Table 4-6. Population Trends in Sussex County by Municipality

Municipality	2000 Census	2010 Census	Change in Population	Percent (%) Population Change
Andover borough	658	606	-52	-7.90%
Andover township	658	606	-52	4.74%



Municipality	2000 Census	2010 Census	Change in Population	Percent (%) Population Change
Branchville borough	6,033	6,319	286	-0.47%
Byram township	845	841	-4	1.16%
Frankford township	8,254	8,350	96	2.68%
Franklin borough	5,420	5,565	145	-2.23%
Fredon township	5,160	5,045	-115	20.17%
Green township	2,860	3,437	577	11.83%
Hamburg borough	3,220	3,601	381	5.54%
Hampton township	3,105	3,277	172	5.12%
Hardyston township	4,943	5,196	253	33.09%
Hopatcong borough	6,171	8,213	2,042	-4.66%
Lafayette township	15,888	15,147	-741	10.35%
Montague township	2,300	2,538	238	12.75%
Newton town	3,412	3,847	435	-3.00%
Ogdensburg borough	8,244	7,997	-247	-8.64%
Sandyston township	2,638	2,410	-228	9.48%
Sparta township	1,825	1,998	173	9.08%
Stanhope borough	18,080	19,722	1,642	0.73%
Stillwater township	3,584	3,610	26	-3.94%
Sussex borough	4,267	4,099	-168	-0.70%
Vernon township	2,145	2,130	-15	-3.01%
Walpack township	24,686	23,943	-743	-60.98%
Wantage township	41	16	-25	9.35%

Source: New Jersey State Data Center 2010

Between 2000 and 2010, a majority of the County's municipalities experienced an increase in population. However, population losses were reported in Branchville, Sussex, Walpack, Andover Borough, Franklin, Stillwater, Ogdensburg, Newton, Hopatcong and Vernon. These losses are, however, offset by growth in all other municipalities, the majority of which was in Hardyston, Sparta and Wantage. Hardyston Township experienced the largest increase in population (33.09%) and Walpack Township experienced the largest decrease in population (-60.98%).

4.3 GENERAL BUILDING STOCK

The 2000 U.S. Census data identified 50,831 households (56,528 housing units) in Sussex County. The 2010 U.S. Census data identified 54,752 households (62,057 housing units) in Sussex County. The County experienced an increase in both households and housing units from 2000 to 2010. As for households, between 2000 and 2010, the County saw a 7.7% increase. As for housing units, the County experienced an increase of 9.8% between 2000 and 2010. The U.S. Census 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. Therefore, you may have more than one household per housing unit. The median price of an owner-occupied home in Sussex County was estimated at \$285,800 (U.S. Census, 2013).



For this update, the default general building stock in HAZUS-MH was updated and replaced with a custom building inventory for Sussex County, both at the aggregate and structure level. The building stock update was performed using the most current parcel and tax assessment data provided by the Sussex County and the NJ Department of the Treasury. The estimated replacement cost value for each structure was calculated using this data and 2015 RS Means valuations. For the purposes of this plan, there are approximately 61,026 structures identified in the County. The estimated replacement cost for the County is approximately \$31.6 billion. Estimated content value was calculated by using 50-percent of the residential improvement value, and 100-percent of the non-residential improvement values. Actual content value varies widely depending on the usage of the structure. Approximately 91.5-percent of the total buildings in the County are residential, which make up approximately 82.2-percent of the building stock structural value associated with residential housing. Table 4-7 presents building stock statistics by occupancy class for Sussex County.

The 2009-2013 American Community Survey for Sussex County identified that the majority of housing units (41.9%) in Sussex County are one-unit detached units. The 2013 U.S. Census Bureau's County Business Patterns data identified 3,267 business establishments employing 31,594 people in Sussex County. The construction industry has the most number of establishments in the County, with 502 establishments. This is followed by the retail trade industry with 408 establishments, and other services (except public administration) with 381 establishments (U.S. Census, 2013).

Figure 4-11 through Source: Sussex County; NJ Department of the Treasury 2015

Figure 4-13 show the distribution and exposure density of residential, commercial and industrial buildings in Sussex County. Exposure density is the dollar value of structures per unit area, including building content value. The densities are shown in units of \$1,000 (\$K) per square mile. Viewing exposure distribution maps, such as Figure 4-11 through Source: Sussex County; NJ Department of the Treasury 2015

Figure 4-13, can assist communities in visualizing areas of high exposure and in evaluating aspects of the study area in relation to the specific hazard risks.



Table 4-7. Number of Buildings and Improvement Value by Occupancy Class

Municipality	All Occupancies				Residential		Commercial		Industrial	
	Count	Replacement Cost Value	Estimated Contents	Total (Structure + Contents)	Count	Total (Structure + Contents)	Count	Total (Structure + Contents)	Count	Total (Structure + Contents)
Borough of Andover	257	\$110,720,294	\$71,842,600	\$182,562,894	193	\$116,633,081	53	\$56,079,224	1	\$1,632,812
Township of Andover	2,248	\$797,432,934	\$462,439,156	\$1,259,872,091	2,015	\$1,004,981,334	126	\$122,658,441	12	\$20,000,461
Borough of Branchville	353	\$105,787,947	\$68,530,522	\$174,318,470	284	\$111,772,276	55	\$51,386,553	0	\$0
Township of Byram	3,401	\$1,001,139,850	\$542,264,614	\$1,543,404,464	3,217	\$1,376,625,709	101	\$77,729,746	3	\$4,898,436
Township of Frankford	2,716	\$1,028,566,798	\$624,677,847	\$1,653,244,645	2,330	\$1,211,666,853	96	\$136,088,723	7	\$12,609,468
Borough of Franklin	1,630	\$555,083,580	\$326,633,635	\$881,717,214	1,454	\$685,349,835	113	\$128,851,782	10	\$16,407,323
Township of Fredon	1,236	\$524,017,917	\$318,153,210	\$842,171,127	1,050	\$617,594,123	32	\$37,554,664	5	\$8,164,060
Township of Green	1,280	\$617,892,936	\$344,490,322	\$962,383,257	1,153	\$820,207,842	22	\$21,278,642	2	\$3,265,624
Borough of Hamburg	1,464	\$478,777,394	\$268,230,009	\$747,007,403	1,367	\$631,642,153	71	\$95,284,515	2	\$3,265,624
Township of Hampton	2,143	\$898,127,786	\$500,329,547	\$1,398,457,332	1,945	\$1,193,394,718	63	\$62,979,318	1	\$1,632,812
Township of Hardyston	3,731	\$1,058,804,064	\$593,695,837	\$1,652,499,901	3,492	\$1,395,324,682	119	\$118,634,650	27	\$46,114,752
Borough of Hopatcong	6,378	\$1,459,447,874	\$764,642,534	\$2,224,090,408	6,199	\$2,084,416,023	86	\$78,652,359	1	\$1,632,812
Township of Lafayette	1,020	\$484,326,532	\$318,063,358	\$802,389,890	762	\$498,789,524	52	\$57,235,196	17	\$24,420,844
Township of Montague	1,972	\$550,631,281	\$307,800,350	\$858,431,631	1,820	\$728,492,793	50	\$43,829,062	6	\$9,876,075
Town of Newton	2,320	\$926,551,970	\$577,488,833	\$1,504,040,803	1,991	\$1,047,189,412	236	\$337,048,692	10	\$24,492,180
Borough of Ogdensburg	915	\$250,464,374	\$139,570,078	\$390,034,452	846	\$332,682,886	33	\$30,043,484	4	\$6,610,451
Township of Sandyston	1,136	\$359,643,031	\$229,219,539	\$588,862,570	912	\$391,270,476	50	\$44,661,616	6	\$8,642,549
Township of Sparta	7,447	\$3,083,993,131	\$1,647,607,612	\$4,731,600,744	6,980	\$4,309,156,557	290	\$220,551,680	38	\$62,046,857
Borough of Stanhope	1,468	\$557,098,000	\$302,686,778	\$859,784,777	1,391	\$763,233,667	53	\$67,828,244	5	\$11,429,684
Township of Stillwater	1,871	\$581,254,607	\$350,557,350	\$931,811,957	1,635	\$692,091,769	39	\$44,743,004	0	\$0



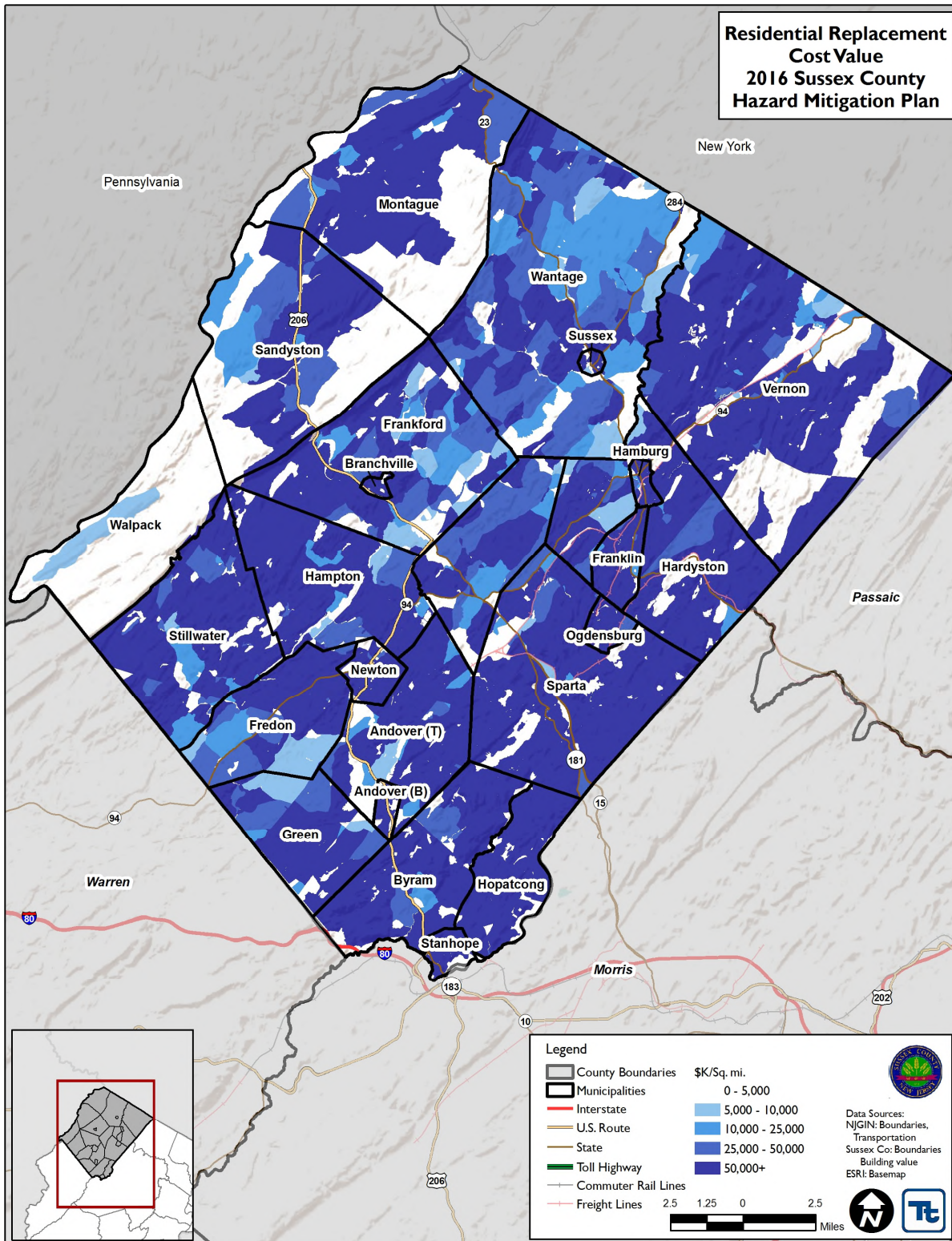
Section 4: County Profile

Municipality	All Occupancies				Residential		Commercial		Industrial	
	Count	Replacement Cost Value	Estimated Contents	Total (Structure + Contents)	Count	Total (Structure + Contents)	Count	Total (Structure + Contents)	Count	Total (Structure + Contents)
Borough of Sussex	579	\$259,651,457	\$165,026,376	\$424,677,833	468	\$283,875,243	65	\$88,319,473	3	\$4,898,436
Township of Vernon	11,280	\$3,063,072,948	\$1,696,315,752	\$4,759,388,700	10,777	\$4,100,271,588	293	\$425,846,569	23	\$44,156,227
Township of Walpack	25	\$8,710,816	\$7,382,442	\$16,093,258	8	\$3,985,123	1	\$1,948,912	0	\$0
Township of Wantage	4,156	\$1,396,272,081	\$853,886,798	\$2,250,158,879	3,551	\$1,627,155,850	125	\$122,725,740	2	\$3,265,624
Sussex County Total	61,026	\$20,157,469,603	\$11,481,535,099	\$31,639,004,702	55,840	\$26,027,803,514	2,224	\$2,471,960,289	185	\$319,463,115

Source: Sussex County; NJ Department of the Treasury 2015



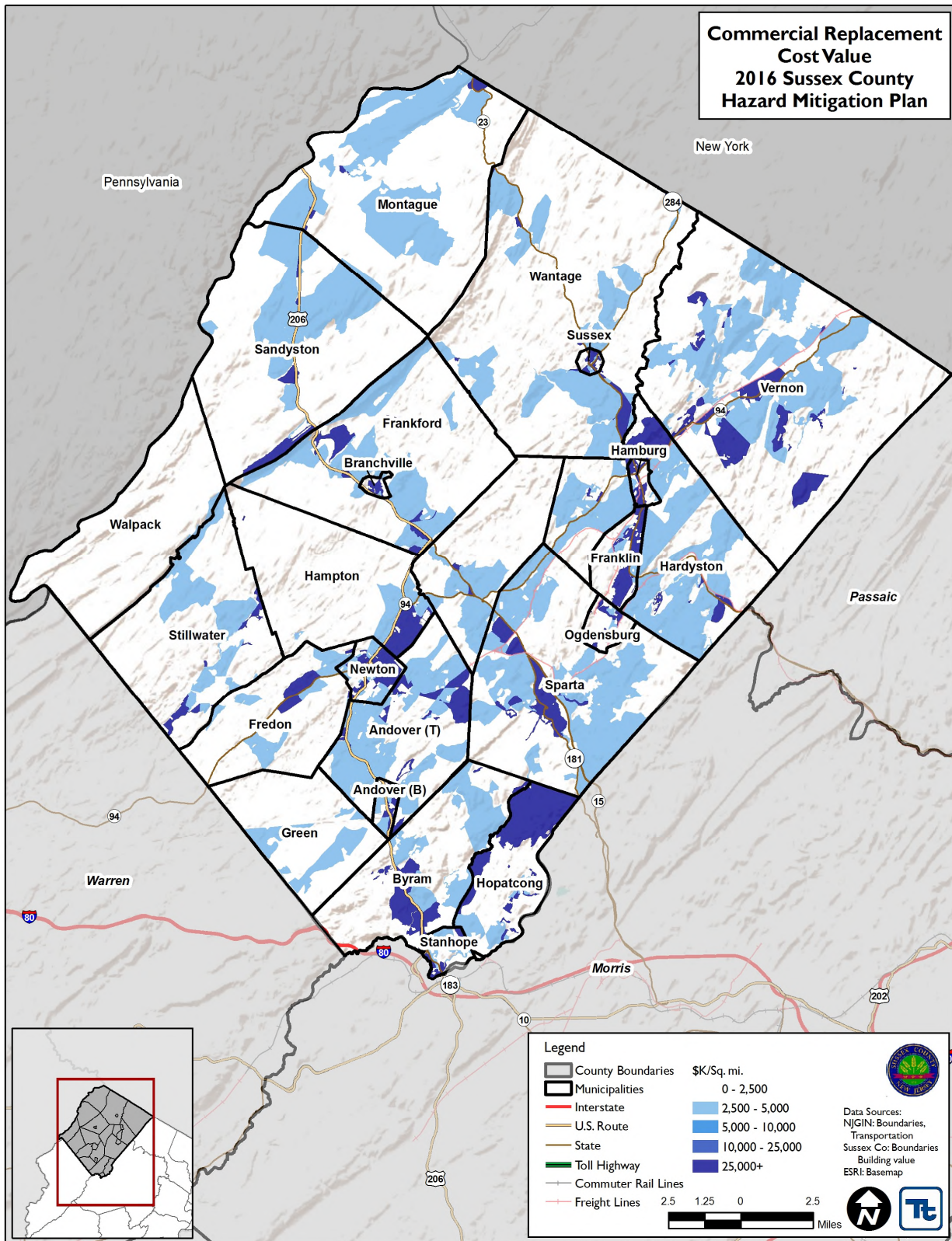
Figure 4-11. Distribution of Residential Building Stock and Value Density in Sussex County



Source: Sussex County; NJ Department of the Treasury 2015



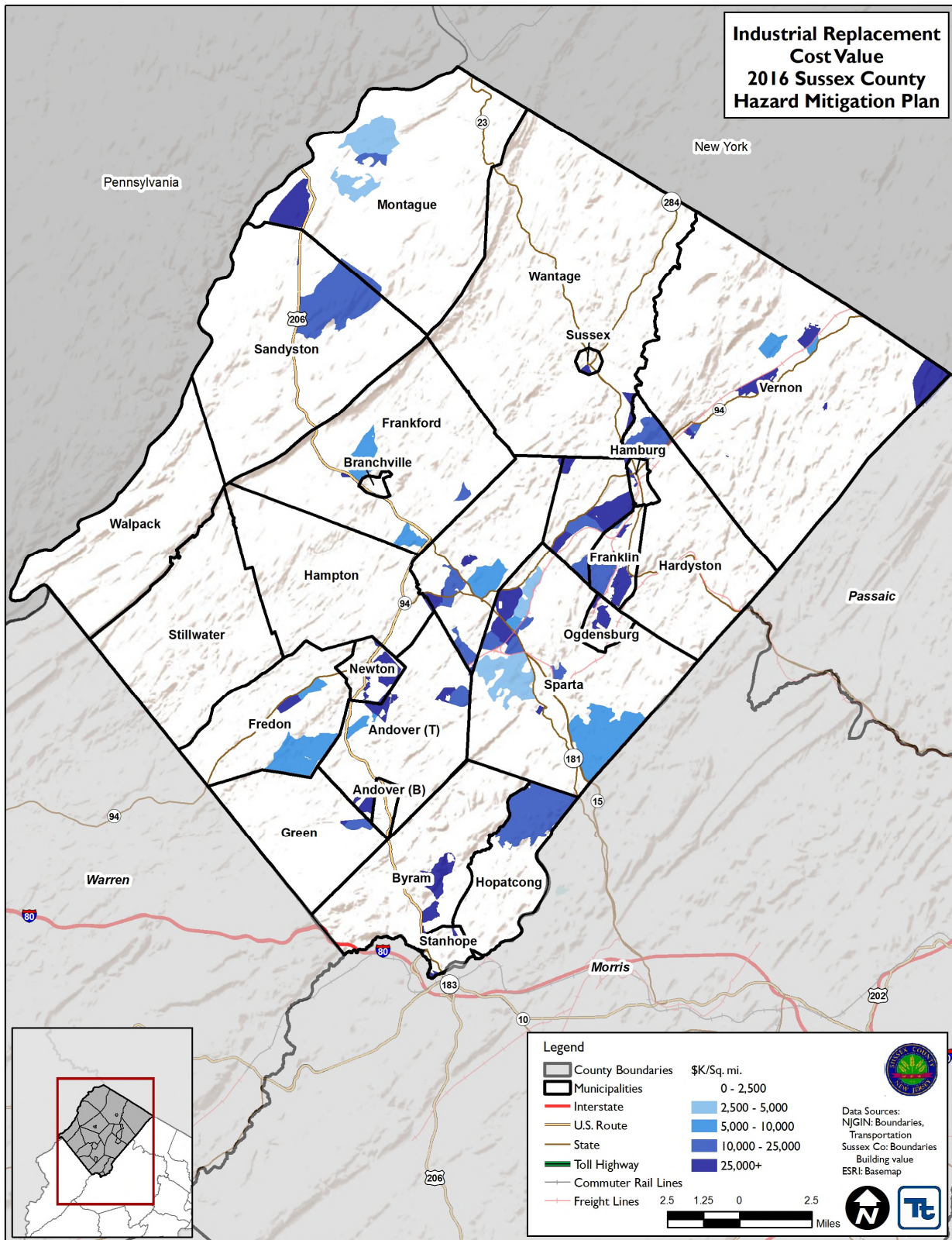
Figure 4-12. Distribution of Commercial Building Stock and Exposure Density in Sussex County



Source: Sussex County; NJ Department of the Treasury 2015



Figure 4-13. Distribution of Industrial Building Stock and Value Density in Sussex County



Source: Sussex County; NJ Department of the Treasury 2015



4.4 ECONOMY

As discussed in the Local Mitigation Handbook, after a natural hazard event, economic resiliency drives recovery. An understanding of the major employers and economic sectors in the County whose losses or inoperability would impact the community and its ability to receive from a disaster is essential.

Sussex County's early industry and commerce was chiefly centered on agriculture, milling, and iron and zinc mining. The local economy expanded due to the introduction of the railroads, which helped the development of factories following the Civil War and continuing to the 1960s. While manufacturing in the County has declined since 2000 and earlier, the County is still home to several manufacturers including Ames Rubber Corp, a manufacturer of molded components, protective coatings, and dispensed gaskets for high-tech applications and ThorLabs, a manufacturer of high-tech components for the laser and fiber optics industry. Today, the fastest growing sectors of the economy are tourism and recreation. The industries represented by the ten largest employers include recreation, healthcare, retail, education and government (Sussex County Strategic Growth Plan Update 2014).

Table 4-8. Top Ten Sussex County Employers

Employer	Location	Employment	Industry
Crystal Springs Golf and Spa Resort	Vernon/Hardyston	2,000	Recreation
Newton Medical Center	Newton	1,200	Healthcare
Selective Insurance	Branchville	900	Insurance
Mountain Creek Resort	Vernon	800	Recreation
County of Sussex	Newton	500	Government
Ames Rubber Corp.	Hamburg	445	Manufacturing
Shop Rite Supermarkets	Newton	301	Retail
Andover Subacute and Rehab Center	Andover	300	Healthcare
Sussex County Community College	Newton	300	Education
Raider Express	Andover	250	Trucking/Logistics

Source: Sussex County Strategic Growth Plan Update 2014

According to the 2014 Update of the County Strategic Growth Plan, the largest employment sector in Sussex County is Education & Healthcare, followed by Trade, Transportation, & Utilities, and Leisure & Hospitality. Sussex County appears to be under-represented in its share of employment in higher-paying industries such as Information, Financial Activities, and Business & Professional Services. These industries are typically considered export-based industries that bring money into the region and have a wealth creating impact on the local economy. The County is over-represented in lower paying industries such as Education & Healthcare, Leisure & Hospitality, and Personal Services. These industries are considered non-basic industries, and except for Leisure & Hospitality, do not bring money into the local economy and as a result have smaller multiplier impacts on the local economy (Sussex County Strategic Growth Plan Update 2014).

Sussex County employment has decreased in a majority of the industry sectors since 2000 with the exception of Education and Healthcare (25.8%), Leisure and Hospitality (28.5%), and Other Services (47.7%). All other industries are below their 2000 employment levels, with many industries significantly below, including Information (55.1%), Manufacturing (21.2%), and Professional & Business Services (20.8%) (Sussex County Strategic Growth Plan Update 2014).



4.5 DEVELOPMENT TRENDS AND NEW DEVELOPMENT

An understanding of population and development trends can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place to protect human health and community infrastructure. DMA 2000 requires that communities consider land use trends, which can impact the need for, and priority of, mitigation options over time. Land use and development 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.

Local zoning and planning authority is provided for under the New Jersey Municipal Land Use Law, which gives municipalities zoning and planning authority. Refer to Sections 6 and 9 for further details on the planning and regulatory capabilities for the County and each municipality.

In the County, the Economic Development Partnership (SCEDP) facilitates the recruitment, retention, and expansion of businesses that will complement and be consistent with the character and environment of the County. Additionally, the Sussex County Planning Board is responsible for approving site plan and subdivision applications within their jurisdiction. A development review committee reviews all applications and acts on behalf of the Planning Board.

Potential future development in the next five years, as identified by each municipality, is noted in the following table and figure. Refer to Section 9 which evaluates the potential new development exposure to natural hazards.



Table 4-9. Potential New Development in Sussex County

Municipality	Property Name	Type	Number of Structures	Address/Block and Lot	Description/Status
Township of Byram	CVS Pharmacy (redevelopment)	Commercial	One	77 Route 206	CVS Pharmacy, demolition of old bldg. underway in prep. to build new CVS underway
Township of Byram	JTK Construction	Commercial	One + outside equipment storage	9 Lackawanna Drive	No date for construction of new building; heavy equip. stored on site
Township of Byram	Venture II (redevelopment)	Commercial	Small strip mall	9 Route 206	Site work begun; project to be revised.
Township of Byram	Village Center Zone	Mixed use	c. 130 homes; c.90,000sf comm.	Corner of Route 206 and Lackawanna Dr.	In Master Plan and governed by Village Center and Smart Growth ordinances; no developer yet.
Township of Byram	Jones Lane Recreational Fields within Tamarack Park	On Twp. open space.	Ballfields; parking.	12 Jones Lane	Planning complete; construction planned for fall 2015.
Township of Frankford	North Plains Holding / Wingles	Commercial	1	749 Route 565	Constructed and Occupied
Township of Frankford	Sussex Commons	Commercial	TBD	Ross' Corner (Route 206 / Route 565)	Site Plans Approved; State approved
Township of Frankford	Township Fire House	Emergency Response	1	390 Route 206 North B: 82 L: 7	Approved; In Progress – clearing land
Township of Frankford	Waste Water Treatment Plant for Branchville	WWTP	Multiple	Route 206	Site located in Township but actually owned/operated by Branchville and County
Township of Frankford	Bentley Assisted Living	Residential	20 units	3 Phillips Road	Approved; not started
Township of Frankford	911 Call Center	Government	1	135 Morris Tpke, Newton	Completed 2014
Borough of Franklin	Auto-Zone	Commercial	1	RT. 23	Completed
Borough of Franklin	Walgreens	Commercial	1	Rt. 23	Completed
Borough of Franklin	S.T.S. Tire store	Commercial	1	Rt. 23	Completed
Borough of Franklin	Taco Bell	Commercial	1	RT. 23	95 % complete
Township of Green	Airport Road	Commercial	3	Airport Road Block 31 Lots 1.06, 1.08, 1.09	Lot 1.08 under construction



Table 4-9. Potential New Development in Sussex County

Municipality	Property Name	Type	Number of Structures	Address/Block and Lot	Description/Status
Township of Green	Hackettstown-Andover 12" Gas Line	Utility	–	Route 517	Gas Main
Township of Green	Airport Road	Commercial	3	Airport Road Block 31 Lots 1.06, 1.08, 1.09	Lot 1.08 under construction
Township of Green	Hackettstown-Andover 12" Gas Line	Utility	–	Route 517	Gas Main
Borough of Hamburg	Fairways at Wallkill	Residential	68	G/B Castle Road Block 11 Lot 30 and Block 11.01 Lot 1	On going
Township of Hampton	McGuire Chevrolet	Commercial	1	63 Hampton House Road	Complete
Township of Hampton	Lowe's – Block 3501, Lot 37	Commercial	1 or 2	39 Hampton House Road Lot/Lots in Front of Current Lowe's Store, Block 3501, Lot 37	Vacant
Township of Hampton	Hampton House Realty 3501, Lots 32,34, 35	Commercial	At Least 1	32-35 Hampton House Road	DEP Clean-up Almost Complete
Township of Hampton	Ephemeral Realty	Commercial	1	98 Hampton House Road 3602/5.03	Vacant. Approval granted for Commercial Bldg. Unknown
Township of Hampton	Stone Rows at Halsey Station	Residential	20	Block 2602/ Lots 2.03, 2.04, 2.06, 2.07, 2.08, 2.09, 2.10, 2.13, 2.14, 2.16, 2.17	Lots Available for Sale
Township of Hardyston	Crystal Springs-Shotmeyer	Single Family	38	Coventry, Woodcott, Tarrington	Under construction
Township of Hardyston	Crystal Springs – Shotmeyer	Multi-Family	1 (18 Units)	Tarrington Road	Under construction
Township of Hardyston	Emerald Estates	Single Family	4	Emerald Drive/Ruby Court	Under construction
Township of Hardyston	Estell Manor	Single Family	3	Estell Drive	Under construction
Township of Hardyston	Crystal Springs – Balmorale	Single Family	2	Exeter Lane/Sutton Court	Under construction
Township of Hardyston	Ridgefield Commons	Single Family-Townhouse	8	Brookview	Under construction
Township of Hardyston	Brecia Farms	Single Family – Townhomes	2	Anthony Lane/Davon Court	Under Construction



Table 4-9. Potential New Development in Sussex County

Municipality	Property Name	Type	Number of Structures	Address/Block and Lot	Description/Status
Township of Hardyston	Crystal Springs-Shotmeyer	Single Family	50	Coventry, Woodcott, Tarrington	Under construction (approved 117 single family, 141 condos, 22 townhomes)
Township of Hardyston	Crystal Springs – Shotmeyer	Multi-Family	1 (18 Units)	Tarrington Road	Under construction
Township of Hardyston	Emerald Estates	Single Family	25	Emerald Drive/Ruby Court	Under construction (29 lot subdivision)
Township of Hardyston	Estell Manor	Single Family	17	Estell Drive	Under construction (20 lot subdivision)
Township of Hardyston	Crystal Springs – Balmorale	Single Family	15	Exeter Lane/Sutton Court	Under construction (28 lot subdivision)
Township of Hardyston	Ridgefield Commons	Single Family-Townhouse	172	Virginia, Highview, Brookview	Under construction (303 planned unit development)
Township of Hardyston	Brecia Farms	Single Family	18	Anthony Lane/Davon Court	Under construction (20 lot subdivision)
Borough of Hopatcong	Atkins/Hopatcong LLC	Residential	35 Units	16 Lawrie Road	Borough Approval-Waiting DEP
Borough of Hopatcong	Greentree at Hopatcong LLC	Residential and Commercial	15 Units/4,660 Residential	446 River Styx Road	Being Built
Borough of Hopatcong	Airport Road Properties	Commercial	2 Warehouses	6 Sparta-Stanhope Road	Borough Approval
Borough of Hopatcong	Greentree at Hopatcong LLC	Residential	9 Units	468 River Styx Road	Borough Approval
Township of Lafayette	Advanced Housing Group Home	Residential	20 Units	10-12 Route 94	Completed
Township of Lafayette	Restaurant / Market w/ waste water treatment plant	Commercial	3 structures	37 Route 15	Approved
Township of Lafayette	Carson Industries	Light Industrial	13 unit	173-175 Route 94	Approved
Township of Sparta	Roundtop at Sparta	Residential	124	Woodport Road	100% complete
Township of Sparta	Chapel Hill	Residential	30	Father John's Lane	90% complete
Township of Sparta	Jersey Investors	Commercial	4	Town Center Drive	75% complete
Township of Sparta	Windsor Lake	Residential	NEED INFO	NEED INFO	NEED INFO



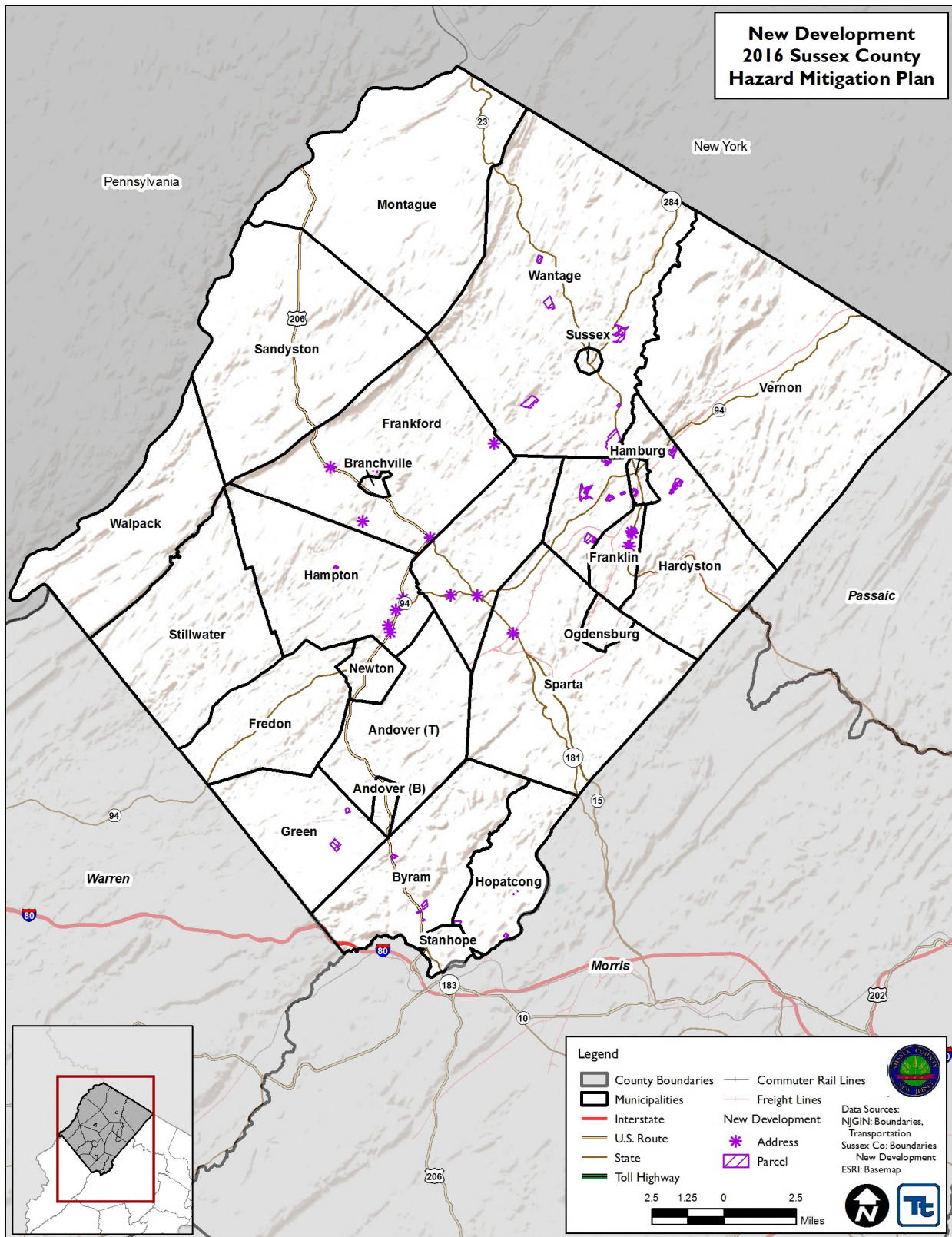
Table 4-9. Potential New Development in Sussex County

Municipality	Property Name	Type	Number of Structures	Address/Block and Lot	Description/Status
Township of Sparta	North Village	Mixed-Use	100+ Residence/8 Commercial	Rt. 15 North	Site Plan Approval
Township of Sparta	Millrace Village	Residential	54 Units	Glen Road	Site Plan Prelim
Township of Vernon	Mountain Creek Day Lodge	Commercial		Provide address or block and lot	
Township of Vernon	Urgent Care Center	Medical		Provide address or block and lot	
Township of Vernon	KDC Solar	Utility		Provide address or block and lot	
Township of Vernon	Theta 456	Residence		Provide address or block and lot	
Township of Vernon	CVS Pharmacy	Commercial		Provide address or block and lot	
Township of Wantage	Jared Builders	Residential	40	Libertyville Road	Approved; partially developed
Township of Wantage	Bicsak Site	Mixed	-	Blair Road	Conceptual
Township of Wantage	Lang	Residential	4	Ramsey Road	Approved
Township of Wantage	LGR Enterprises	Residential	11	Sherman Ridge Rd	Approved
Township of Wantage	Toll	Residential	38	Sterling Drive; Flagstone Hill Road	Developed
Township of Wantage	Christian Leone	Residential	15		Approved
Township of Wantage	Town Center At Wantage	Mixed	43	Route 23	Approved; phased development

Source: Planning Committee



Figure 4-14. Potential New Development in Sussex County



Source: Sussex County





4.6 CRITICAL FACILITIES

Critical and essential facilities are necessary for a community's response to and recovery from natural hazard events. A comprehensive inventory of critical facilities in Sussex County was developed from various sources including the Sussex County Office of Emergency Management, Sussex County Division of Planning and individual municipalities and used for the risk assessment in Section 5.

The inventory developed for the HMP update is considered sensitive information. It is protected by the Protected Critical Infrastructure Information (PCII) program and under New Jersey Executive Order 21. Therefore individual facility names and addresses are not provided in this HMP. A summary of the facility types used for the risk assessment are presented further in this section.

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, EOCs, schools, shelters, senior facilities and medical facilities.

Emergency Facilities are for the purposes of this Plan, emergency facilities include police, fire, emergency medical services (EMS) and emergency

4.6.1 Essential Facilities

This section provides information on emergency facilities, hospital and medical facilities, schools, shelters and senior care and living facilities. Figure 4-15 illustrates the inventory of these essential facilities in Sussex County.

Emergency Facilities

For the purposes of this Plan, emergency facilities include police, fire, emergency medical services (EMS) and emergency operations centers (EOC). The County has a highly coordinated and interconnected network of emergency facilities and services at the county and municipal level. The Sussex County Sheriff Department's Division of Emergency Management serves as the primary coordinating agency between local, state and federal agencies. In response to an emergency event, the Division will work with county and municipal health agencies and healthcare providers, emergency facilities and the County Sheriff's Office to provide aid to residents of the County.

Each municipality is responsible for maintaining its own fire department with the exception of Walpack Township. Andover Township, Byram Township, Franklin Borough, Hamburg Borough, Hardyston Township, Hopatcong Borough, Newton Town, Ogdensburg Borough, Sparta Township, Stanhope Borough, and Vernon Township all maintain their own police department and provide support to surrounding municipalities. All of the municipalities also maintain their own emergency medical service facilities with the exception of Andover Borough, Branchville Borough, Hamburg Borough, Hampton Township, Sandyston Township, Sussex Borough, and Walpack Township.

Overall, there are 12 enforcement facilities, 45 fire and emergency medical services facilities and 10 emergency operation centers in Sussex County.

Hospital and Medical Facilities

Sussex County has a dynamic health care industry that includes hospitals, adult day care centers, and long-term care facilities. The two major health centers in the County are Newton Memorial Hospital in Newton Town and Saint Claire's Hospital in Sussex Borough. Additionally, adult care and long-term care facilities are



located in Andover Borough, Andover Township, Hampton Township, Hopatcong Borough, Newton Town, and Sparta Township.

Schools

More than 50 schools, ranging from elementary to post-secondary education, service the county. Several municipalities have their own school systems, while several others are serviced by regional school districts. During an emergency event, many of these facilities can function as shelters. The primary higher education school in Sussex County is Sussex County Community College in Newton Town.

There is a total of 52 education facilities located in the County.

Shelters

There were 27 shelters identified within the County; many schools, community centers and municipal buildings could serve as a shelter during an emergency.

Senior Care and Living Facilities

It is important to identify and account for senior facilities, as they are highly vulnerable to the potential impacts of disasters. Understanding the location and numbers of these types of facilities can help manage effective response plan post disaster. There are 7 senior facilities located within the County.

Government Buildings

In addition to the facilities discussed, other county and municipal buildings and department of public works facilities are essential to the continuity of operations pre-, during and post-disasters. There are 49 government facilities located in the County.

4.6.2 Transportation Systems

One of the County's strongest assets is its transportation infrastructure. Air and land are available and major roadways include Interstate 80, State Routes 15, 23, 94, 181, and 284, and US Route 206. There are three private airports in the County, and 29 bus and park & ride locations. Figure 4-16 illustrates the transportation facilities in Sussex County.

Three organizations provide limited public transportation services within Sussex County, between the County and Morris County, and extended service to Newark and New York. New Jersey Transit (NJ Transit) provides bus and rail service for County residents. Sussex County Transit provides deviated fixed route and demand response service for the general public and paratransit mobility options for elderly or disabled residents. Lakeland Bus Lines, under contract with NJ Transit, provides service between Sussex County and adjacent counties as well as commuter service to Newark and New York. There are also private agencies in the County that provide transportation for their clients who are either elderly or disabled (Sussex County Ten-Year Mobility Study)

Bus Service

NJ Transit provides bus service to Sussex County residents. NJ Transit directly operates some of the services that they provide and contracts out to local providers for other services. NJ Transit provides one bus route in Sussex County through its Wheels program. The Sparta Diamond Express bus provides peak hour service between Sparta Township and Parsippany (Morris County) (Sussex County Ten-Year Mobility Study).

Lakeland Bus Lines, Inc. operates five routes that are available to County residents under contract by NJ Transit. Two of the five routes are operated inside Sussex County. One is a local circulator and the other is a



commuter service to New York City. The other three routes provide commuter service to New York City starting in Dover (Morris County) (Sussex County Ten-Year Mobility Study).

Sussex County Transit provides both fixed route and demand response services in the County. The fixed routes are open to the public but the demand response paratransit service is only available to senior citizens and persons with disabilities (Sussex County Ten-Year Mobility Study).

Rail Service

Rail service does not enter Sussex County; residents travel to Morris and Warren Counties to use rail service (Sussex County Ten-Year Mobility Study).

There are interstate highways located outside of Sussex County to the north and south, but within the County, the highways are primarily two-lane roads.

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Figure 4-15. Essential Facilities in Sussex County

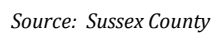
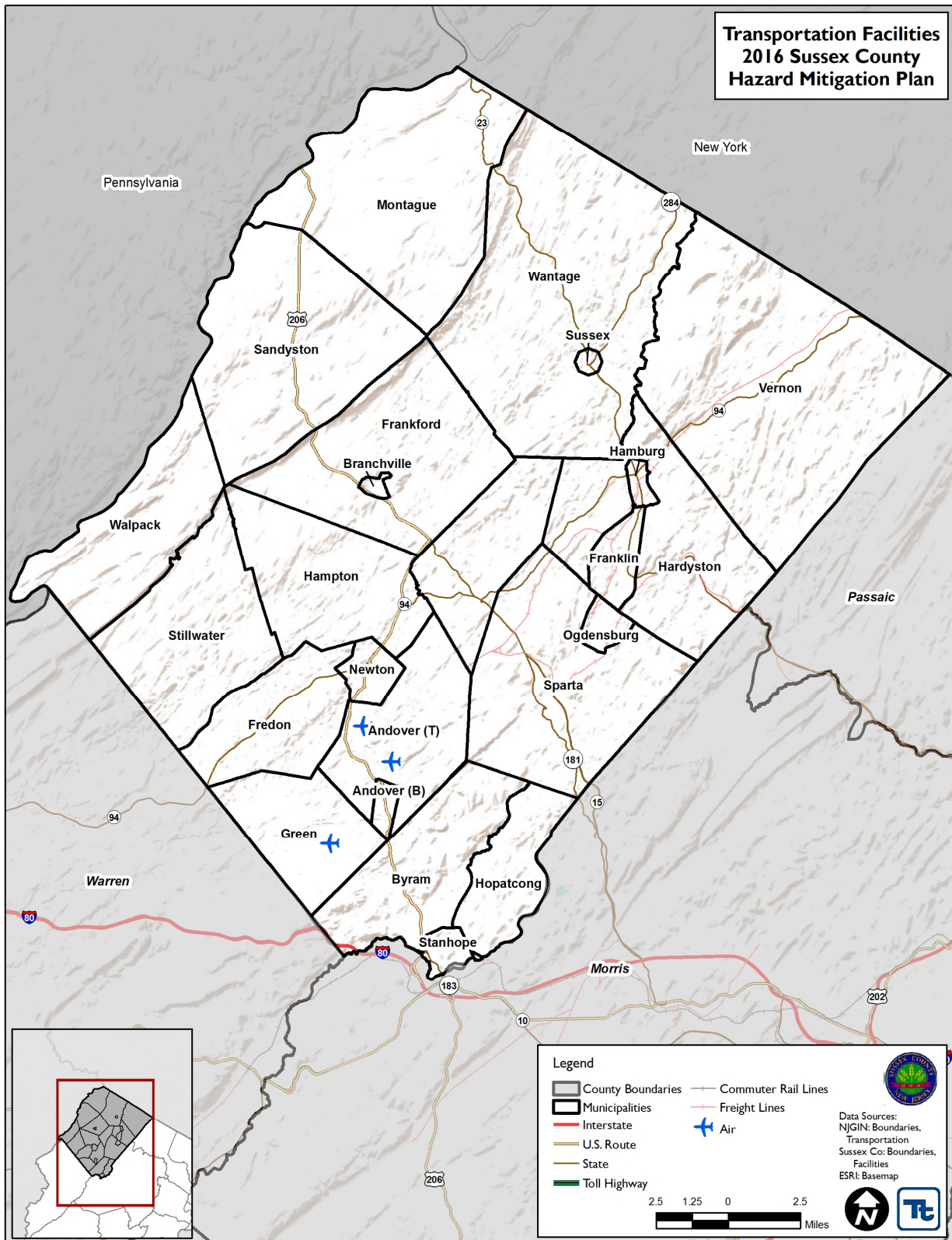




Figure 4-16. Transportation Facilities in Sussex County



Source: Sussex County





4.6.3 Lifeline Utility Systems

This section presents communication, potable water, wastewater, and energy resource utility system data. Due to heightened security concerns, local utility lifeline data sufficient to complete the analysis have only partially been obtained.

Communication

Sussex County has a network of communication facilities and cell towers. These facilities are controlled by both public and private institutions. The County identified 6 essential communication facilities identified in the County.

Potable Water

There are community water supply systems in Sussex County that serve municipalities and places with higher density development, and some lake communities. Twenty-one of the County's municipalities are partially or fully served by public water. The Townships of Lafayette, Sandyston, and Walpack do not have public water supply systems (Wastewater Management Plan 2015).

Approximately 95% of Sussex County residents rely on groundwater for consumption. It is pumped to County residents from aquifers through either private on-site wells, community wells, or municipal wells (Natural Resources Inventory 2014).

There are five surface water bodies that are used for potable water supply purposes in Sussex County:

- Morris Lake in Sparta Township – used by the Town of Newton
- Lake Rutherford in Wantage Township – used by the Borough of Sussex
- Branchville Reservoir in Frankford Township – used by the Borough of Branchville
- Franklin Pond in the Borough of Franklin – used by the Borough as an emergency water supply
- Lake Hopatcong – used as emergency water supply for several municipalities
- Canistear Reservoir in Vernon Township – located on the Newark water supply management lands
- Heaters Pond in Ogdensburg – used as an emergency water supply (Natural Resources Inventory 2014)

The County identified 7 potable water pumps and 3 wells as critical.

Wastewater Facilities

The Sussex County Municipal Utilities Authority (SCMUA) operates the largest sewer treatment plant, located in Hardyston Township, in Sussex County. SCMUA also operates other wastewater facilities in the County, including the Hampton Commons facility in Hampton Township. Additionally, the Town of Newton is the owner and operator of its own wastewater treatment plant. The Musconetcong Sewer Authority owns and operates a wastewater treatment plant located in Mount Olive (Morris County), which provides sewer service into Stanhope, Byram, and Hopatcong in Sussex County and portions of Morris County. There are smaller treatment plants located throughout the County that serve schools, commercial, and industrial sites. There are no combined sewers within Sussex County (Wastewater Management Plan 2015). There was 1 wastewater treatment plants and 12 wastewater pump station identified as critical within the County.

Table 4-10. Wastewater Districts, Franchise Areas and Municipalities

Wastewater Utility	Municipalities
Sussex County Municipal Utilities Authority	Andover Borough, Andover Twp., Branchville, Frankford, Franklin, Green,



	Hamburg, Hardyston, Lafayette, Montague, Ogdensburg, Sandyston, Sparta, Stillwater, Sussex, Vernon, Walpack, Wantage
Musconetcong Sewer Authority District	Byram, Hopatcong, Stanhope
Hardyston Township Municipal Utilities Authority	All of Hardyston Township, except Aqua NJ area
Town of Newton	Newton
Aqua NJ – Wallkill (owns Wallkill Sewer Company)	Portion of Hardyston Township
Andover Utility Company Inc.	Portion of Andover Township
Montague Sewer Company (owned by Utilities Inc.)	Portion of Montague
Vernon Township Municipal Utilities Authority	Portion of Vernon Township

Source: *Sussex County Wastewater Management Plan 2015*

Energy Resources

JCP&L is the primary electric and gas utility company in Sussex County with Sussex Rural Electric Cooperative also providing electric to many of the communities. A portion of the Susquehanna-Roseland line, owned by PSE&G, runs through Fredon, Andover Township, Byram, and Hopatcong in southern Sussex County (PSE&G). There were 7 electric substations identified by the County as critical. Figure 4-17 illustrates the location of the utility lifelines in Sussex County.

4.6.4 High-Potential Loss Facilities

High-potential loss facilities include dams, levees, chemical storage facilities and military installations. Figure 4-18 displays the general locations of these facilities in the County. Dams are discussed further below.

According to the New Jersey Department of Environmental Protection (NJDEP), there are four hazard classifications of dams in New Jersey. The classifications relate to the potential for property damage and/or loss of life should the dam fail:

- Class I (High-Hazard Potential) - Failure of the dam may result in probable loss of life and/or extensive property damage
- Class II (Significant-Hazard Potential) - Failure of the dam may result in significant property damage; however loss of life is not envisioned.
- Class III (Low-Hazard Potential) - Failure of the dam is not expected to result in loss of life and/or significant property damage.
- Class IV (Small-Dam Low-Hazard Potential) - Failure of the dam is not expected to result in loss of life or significant property damage.

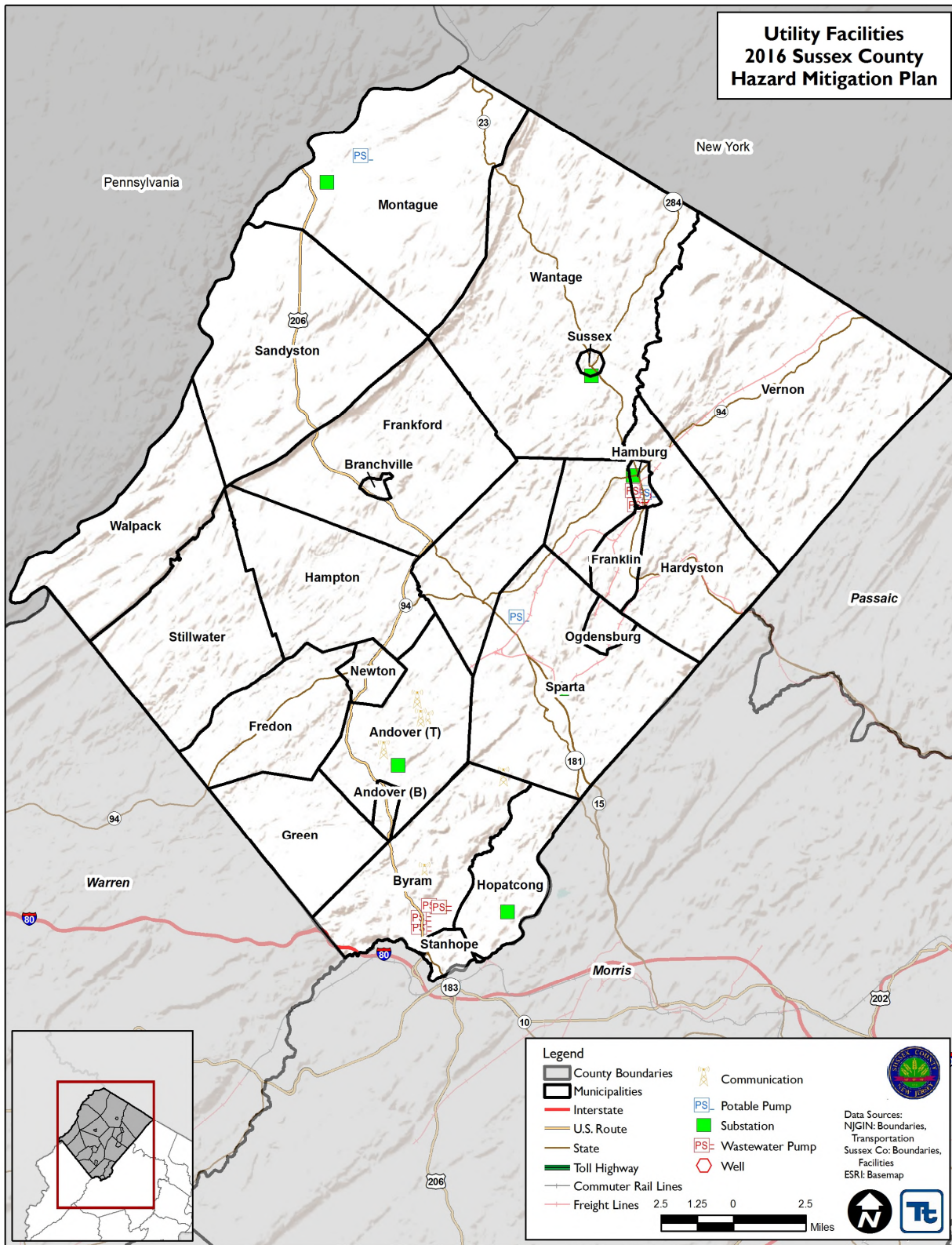
According to the NJDEP Bureau of Dam Safety, there are 263 dams located in Sussex County, 37 of which are classified with a high-hazard potential.

4.6.5 Other Facilities

The Planning Committee identified additional facilities (user-defined facilities) as critical. These facilities include 1 correctional facility and 1 public health facility. Figure 4-19 illustrates the general locations of these facilities in the County.



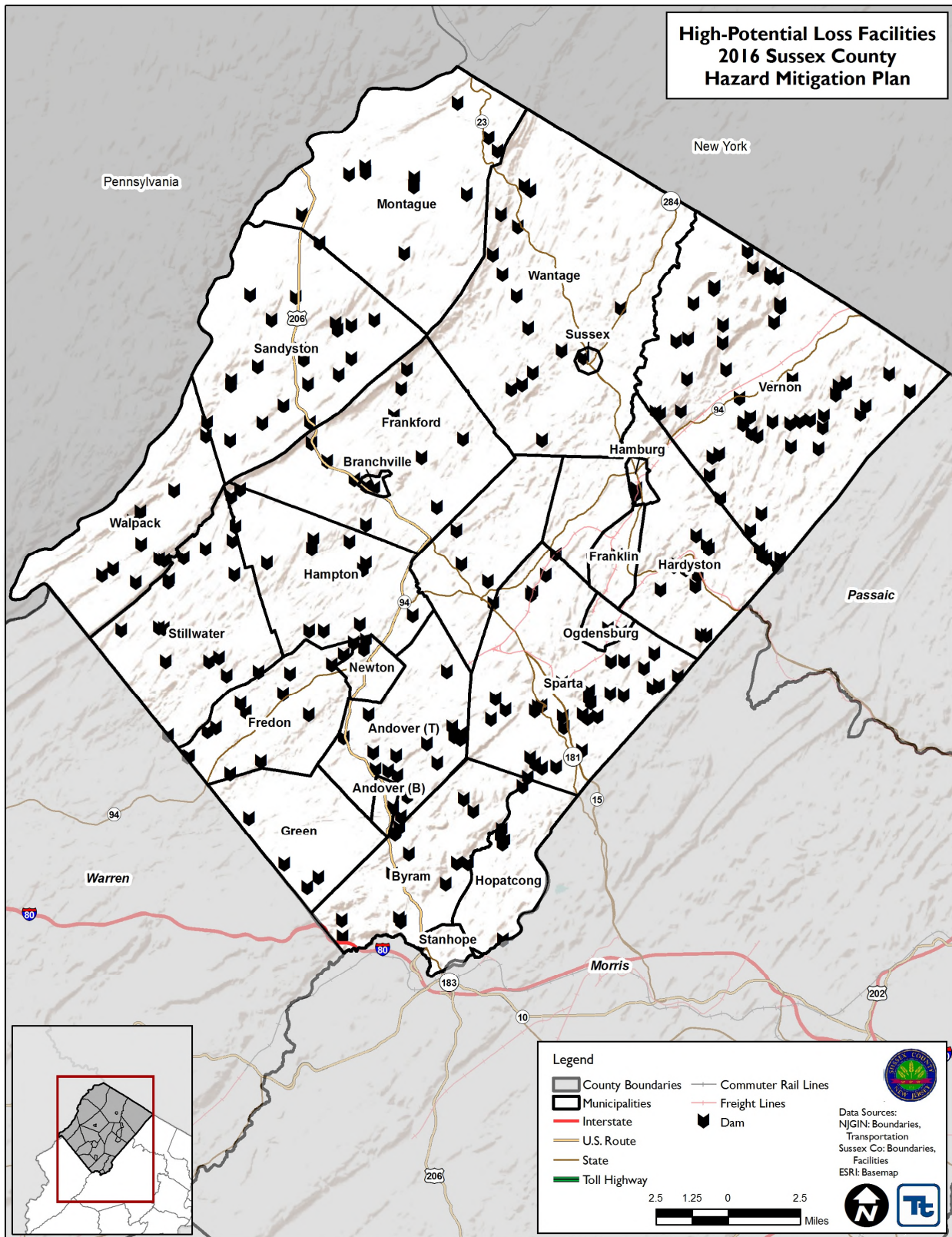
Figure 4-17. Utility Lifelines in Sussex County



Source: Sussex County



Figure 4-18. High-Potential Loss Facilities in Sussex County

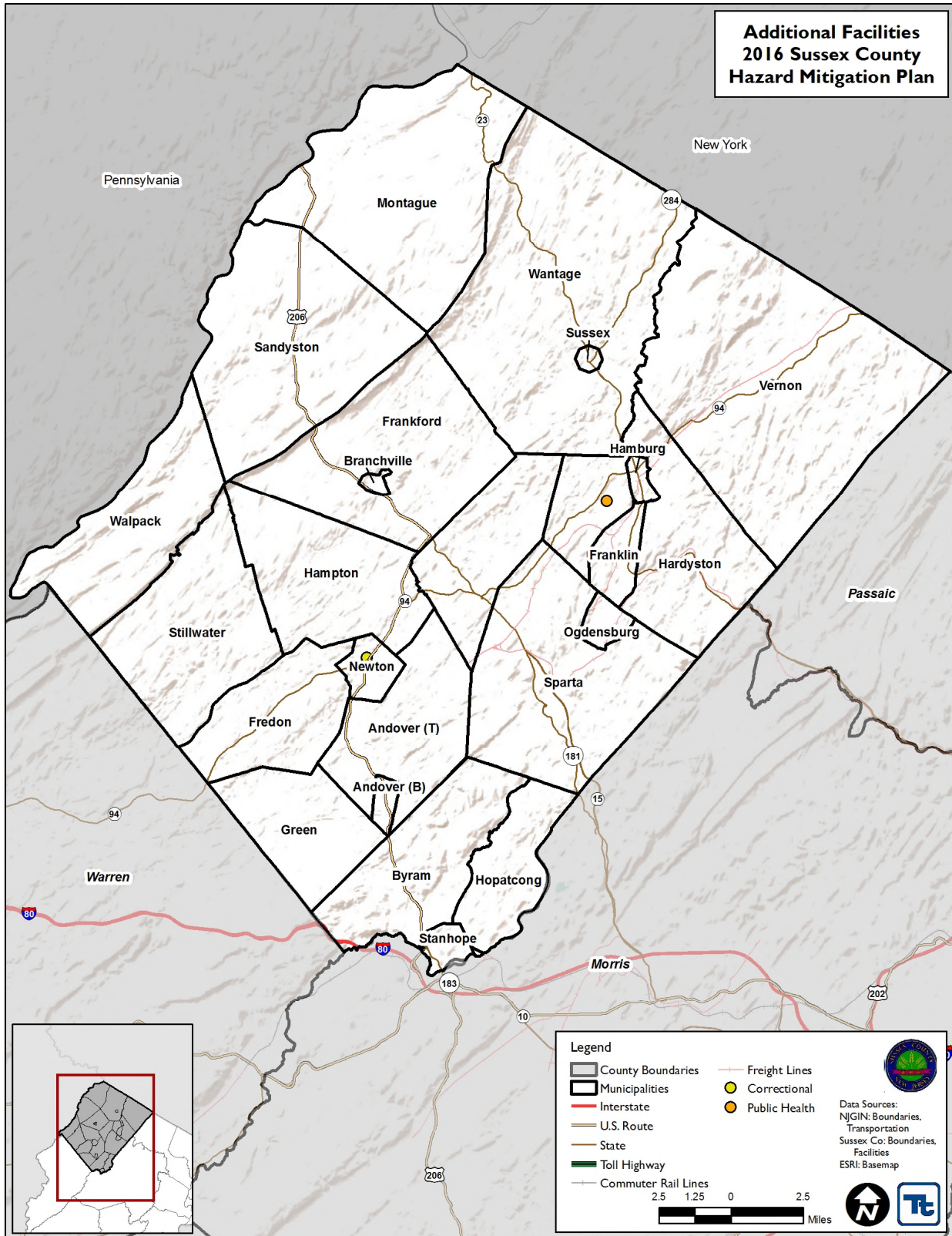


Source: Sussex County





Figure 4-19. Other Facilities in Sussex County



Source: Sussex County





5.1 METHODOLOGY AND TOOLS

This section describes the methodology and tools used to support the risk assessment process.

5.1.1 Methodology

The risk assessment process used for this Plan is consistent with the process and steps presented in FEMA 386-2, State and Local Mitigation Planning How-to-Guide, Understanding Your Risks – Identifying Hazards and Estimating Losses (FEMA, 2001). This process identifies and profiles the hazards of concern and assesses the vulnerability of assets (population, structures, critical facilities and the economy) at risk in the community. A risk assessment provides a foundation for the community's decision makers to evaluate mitigation measures that can help reduce the impacts of a hazard when one occurs (Section 9 of this plan).

Step 1: The first step of the risk assessment process is to identify the hazards of concern. FEMA's current regulations only require an evaluation of natural hazards. Natural hazards are natural events that threaten lives, property, and many other assets. Often, natural hazards can be predicted, where they tend to occur repeatedly in the same geographical locations because they are related to weather patterns or physical characteristics of an area.

Step 2: The next step of the risk assessment is to prepare a profile for each hazard of concern. These profiles assist communities in evaluating and comparing the hazards that can impact their area. Each type of hazard has unique characteristics that vary from event to event. That is, the impacts associated with a specific hazard can vary depending on the magnitude and location of each event (a hazard event is a specific, uninterrupted occurrence of a particular type of hazard). Further, the probability of occurrence of a hazard in a given location impacts the priority assigned to that hazard. Finally, each hazard will impact different communities in different ways, based on geography, local development, population distribution, age of buildings, and mitigation measures already implemented.

Steps 3 and 4: To understand risk, a community must evaluate what assets it possesses and which assets are exposed or vulnerable to the identified hazards of concern. Hazard profile information combined with data regarding population, demographics, general building stock, and critical facilities at risk, located in Section 4, prepares the community to develop risk scenarios and estimate potential damages and losses for each hazard.

5.1.2 Tools

To address the requirements of DMA 2000 and better understand potential vulnerability and losses associated with hazards of concern, Sussex County used standardized tools, combined with local, state, and federal data and expertise to conduct the risk assessment. Our standardized tools used to support the risk assessment are described below.

Hazards U.S. – Multi-Hazard (HAZUS-MH)

In 1997, FEMA developed a standardized model for estimating losses caused by earthquakes, known as Hazards U.S. or HAZUS. HAZUS was developed in response to the need for more effective national-, state-, and community-level planning and the need to identify areas that face the highest risk and potential for loss. HAZUS was expanded into a multi-hazard methodology, HAZUS-MH with new models for estimating potential losses from wind (hurricanes) and flood (riverine and coastal) hazards. HAZUS-MH



is a Geographic Information System (GIS)-based software tool that applies engineering and scientific risk calculations, which have been developed by hazard and information technology experts, to provide defensible damage and loss estimates. These methodologies are accepted by FEMA and provide a consistent framework for assessing risk across a variety of hazards. The GIS framework also supports the evaluation of hazards and assessment of inventory and loss estimates for these hazards.

HAZUS-MH uses GIS technology to produce detailed maps and analytical reports that estimate a community's direct physical damage to building stock, critical facilities, transportation systems and utility systems. To generate this information, HAZUS-MH uses default HAZUS-MH provided data for inventory, vulnerability, and hazards; this default data can be supplemented with local data to provide a more refined analysis. Damage reports can include induced damage (inundation, fire, threats posed by hazardous materials and debris) and direct economic and social losses (casualties, shelter requirements, and economic impact) depending on the hazard and available local data. HAZUS-MH's open data architecture can be used to manage community GIS data in a central location. The use of this software also promotes consistency of data output now and in the future and standardization of data collection and storage. The guidance *Using HAZUS-MH for Risk Assessment: How-to Guide* (FEMA 433) was used to support the application of HAZUS-MH for this risk assessment and plan. More information on HAZUS-MH is available at <http://www.fema.gov/plan/prevent/hazus/index.shtm>.

In general, probabilistic analyses were performed to develop expected/estimated distribution of losses (mean return period losses) for the flood, wind and seismic hazards. The probabilistic model generates estimated damages and losses for specified return periods (e.g., 100- and 500-year). For annualized losses, HAZUS-MH calculates the maximum potential annual dollar loss resulting from various return periods averaged on a "per year" basis. It is the summation of all HAZUS-supplied return periods (e.g., 10, 50, 100, 200, 500) multiplied by the return period probability (as a weighted calculation). In summary, the estimated cost of a hazard each year is calculated.

Custom methodologies in HAZUS-MH versions 3.0 were used to assess potential exposure and losses associated with hazards of concern for Sussex County:

Inventory: The 2010 U.S. Census data at the Census-block level was used to estimate hazard exposure at the municipal level. The default demographic data in HAZUS-MH 3.0, based on the 2010 U.S. Census, was used to estimate potential sheltering and injuries for this analysis for the Flood, Earthquake, and Hurricanes and Tropical Storms (wind) vulnerability assessment.

The default building inventory in HAZUS-MH was updated and replaced with a custom building inventory developed for the County. The updated building inventory was developed using parcel information provided by the County and MODIV tax assessor data obtained from the New Jersey Department of the Treasury. Attributes provided in the spatial files were used to further define each structure in terms of occupancy class, construction type, etc. A building footprint spatial layer was available, and used to estimate building location and building square footage to calculate the replacement cost value.

The critical facility inventory (essential facilities, utilities, transportation features and user-defined facilities) was updated beginning with all GIS data provided by Sussex County. Both the critical facility and building inventories were formatted to be compatible with HAZUS-MH and its Comprehensive Data Management System (CDMS). Once approved, HAZUS-MH was updated with the final inventories and used for the risk assessment.



Flood: The FEMA DFIRM dated September 2011 was used to evaluate exposure for the 1- and 0.2-percent annual chance flood events, and determine potential future losses for the 1-percent annual chance event in Sussex County. The 2014 New Jersey State HMP depth grid for Sussex County was used in this assessment. The depth grid was generated using DEM data obtained from the NJ Office of Information Technology and the base flood and cross-section elevations for the detailed study areas. Hazus-MH 2.1 was used to develop the depth grid for all other areas of the special flood hazard area (1-percent annual chance flood zone) using the provided DEM data. The countywide depth grid was integrated into HAZUS-MH 3.0 and the flood model was run to estimate potential losses at the structure level using the County's custom building inventory.

Earthquake: A probabilistic assessment was conducted for Sussex County for the 100-, 500- and 2,500-year MRPs through a Level 2 analysis in HAZUS-MH 3.0 to analyze the earthquake hazard and provide a range of loss estimates for Sussex County. The probabilistic method uses information from historic earthquakes and inferred faults, locations and magnitudes, and computes the probable ground shaking levels that may be experienced during a recurrence period by Census tract.

As noted in the HAZUS-MH Earthquake User Manual '*Uncertainties are inherent in any loss estimation methodology. They arise in part from incomplete scientific knowledge concerning earthquakes and their effects upon buildings and facilities. They also result from the approximations and simplifications that are necessary for comprehensive analyses. Incomplete or inaccurate inventories of the built environment, demographics and economic parameters add to the uncertainty. These factors can result in a range of uncertainty in loss estimates produced by the HAZUS Earthquake Model, possibly at best a factor of two or more.*' However, HAZUS' potential loss estimates are acceptable for the purposes of this HMP.

Ground shaking is the primary cause of earthquake damage to man-made structures and soft soils amplify ground shaking. One contributor to the site amplification is the velocity at which the rock or soil transmits shear waves (S-waves). The National Earthquake Hazard Reductions Program (NEHRP) has developed five soil classifications defined by their shear-wave velocity that impact the severity of an earthquake. The soil classification system ranges from A to E, where A represents hard rock that reduces ground motions from an earthquake and E represents soft soils that amplify and magnify ground shaking and increase building damage and losses.

NEHRP soil classifications were not available for Sussex County at the time of this analysis. Soils were estimated as NEHRP soil Type D across Sussex County, as a conservative approach to this risk assessment. Groundwater was set at a depth of 5 feet (default setting). Damages and losses due to liquefaction, landslide, or surface fault rupture were not included in this analysis.

Hurricane and Tropical Storms: After reviewing historic data, the HAZUS-MH methodology and model were used to analyze the coastal hazards for Sussex County. Data used to assess this hazard include data available in the HAZUS-MH wind model, professional knowledge, information provided by the Steering and Planning Committees. HAZUS version 3.0 was used for this analysis.

A probabilistic scenario was run for Sussex County for annualized losses and the 100- and 500-year MRPs were examined for the wind hazard using HAZUS version 3.0. HAZUS-MH contains data on historic hurricane events and wind speeds. It also includes surface roughness and vegetation (tree coverage) maps for the area. Surface roughness and vegetation data support the modeling of wind force across various types of land surfaces. Hurricane and inventory data available in HAZUS-MH were used to evaluate potential losses from the 100- and 500-year MRP events (wind impacts).



Wildfire: The New Jersey Forest Fire Service (NJFFS) uses Wildfire Fuel Hazard data to assign wildfire fuel hazard rankings across the State. This data, developed in 2009, is based upon NJDEP's 2002 Land Use/Land Cover datasets and NJDEP's 2002 10-meter Digital Elevation Grid datasets. For the wildfire hazard, the NJFFS Wildfire Fuel Hazard “extreme”, “very high” and “high” areas are identified as the wildfire hazard area. The statistics in the “moderate” to “low” areas are also reported.

To determine vulnerability, a spatial analysis was conducted using the NJFFS Fuel Hazard Area guidelines. When the analysis determined the hazard area would impact the area in a jurisdiction, or the location of critical facilities, these locations were deemed potentially vulnerable to the hazard. The limitations of this analysis are recognized, and as such the analysis is only used to provide a general estimate.

Geologic Hazards: Multiple hazard layers were used to evaluate the County’s exposure to this hazard. The Landslide Incidence and Susceptibility GIS layer from the National Atlas was used to assess the vulnerability to landslides. The New Jersey Geologic and Water Survey generated a Carbonate Formations GIS layer, which indicates areas in New Jersey with carbonate geological formations.

Other Hazards: For many of the hazards evaluated in this risk assessment, historic data is not adequate to model future losses at this time. For some of the other hazards of concern, areas and inventory susceptible to specific hazards were mapped and exposure was evaluated to help guide mitigation efforts discussed in Section 9. For other hazards, a qualitative analysis was conducted using the best available data and professional judgment.

For this risk assessment, the loss estimates, exposure assessments, and hazard-specific vulnerability evaluations rely on the best available data and methodologies. Uncertainties are inherent in any loss estimation methodology and arise in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from the following:

- 1) Approximations and simplifications necessary to conduct such a study
- 2) Incomplete or dated inventory, demographic, or economic parameter data
- 3) The unique nature, geographic extent, and severity of each hazard
- 4) Mitigation measures already employed by Sussex County and the amount of advance notice residents have to prepare for a specific hazard event

These factors can result in a range of uncertainty in loss estimates, possibly by a factor of two or more. Therefore, potential exposure and loss estimates are approximate. These results do not predict precise results and should be used to understand relative risk. Over the long term, Sussex County will collect additional data to assist in developing refined estimates of vulnerabilities to natural hazards.



5.2 IDENTIFICATION OF HAZARDS OF CONCERN

2016 HMP Update Changes

- The 2011 HMP hazard identification was presented in Section 3. For the 2016 HMP update, the hazard identification is presented in subsection 5.2 (Risk Assessment – Identification of Hazards of Concern).
- The Steering Committee chose to group some natural hazards together based on the similarity of hazard events, their typical occurrence or impacts, and consideration of hazard grouping in the 2014 State of New Jersey Hazard Mitigation Plan (NJ HMP).

To provide a strong foundation for mitigation strategies considered in Section 6, Sussex County considered a full range of natural hazards that could impact the area, and then identified and ranked those hazards that presented the greatest concern. The natural hazard of concern identification process incorporated input from the county and participating jurisdictions; review of the 2014 NJ HMP and previous hazard identification efforts; research of local, state, and federal information on the frequency, magnitude, and costs associated with the various hazards that have previously, or could feasibly, impact the region; and qualitative or anecdotal information regarding natural hazards and the perceived vulnerability of the study area's assets to them. Table 5.2-1 documents the process of identifying the natural hazards of concern for further profiling and evaluation.

Hazards of Concern
are defined as those hazards that are considered most likely to impact a community. These are identified using available data and local knowledge.

For the purposes of this planning effort, the Steering Committee chose to group some natural hazards together, based on the similarity of hazard events, their typical concurrence or their impacts, consideration of how hazards have been grouped in FEMA guidance documents (*FEMA 386-1, Understanding Your Risks, Identifying Hazards and Estimating Losses*; FEMA's *Multi-Hazard Identification and Risk Assessment – The Cornerstone of the National Mitigation Strategy*), and consideration of hazard grouping in the 2014 NJ HMP.

The "Flood" hazard includes riverine (inland) flooding and ice jams. Other types of flooding that can occur in the county include flooding from dam failures which is further discussed under the dam failure hazard in Section 5.4.1 (Dam Failure). Inclusion of the various forms of flooding under a general "Flood" hazard is consistent with that used in FEMA's *Multi-Hazard Identification and Risk Assessment* guidance.

Tropical cyclones (hurricanes, tropical storms, and tropical depressions) and extra-tropical cyclones (Nor'Easters) were grouped under the "Hurricane/Tropical" and "Nor'Easter" hazards, respectively. The "Severe Weather" hazard includes windstorms that often entail a variety of other influencing weather conditions including thunderstorms, hail, lightning, extreme temperatures, and tornadoes.

The "Severe Winter Weather" hazard includes heavy snowfall, blizzards, freezing rain/sleet, and ice storms. This grouping is consistent with that used in the 2014 NJ HMP.

The "Geologic" hazard includes landslides, land subsidence, and sinkholes. This grouping is consistent with that used in the 2014 NJ HMP.



Table 5.2-1. Identification of Hazards of Concern for Sussex County

Hazard	Is this a hazard that may occur in Sussex County?	If yes, does this hazard pose a significant threat to Sussex County?	Why was this determination made?	Source(s)
Avalanche	No	No	<ul style="list-style-type: none"> The 2014 NJ HMP does not identify avalanche as a hazard of concern for New Jersey. The topography and climate of Sussex County does not support the occurrence of an avalanche event. New Jersey in general has a very low occurrence of avalanche events based on statistics provided by the National Avalanche Center-American Avalanche Association (NAC-AAA) between 1950 and 2014. 	<ul style="list-style-type: none"> 2014 NJ HMP Review of NAC-AAA database between 1998 and 2014 Steering and Planning Committee Input
Coastal Erosion	No	No	<ul style="list-style-type: none"> The 2014 NJ HMP identifies coastal erosion as a hazard of concern for New Jersey. Counties bounded by coastal waters are most affected by coastal erosion. Sussex County is not bounded by coastal waters or contain any tidally influenced bodies of water. Based on the inland location of the County and input from the Steering and Planning Committees, coastal erosion is not a hazard of concern for Sussex County. 	<ul style="list-style-type: none"> 2014 NJ HMP Steering and Planning Committee Input
Coastal Storm	Yes	Yes	<ul style="list-style-type: none"> The 2014 NJ HMP identifies coastal storms as a hazard of concern for New Jersey. For the purpose of this HMP Update, hurricanes and tropical storms will be included in 'Hurricanes/Tropical Storms' and Nor'Easters will be included separately in 'Nor'Easters'. Please see those sections for information regarding hurricanes, tropical storms, and Nor'Easters in Sussex County. 	<ul style="list-style-type: none"> 2014 NJ HMP FEMA NOAA Steering and Planning Committee Input
Dam Failure	Yes	Yes	<ul style="list-style-type: none"> The 2014 NJ HMP identifies dam/levee failure as a hazard of concern for New Jersey. For the purpose of this HMP Update, only dam failure was identified as a hazard of concern for Sussex County. There are 263 dams located in Sussex County; 37 of which are identified as high hazard dams. The high hazard dams are located in the Townships of Andover, Byram, Green, Hardyston, Montague, Sandyston, Sparta, Vernon, Town of Newton and the Borough of Sussex. The Steering and Planning Committees identified earthquake as a hazard of concern for Sussex County. 	<ul style="list-style-type: none"> 2014 NJ HMP FEMA NJDEP Steering and Planning Committee Input
Disease Outbreak	Yes	No	<ul style="list-style-type: none"> The 2014 NJ HMP identifies disease outbreak as a hazard of concern for New Jersey. Infestations of ticks, mosquitoes, and/or other types of pest may be present in Sussex County; however, the Steering and Planning Committees did not identify disease outbreak as a hazard of concern. 	<ul style="list-style-type: none"> 2014 NJ HMP NJDOH Steering and Planning Committee Input
Drought	Yes	Yes	<ul style="list-style-type: none"> The 2014 NJ HMP identifies drought as a hazard of concern for New Jersey. Since 2008, Sussex County has been impacted by nine drought events. Between 2012 and 2014, the State of New Jersey has been included in 18 USDA declarations; of 	<ul style="list-style-type: none"> 2014 NJ HMP USGS USDA



Table 5.2-1. Identification of Hazards of Concern for Sussex County

Hazard	Is this a hazard that may occur in Sussex County?	If yes, does this hazard pose a significant threat to Sussex County?	Why was this determination made?	Source(s)
			<p>which, Sussex County was included in two of the declarations related to drought conditions.</p> <ul style="list-style-type: none"> Sussex County is located in the Northern Climate Division. According to the NRCC, this climate division has been impacted by the following periods of severe and extreme drought: <ul style="list-style-type: none"> August – September 1932 November 1949 – January 1950 September – November 1957 August 1964 – August 1966 December 1980 – January 1981 March – April 1985 August – September 1995 July – August 1999 December 2001 – May 2002 July – September 2002 The Steering and Planning Committees identified earthquake as a hazard of concern for Sussex County. 	<ul style="list-style-type: none"> NRCC NOAA NOAA-NCDC Storm Database Steering and Planning Committee Input
Earthquake	Yes	No	<ul style="list-style-type: none"> The 2014 NJ HMP identifies earthquake as a hazard of concern for New Jersey. According to FEMA, if an area is located within that has PGA of 3%g or greater, earthquake should be profiled. According to the USGS, Sussex County has a PGA between 3%g and 5%g. Although they are known to occur on a regular basis, records indicate that no major earthquakes have struck the state since the establishment of historical record-keeping (1500s). Between 1783 and 2014, there have been 181 documented earthquakes in New Jersey. Twenty of these events have been epicentered in Sussex County. The Steering and Planning Committees identified earthquake as a hazard of concern for Sussex County. 	<ul style="list-style-type: none"> 2014 NJ HMP NJDEP NJGWS Steering and Planning Committee Input
Expansive Soils	No	No	<ul style="list-style-type: none"> The 2014 NJ HMP identifies expansive soils as a hazard of concern for New Jersey; however, the Planning Committee did not identify this as a hazard of concern for Sussex County. Soils that expand (swell) as they become wet and contract (shrink) as they dry are called expansive soils. This change can cause the ground to move up and down several inches during a cycle of wetting and drying. Expansive soils that are predominately clay minerals have the ability to absorb water. 	<ul style="list-style-type: none"> 2014 NJ HMP USGS Steering and Planning Committee Input



Table 5.2-1. Identification of Hazards of Concern for Sussex County

Hazard	Is this a hazard that may occur in Sussex County?	If yes, does this hazard pose a significant threat to Sussex County?	Why was this determination made?	Source(s)
			<ul style="list-style-type: none"> In Sussex County, most areas are underlain by soils with little to no clays with swelling potential. There are some areas, less than 50%, which are underlain by soils with abundant clays of slight moderate swelling potential. Based on the soil type and no history of expansive soil incidence occurring in the county, expansive soils is not a hazard of concern for Sussex County. 	
Extreme Temperature	Yes	Yes	Please see “Severe Weather”	
Flood	Yes	Yes	<ul style="list-style-type: none"> The 2014 NJ HMP identifies flooding as a hazard of concern in New Jersey. There are 3,034 (2.0% of total population) people in Sussex County living in the 1% and 3,121 people (2.1% of total population) living in the 0.2% annual chance flood zones. Over 27,000 (8.2% total area) acres of Sussex County are located in the 1% and over 28,000 (8.4% total area) in the 0.2% annual chance flood zones. The County has 392 NFIP policies with total loss payments equaling over \$1.7 million. Between 2008 and 2015, Sussex County was included in two FEMA declarations related to flooding: <ul style="list-style-type: none"> August 26-September 5, 2011 – FEMA-DR-4021 – Hurricane Irene September 28-October 6, 2011 – FEMA-DR-4039 – Remnants of Tropical Storm Lee The Steering and Planning Committees identified flooding as a hazard of concern for Sussex County. 	<ul style="list-style-type: none"> 2014 NJ HMP FEMA FEMA FIS NFIP NOAA-NCDC Storm Database Steering and Planning Committee Input
Geological Hazards	Yes	Yes	<ul style="list-style-type: none"> The 2014 NJ HMP identifies geological hazards as a hazard of concern for New Jersey. For the 2016 HMP update, the Planning Committee identified landslides, sinkholes and land subsidence as hazards of concern for Sussex County. A majority of Sussex County has a low susceptibility/incidence of landslides. In the northwest portion, in the Townships of Montague, Sandyston and Walkpack, there are portions of high susceptibility/moderate incidence of landslides; however, events have occurred throughout the County. Sussex County has several bands of carbonate rock running throughout the County. Approximately 24.9% of the County has carbonate rock formations and susceptible to sinkholes. The Steering and Planning Committees identified geological hazards as a hazard of concern for Sussex County. 	<ul style="list-style-type: none"> 2014 NJ HMP NJGWS NJDEP Steering and Planning Committee Input
Hailstorm	Yes	Yes	Please see “Severe Weather”	



Table 5.2-1. Identification of Hazards of Concern for Sussex County

Hazard	Is this a hazard that may occur in Sussex County?	If yes, does this hazard pose a significant threat to Sussex County?	Why was this determination made?	Source(s)
Hazardous Materials	Yes	Yes	<ul style="list-style-type: none"> The 2014 NJ HMP identifies hazardous materials as a hazard of concern for New Jersey. Several major transportation routes are located in Sussex County and pose a threat to spills, accidents, and incidents. There are been numerous hazardous material incidents in Sussex County. Based on the history of occurrences and input from the Steering and Planning Committees, hazardous materials was identified as a hazard of concern for Sussex County. 	<ul style="list-style-type: none"> 2014 NJ HMP Steering and Planning Committee Input
Hurricane (and other Tropical Cyclones)	Yes	Yes	<ul style="list-style-type: none"> The 2014 NJ HMP identifies hurricanes and tropical storms as hazards of concern for New Jersey. According to FEMA, between 2010 and 2015, Sussex County was included in three declarations associated with hurricanes and tropical storms. <ul style="list-style-type: none"> August 26-September 5, 2011 – FEMA-DR-4021 – Hurricane Irene September 5-14, 2011 – FEMA-DR-4039 – Remnants of Tropical Storm Lee October 26-November 8, 2011 – FEMA-DR-4048 – Hurricane Sandy The Steering and Planning Committees identified hurricanes and tropical storms as a hazard of concern for Sussex County. 	<ul style="list-style-type: none"> 2014 NJ HMP NOAA – NCDC FEMA Steering and Planning Committee Input
Ice Storm	Yes	Yes	Please see “Severe Winter Weather”	
Infestation	Yes	No	Please see “Disease Outbreak”	
Land Subsidence	Yes	No	Please see “Geological Hazards”	
Landslide	Yes	No	Please see “Geological Hazards”	
Nor’Easters	Yes	Yes	<ul style="list-style-type: none"> The 2014 NJ HMP identifies Nor’Easters as hazards of concern for New Jersey. According to FEMA, between 2010 and 2015, Sussex County was included in one declaration associated with Nor’Easters. <ul style="list-style-type: none"> October 29, 2011 – FEMA-DR-4048 – Severe Weather (snowstorm/Nor’Easter) The Steering and Planning Committees identified Nor’Easter events as a hazard of concern for Sussex County. 	<ul style="list-style-type: none"> 2014 NJ HMP NOAA – NCDC FEMA Steering and Planning Committee Input
Severe Weather (Windstorms, Thunderstorms, Hail, Lightning, Extreme Temperature, and Tornadoes)	Yes	Yes	<ul style="list-style-type: none"> The 2014 NJ HMP identifies thunderstorms, lightning, tornadoes, extreme winds and extreme temperature as hazards of concern for New Jersey. According to FEMA, between 2010 and 2015, Sussex County was included in four declarations associated with severe weather events. <ul style="list-style-type: none"> August 26-September 5, 2011 – FEMA-DR-4021 – Hurricane Irene 	<ul style="list-style-type: none"> 2014 NJ HMP NOAA – NCDC FEMA SPC Steering and Planning Committee Input



Table 5.2-1. Identification of Hazards of Concern for Sussex County

Hazard	Is this a hazard that may occur in Sussex County?	If yes, does this hazard pose a significant threat to Sussex County?	Why was this determination made?	Source(s)
			<ul style="list-style-type: none"> September 28-October 6, 2011 – FEMA-DR-4039 – Remnants of Tropical Storm Lee October 29, 2011 – FEMA-DR-4048 – Severe Weather October 26 – November 8, 2012 – FEMA-DR-4086 – Hurricane Sandy New Jersey has experienced 147 tornadoes between 1950 and 2014, with three of those occurring in Sussex County. However, there have been no tornadoes between 2010 and 2015 in the County. NOAA’s NCDC storm events database indicates that Sussex County was impacted by approximately 125 severe weather events between 2010 and 2015 causing a total of over \$100.6 million in property damages, \$15,000 in crop damages, one fatality and five injuries. The Steering and Planning Committees identified severe weather (windstorms, thunderstorms, hail, lightning, extreme temperatures, and tornadoes) as a hazard of concern for Sussex County. 	
Severe Winter Weather (Heavy Snow, Blizzards, Freezing Rain/Sleet, Ice Storms)	Yes	Yes	<ul style="list-style-type: none"> The 2014 NJ HMP identifies severe winter weather as a hazard of concern for New Jersey and includes snow, blizzards, and ice storms. For the purpose of this HMP update, Sussex County is including blizzards, heavy snow, and ice storms in the severe winter weather hazard profile. Normal seasonal snowfall in Sussex County is between 38.9 inches and 40.7 inches. According to FEMA, between 2010 and 2015, Sussex County was included in one declaration associated with severe winter weather events. <ul style="list-style-type: none"> October 29, 2011 – FEMA-DR-4048 – Severe Weather NOAA-NCDC has indicated that Sussex County has experienced the impacts of 98 winter storm events between 2010 and 2015. Based on the history of occurrences and losses, and based on input from the Planning and Steering Committees, Sussex County identified severe winter weather as a hazard of concern for the County. 	<ul style="list-style-type: none"> 2014 NJ HMP FEMA NOAA – NCDC Storm Database ONJSC Steering and Planning Committee Input
Tornado	Yes	Yes	Please see “Severe Weather”	
Tsunami	No	No	<ul style="list-style-type: none"> The 2014 NJ HMP does identify tsunami as a hazard of concern for New Jersey. Sussex County is not bounded by coastal waters; therefore, based on input from the Steering and Planning Committees and the location of the county, tsunami is not a hazard of concern for Sussex County. 	<ul style="list-style-type: none"> 2014 NJ HMP Steering and Planning Committee Input
Volcano	No	No	<ul style="list-style-type: none"> The 2014 NJ HMP does not identify volcano as a hazard of concern for New Jersey. 	<ul style="list-style-type: none"> 2014 NJ HMP



Table 5.2-1. Identification of Hazards of Concern for Sussex County

Hazard	Is this a hazard that may occur in Sussex County?	If yes, does this hazard pose a significant threat to Sussex County?	Why was this determination made?	Source(s)
			<ul style="list-style-type: none"> The Steering and Planning Committees did not identify volcano as a hazard of concern for Sussex County. 	<ul style="list-style-type: none"> Steering and Planning Committee Input
Wildfire	Yes	Yes	<ul style="list-style-type: none"> The 2014 NJ HMP identifies wildfire as a hazard of concern for New Jersey. In Sussex County, approximately 345.5 square miles of the County are located in the low to moderate NJFFS Risk Area and 68.9 square miles is located in the high to extreme risk area. The northern area of the County has the highest risk to wildfire events. Between 2010 and 2015, there have several reports of wildfires and brush fires in Sussex County. Approximately 48.6% of the County’s population is exposed to a moderate/low risk area and 7.4% of the population is exposed to an extreme/very high/high risk area. Based on input from the Steering and Planning Committees and the amount of land vulnerable to wildfires, wildfire is considered a hazard of concern for Sussex County. 	<ul style="list-style-type: none"> 2014 NJ HMP NOAA – NCDC Storm Events Query USGS NJFFS Steering and Planning Committee Input
Windstorm	Yes	Yes	Please see “Severe Weather”	

DR Presidential Disaster Declaration Number
 FEMA Federal Emergency Management Agency
 HMP Hazard Mitigation Plan
 NAC-AAA National Avalanche Center-American Avalanche Association
 NCDC National Climatic Data Center
 NFIP National Flood Insurance Program
 NJ New Jersey
 NJDEP New Jersey Department of Environmental Protection
 NJDOH New Jersey Department of Health
 NJFFS New Jersey Forest Fire Service
 NJGWS New Jersey Geological and Water Survey
 NJ HMP State of New Jersey Hazard Mitigation Plan
 NJOEM New Jersey Office of Emergency Management
 NRCC Northeast Regional Climate Center
 NOAA National Oceanic and Atmospheric Administration
 ONJSC Office of the New Jersey State Climatologist
 SPC Storm Prediction Center
 USDA U.S. Department of Agriculture
 USGS U.S. Geological Survey



According to input from the county, and review of all available resources, a total of 11 hazards of concern were identified as significant hazards affecting the entire planning area, to be addressed at the county level in this plan:

- Dam Failure
- Drought
- Earthquake
- Flooding (including ice jams)
- Geological Hazards (landslide and subsidence/sinkholes)
- Hazardous Materials (fixed site and in-transit)
- Hurricanes/Tropical Storms
- Nor'Easter
- Severe Weather (High Winds, Tornadoes, Thunderstorms, Hail, Extreme Temperatures)
- Severe Winter Weather (Heavy Snow, Blizzards, Ice Storms)
- Wildfire

Other natural and human-caused hazards of concern have occurred within Sussex County, but have a low potential to occur and/or result in significant impacts within the county. Therefore, these hazards will not be further addressed within this version of the HMP. However, if deemed necessary by the county, these hazards may be considered in future HMP updates.



5.3 HAZARD RANKING

After the hazards of concern were identified for Sussex County, the hazards were ranked to describe their probability of occurrence and their impact on population, property (general building stock including critical facilities) and the economy. Each participating city, town, township, or borough may have differing degrees of risk exposure and vulnerability compared to the county as a whole; therefore, each jurisdiction ranked the degree of risk to each hazard as it pertains to their community using the same methodology as applied to the county-wide ranking. This assured consistency in the overall ranking of risk process. The hazard ranking for the county and each participating district can be found in their jurisdictional annex in Volume II of this plan.

2016 Plan Update Changes

- The 2011 HMP hazard ranking was presented in Section 3. For the 2016 HMP Update, the hazard ranking is now presented in subsection 5.3 (Risk Assessment – Hazard Ranking).
- The 2016 HMP update hazard ranking methodology was expanded to include probability of occurrence and impact to population and economy.

5.3.1 Hazard Ranking Methodology

The methodology used to rank the hazards of concern for Sussex County is described below. Estimates of risk for the county were developed using methodologies promoted by FEMA’s hazard mitigation planning guidance and generated by FEMA’s HAZUS-MH risk assessment tool.

Probability of Occurrence

The probability of occurrence is an estimate of how often a hazard event occurs. A review of historic events assists with this determination. Each hazard of concern is rated in accordance with the numerical ratings and definitions in Table 5.3-1.

Table 5.3-1. Probability of Occurrence Ranking Factors

Rating	Probability Category	Definition
1	Rare	Hazard event is not likely to occur within 100 years (>1% chance of occurrence in any given year)
2	Occasional	Hazard event is likely to occur within 100 years (1% chance of occurrence in any given year)
3	Frequent	Hazard event is likely to occur within 25 years (4% chance of occurrence in any given year)

Impact

The impact of each hazard is considered in three categories: impact on population, impact on property (general building stock including critical facilities), and impact on the economy. Based on documented historic losses and a subjective assessment by the Planning Committee, an impact rating of high, medium, or low is assigned with a corresponding numeric value for each hazard of concern. In addition, a weighting factor is assigned to each impact category: three (3) for population, two (2) for property, and one (1) for economy. This gives the impact on population the greatest weight in evaluating the impact of a hazard. Table 5.3-2 presents the numerical rating, weighted factor and description for each impact category



Table 5.3-2. Numerical Values and Definitions for Impacts on Population, Property and Economy

Category	Weighting Factor	Low Impact* (1)	Medium Impact (2)	High Impact (3)
Population	3	14% or less of your population is exposed to a hazard with potential for measurable life safety impact, due to its extent and location	15% to 29% of your population is exposed to a hazard with potential for measurable life safety impact, due to its extent and location	30% or more of your population is exposed to a hazard with potential for measurable life safety impact, due to its extent and location
Property	2	Property exposure is 14% or less of the total replacement cost for your community	Property exposure is 15% to 29% of the total replacement cost for your community	Property exposure is 30% or more of the total replacement cost for your community
Economy	1	Loss estimate is 9% or less of the total replacement cost for your community	Loss estimate is 10% to 19% of the total replacement cost for your community	Loss estimate is 20% or more of the total replacement cost for your community

Note: A numerical value of zero is assigned if there is no impact.

*For the purposes of this exercise, “impacted” means exposed for population and property and loss for economy.

Risk Ranking Value

The risk ranking for each hazard is then calculated by multiplying the numerical value for probability of occurrence by the sum of the numerical values for impact. The equation is as follows: Weighting Factor (1, 2, or 3) × Impact Value (6 to 18) = Hazard Ranking Value. Based on the total for each hazard, a priority ranking is assigned to each hazard of concern (high, medium, or low).

5.3.2 Hazard Ranking Results

Using the process described above, the risk ranking for the identified hazards of concern was determined for Sussex County. Based on the combined risk values for probability of occurrence and impact to Sussex County, a priority ranking of “high”, “medium” or “low” risk was assigned. The hazard ranking for the Sussex County planning area is detailed in the subsequent tables that present the step-wise process for the ranking. The county-wide risk ranking includes the entire planning area and may not reflect the highest risk indicated for any of the participating jurisdictions. The resulting ranks of each municipality indicate the differing degrees of risk exposure, and vulnerability. The results support the appropriate selection and prioritization of initiatives to reduce the highest levels of risk for each municipality. Both the county and the participating jurisdictions have applied the same methodology to develop the county-wide risk and local rankings to ensure consistency in the overall ranking of risk.

This risk ranking exercise serves two purposes: 1) to describe the probability of occurrence for each hazard, and 2) to describe the impact each would have on the people, property and economy of Sussex County. Estimates of risk for the county were developed using methodologies promoted by FEMA’s hazard mitigation planning guidance and generated by FEMA’s HAZUS-MH risk assessment tool.

Table 5.3-3 shows the probability ranking assigned for likelihood of occurrence for each hazard.



Table 5.3-3. Probability of Occurrence Ranking for Hazards of Concern for Sussex County

Hazard of Concern	Probability	Numeric Value
Dam Failure	Occasional	2
Drought	Frequent	3
Earthquake	Occasional	2
Flood	Frequent	3
Geological Hazards	Frequent	3
Hurricane/Tropical Storm	Frequent	3
Nor'Easter	Frequent	3
Severe Weather	Frequent	3
Severe Winter Weather	Frequent	3
Wildfire	Frequent	3
Hazardous Materials	Frequent	3

Table 5.3-4 shows the impact evaluation results for each hazard of concern, including impact on property, structures, and the economy on the county level. It is noted that several hazards that have a high impact on the local jurisdictional level, may have a lower impact when analyzed county-wide. Jurisdictional ranking results are presented in each local annex in Section 9 of this plan. The weighting factor results and a total impact for each hazard also are summarized.



Table 5.3-4. Impact Ranking for Hazards of Concern for Sussex County

Hazard of Concern	Population			Property			Economy			Total Impact Rating (Population + Property + Economy)
	Impact	Numeric Value	Multiplied by Weighing Factor (3)	Impact	Numeric Value	Multiplied by Weighing Factor (2)	Impact	Numeric Value	Multiplied by Weighing Factor (1)	
Dam Failure	Medium	2	$3 \times 2 = 6$	Medium	2	$2 \times 2 = 4$	Medium	2	$1 \times 2 = 2$	12
Drought	Medium	2	$3 \times 2 = 6$	Low	1	$2 \times 1 = 2$	Medium	2	$1 \times 2 = 2$	10
Earthquake	High	3	$3 \times 3 = 9$	Medium	2	$2 \times 2 = 4$	Low	1	$1 \times 1 = 1$	14
Flood	Low	1	$3 \times 1 = 3$	Low	1	$2 \times 1 = 2$	Low	1	$1 \times 1 = 1$	6
Geological Hazards	Medium	2	$3 \times 2 = 6$	Medium	2	$2 \times 2 = 4$	High	3	$3 \times 1 = 3$	13
Hurricane / Tropical Storm	High	3	$3 \times 3 = 9$	High	3	$2 \times 3 = 6$	Low	1	$1 \times 1 = 1$	16
Nor'Easter	High	3	$3 \times 3 = 9$	High	3	$2 \times 3 = 6$	Low	1	$1 \times 1 = 1$	16
Severe Weather	High	3	$3 \times 3 = 9$	High	3	$2 \times 3 = 6$	Low	1	$1 \times 1 = 1$	16
Severe Winter Weather	High	3	$3 \times 3 = 9$	High	3	$2 \times 3 = 6$	Medium	2	$1 \times 2 = 2$	17
Wildfire	Low	1	$3 \times 1 = 3$	Medium	2	$2 \times 2 = 4$	Low	1	$1 \times 1 = 1$	8
Hazardous Materials	High	3	$3 \times 3 = 9$	Low	1	$2 \times 1 = 2$	Low	1	$1 \times 1 = 1$	12



Table 5.3-5 presents the total ranking value for each hazard.

Table 5.3-5. Total Risk Ranking Value for Hazards of Concern for Sussex County

Hazard of Concern	Probability	Impact	Total = (Probability x Impact)
Dam Failure	2	12	24
Drought	3	10	30
Earthquake	2	14	28
Flood	3	6	18
Geological Hazards	3	13	39
Hurricane / Tropical Storm	3	16	48
Nor'Easter	3	16	48
Severe Weather	3	16	48
Severe Winter Weather	3	17	51
Wildfire	3	8	24
Hazardous Materials	3	12	36

Refer to Section 9 for the hazard ranking category by jurisdiction assigned for each hazard of concern. The ranking categories are determined by an evaluation of the total risk ranking score into three categories (low, medium and high) whereby a score of 14 and below is categorized as low, 15 to 30 is medium, and 31 and over is considered a high risk category.

These rankings have been used as one of the bases for identifying the jurisdictional hazard mitigation strategies included in Section 9 of this plan. The summary rankings for the county reflect the results of the vulnerability analysis for each hazard of concern and vary from the specific results of each jurisdiction. For example the dam failure hazard may be ranked high in one jurisdiction, but due to the exposure and impact county-wide, it is ranked as a medium hazard and is addressed in the county mitigation strategy accordingly

The hazard rankings indicated in this plan update have been adjusted from the 2011 plan due to the improved vulnerability assessment based on structure-specific data available from the county rather than HAZUS default aggregate data as discussed in Section 5.1, Methodology. Any changes to the ranking results therefore do not necessarily reflect significant changes in exposure, but a more refined vulnerability analysis methodology. The summary county-level values reflect the vulnerability data on the county level and do not represent an average of jurisdiction ranks or the highest rank indicated in Sussex County. These designations are an element of the prioritization criteria as detailed in Section 6 of this plan.



5.4.1 Dam Failure

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the dam failure hazard in Sussex County.

2016 Plan Update Changes

- The hazard profile has been significantly enhanced to include a detailed hazard description, location, extent, previous occurrences, probability of future occurrence, and potential change in climate and its impacts on the dam failure hazard is discussed. The dam failure hazard is now located in Section 5 of the plan update.
- New and updated figures from federal and state agencies are incorporated.
- Previous occurrences were updated with events that occurred between 2011 and 2015.
- A vulnerability assessment was conducted for the dam failure hazard and it now directly follows the hazard profile. The map illustrating the County's inventory of dams and specific dam failure scenario results were removed due to the sensitive nature of this information; only a qualitative assessment was completed.

5.4.1.1 Profile

Hazard Description

A dam is an artificial barrier that has the ability to store water, wastewater, or liquid-borne materials for many reasons (flood control, human water supply, irrigation, livestock water supply, energy generation, containment of mine tailings, recreation, or pollution control. Many dams fulfill a combination of the stated functions (Association of State Dam Safety Officials 2013). They are an important resource in the United States.

Man-made dams can be classified according to the type of construction material used, the methods used in construction, the slope or cross-section of the dam, the way the dam resists the forces of the water pressure behind it, the means used for controlling seepage, and, occasionally, according to the purpose of the dam. The materials used for construction of dams include earth, rock, tailings from mining or milling, concrete, masonry, steel, timber, miscellaneous materials (plastic or rubber), and any combination of these materials (Association of State Dam Safety Officials 2013).

More than a third of the country's dams are 50 or more years old. Approximately 14,000 of those dams pose a significant hazard to life and property if failure occurs. There are also about 2,000 unsafe dams in the United States, located in almost every state.

Dam failures typically occur when spillway capacity is inadequate and excess flow overtops the dam, or when internal erosion (piping) through the dam or foundation occurs. Complete failure occurs if internal erosion or overtopping results in a complete structural breach, releasing a high-velocity wall of debris-filled waters that rush downstream damaging and/or destroying anything in its path (FEMA 1996).

Dam failures can result from one or a combination of the following reasons:

- Overtopping caused by floods that exceed the capacity of the dam
- Deliberate acts of sabotage
- Structural failure of materials used in dam construction
- Movement and/or failure of the foundation supporting the dam
- Settlement and cracking of concrete or embankment dams
- Piping and internal erosion of soil in embankment dams
- Inadequate maintenance and upkeep (FEMA 2013a)



Location

Dams provide a life-sustaining resource to people in all regions of the United States. They can provide water supply for domestic, agricultural, industrial, and community use; flood control; recreation; and energy. The exact number of dams in the United States is unknown. According to the U.S. Army Corps of Engineers (USACE) National Inventory of Dams (NID), there are over 87,000 dams in the country; however, this inventory only covers dams that meet minimum height and impoundment requirements. In addition to those identified by the USACE, there are numerous small dams not identified. The NID reported 825 dams in the State of New Jersey, of which, 133 are located in Sussex County. However, this total differs from that provided by the NJDEP, which identifies 263 dams in the County. For the purpose of this HMP update, the New Jersey Department of Environmental Protection (NJDEP) data will be used. Table 5.4.1-1 summarizes the number of dams and their hazard classifications in Sussex County. According to the 2011 Sussex County HMP, there are high hazard dams in the following municipalities: Andover Township, Byram Township, Fredon Township, Green Township, Hampton Township, Hardyston Township, Montague Township, Newton, Ogdensburg Borough, Sandyston Township, Sparta Township, Stillwater Township, Sussex Borough, Vernon Township, and Wantage Township.

Table 5.4.1-1. Number of Dams in Sussex County

County	High Hazard	Significant Hazard	Low Hazard	Other	Total
Sussex	37	42	159	25	263

Source: NJDEP 2013

Extent

The extent or magnitude of a dam failure event can be measured in terms of the classification of the dam. Additionally, there are two factors that influence the potential severity of a full or partial dam failure are: (1) the amount of water impounded; and (2) the density, type, and value of development and infrastructure located downstream (City of Sacramento Development Service Department 2005). There are several classification tools used to identify the hazards of dam. FEMA, USACE and NJDEP all have a form of classifying hazards. For the purpose of this HMP Update, the NJDEP hazard classification will be explained in this section. Please refer to *Federal Guidelines for Dam Safety: Hazard Potential Classification System for Dams* (2004) and *Safety of Dams – Policy and Procedures* (2014) for an explanation of the FEMA and USACE classifications.

The New Jersey Department of Environmental Protection (NJDEP) has four hazard classifications for dams located in New Jersey. The classifications relate to the potential of property damage and/or loss of life should a dam fail. The classifications are as follows:

- Class I (High-Hazard Potential) - Failure of the dam may result in probable loss of life and/or extensive property damage
- Class II (Significant-Hazard Potential) - Failure of the dam may result in significant property damage; however loss of life is not envisioned.
- Class III (Low-Hazard Potential) - Failure of the dam is not expected to result in loss of life and/or significant property damage.
- Class IV (Small-Dam Low-Hazard Potential) - Failure of the dam is not expected to result in loss of life or significant property damage. Dam must also meet the requirements of a Class IV dam above.

It is required by the State of New Jersey that all High Hazard and Significant Hazard dams must have NJDEP-approved Emergency Action Plans (EAP) in place. It is the responsibility of the dam owner to review and update the EAP on an annual basis. New Jersey Dam Safety Standards also require that are periodically inspected to identify conditions that may adversely affect the safety and functionality a dam its appurtenant structures; to



note the extent of deterioration as a basis for long term planning, periodic maintenance or immediate repair; to evaluate conformity with current design and construction practices; and to determine the appropriateness of the existing hazard classification. Inspection guidelines, as identified in the State Hazard Mitigation Plan, are reproduced in Table 5.4.1-2 in brief. Complete inspection and operating requirements for dams can be found in the New Jersey Dam Safety Standards (N.J.A.C 7:20-1.11).

Table 5.4.1-2. New Jersey Dam Inspection Requirements

Dam Size/Type	Regular Inspection	Formal Inspection
Class I (High Hazard) Large Dam	Annually	Once every 3 years
Class I (High Hazard) Dam	Once every 2 years	Once every 6 years
Class II (Significant Hazard) Dam	Once every 2 years	Once every 10 years
Class III (Low Hazard) Dam	Once every 4 years	Only as required
Class IV (Zero Hazard) Dam	Once every 4 years	Only as required

In New Jersey, every dam in the State as defined in the Safe Dam Act, N.J.S.A. 58:4 is required to meet State dam safety standards. Dam Safety Laws provide the NJDEP with enforcement capabilities to achieve statewide compliance with dam safety standards. This includes issuing orders for compliance to dam owners, and pursuing legal action if the owner does not comply (with the goal of compliance and possible fines levied on a per-day basis for violations).

Previous Occurrences and Losses

As stated in the 2014 New Jersey State HMP Update, dam failures can occur suddenly, without warning, and may occur during normal operating conditions. This is referred to as a “sunny-day” failure. Dam failures may also occur during a large storm event. Significant rainfall can quickly inundate an area and cause floodwaters to overwhelm a reservoir. If the spillway of the dam cannot safely pass the resulting flows, water will begin flowing in areas not designed for such flows, and a failure may occur. New Jersey has seen significant property damage including damage or loss of dams, bridges, roads, and buildings as a result of storm events and dam failures (New Jersey HMP 2014).

According to the Association of State Dam Safety Officials, there have been no recorded events of dam incidents in Sussex County. However, the 2011 HMP indicates there have been four previous dam failures and 31 dam incidents in the County. Between 1954 and 2015, FEMA has not included the State of New Jersey in any dam/levee break-related major disasters (DR) or emergencies (EM). For this 2016 HMP update, dam failure events impacting Sussex County between 2008 and 2015 were researched, and no known events were reported. Please note that not all events that have occurred in Sussex County are included due to the extent of documentation and the fact that not all sources may have been identified or researched. Loss and impact information could vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP Update.

Probability of Future Occurrences

Dam failure events are infrequent and usually coincide with events that cause them, such as earthquakes, landslides, and excessive rainfall and snowmelt. As noted in the Previous Occurrences and Losses section, dam failures typically occur in New Jersey as a result of heavy rains or other precipitation. There is a “residual risk” associated with dams. Residual risk is the risk that remains after safeguards have been implemented. For dams, the residual risk is associated with events beyond those that the facility was designed to withstand. However, the



probability of any type of dam failure is low in today’s dam safety regulatory and oversight environment (New Jersey State HMP 2014).

According to the 2011 County HMP, there were at least 31 dam failures identified based on information queried from the National Performance of Dams Program (NPDP) database; however, details regarding every incident in the County were not included. Eighteen of these dam failures were associated with the August 2000 severe storm. For the 2016 Plan update, however, a query of the NPDP database was conducted and it identified 16 dam incidents in Sussex County, with 15 occurring during the August 2000 severe storm event. Therefore, for the purpose of this plan update, the most up-to-date data was collected to calculate the probability of future occurrence. Information from the Stanford University’s NPDP database and the NOAA-NCDC storm events database were both used to identify the number of failures/incidents that occurred between 1950 and 2015. Using both sources ensures the most accurate probability estimates possible. The table below shows these statistics, as well as the annual average number of events and the estimated percent chance of an incident occurring in a given year (NOAA-NCDC 2016; NPDP 2016). Based on these statistics, there is an estimated 24.24% chance of a dam failure/incident occurring in any given year in Sussex County.

Table 5.4.1-3. Probability of Future Occurrences of Dam Damage and Failure Events

Hazard Type	Number of Occurrences Between 1950 and 2015	Rate of Occurrence or Annual Number of Events (average)	Recurrence Interval (in years) (# Years/Number of Events)	Probability of Event in any given year	% Chance of occurrence in any given year
Dam Incident	16	0.25	4.13	0.24	24.24%

Source: NCDC 2016; NPDP 2016

In Section 5.3, the identified hazards of concern for Sussex County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Committee, the probability of occurrence for dam failure in the County is considered ‘Frequent’ (likely to occur within 25 years, as presented in Table 5.3-3). The ranking of the dam failure hazard for individual municipalities is presented in Section 5.3 and in the jurisdictional annexes.

Climate Change Impacts

Dams are designed partly based on assumptions about a river’s flow behavior, expressed as hydrographs. Changes in weather patterns can have significant effects on the hydrograph used for the design of a dam. If the hydrograph changes, it is conceivable that the dam can lose some or its entire designed margin of safety, also known as freeboard. Loss of designed margin of safety may cause floodwaters more readily to overtop the dam or create unintended loads. Such situations could lead to a dam failure.

The climate of New Jersey is already changing and will continue to change over the course of this century. Both northern and southern New Jersey have become wetter over the past century, and precipitation is expected to increase over the next several decades in the State. Since 1895, annual precipitation has increased at a rate of 4.1 inches per century. Northern New Jersey’s 1971-2000 precipitation average was over five inches (12%) greater than the average from 1895-1970 (Sustainable Jersey Climate Change Adaptation Task Force [CATF] 2011). Average annual precipitation is projected to increase in the region by four to 11% by the 2050s and five to 13% by the 2080s. (New York City Panel on Climate Change [NPCC] 2015).

Heavy precipitation events have increased in the past 20 years and it is expected that this trend may continue (Rutgers Climate Institute 2013). Changes in climate may lead to higher intensity rainfall events. As a result, the failure probability of low, significant, and under-designed high hazard dams may increase.



5.4.1.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed and vulnerable in the identified hazard area. For the dam failure hazard, dam failure inundation areas are identified as the hazard areas. The following text evaluates and estimates the potential impact of dam failures for Sussex County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health and safety of residents, (2) general building stock, (3) critical facilities, (4) economy, and (5) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2011 Sussex County Hazard Mitigation Plan
- Further data collections that will assist understanding this hazard over time

Overview of Vulnerability

As discussed above, dam failure events may occur suddenly, without warning, or during normal operating conditions. Additionally, events can occur as a result of a natural hazard event, including severe weather, earthquakes, landslides, and flooding. The direct and indirect losses associated with dam failures include injury and loss of life, damage to structures and infrastructure, agricultural losses, utility failure and stress on community resources. The warning time for a dam failure event is often limited, which contributes to the direct and indirect losses.

As noted earlier, there are 37 high hazard dams located in Sussex County: Andover Township, Byram Township, Fredon Township, Green Township, Hampton Township, Hardyston Township, Montague Township, Newton, Ogdensburg Borough, Sandyston Township, Sparta Township, Stillwater Township, Sussex Borough, Vernon Township, and Wantage Township (Sussex County, 2011).

The 2011 Sussex County HMP included analyses on three high hazard dam sites: Morris Lake Dam, Lake Wallenpaupack in Wilsonville, Pennsylvania, and Mongaup River complex in Sullivan County, New York. The results of these analyses are summarized below.

- The Morris Lake Dam is owned and operated by the Town of Newton. The scenario evaluated was a probable maximum precipitation flood with a breach (representing a worse-case scenario, as documented in the EAP). This dam breach scenario is estimated to impact areas of Sparta Township, Ogdensburg Borough and Franklin Borough.
- The Wallenpaupack hydroelectric station in Wilsonville, Pennsylvania is owned and operated by PPL Generation, LLC. To evaluate a dam breach event, the probable maximum precipitation flood with a breach as included in the EAP was used (representing the worse-case scenario). This dam breach scenario is estimated to impact areas of Montague Township, Sandyston Township and Walpack Township.
- The Mongaup River Hydro System consists of Swinging Bridge, Mongaup, and Rio dam systems; is owned and operated by AER-NY Gen, LLC. The dam breach scenario evaluated was a flood breach, representing the worse-case scenario as included in the EAP. This dam breach scenario is estimated to impact areas of Montague Township, Sandyston Township and Walpack Township (Sussex County, 2011).

Data and Methodology

Dam failure inundation maps and delineated downstream hazard areas are considered sensitive information and were not available to conduct a quantitative risk assessment. Inundation mapping of select high hazard dams may be available upon request of the New Jersey Bureau of Dam Safety & Flood Control. The following section discusses the County's vulnerability to the hazard in a qualitative nature.



Impact on Life, Health and Safety

The entire population residing within a dam failure inundation zone is considered exposed and vulnerable to an event. The potential for loss of life is affected by the capacity and number of evacuation routes available to populations living within these areas. Those most at risk include the economically disadvantaged, the population over the age of 65, and non-English speakers. Economically disadvantaged populations are likely to evaluate their risk and make the decision to evacuate based upon the net economic impact to their family, while elderly populations are likely to seek or need medical attention. The availability of medical attention may be limited due to isolation during a dam failure event and other difficulties in evacuating.

Impact on General Building Stock, Critical Facilities and Economy

All buildings and infrastructure located in the dam failure inundation zone are considered exposed and vulnerable. Property located closest to the dam inundation area has the greatest potential to experience the largest, most destructive surge of water. All transportation infrastructure in the dam failure inundation zone is vulnerable to damage and potentially cutting off evacuation routes, limiting emergency access, and creating isolation issues. Utilities such as overhead power lines, cable and phone lines could also be vulnerable. Loss of these utilities could create additional isolation issues for the inundation areas.

Dam failure can cause severe downstream flooding and may transport large volumes of sediment and debris, depending on the magnitude of the event. Widespread damage to buildings and infrastructure affected by an event would result in large costs to repair these locations. In addition to physical damage costs, businesses can be closed while flood waters retreat and utilities are returned to a functioning state.

Effect of Climate Change on Vulnerability

As discussed above, climate change can have great impacts upon the functionality of dams in the County. Dams are constructed based on assumptions about a river's flow, which is expressed as a hydrograph. Changes in precipitation will alter surface and groundwater flow, which will directly affect riverine flow. Climate change could cause these dams to become obsolete.

Change of Vulnerability

Overall, the County's vulnerability has not changed and the entire County will continue to be exposed and vulnerable to dam failure events, especially those located within or near flood hazard areas (i.e., downstream dam-failure inundation areas such as those delineated in EAPs). However, for the 2016 HMP update, the County's inventory of dams was removed due to their sensitive nature.

Future Growth and Development

As discussed in Sections 4 and 9, areas targeted for future growth and development have been identified across the County. Any areas of growth could be potentially impacted by the dam failure hazard if located within an inundation area. Please refer to the specific areas of development indicated in tabular form and/or on the hazard maps included in the jurisdictional annexes in Volume II, Section 9 of this plan.

Additional Data and Next Steps

Because of the sensitive nature of the dam failure inundation zones, potential losses have not been quantified and presented in this plan. To estimate potential losses to population, buildings, critical facilities and infrastructure, dam inundation areas and depths of flooding may be used to generate depth grids. HAZUS-MH may be used to estimate potential losses for the County and participating municipalities.



5.4.2 Drought

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the drought hazard in Sussex County.

2016 Plan Update Changes

- The hazard profile has been significantly enhanced to include a detailed hazard description, location, extent, previous occurrences, probability of future occurrence, and potential change in climate and its impacts on the drought hazard is discussed. The drought hazard is now located in Section 5 of the plan update.
- New and updated figures from federal and state agencies are incorporated. U.S. 2010 Census data was incorporated, where appropriate.
- Previous occurrences were updated with events that occurred between 2008 and 2015.
- A vulnerability assessment was conducted for the drought hazard and it now directly follows the hazard profile.

5.4.2.1 Profile

Hazard Description

As defined by the National Weather Service (NWS), drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people. It is a normal, recurrent feature of climate that occurs in virtually all climate zones, from very wet to very dry. Drought is a temporary aberration from normal climatic conditions and can vary significantly from one region to another. Human factors, such as water demand and water management, can exacerbate the impact that a drought has on a region. There are four different ways that drought can be defined or grouped:

- Meteorological drought is a measure of departure of precipitation from normal. It is defined solely on the relative degree of dryness. Due to climatic differences, what might be considered a drought in one location of the country may not be a drought in another location.
- Agricultural drought links various characteristics of meteorological (or hydrological) drought to agricultural impacts, focusing on precipitation shortages, differences between actual and potential evapotranspiration, soil water deficits, reduced ground water or reservoir levels, and other parameters. It occurs when there is not enough water available for a particular crop to grow at a particular time. Agricultural drought is defined in terms of soil moisture deficiencies relative to water demands of plant life, primarily crops.
- Hydrological drought is associated with the effects of periods of precipitation shortfalls (including snowfall) on surface or subsurface water supply. It occurs when these water supplies are below normal. It is related to the effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
- Socioeconomic drought is associated with the supply and demand of an economic good with elements of meteorological, hydrological, and agricultural drought. This differs from the aforementioned types of drought because its occurrence depends on the time and space processes of supply and demand to identify or classify droughts. The supply of many economic goods depends on weather (for example water, forage, food grains, fish, and hydroelectric power). Socioeconomic drought occurs when the demand for an economic good exceeds supply as a result of a weather-related shortfall in water supply (National Drought Mitigation Center 2012).

Scientists at this time do not know how to predict drought more than one month in advance for most locations. Predicting drought depends on the ability to forecast precipitation and temperature. Anomalies of precipitation



and temperature may last from several months to several decades. How long they last depends on interactions between the atmosphere and the oceans, soil moisture and land surface processes, topography, internal dynamics, and the accumulated influence of weather systems on the global scale (NDMC Date Unknown).

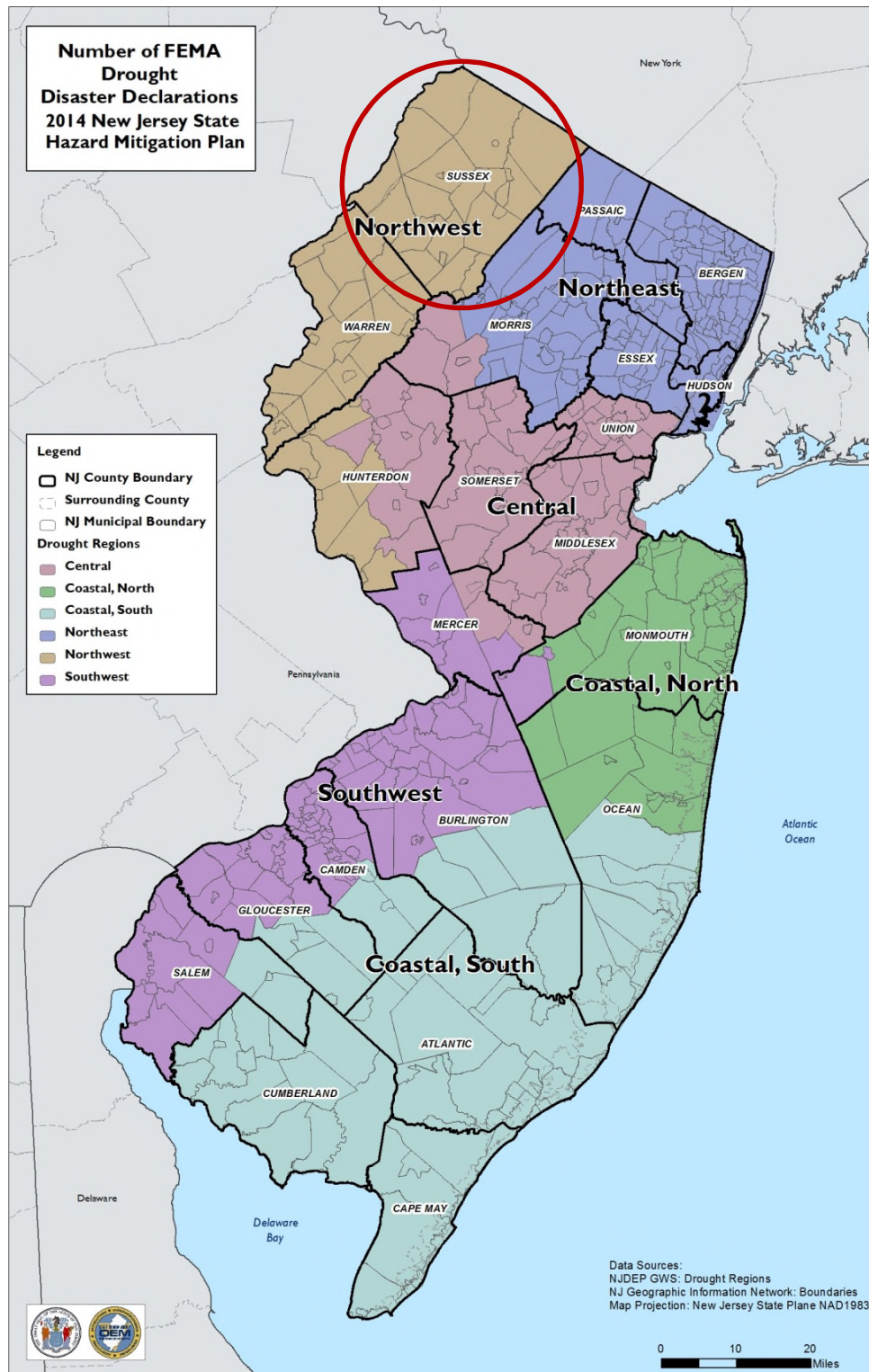
Location

Climate divisions are regions within a state that are climatically homogenous. The National Oceanic and Atmospheric Administration (NOAA) has divided the U.S. into 359 climate divisions. The boundaries of these divisions typically coincide with the county boundaries, except in the western U.S., where they are based largely on drainage basins (U.S. Energy Information Administration, Date Unknown). According to NOAA, New Jersey is made up of three climate divisions: Northern, Southern, and Coastal; Sussex County is located in the Northern Climate Division (NOAA, 2012).

Drought regions allow New Jersey to respond to changing conditions without imposing restrictions on areas not experiencing water supply shortages. New Jersey is divided into six drought regions that are based on regional similarities in water supply sources and rainfall patterns. Sussex County is located in the Northwest Drought Region. Other counties in the Northwest Drought region include Hunterdon and Warren Counties (Hoffman and Domber, 2003) (see Figure 5.4.2-1). These regions were developed based upon hydro-geologic conditions, watershed boundaries, municipal boundaries, and water supply characteristics. Drought region boundaries are contiguous with municipal boundaries because during a water emergency, the primary enforcement mechanism for restrictions is municipal police forces.



Figure 5.4.2-1. Drought Regions of New Jersey



Source: NJHMP 2014

Note: The red circle indicates the location of Sussex County. The County is located within the Northwest Drought Region of New Jersey.



Extent

The severity of a drought depends on the degree of moisture deficiency, the duration, and the size and location of the affected area. The longer the duration of the drought and the larger the area impacted, the more severe the potential impacts (NOAA Date Unknown). Droughts are not usually associated with direct impacts on people or property, but they can have significant impacts on agriculture, which can impact people indirectly. When measuring the severity of droughts, analysts typically look at economic impacts on a planning area.

Drought Indices

A number of drought indices are available from U.S. Geological Survey (USGS) and the New Jersey Department of Environmental Protection (NJDEP) to assess the various impacts of dry conditions. However, the USGS indicators are not used by NJDEP to a significant extent. The State uses a multi-index system that takes advantage of some of these indices to determine the severity of a drought or extended period of dry conditions.

The following text provides information regarding the drought indices used by NJDEP to determine drought conditions throughout the State. These indices were designed for the particular characteristics and needs of New Jersey.

- The **Groundwater Level Index** is based on the number of consecutive months that groundwater levels are below normal (lowest 25% of period of record for the respective months). The U.S. Geological Survey (USGS) monitors groundwater levels in a network of monitoring wells throughout New Jersey. Groundwater condition maps showing areas of above normal, normal, and below normal (monthly conditions compared to monthly normals) are provided by the USGS on a monthly basis.
- The **Stream Flow Index** is based on the number of consecutive months that stream flow levels are below normal (lowest 25% of period of record for the respective months). The USGS monitors stream flow in a network of 111 gages throughout New Jersey. Stream flow conditions maps showing areas of above normal, normal and below normal (monthly conditions compared to monthly normals) are provided by the USGS on a monthly basis. In addition, USGS provides a table that describes the cumulative monthly stream flow condition as normal, above normal, or below normal (USGS 2013).
- New Jersey maintains a real-time groundwater level monitoring system consisting of observation wells throughout the state. The network, a cooperative between the USGS and NJDEP, uses satellite telemetry to provide observations in four-hour increments. Observations are available on the USGS website at <http://water.usgs.gov/nj/nwis/current/?type=gw>. The primary purpose of the network is to provide information regarding the status of wells throughout the state and to anticipate potential shortages. As of 2002, the monitoring system maintained a network of 15 observation wells; however, the State now manages 22 observation sites as of 2015 (NJDEP 2002; USGS 2015). Sussex County currently contains two wells within its boundaries. These wells include station 370205-Swartswood Park 5 Obs (depth to water level of 26.51) and station 370202-Taylor Obs (depth to water level of 22.40) (USGS 2015).
- The **Reservoir Index** is based on the water levels of small, medium, and large index reservoirs across the state. The reservoir level relative to normal conditions will be considered. The NJDEP maintains a listing of current reservoir levels across the State and the Northeast. The current reservoir levels are available at <http://www.njdrought.org/reservoir.html>.
- New Jersey also maintains a real time **Regional Drought Indicator Status**, showing the level of 90-day precipitation, 90-day stream flow, reservoir levels, the Delaware River Basin Commission reservoir levels, and the unconfined groundwater levels in terms of dryness indices. These indicators determine the Declared Drought Status for each drought region. The observations and status are available at <http://www.njdrought.org/status.html>.



Watches, Warnings and Emergencies

During periods of drought, the NJDEP may issue drought watches, drought warnings, or a water emergency. A drought watch is an administrative designation made by the NJDEP when drought or other factors begin to adversely affect water supply conditions. A watch indicates that conditions are dry but not significantly. During a drought watch, the NJDEP closely monitors drought indicators and consults with affected water suppliers. The watch designation is used to alert the public about deteriorating conditions, while reminding water supply professionals to keep watch on conditions and update contingency plans (NJDEP 2011).

A drought warning represents a non-emergency phase of managing available water supplies during the developing stages of drought and falls between the watch and emergency levels of drought response. Under a drought warning, the NJDEP commissioner may order water purveyors to develop alternative sources of water or transfer water between areas of the State with relatively more water to those with less (NJDEP 2011).

A water emergency (or drought emergency) can only be declared by the governor. During a water emergency, a phased approach to restricting water consumption is typically initiated. Phase I water use restrictions typically target non-essential, outdoor water use (NJDEP 2011).

Previous Occurrences and Losses

Between 1954 and 2015, the State of New Jersey experienced two FEMA declared drought-related major disasters (DR) or emergencies (EM) classified as a water shortage. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. Of those two declarations, Sussex County has been included in both declarations (FEMA 2015). Both of these events occurred prior to 2008; no FEMA DR or EM drought events have occurred since the last Sussex County HMP update (see Table 5.4.2-1).

Table 5.4.2-1. FEMA DR and EM Declarations Since 2008 for Drought Events in Sussex County

FEMA Declaration Number	Date(s) of Event	Event Type	Location
No DR or EM Declarations were recorded for Sussex County during this time period.			

Source: FEMA 2015

Agriculture-related drought disasters are quite common. One-half to two-thirds of the counties in the U.S. have been designated as disaster areas in each of the past several years. The USDA Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and in counties that are contiguous to a designated county. Between 2012 and 2015, New Jersey has been included in 18 USDA drought declarations. Sussex County has been included in two of these declarations, to date.

For this 2016 Plan Update, known drought events that have impacted Sussex County between 2008 and 2015 are identified in Appendix X. For events that occurred prior to 2008, see the 2011 Sussex County HMP. Please note that not all events that have occurred in Sussex County are included due to the extent of documentation and the fact that not all sources may have been identified or researched. Loss and impact information could vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP Update.

Probability of Future Occurrences

Based upon risk factors and past occurrences, it is likely that droughts will occur across New Jersey and Sussex County in the future. In addition, as temperatures increase (see climate change impacts), the probability for



future droughts will likely increase as well. Therefore, it is likely that droughts will occur in New Jersey of varied severity in the future.

It is estimated that Sussex County will continue to experience direct and indirect impacts of drought and its impacts on occasion, with the secondary effects causing potential disruption or damage to agricultural activities and creating shortages in water supply within communities. The table below shows the probability of future drought events, of any and all magnitudes, for Sussex County.

Table 5.4.2-2. Probability of Future Occurrence of Drought Events

Hazard Type	Number of Occurrences Between 1950 and 2015	Rate of Occurrence	Recurrence Interval (in years)	Probability of event Occurring in Any Given Year	% Chance of Occurring in Any Given Year
Drought	36	0.55	1.83	0.55	54.55

Source: NOAA-NCDC 2015

In Section 5.3, the identified hazards of concern for Sussex County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Committee, the probability of occurrence for drought in the County is considered ‘frequent’ (likely to occur within 25 years, as presented in Table 5.3-3).

Climate Change Impacts

Water resources are important to both society and ecosystems. Humans depend on reliable, clean supply of drinking water to sustain their health. Water is also needed for agriculture, energy production, navigation, recreation, and manufacturing. These water uses put pressure on water resources and are most likely to be worsened by climate change in the future.

The climate of New Jersey is already changing and will continue to change over the course of this century. Since 1900, temperatures in the northeastern U.S. have increased an average of 1.5 degrees Fahrenheit (°F). The majority of this warming has occurred since 1970. From 1970 to 2010, average temperatures in New Jersey have increased 1.2°F (Office of the New Jersey State Climatologist [ONJSC] 2013). In terms of winter temperatures, the northeast region has seen an increase in the average temperature of 4°F since 1970 (Northeast Climate Impacts Assessment [NECIA] 2007). By the 2020s, the average annual temperature in New Jersey is projected to increase by 1.5°F to 3°F above the statewide baseline (1971 to 2000), which was 52.7°F. By 2050, the temperature is projected to increase 3°F to 5°F, and by 2080 projections show an increase of 4°F to 7.5°F (Sustainable Jersey Climate Change Adaptation Task Force 2015). However, both northern and southern New Jersey have become wetter over the past century. Northern New Jersey’s 1971-2000 precipitation average was over five inches (12%) greater than the average from 1895-1970. Southern New Jersey became 2” (5%) wetter late in the 20th century (Office of New Jersey State Climatologist). Average annual precipitation is projected to increase in the region by 5% by the 2020s and up to 10% by the 2050s. Most of the additional precipitation is expected to come during the winter months (New York City Panel on Climate Change [NPCC] 2009).

As temperatures rise, people and animals will need more water to maintain their health and to thrive. Many economic activities, such as hydropower, raising livestock, and growing foods, will also require water. The amount of water available for these activities may be reduced as temperatures rise and if competition for water resources increases. As shown in the paragraph above, these trends will certainly affect the probability and frequency of dryer conditions that could lead to drought events in Sussex County.



5.4.2.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For the drought hazard, all of Sussex County has been identified as exposed. Therefore, all assets in the County (population, structures, critical facilities and lifelines), as described in the County Profile (Section 4), are exposed and potentially vulnerable to a drought. The following text evaluates and estimates the potential impact of the drought hazard on the County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impacts on: (1) life, health and safety of residents, (2) general building stock, (3) critical facilities, (4) economy, and (5) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2011 Sussex County HMP
- Further data collections that will assist understanding this hazard over time

Overview of Vulnerability

The entire County is vulnerable to drought. However, areas at particular risk are areas used for agricultural purposes (farms and cropland), open/forested land vulnerable to the wildfire hazard, densely-populated areas where communities rely on surface water supplies (above ground reservoirs) for industrial, commercial, and domestic purposes, and certain areas where elderly, impoverished or otherwise vulnerable populations are located. Vulnerable populations could be particularly susceptible to the drought hazard and cascading impacts due to age, health conditions, and limited ability to mobilize to shelter, cooling and medical resources. The New Jersey HMP has additionally identified Sussex County as one of the eight counties with the highest number of farms and the greatest acreage of farmland across the State, increasing land exposure and vulnerability to drought (NJ HMP, 2014).

Droughts conditions can cause a shortage of water for human consumption and reduce local fire-fighting capabilities. According to the New Jersey HMP, counties most often affected by a drought are densely populated areas that rely on above-ground reservoirs for their water supply; however, this does not include Sussex County. As noted in Table 5.4.2-3, all but two of the County's water suppliers use groundwater for drinking water supplies (although one of these groundwater sources is influenced by surface water). This ultimately makes the County and its municipalities more resistant to drought conditions (NJ HMP, 2014). Sussex County is located within the Northwest Drought Region of New Jersey. According to the NJDEP, available water supply sources for the Northwest Drought Region include rivers and unconfined groundwater, as well as a minor supply source of New Jersey and Delaware River Basin Commission (DRBDC) reservoirs (NJDEP 2015).

Some County residents and organizations also rely on wells for their water supply needs. From January 1, 1965 through August 31, 2015, Sussex County has had over 8,719 domestic (i.e., drinking water) well permits issued. While this number may still be lower than the actual drinking water well count for the County, it still demonstrates the importance of well water to residents.

Data and Methodology

Data was collected from HAZUS-MH, USDA, NOAA-NCDC, Sussex County, and the Planning Committee. Insufficient data was available to model the long-term potential impacts of a drought on the County. Over time, additional data will be collected to allow better analysis for this hazard. Available information and a preliminary assessment are provided below.



Impact on Life, Health and Safety

Droughts may have devastating effects on communities and the surrounding environment. The amount of devastation depends on the strength and duration of a drought event. One impact of drought is its impact on water supply. When drought conditions persist with little to no relief, water restrictions may be put into place by local or state governments. These restrictions can include watering of lawns, washing cars, etc. In exceptional drought conditions, watering of lawns and crops may not be an option. If crops are not able to receive water, farmland will dry out and crops will die. This can lead to crop shortages, which, in turn, increases the price of food (State Climate Office of NC 2015).

Droughts also have the potential to lead to water pollution due to the lack of rain water to dilute any chemicals in water sources. Contaminated water supplies may be harmful to plants and animals. If water is not getting into the soils, the ground will dry up and become unstable. Unstable soils increase the risk of erosion and loss of top soil (State Climate Office of NC 2015).

The impacts on public health from drought can be severe which includes increase in heat-related illnesses, waterborne illnesses, recreational risks, limited food availability, and reduced living conditions. Those individuals who rely on water, such as farmers, may experience financial-related stress. Decreased amounts and quality of water during drought events have the potential to reduce the availability of electricity (hydropower, coal-burning and nuclear) (State Climate Office of NC 2015).

Drought conditions can affect people's health and safety including health problems related to low water flows and poor water quality; and health problems related to dust. Droughts also have the potential to lead to loss of human life (NDMC 2014). Other possible impacts to health due to drought include increased recreational risks; effects on air quality; diminished living conditions related to energy, air quality, and sanitation and hygiene; compromised food and nutrition; and increased incidence of illness and disease. Health implications of drought are numerous. Some drought-related health effects are short-term while others can be long-term (CDC 2012).

Drought affects groundwater sources, but generally not as quickly as surface water supplies. Groundwater supplies generally take longer to recover. Reduced precipitation during a drought means that groundwater supplies are not replenished at a normal rate. This can lead to a reduction in groundwater levels and problems such as reduced pumping capacity or wells going dry. Shallow wells are more susceptible than deep wells. Reduced replenishment of groundwater affects streams also. Much of the flow in streams comes from groundwater, especially during the summer when there is less precipitation and after snowmelt ends. Reduced groundwater levels mean that even less water will enter streams when stream flows are lowest. The following table provides the drinking water suppliers for Sussex County.

Table 5.4.2-3. Drinking Water Suppliers in Sussex County

Name	Population Served	Source Type
Andover Boro Water Dept	783	Groundwater
Andover Intermediate Care Cntr	543	Groundwater
Andover Nursing Home	250	Groundwater
Andover Water Corp	82	Groundwater
Aqua NJ – Summit Lake	220	Groundwater
Aqua NJ Inc – Bear Brook	130	Groundwater
Aqua NJ Vernon	713	Groundwater
Ascot Park Apts	125	Groundwater



Table 5.4.2-3. Drinking Water Suppliers in Sussex County

Name	Population Served	Source Type
Branchville W Dept	1,436	Groundwater
Brookwood Musconetcong River POA	1,200	Groundwater
Byram Hmwnrs Assoc Water	400	Groundwater
Carriage Mobile Homes Inc	387	Groundwater
Colby Water Co	65	Groundwater
Culver Lake Water Company	40	Groundwater
East Brookwood Estates POA	612	Groundwater
Forest Lakes W Co	1,410	Groundwater
Franklin Board of Public	5,500	Groundwater
Green Hills Est Prop Own	175	Groundwater
Hamburg Board of Public	3,382	Groundwater
Hardyston Twp MUA	1,963	Groundwater
Hardyston Two MUA	769	Groundwater
Hidden Village Condo Association	175	Groundwater
Hillside Estates at Franklin	300	Groundwater
Hopatcong Water Dept	7,224	Groundwater
Lake Lenape Water Co	1,650	Groundwater
Lake Stockholm, Inc	300	Groundwater
Lake Tamarack W Co	1,000	Groundwater
Locor Lakefront Lodging	85	Groundwater
Montague Water Co.	2,124	Groundwater
Newton Water & Sewer Utility	8,300	Surface Water
North Shore Water Association	105	Groundwater
Ogdensburg W Dept	2,800	Groundwater
Regency Apartments LLC	300	Groundwater
Rolling Hills Condominium Association	240	Groundwater
Simmons W Co	180	Groundwater
Sparta Twp Water Utility – Lake Mohawk	15,726	Groundwater
Sparta Twp Water Utility – Highlands	1,618	Groundwater
Sparta Twp Wtr – Sunset	339	Groundwater
Stanhope W Dept	3,730	Groundwater
Stillwater Water District 1	1,200	Groundwater
Strawberry Point POA	95	Groundwater
Sussex Cnty Hlth – The Homestead	100	Groundwater
Sussex W Dept	2,201	Surface Water
The Village of Lake Glenwood	250	Groundwater
Tranquility Springs Water Co	599	Groundwater under influence of surface water
U W V H Barry Lakes	120	Groundwater
U W V H Cliffwoods Lakes	90	Groundwater

**Table 5.4.2-3. Drinking Water Suppliers in Sussex County**

Name	Population Served	Source Type
U W V H Grandview Estates	72	Groundwater
U W V H Highland Lakes	37	Groundwater
U W V H Lake Conway	67	Groundwater
U W V H Predmore Estates	45	Groundwater
U W V H Sammis Road	55	Groundwater
U W V H Sussex Hills #1	110	Groundwater
U W V H Woodridge Estates	85	Groundwater
U W V H DC System	75	Groundwater
United Water Hampton Inc	650	Groundwater
United Water Mid-Atlantic/Sunset Ridge	300	Groundwater
United Water NJ Vernon Valley	3,295	Groundwater
United Water Vernon Hills	75	Groundwater
Wallkill Water Co	1,520	Groundwater
Willow Glen Academy/Abbey	530	Groundwater

Source: NJ DEP 2015; EPA 2015

As previously stated, drought conditions can cause shortages in water for human consumption. Droughts can also lead to reduced local firefighting capabilities. The drought hazard is a concern for Sussex County because the County's water is supplied by both surface water and groundwater. Surface water supplies are affected more quickly during droughts than groundwater sources.

Impact on General Building Stock

No structures are anticipated to be directly affected by a drought event. However, droughts contribute to conditions conducive to wildfires and reduce fire-fighting capabilities. Risk to life and property is greatest in those areas where forested areas adjoin urbanized areas (high density residential, commercial and industrial) also known as the wildfire urban interface (WUI). Therefore, all assets in and adjacent to, the WUI zone, including population, structures, critical facilities, lifelines, and businesses are considered vulnerable to wildfire. Refer Section 5.4.10 for the Wildfire risk assessment.

Impact on Critical Facilities

Water supply facilities may be affected by short supplies of water. As mentioned, drought events generally do not impact buildings; however, droughts have the potential to impact agriculture-related facilities and critical facilities that are associated with potable water supplies. This is particularly important to Sussex County due to its high amount of acreage devoted to farmland. Also, those critical facilities in and adjacent to the WUI zone are considered vulnerable to wildfire.

Impact on the Economy

Drought can produce a range of impacts that span many sectors of an economy and can reach beyond an area experiencing physical drought. This exists because water is integral to our ability to produce goods and provide services. Direct impacts of drought include reduced crop yield, increased fire hazard, reduced water levels, and damage to wildlife and fish habitat. The consequences of these impacts illustrate indirect impacts that include: reduction in crop, rangeland, and forest productivity that may result in reduced income for farmers and agribusiness, increased prices for food and timber, unemployment, reduced tax revenues due to reduced



expenditures, increased crime, foreclosures, migration, and disaster relief programs. The many impacts of drought can be listed as economic, environmental, or social.

Economic impacts occur in agriculture and related sectors because of the reliance of these sectors on surface and subsurface water supplies. Environmental impacts are the result of damage to plant and animal species, wildlife habitat, and air and water quality, forest and grass fires, degradation of landscape quality, loss of biodiversity, and soil erosion. Social impacts involve public safety, health, conflicts between water users, reduced quality of life, and inequities in the distribution of impacts and disaster relief. A summary of potential impacts associated with drought are identified in Table 5.4.2-. This table includes only some of the potential impacts of drought.

Table 5.4.2-4. Economic, Environmental, and Social Impacts of Drought

Economic	Environmental	Social
<ul style="list-style-type: none">• Loss of national economic growth, slowing down of economic development	<ul style="list-style-type: none">• Increased desertification - damage to animal species	<ul style="list-style-type: none">• Food shortages
<ul style="list-style-type: none">• Loss of national economic growth, slowing down of economic development	<ul style="list-style-type: none">• Reduction and degradation of fish and wildlife habitat	<ul style="list-style-type: none">• Loss of human life from food shortages, heat, suicides, violence
<ul style="list-style-type: none">• Damage to crop quality, less food production	<ul style="list-style-type: none">• Lack of feed and drinking water	<ul style="list-style-type: none">• Mental and physical stress
<ul style="list-style-type: none">• Increase in food prices	<ul style="list-style-type: none">• Disease	<ul style="list-style-type: none">• Water user conflicts
<ul style="list-style-type: none">• Increased importation of food (higher costs)	<ul style="list-style-type: none">• Increased vulnerability to predation	<ul style="list-style-type: none">• Political conflicts
<ul style="list-style-type: none">• Insect infestation	<ul style="list-style-type: none">• Loss of wildlife in some areas and too many in others	<ul style="list-style-type: none">• Social unrest
<ul style="list-style-type: none">• Plant disease	<ul style="list-style-type: none">• Increased stress to endangered species	<ul style="list-style-type: none">• Public dissatisfaction with government regarding drought response
<ul style="list-style-type: none">• Loss from dairy and livestock production	<ul style="list-style-type: none">• Damage to plant species, loss of biodiversity	
<ul style="list-style-type: none">• Unavailability of water and feed for livestock which leads to high livestock mortality rates	<ul style="list-style-type: none">• Increased number and severity of fires	<ul style="list-style-type: none">• Inequity in the distribution of drought relief
<ul style="list-style-type: none">• Disruption of reproduction cycles (breeding delays or unfilled pregnancies)	<ul style="list-style-type: none">• Wind and water erosion of soils	<ul style="list-style-type: none">• Loss of cultural sites
<ul style="list-style-type: none">• Increased predation	<ul style="list-style-type: none">• Loss of wetlands	<ul style="list-style-type: none">• Reduced quality of life which leads to changes in lifestyle
<ul style="list-style-type: none">• Increased fire hazard - range fires and wildland fires	<ul style="list-style-type: none">• Increased groundwater depletion	<ul style="list-style-type: none">• Increased poverty
<ul style="list-style-type: none">• Damage to fish habitat, loss from fishery production	<ul style="list-style-type: none">• Water quality effects	<ul style="list-style-type: none">• Population migrations
<ul style="list-style-type: none">• Income loss for farmers and others affected	<ul style="list-style-type: none">• Increased number and severity of fires	
<ul style="list-style-type: none">• Unemployment from production declines	<ul style="list-style-type: none">• Air quality effects	
<ul style="list-style-type: none">• Loss to recreational and tourism industry		
<ul style="list-style-type: none">• Loss of hydroelectric power		
<ul style="list-style-type: none">• Loss of navigability of rivers and canals		

A prolonged drought can have a serious economic impact on a community. Increased demand for water and electricity may result in shortages and a higher cost for these resources (FEMA 2005). Industries that rely on water for business may be impacted the hardest (e.g., landscaping businesses). Even though most businesses



will still be operational, they may be impacted aesthetically. These aesthetic impacts are most significant to the recreation and tourism industry. In addition, droughts in another area could impact the food supply/price of food for residents in the County.

When a drought occurs, the agricultural industry is most at risk in terms of economic impact and damage. During droughts, crops do not mature leading to a lessened crop yield, wildlife and livestock are undernourished, land values decrease, and ultimately there is financial loss to the farmer (FEMA, 1997).

A drought directly or indirectly impacts all people in affected areas. A drought can result in farmers not being able to plant crops or the failure of already planted crops. This results in loss of work for farm workers and those in related food processing jobs. Based on the 2012 Census of Agriculture, there were 885 farms in Sussex County, with 61,033 acres of total land in farms. The average farm size was 69 acres. Sussex County farms had a total market value of products sold of \$11.59 million in crop sales and \$7.064 million in livestock sales, averaging \$21,078 per farm. The Census indicated that 424 of farm operators reported farming as their primary occupation (USDA 2012). Table 5.4.2-3 shows the acreage of agricultural land exposed to the drought hazard.

Table 5.4.2-3. Agricultural Land in Sussex County in 2012

Number of Farms	Land in Farms (acres)	Total Cropland (acres)	Harvested Cropland (acres)	Irrigated Land (acres)
885	61,033	58,261	22,491	268

Source: USDA 2012

The 2012 Census of Agriculture for Sussex County indicated that the top crop items, by acres, in the County are forage-land used for all hay and haylage, grass silage, and greenchop (15,189 acres); corn for grain (3,250 acres); corn for silage (1,839 acres); vegetables harvested (590 acres); and cut Christmas trees (585 acres).

Future Growth and Development

As discussed in Section 4, areas targeted for future growth and development have been identified across Sussex County. Future growth could impact the amount of potable water available due to a drain on the available water resources. Other areas that could be impacted include agriculture and recreational facilities such as golf courses, farms, and nurseries. Areas targeted for potential future growth and development in the next five years have been identified across the County at the municipal level. Refer to the jurisdictional annexes in Volume II of this HMP.

Effect of Climate Change on Vulnerability

Nearly every region in the country is facing some increased risk of seasonal drought. Climate change can significantly affect the sustainability of water supplies in the future. As parts of the United States get drier, the amount and quality of water available will likely decrease, impacting people's health and food supplies. Western United States have already been experiencing water shortages due to severe dry-spells. With climate change, the entire country will likely face some level of drought. A report by the Natural Resources Defense Council (NRDC) found that 1,100 counties (one-third of all counties in the contiguous 48 states) face higher risks of water shortages by mid-century as a result of climate change. More than 400 of these counties will face extremely high risks of water shortages.

Change of Vulnerability

When examining the change in the County's vulnerability to drought events from the 2011 original HMP to this update, it is important to look at each entity that is exposed and vulnerable. The total population across the County has continued to increase over the past few years, which will place a greater stress on the water supply



during a drought event. In terms of the agricultural industry for Sussex County, there has been a 17% decrease in the total number of farms and a 6% decrease in total farmland area; however, the average size of a farm has increased by 11% (USDA 2012).

Additional Data and Next Steps

For the HMP update, any additional information regarding localized concerns and past impacts will be collected and analyzed. This data will be developed to support future revisions to the plan. Mitigation efforts could include building on existing New Jersey, Sussex County, and local efforts.

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5.4.3 Earthquake

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the earthquake hazard in Sussex County.

2016 Plan Update Changes

- The hazard profile has been significantly enhanced to include a detailed hazard description, location, extent, previous occurrences, probability of future occurrence, and potential change in climate and its impacts on the earthquake hazard is discussed. The earthquake hazard is now located in Section 5 of the plan update.
- New and updated figures from federal and state agencies are incorporated. The 2010 U.S. Census data has been incorporated, where appropriate.
- Previous occurrences were updated with events that occurred between 2008 and 2015.
- A vulnerability assessment was conducted for the earthquake hazard using FEMA's HAZUS-MH earthquake model, and it now directly follows the hazard profile.

5.4.3.1 Profile

Hazard Description

An earthquake is the sudden movement of the Earth's surface caused by the release of stress accumulated within or along the edge of the Earth's tectonic plates, a volcanic eruption, or by a manmade explosion (Federal Emergency Management Agency [FEMA] 2001; Shedlock and Pakiser 1997). Most earthquakes occur at the boundaries where the Earth's tectonic plates meet (faults); less than 10% of earthquakes occur within plate interiors. New Jersey is in an area where the rarer plate interior-related earthquakes occur. As plates continue to move and plate boundaries change geologically over time, weakened boundary regions become part of the interiors of the plates. These zones of weakness within the continents can cause earthquakes in response to stresses that originate at the edges of the plate or in the deeper crust (Shedlock and Pakiser 1997).

According to the U.S. Geological Society (USGS) Earthquake Hazards Program, an earthquake hazard is any disruption associated with an earthquake that may affect residents' normal activities. This includes surface faulting, ground shaking, landslides, liquefaction, tectonic deformation, tsunamis, and seiches; each of these terms is defined below:

- *Surface faulting*: Displacement that reaches the earth's surface during a slip along a fault. Commonly occurs with shallow earthquakes—those with an epicenter less than 20 kilometers.
- *Ground motion (shaking)*: The movement of the earth's surface from earthquakes or explosions. Ground motion or shaking is produced by waves that are generated by a sudden slip on a fault or sudden pressure at the explosive source and travel through the Earth and along its surface.
- *Landslide*: A movement of surface material down a slope.
- *Liquefaction*: A process by which water-saturated sediment temporarily loses strength and acts as a fluid, like the wet sand near the water at the beach. Earthquake shaking can cause this effect. Liquefaction susceptibility is determined by the geological history, depositional setting, and topographic position of the soil (Stanford 2003). Liquefaction effects may occur along the shorelines of the ocean, rivers, and lakes and they can also happen in low-lying areas away from water bodies in locations where the ground water is near the earth's surface.
- *Tectonic Deformation*: A change in the original shape of a material caused by stress and strain.
- *Tsunami*: A sea wave of local or distant origin that results from large-scale seafloor displacements associated with large earthquakes, major sub-marine slides, or exploding volcanic islands.



- **Seiche:** The sloshing of a closed body of water, such as a lake or bay, from earthquake shaking (USGS 2012a).

Location

Earthquakes are most likely to occur in the northern parts of New Jersey, which includes Sussex County, where significant faults are concentrated; however, low-magnitude events can and do occur in many other areas of the State. The National Earthquake Hazard Reduction Program (NEHRP) developed five soil classifications defined by their shear-wave velocity that impact the severity of an earthquake. The soil classification system ranges from A to E, as noted in Table 5.4.3-1, where A represents hard rock that reduces ground motions from an earthquake and E represents soft soils that amplify and magnify ground shaking and increase building damage and losses.

Table 5.4.3-1. NEHRP Soil Classifications

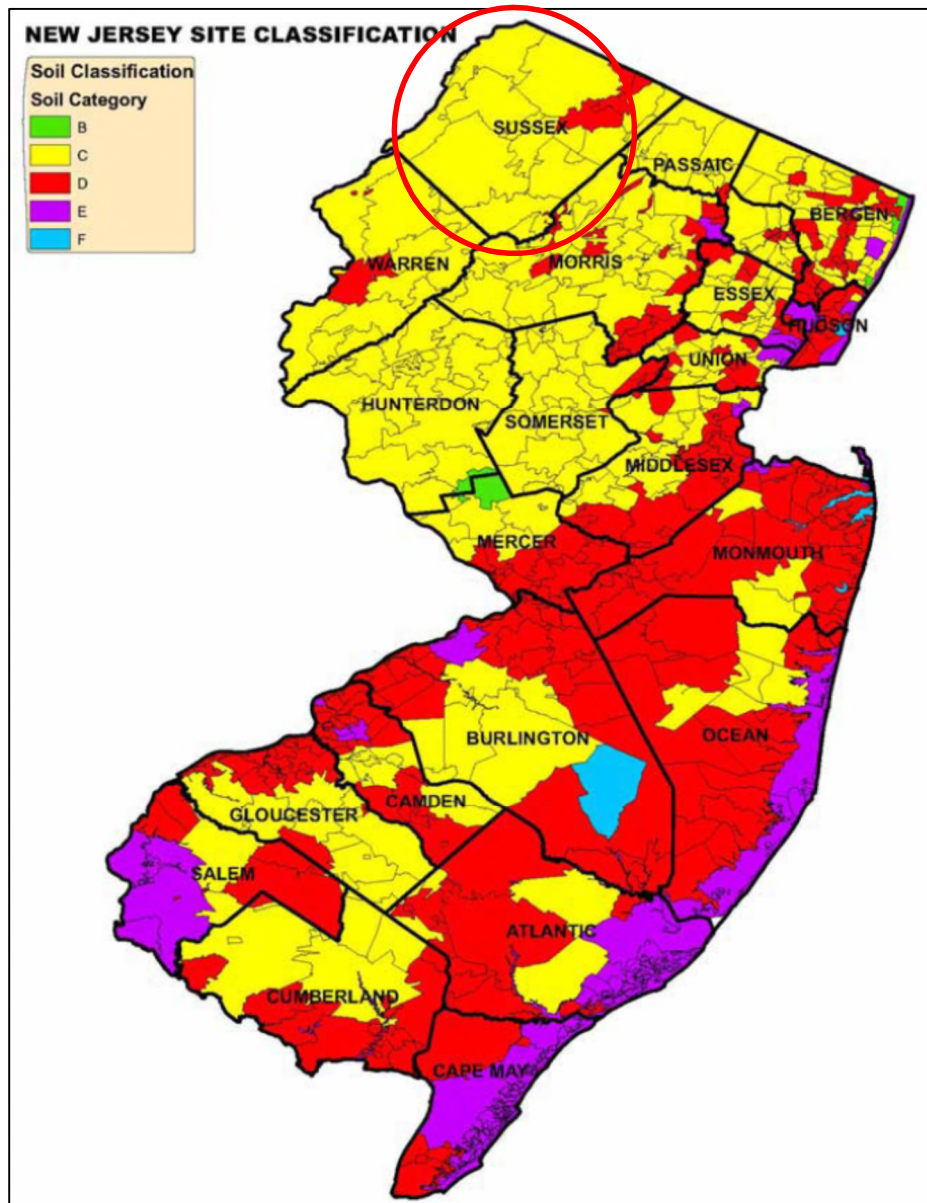
Soil Classification	Description
A	Hard Rock
B	Rock
C	Very dense soil and soft rock
D	Stiff soils
E	Soft soils

Source: FEMA 2013

New Jersey Department of Transportation (NJDOT) compiled a report on seismic design consideration for bridges in New Jersey, dated March 2012. In the report, NJDOT classifies the seismic nature of soils according to the American Association of State Highway and Transportation Officials (AASHTO) Guide Specifications for Bridge Seismic Design (SGS). For the purpose of seismic analysis and design, sites can be classified into Soil Classes A, B, C, D, E and F, ranging from hard rock to soft soil and special soils (similar to NEHRP soil classifications). NJDOT also developed a Geotechnical Database Management System, which contains soil boring data across New Jersey. The soil boring logs were then used to classify soil sites. Through this analysis, NJDOT developed a map of soil site classes according to ZIP codes in New Jersey where each ZIP code was assigned a class based on its predominant soil condition. In Sussex County, most ZIP codes were rated as a Category C, and a few were rated as Category D. Figure 5.4.3-1 provides a visual confirmation of this information.



Figure 5.4.3-1. ZIP Code-Based Soil Site Class Map



Source: NJDOT 2012

Note: Sussex County is indicated by the red circle.

Soil Classes A and B are rock sites

Soil Class C is very dense soil

Soil Class D is dense soil

Soil Class E is soft soil

Soil Class F is special soil requiring site-specific analysis

Liquefaction has been responsible for tremendous amounts of damage in historical earthquakes around the world. Shaking behavior and liquefaction susceptibility of soils are determined by their grain size, thickness, compaction, and degree of saturation. These properties, in turn, are determined by the geologic origin of the soils and their topographic position. Although this data has been calculated for parts of New Jersey, NJGWS has not yet completed this for Sussex County, New Jersey. Based on the Standard Penetration Test (SPT) data from the neighboring Morris County, which contains means, ranges, and standard deviations similar to Hudson,



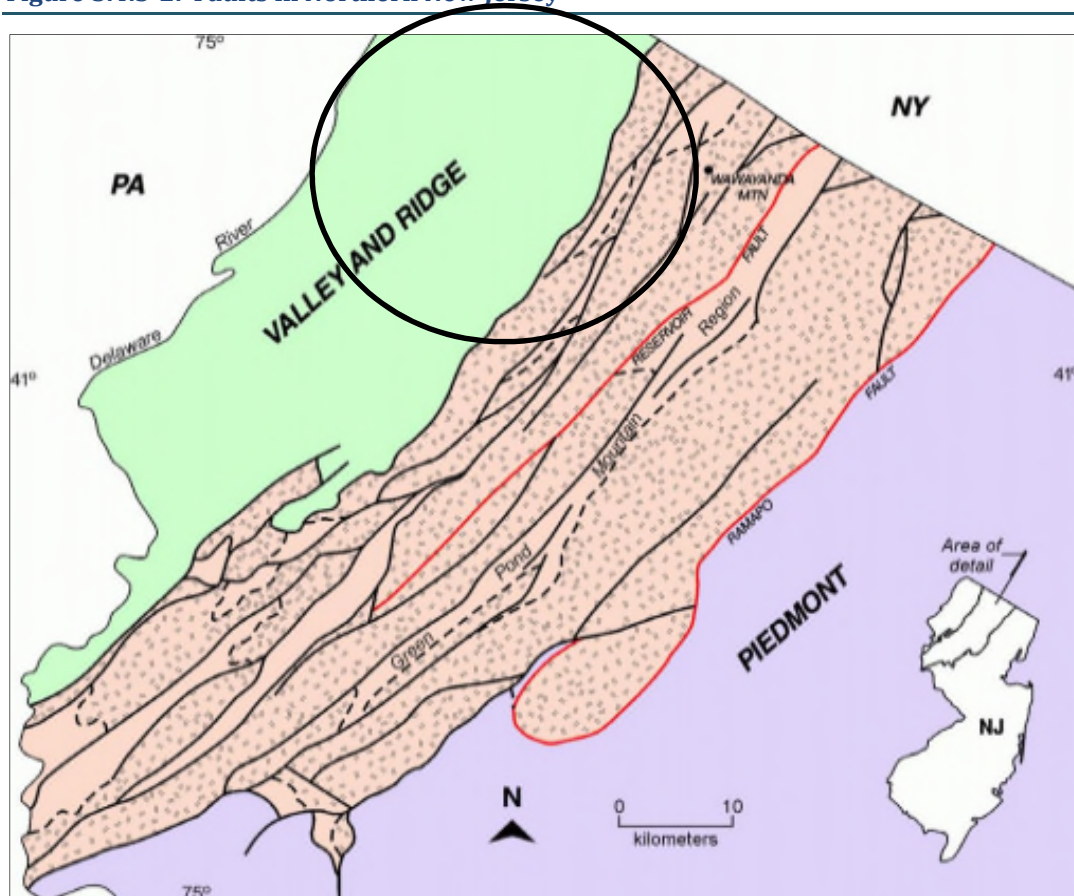
Essex, Union, and Bergen County data, it is likely that Sussex County soil properties are comparative. Although liquefaction susceptibility will vary throughout the County, the majority of the County most likely has a low to very low susceptibility, with a few small areas having moderate or high susceptibility. Once test boring samples are conducted and calculated for Sussex County, more accurate data regarding liquefaction vulnerability in specific areas will be able to be determined.

Liquefaction occurs in saturated soils and when it occurs, the strength of the soil decreases and the ability of a soil deposit to support foundations for buildings and bridges is reduced. Shaking from earthquakes often triggers an increase in water pressure which can trigger landslides and the collapse of dams. For information regarding dam failures, refer to Section 5.4.1 (Dam Failure) and for landslides refer to Section 5.4.6 (Geological Hazards). On the other side, earthquakes contribute to landslide hazards. Earthquakes create stresses that make weak slopes fail. Earthquakes of magnitude 4.0 or greater have been known to trigger landslides.

Fractures or fracture zones along with rocks on adjacent sides have broken and moved upward, downward, or horizontally are known as faults (Volkert and Witte 2015). Movement can take place at faults and cause an earthquake. Earthquake epicenters in eastern North America and the New Jersey area, however, do not typically occur on known faults. The faults in these areas are the result of tectonic activity from over 200 million years ago. Many faults can be located in New Jersey and in parts of Sussex County. One of the most well-known faults in the state is the Ramapo Fault, which separates the Piedmont and Highlands Physiographic Provinces. As indicated in Figure 5.4.3-4, Sussex County might feel the effects of an earthquake along the Ramapo Fault; however, the fault itself is not located within County borders. The Reservoir Fault, which borders the Green Pond Mountain region, is another major faultline in New Jersey and is closer to County borders than the Ramapo Fault (Volkert and Witte 2015).

The New Jersey Highlands are a physiographic province in northern New Jersey and they span approximately 1,000 square miles of scenic and rugged terrain, which includes portions of Sussex County (specifically, 8 municipalities). Faults are a common feature in the Precambrian rocks of the Highlands. The faults range in width from a few tenths of an inch to hundreds of feet and in length from a few feet to as much as tens of miles. The Ramapo fault forms the boundary between the Highlands and Piedmont Provinces. It is a major structural feature, having a width of at least several hundred feet and stretching for a length of 50 miles from Somerset County northeast into New York State. It is the most seismically active fault in the region. Other faults in the region, including the Reservoir Fault, are also prime locations for earthquakes should they occur in the northern part of the state (Volkert and Witte 2015). Figure 5.4.3-2 illustrates the location of both faults in northern New Jersey and their relation to Sussex County.

Figure 5.4.3-2. Faults in Northern New Jersey



Source: Volkert and Witte 2015

Note (1): This is a simplified geologic map of northern New Jersey showing the location of the Highlands (tan). Solid black lines are faults and red lines mark the Reservoir and Ramapo fault lines. Short-dashed lines mark contacts between older Precambrian rocks and younger Paleozoic rocks.

Note (2): The black circle indicates the approximate location of Sussex County. The northern tip of the County is not visible in the map.

Extent

An earthquake's magnitude and intensity are used to describe the size and severity of the event. Magnitude describes the size at the focus of an earthquake and intensity describes the overall felt severity of shaking during the event. The earthquake's magnitude is a measure of the energy released at the source of the earthquake and is expressed by ratings on the Richter scale and/or the moment magnitude scale. The Richter Scale measures magnitude of earthquakes and has no upper limit; however, it is not used to express damage (USGS 2012c). Table 5.4.3-2 presents the Richter scale magnitudes and corresponding earthquake effects.

**Table 5.4.3-2. Richter Magnitude Scale**

Richter Magnitude	Earthquake Effects
2.5 or less	Usually not felt, but can be recorded by seismograph
2.5 to 5.4	Often felt, but causes only minor damage
5.5 to 6.0	Slight damage to buildings and other structures
6.1 to 6.9	May cause a lot of damage in very populated areas
7.0 to 7.9	Major earthquake; serious damage
8.0 or greater	Great earthquake; can totally destroy communities near the epicenter

Source: Michigan Tech University Date Unknown

The moment magnitude scale (MMS) is used to describe the size of an earthquake. It is based on the seismic moment and is applicable to all sizes of earthquakes (USGS 2012d). The Richter Scale is not commonly used anymore, as it has been replaced by the MMS which is a more accurate measure of the earthquake size (USGS 2012c). The MMS uses the following classifications of magnitude:

- Great— $M_w \geq 8$
- Major— $M_w = 7.0 - 7.9$
- Strong— $M_w = 6.0 - 6.9$
- Moderate— $M_w = 5.0 - 5.9$
- Light— $M_w = 4.0 - 4.9$
- Minor— $M_w = 3.0 - 3.9$
- Micro— $M_w < 3$

The intensity of an earthquake is based on the observed effects of ground shaking on people, buildings, and natural features, and varies with location. The Modified Mercalli (MMI) scale expresses intensity of an earthquake and describes how strong a shock was felt at a particular location in values. Table 5.4.3-3 summarizes earthquake intensity as expressed by the Modified Mercalli scale. Table 5.4.3-4 displays the MMI scale and its relationship to the areas peak ground acceleration.

Table 5.4.3-3. Modified Mercalli Intensity Scale

Mercalli Intensity	Shaking	Description
I	Not Felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very Strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.



Table 5.4.3-3. Modified Mercalli Intensity Scale

Mercalli Intensity	Shaking	Description
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Source: USGS 2014

Table 5.4.3-4. Modified Mercalli Intensity and PGA Equivalents

Modified Mercalli Intensity	Acceleration (%g) (PGA)	Perceived Shaking	Potential Damage
I	< .17	Not Felt	None
II	.17 – 1.4	Weak	None
III	.17 – 1.4	Weak	None
IV	1.4 – 3.9	Light	None
V	3.9 – 9.2	Moderate	Very Light
VI	9.2 – 18	Strong	Light
VII	18 – 34	Very Strong	Moderate
VIII	34 – 65	Severe	Moderate to Heavy
IX	65-124	Violent	Heavy
X	>124	Extreme	Very Heavy

Source: Freeman et al. (Purdue University) 2004

Note: PGA Peak Ground Acceleration

Most damage and loss caused by an earthquake is directly or indirectly the result of ground shaking. Modern intensity scales use terms that can be physically measured with seismometers, such as the acceleration, velocity, or displacements (movement) of the ground. The most common physical measure is peak ground acceleration (PGA). PGA is one of the most important measures used to quantify ground motion. PGA is a good index of hazard to buildings because there is a strong correlation between it and the damage a building might experience (NYCEM 2003).

PGA expresses the severity of an earthquake and is a measure of how hard the earth shakes, or accelerates, in a given geographic area. PGA is expressed as a percent acceleration force of gravity (%g). For example, 1.0%g PGA in an earthquake (an extremely strong ground motion) means that objects accelerate sideways at the same rate as if they had been dropped from the ceiling. 10%g PGA means that the ground acceleration is 10% that of gravity (NJOEM 2011). Damage levels experienced in an earthquake vary with the intensity of ground shaking and with the seismic capacity of structures, as noted in



Table 5.4.3-5. Damage Levels Experienced in Earthquakes

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Table 5.4.3-5. Damage Levels Experienced in Earthquakes

Ground Motion Percentage	Explanation of Damages
1-2%g	Motions are widely felt by people; hanging plants and lamps swing strongly, but damage levels, if any, are usually very low.
Below 10%g	Usually causes only slight damage, except in unusually vulnerable facilities.
10 - 20%g	May cause minor-to-moderate damage in well-designed buildings, with higher levels of damage in poorly designed buildings. At this level of ground shaking, only unusually poor buildings would be subject to potential collapse.
20 - 50%g	May cause significant damage in some modern buildings and very high levels of damage (including collapse) in poorly designed buildings.
≥50%g	May causes higher levels of damage in many buildings, even those designed to resist seismic forces.

Source: NJOEM 2011

Note: %g Peak Ground Acceleration

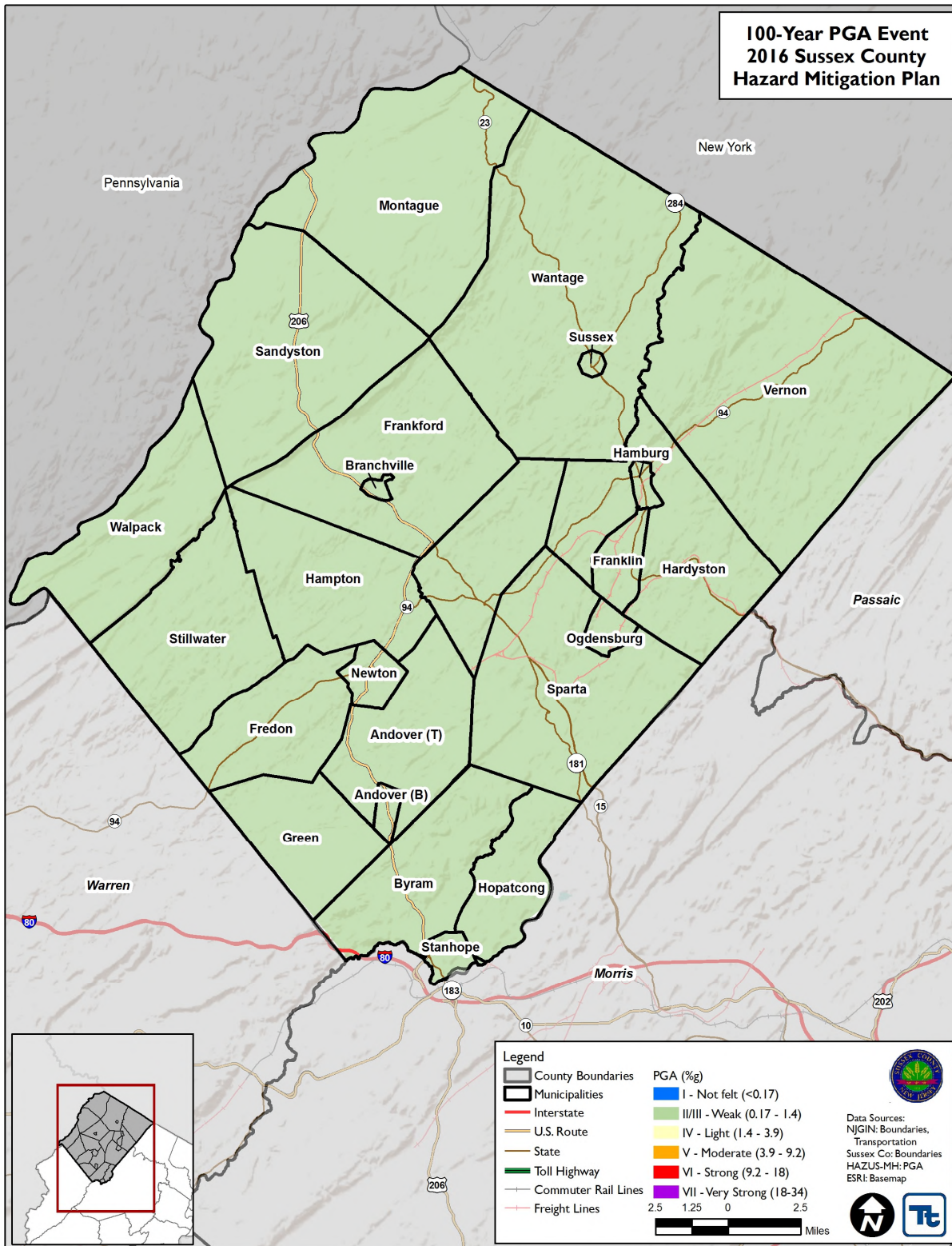
National maps of earthquake shaking hazards have been produced since 1948. They provide information essential to creating and updating the seismic design requirements for building codes, insurance rate structures, earthquake loss studies, retrofit priorities and land use planning used in the U.S. Scientists frequently revise these maps to reflect new information and knowledge. Buildings, bridges, highways and utilities built to meet modern seismic design requirements are typically able to withstand earthquakes better, with less damages and disruption. After thorough review of the studies, professional organizations of engineers update the seismic-risk maps and seismic design requirements contained in building codes (Brown et al., 2001).

The USGS updated the National Seismic Hazard Maps in 2014, which superceded the 2008 maps. New seismic, geologic, and geodetic information on earthquake rates and associated ground shaking were incorporated into these revised maps. The 2014 map represents the best available data as determined by the USGS. According to the data, Sussex County has a PGA between 3%g and 5%g (USGS 2014). The 2014 PGA map can be found at <http://earthquake.usgs.gov/hazards/products/conterminous/2014/2014pga10pct.pdf>

A probabilistic assessment was conducted for the 100-, 500- and 2,500-year mean return periods (MRP) in HAZUS-MH 3.0 to analyze the earthquake hazard for Sussex County. The HAZUS analysis evaluates the statistical likelihood that a specific event will occur and what consequences will occur. Figure 5.4.3-3 through Figure 5.4.3-5 illustrates the geographic distribution of PGA (g) across the County for 100-, 500- and 2,500-year MRP events by Census-tract.



Figure 5.4.3-3. Peak Ground Acceleration 100-Year Mean Return Period for Sussex County



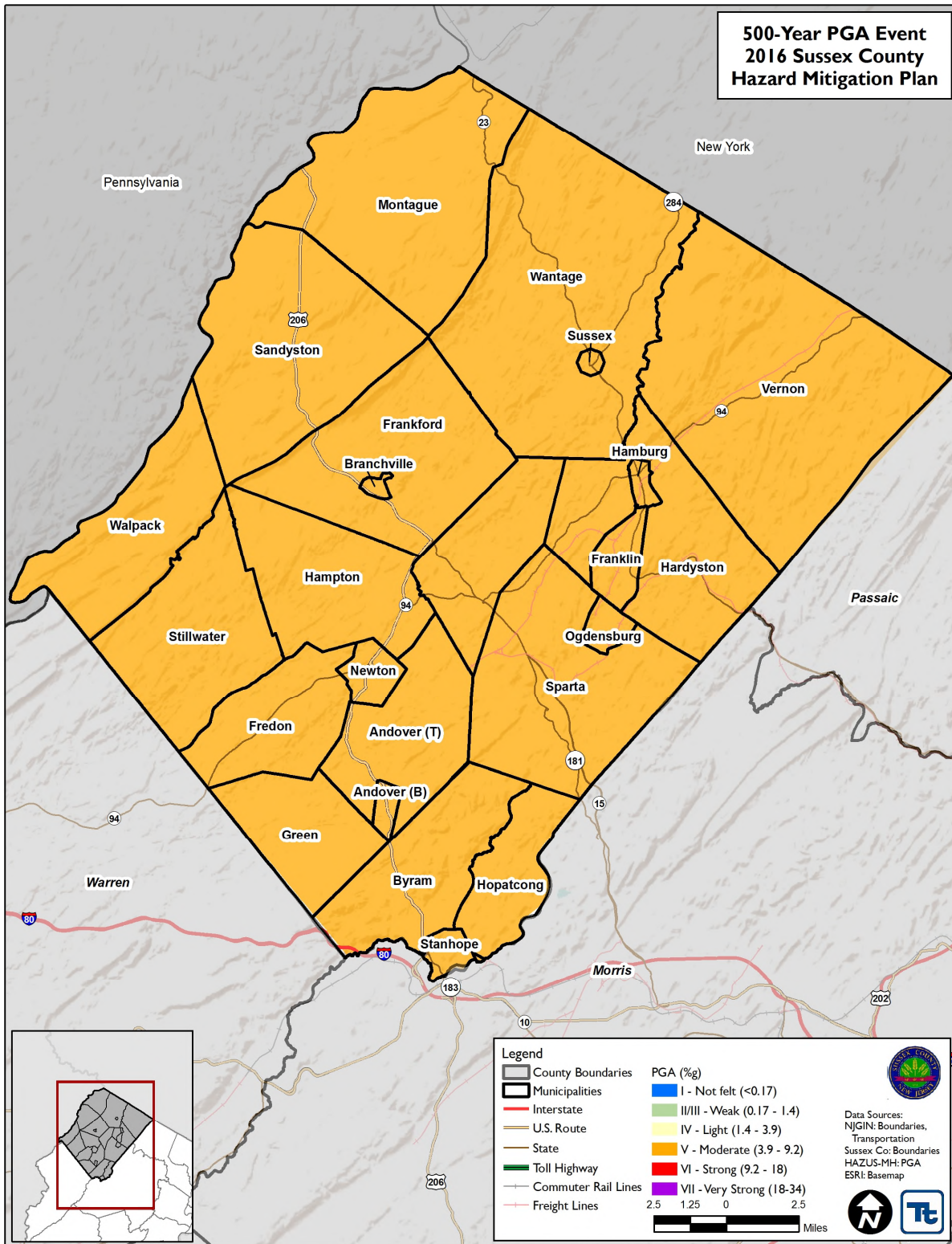
Source: HAZUS-MH 3.0

Note: The peak ground acceleration for the 100-year MRP is 1.27 to 1.35 %g.





Figure 5.4.3-4. Peak Ground Acceleration 500-Year Mean Return Period for Sussex County



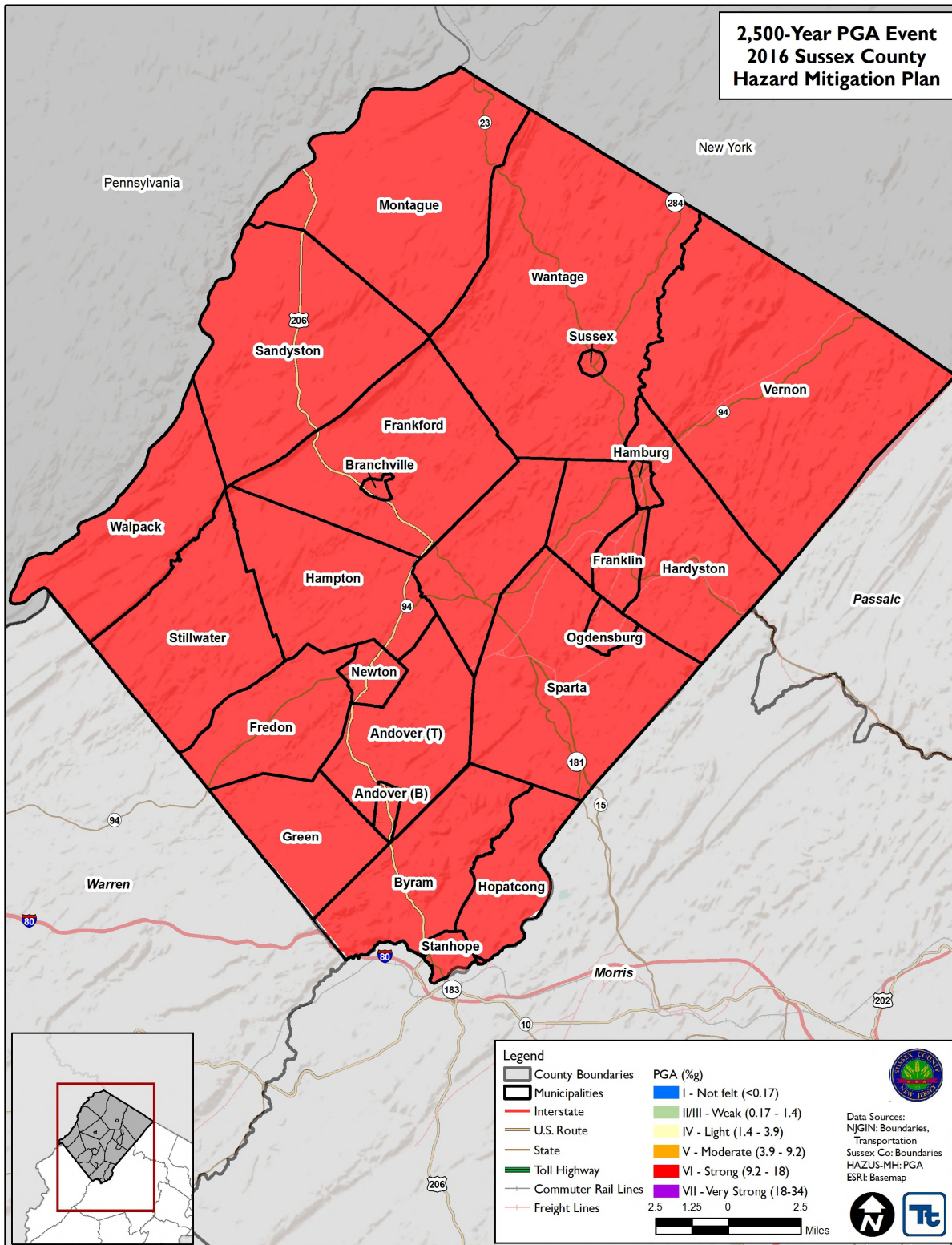
Source: HAZUS-MH 3.0

Note: The peak ground acceleration for the 500-year MRP is 4.6 to 5.3 %g.





Figure 5.4.3-5. Peak Ground Acceleration 2,500-Year Mean Return Period for Sussex County



Source: HAZUS-MH 3.0

Note: The peak ground acceleration for the 2,500-year MRP is 14.4 to 18.0 %g.





Previous Occurrences and Losses

Historically, Sussex County has not experienced a major earthquake. However, there have been a number of earthquakes of relatively low intensity. The majority of earthquakes that have occurred in New Jersey have occurred along faults in the central and eastern Highlands, with the Ramapo fault being the most seismically active fault in the region (Volkert and Witte 2015); Sussex County can be impacted by earthquakes in the New Jersey Highlands. Small earthquakes may occur several times a year and generally do not cause significant damage. The largest earthquake to impact Sussex County was a magnitude 5.3 earthquake that was epicentered west of New York City. It was felt from New Hampshire to Pennsylvania (Stover and Coffman 1993; NJGWS 2014).

Between 1954 and 2015, FEMA has not issued any major disaster (DR) or emergency (EM) declarations for earthquakes in the State of New Jersey.

Table 5.4.3-6. FEMA DR and EM Declarations Since 2008 for Earthquake Events in Sussex County

FEMA Declaration Number	Date(s) of Event	Event Type	Location
No DR or EM Declarations were recorded for Sussex County during this time period.			

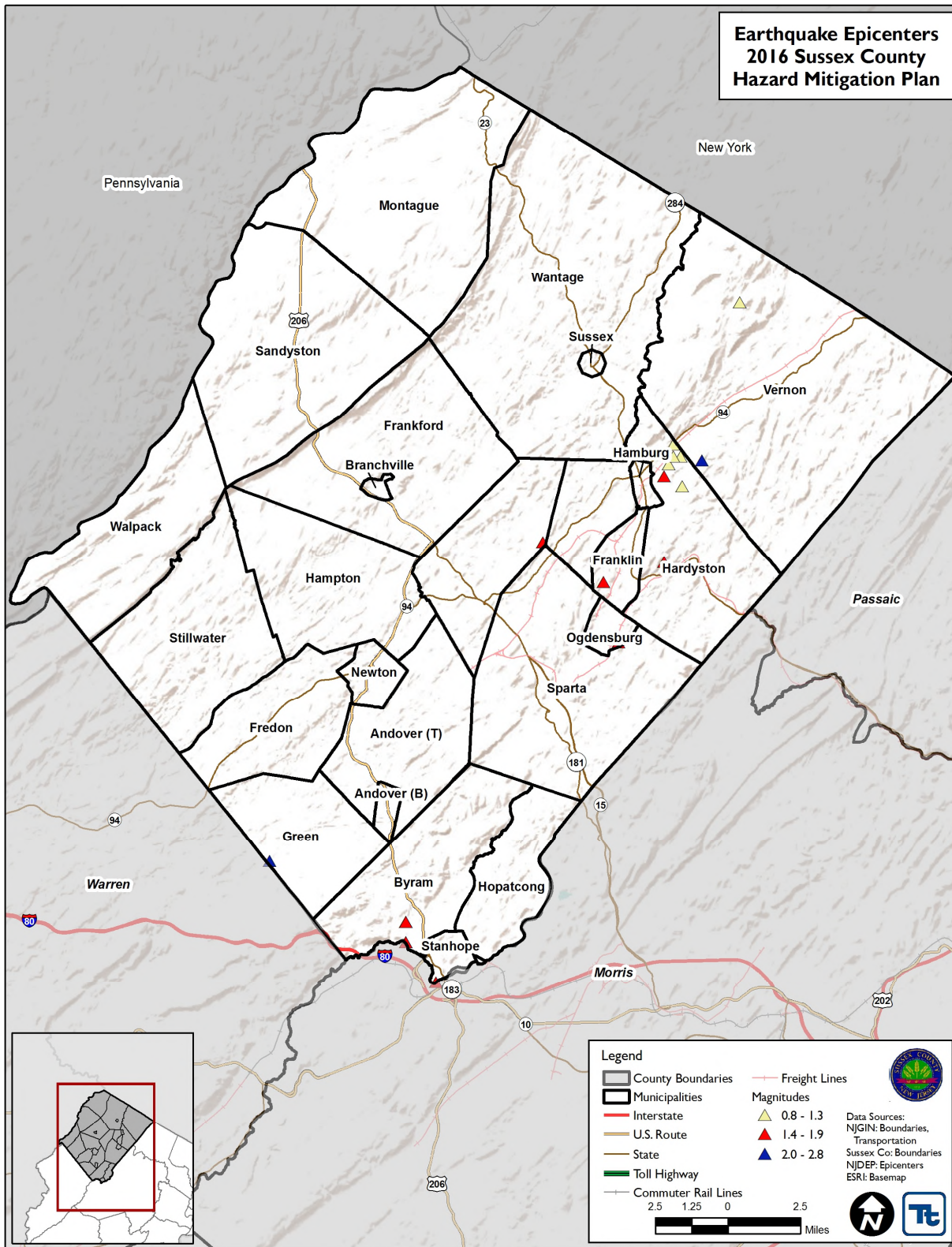
Source: FEMA 2015

For this 2016 HMP update, known earthquake events that have impacted Sussex County or that have had its epicenter in the County, between 2008 and 2015 are identified in Appendix X. For events that occurred prior to 2008, see the 2011 Sussex County HMP. Please note that not all events that have occurred in Sussex County are included due to the extent of documentation and the fact that not all sources may have been identified or researched. Loss and impact information could vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP Update.

Figure 5.4.3-6 illustrates earthquake events where the epicenters were located in Sussex County. The figure shows that 20 earthquakes had epicenters in the County; all of these earthquakes occurred prior to 2008 and are not included in the table in Appendix XX (NJGWS 2015).



Figure 5.4.3-6. Earthquakes with Epicenters in Sussex County, 1783 to 2015



Source: NJDEP 2014





Probability of Future Occurrences

Earthquakes cannot be predicted and may occur any time of the day or year. Major earthquakes are infrequent in the State and County and may occur only once every few hundred years or longer, but the consequences of major earthquakes may potentially be very high. Based on the historic record, the future probability of damaging earthquakes impacting Sussex County is low.

According to the New Jersey Geological and Water Survey (NJGWS), since 2008, Sussex County has had zero earthquakes with epicenters in the County. The County has about an 8.5% chance of having an earthquake of any magnitude with an epicenter somewhere in Sussex County in any given year; additionally, it has over a 40% chance of feeling an earthquake (regardless of the epicenter's location) in any given year. Refer to Table 5.4.3-7 which summarizes the probability of future earthquakes, of any given magnitude, impacting the County, as based on data from the previous occurrences table in Appendix X.

Table 5.4.3-7. Probability of Future Occurrence of Earthquake Events

Hazard Type	Number of Occurrences Between 1783 and 2015	Rate of Occurrence	Recurrence Interval (in years)	Probability of event Occurring in Any Given Year	% Chance of Occurring in Any Given Year
Earthquake with Epicenter inside County	20	0.09	11.65	0.09	8.58
Earthquakes Felt by the County (Including those with Epicenters outside the County)	95	0.41	2.45	0.41	40.77

Source: NJGWS 2015

In Section 5.3, the identified hazards of concern for Sussex County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Committee, the probability of occurrence for earthquake events in the County is considered 'occasional' (hazard event is likely to occur within 100 years see Table 5.3-3).

Climate Change Impacts

Providing projections of future climate change for a specific region is challenging. Shorter term projections are more closely tied to existing trends making longer term projections even more challenging. The further out a prediction reaches the more subject to changing dynamics it becomes. The potential impacts of global climate change on earthquake probability are unknown. Some scientists feel that melting glaciers could induce tectonic activity. As ice melts and water runs off, tremendous amounts of weight are shifted on the Earth's crust. As newly freed crust returns to its original, pre-glacier shape, it could cause seismic plates to slip and stimulate volcanic activity according to research into prehistoric earthquakes and volcanic activity. National Aeronautics and Space Administration (NASA) and USGS scientists found that retreating glaciers in southern Alaska might be opening the way for future earthquakes (New Jersey State HMP 2014).

Secondary impacts of earthquakes could be magnified by future climate change. Soils saturated by repetitive storms could experience liquefaction during seismic activity because of the increased saturation. Dams storing increased volumes of water from changes in the hydrograph could fail during seismic events. There are currently no models available to estimate these impacts (New Jersey State HMP 2014).



5.4.3.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For the earthquake hazard, the entire County has been identified as the exposed hazard area. Therefore, all assets in Sussex County (population, structures, critical facilities and lifelines), as described in the County Profile (Section 4), are vulnerable. The following section includes an evaluation and estimation of the potential impact of the earthquake hazard on Sussex County including the following:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health and safety of residents, (2) general building stock, (3) critical facilities, (4) economy, and (5) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2011 Sussex County Hazard Mitigation Plan
- Further data collections that will assist understanding this hazard over time

Overview of Vulnerability

Earthquakes usually occur without warning and can impact areas a great distance from their point of origin. The extent of damage depends on the density of population and building and infrastructure construction in the area shaken by the quake. Some areas may be more vulnerable than others based on soil type, the age of the buildings and building codes in place. Compounding the potential for damage – historically, Building Officials Code Administration (BOCA) used in the Northeast were developed to address local concerns including heavy snow loads and wind; seismic requirements for design criteria are not as stringent compared to the west coast’s reliance on the more seismically-focused Uniform Building Code). As such, a smaller earthquake in the Northeast can cause more structural damage than if it occurred out west.

Ground shaking is the primary cause of earthquake damage to man-made structures. Damage can be increased when soft soils amplify ground shaking. Soils influence damage in different ways. One way is that soft soils amplify the motion of earthquake waves, producing greater ground shaking and increasing the stresses on structures. Another way is that loose, wet, sandy soils may lose strength and flow as a fluid when shaken, causing foundations and underground structures to shift and break (Stanford 2003).

Damage from earthquakes depends on the location, depth, and magnitude of the earthquake; the thickness and composition of soil and bedrock beneath the area in question; and the types of building structures. Soils influence damage in two ways. Soft soils amplify the motion of earthquake waves, producing greater ground shaking and increasing the stresses on structures. Loose, wet, sandy soils may lose strength and flow as a fluid when shaken (this is known as liquefaction). This causes foundations and underground structures to shift and break.

The entire population and general building stock inventory of the County is at risk of being damaged or experiencing losses due to impacts of an earthquake. Potential losses associated with the earth shaking were calculated for Sussex County for three probabilistic earthquake events, the 100-year, 500- and 2,500-year mean return periods (MRP). The impacts on population, existing structures, critical facilities and the economy within Sussex County are presented below, following a summary of the data and methodology used.

Data and Methodology

A probabilistic assessment was conducted for Sussex County for the 100-, 500- and 2,500-year MRPs through a Level 2 analysis in HAZUS-MH 3.0 to analyze the earthquake hazard and provide a range of loss estimates for Sussex County. The probabilistic method uses information from historic earthquakes and inferred faults, locations and magnitudes, and computes the probable ground shaking levels that may be experienced during a



recurrence period by Census tract. Soil type data from the NJGWS is not available for Sussex County, so HAZUS-MH default data was used.

In addition to the probabilistic scenarios mentioned, an annualized loss run was conducted in HAZUS-MH 3.0 to estimate the annualized general building stock dollar losses for the County. The annualized loss methodology combines the estimated losses associated with ground shaking for eight return periods: 100, 250, 500, 750, 1000, 1500, 2000, 2500-year, which are based on values from the USGS seismic probabilistic curves. Annualized losses are useful for mitigation planning because they provide a baseline upon which to 1) compare the risk of one hazard across multiple jurisdictions and 2) compare the degree of risk of all hazards for each participating jurisdiction.

As noted in the HAZUS-MH Earthquake User Manual *‘Uncertainties are inherent in any loss estimation methodology. They arise in part from incomplete scientific knowledge concerning earthquakes and their effects upon buildings and facilities. They also result from the approximations and simplifications that are necessary for comprehensive analyses. Incomplete or inaccurate inventories of the built environment, demographics and economic parameters add to the uncertainty. These factors can result in a range of uncertainty in loss estimates produced by the HAZUS Earthquake Model, possibly at best a factor of two or more.’* However, HAZUS’ potential loss estimates are acceptable for the purposes of this HMP.

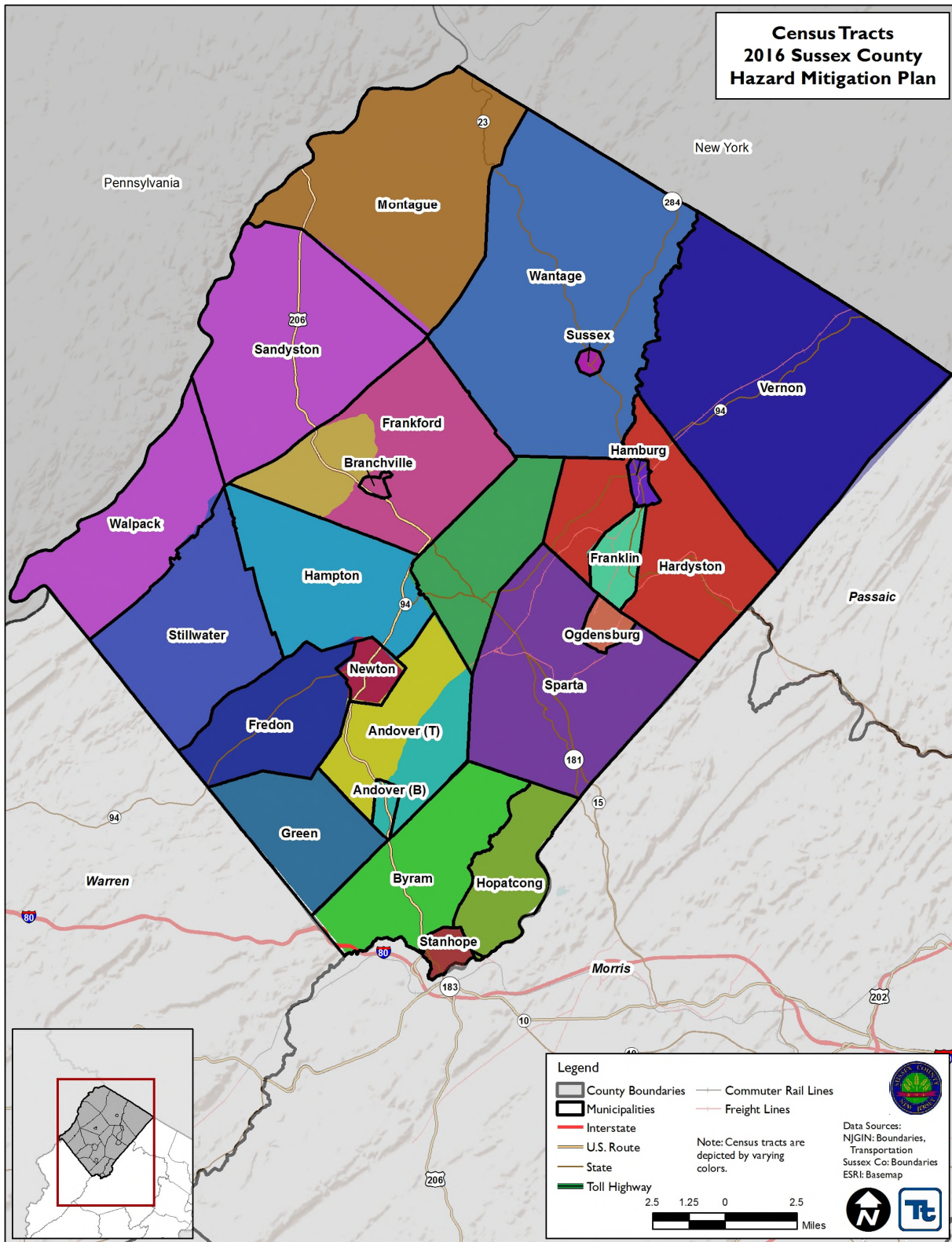
The building stock in HAZUS-MH was updated using the custom building inventory generated for the County. The occupancy classes available in HAZUS-MH 3.0 were condensed into the following categories (residential, commercial, industrial, agricultural, religious, government, and educational) to facilitate the analysis and the presentation of results. Residential loss estimates address both multi-family and single family dwellings. Impacts to critical facilities and utilities were also evaluated.

Data used to assess this hazard include data available in the HAZUS-MH 3.0 earthquake model and professional knowledge.

HAZUS-MH 3.0 generates results at the Census-tract level. The boundaries of the Census tracts are not always coincident with municipal boundaries in Sussex County. The results in the tables below are presented for the Census tracts with the associated municipalities listed for each tract. Figure 5.4.3-7 shows the spatial relationship between the Census tracts and the municipal boundaries.



Figure 5.4.3-7. Census Tracts in Sussex County



Source: HAZUS-MH 3.0





Impact on Life, Health and Safety

Overall, the entire population of Sussex County is exposed to an earthquake hazard event. The impact of earthquakes on life, health and safety is dependent upon the severity of the event. Risk to public safety and loss of life from an earthquake in Sussex County is minimal with higher risk occurring in buildings as a result of damage to the structure, or people walking below building ornamentation and chimneys that may be shaken loose and fall as a result of the quake.

Populations considered most vulnerable are those located in/near the built environment, particularly near unreinforced masonry construction. In addition, the vulnerable population includes the elderly (persons over the age of 65) and individuals living below the Census poverty threshold. These socially vulnerable populations are most susceptible, 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. Refer to Section 4 (County Profile) for the vulnerable population statistics in Sussex County.

Residents may be displaced or require temporary to long-term sheltering due to the event. The number of people requiring shelter is generally less than the number displaced as some displaced persons use hotels or stay with family or friends following a disaster event. In HAZUS-MH, estimated sheltering needs for the earthquake hazard are summarized at the Census tract level. HAZUS-MH estimates there will be no displaced households or people seeking short-term shelter as a result of the 100-year event. HAZUS-MH also estimates less than 10 displaced households and 10 people seeking short-term shelter County-wide as a result of the 500-year event. Table 5.4.3-7 summarizes the population HAZUS-MH estimates will be displaced or will require short-term sheltering for the 2,500-year MRP by municipality.

Table 5.4.3-8. Estimated Displaced Households and Population Seeking Short-Term Shelter from the 2,500-year MRP Events by Municipality

Municipality	2,500-Year MRP	
	Displaced Households	People Requiring Short-Term Shelter
Township of Andover	3	1
Township of Andover-Borough of Andover	2	1
Township of Byram	2	1
Township of Frankford	1	0
Township of Frankford-Borough of Branchville	2	1
Borough of Franklin	5	3
Township of Fredon	0	0
Township of Glen	0	0
Borough of Hamburg	6	3
Township of Hampton	1	1
Township of Hardyston	5	3
Borough of Hopatcong	4	2
Township of Lafayette	1	1
Township of Montague	4	2
Town of Newton	14	9
Borough of Ogdensburg	1	1
Township of Sandyston-Township of Walpack	0	0
Township of Sparta	8	4
Borough of Stanhope	3	2

**Table 5.4.3-8. Estimated Displaced Households and Population Seeking Short-Term Shelter from the 2,500-year MRP Events by Municipality**

Municipality	2,500-Year MRP	
	Displaced Households	People Requiring Short-Term Shelter
Township of Stillwater	1	0
Borough of Sussex	5	3
Township of Vernon	16	7
Township of Wantage	4	2
Sussex County Total	87	47

Source: HAZUS-MH 3.0

Note: The number of displaced households and persons seeking shelter was calculated using the 2010 U.S. Census data (HAZUS-MH 3.0 default demographic data).

According to the 1999-2003 NYCEM Summary Report (*Earthquake Risks and Mitigation in the New York / New Jersey / Connecticut Region*), there is a strong correlation between structural building damage and the number of injuries and casualties from an earthquake event. Further, the time of day also exposes different sectors of the community to the hazard. For example, HAZUS considers the residential occupancy at its maximum at 2:00 a.m., where the educational, commercial and industrial sectors are at their maximum at 2:00 p.m., and peak commute time is at 5:00 p.m. Whether directly impacted or indirectly impact, the entire population will have to deal with the consequences of earthquakes to some degree. Business interruption could keep people from working, road closures could isolate populations, and loss of functions of utilities could impact populations that suffered no direct damage from an event itself.

There are no injuries or casualties estimated for the 100-year event. Table 5.4.3-9 and Table 5.4.3-10 summarize the County-wide injuries and casualties estimated for the 500- and 2,500-year MRP earthquake events, respectively.

Table 5.4.3-9. Estimated Number of Injuries and Casualties from the 500-Year MRP Earthquake Event

Level of Severity	Time of Day		
	2:00 AM	2:00 PM	5:00 PM
Injuries	4	0	0
Hospitalization	0	1	0
Casualties	4	0	0

Source: HAZUS-MH 3.0

Table 5.4.3-10. Estimated Number of Injuries and Casualties from the 2,500-Year MRP Earthquake Event

Level of Severity	Time of Day		
	2:00 AM	2:00 PM	5:00 PM
Injuries	34	45	35
Hospitalization	6	8	6
Casualties	1	1	1

Source: HAZUS-MH 3.0



Impact on General Building Stock

After considering the population vulnerable to the earthquake hazard, the value of general building stock exposed to and damaged by 100-, 500- and 2,500-year MRP earthquake events was evaluated. In addition, annualized losses were calculated using HAZUS-MH 3.0. The entire County's general building stock is considered at risk and exposed to this hazard.

The HAZUS-MH 3.0 model estimates the value of the exposed building stock and the loss (in terms of damage to the exposed stock). Refer to Table 4-7 in the County Profile (Section 4) for general building stock statistics (structure and contents).

For this plan update, a HAZUS-MH probabilistic model was run to estimate annualized dollar losses for Sussex County. Annualized losses are useful for mitigation planning because they provide a baseline upon which to 1) compare the risk of one hazard across multiple jurisdictions and 2) compare the degree of risk of all hazards for each participating jurisdiction. Please note that annualized loss does not predict what losses will occur in any particular year. The estimated annualized losses are approximately \$2.3 million per year (building and contents) for the County.

According to NYCEM, where earthquake risks and mitigation were evaluated in the New York, New Jersey and Connecticut region, most damage and loss caused by an earthquake is directly or indirectly the result of ground shaking (NYCEM, 2003). NYCEM indicates there is a strong correlation between PGA and the damage a building might experience. The HAZUS-MH model is based on the best available earthquake science and aligns with these statements. HAZUS-MH 3.0 methodology and model were used to analyze the earthquake hazard for the general building stock for Sussex County. See Figure 5.4.3-3 through Figure 5.4.3-5 illustrates the geographic distribution of PGA (g) across the County or 100-, 500- and 2,500-year MRP events by Census-tract.



In addition, according to NYCEM, a building's construction determines how well it can withstand the force of an earthquake. The NYCEM report indicates that un-reinforced masonry buildings are most at risk during an earthquake because the walls are prone to collapse outward, whereas steel and wood buildings absorb more of the earthquake's energy. Additional attributes that contribute to a building's capability to withstand an earthquake's force include its age, number of stories and quality of construction. HAZUS-MH considers building construction and the age of buildings as part of the analysis.

Potential building damage was evaluated by HAZUS-MH 3.0 across the following damage categories (none, slight, moderate, extensive and complete). Table 5.4.3-12 provides definitions of these five categories of damage for a light wood-framed building; definitions for other building types are included in HAZUS-MH technical manual documentation. General building stock damage for these damage categories by occupancy class and building type on a County-wide basis is summarized below for the 100-, 500- and 2,500-year events.

Table 5.4.3-11. Example of Structural Damage State Definitions for a Light Wood-Framed Building

Damage Category	Description
Slight	Small plaster or gypsum-board cracks at corners of door and window openings and wall-ceiling intersections; small cracks in masonry chimneys and masonry veneer.
Moderate	Large plaster or gypsum-board cracks at corners of door and window openings; small diagonal cracks across shear wall panels exhibited by small cracks in stucco and gypsum wall panels; large cracks in brick chimneys; toppling of tall masonry chimneys.
Extensive	Large diagonal cracks across shear wall panels or large cracks at plywood joints; permanent lateral movement of floors and roof; toppling of most brick chimneys; cracks in foundations; splitting of wood sill plates and/or slippage of structure over foundations; partial collapse of room-over-garage or other soft-story configurations.
Complete	Structure may have large permanent lateral displacement, may collapse, or be in imminent danger of collapse due to cripple wall failure or the failure of the lateral load resisting system; some structures may slip and fall off the foundations; large foundation cracks.

Source: HAZUS-MH Technical Manual

Tables 5.4.3-14 through 5.4.3-17 summarize the damage estimated for the 500- and 2,500-year MRP earthquake events. HAZUS-MH estimates no damage to the building stock as a result of the 100-year event. Damage loss estimates include structural and non-structural damage to the building and loss of contents.

Table 5.4.3-12. Estimated Buildings Damaged by General Occupancy for 500-year and 2,500-year MRP Earthquake Events

Category	Average Damage State									
	500-Year MRP					2,500-Year MRP				
	None	Slight	Moderate	Extensive	Complete	None	Slight	Moderate	Extensive	Complete
Residential	54,653 (89.6%)	666 (1.1%)	148 (<1%)	18 (<1%)	2 (<1%)	49,069 (80.4%)	4,980 (8.2%)	1,222 (2.0%)	190 (<1%)	26 (<1%)
Commercial	2,075 (3.4%)	51 (<1%)	15 (<1%)	2 (<1%)	0 (0%)	1,787 (2.9%)	226 (<1%)	110 (<1%)	19 (<1%)	2 (<1%)
Industrial	171 (<1%)	5 (<1%)	2 (<1%)	0 (0%)	0 (0%)	145 (<1%)	19 (<1%)	11 (<1%)	2 (<1%)	0 (0%)
Education, Government, Religious and Agricultural	2,568 (4.2%)	63 (<1%)	17 (<1%)	1 (<1%)	0 (0%)	2,222 (3.6%)	284 (1%)	120 (<1%)	23 (<1%)	1 (<1%)

Source: HAZUS-MH 3.0



Table 5.4.3-13. Estimated Value (Building and Contents) Damaged by the 500- and 2,500-Year MRP Earthquake Events

Municipality	Total Improved Value (Building and Contents)	Estimated Total Damages*			Percent of Total Building and Contents *		
		Annualized Loss	500-Year	2,500-Year	Annualized Loss	500-Year	2,500-Year
Township of Andover	\$649,634,032	\$4,507	\$294,135	\$4,643,224	<1%	<1%	<1%
Township of Andover-Borough of Andover	\$803,077,000	\$5,948	\$385,540	\$6,195,143	<1%	<1%	<1%
Township of Byram	\$1,533,053,238	\$10,896	\$697,588	\$11,494,316	<1%	<1%	<1%
Township of Frankford	\$641,999,080	\$3,675	\$249,415	\$3,767,717	<1%	<1%	<1%
Township of Frankford-Borough of Branchville	\$1,188,788,696	\$7,937	\$531,175	\$8,027,019	<1%	<1%	<1%
Borough of Franklin	\$875,822,684	\$6,870	\$453,402	\$7,110,614	<1%	<1%	<1%
Township of Fredon	\$843,240,122	\$5,771	\$377,871	\$5,941,808	<1%	<1%	<1%
Township of Glen	\$964,670,747	\$6,212	\$405,042	\$6,470,904	<1%	<1%	<1%
Borough of Hamburg	\$742,375,475	\$6,069	\$399,167	\$6,271,068	<1%	<1%	<1%
Township of Hampton	\$1,405,498,363	\$9,527	\$634,723	\$9,774,688	<1%	<1%	<1%
Township of Hardyston	\$1,675,301,658	\$13,193	\$859,826	\$13,708,981	<1%	<1%	<1%
Borough of Hopatcong	\$2,226,722,745	\$16,310	\$1,045,562	\$17,280,283	<1%	<1%	<1%
Township of Lafayette	\$808,223,135	\$5,768	\$378,971	\$5,859,616	<1%	<1%	<1%
Township of Montague	\$855,315,939	\$4,816	\$336,634	\$4,837,353	<1%	<1%	<1%
Town of Newton	\$1,475,297,242	\$10,319	\$675,651	\$10,576,744	<1%	<1%	<1%
Borough of Ogdensburg	\$391,320,172	\$2,979	\$195,496	\$3,104,875	<1%	<1%	<1%
Township of Sandyston-Township of Walpack	\$608,071,520	\$3,445	\$235,819	\$3,436,620	<1%	<1%	<1%
Township of Sparta	\$4,748,450,586	\$35,370	\$2,296,088	\$37,195,525	<1%	<1%	<1%
Borough of Stanhope	\$863,394,252	\$7,086	\$455,982	\$7,417,681	<1%	<1%	<1%
Township of Stillwater	\$923,565,485	\$5,723	\$381,305	\$5,840,833	<1%	<1%	<1%
Borough of Sussex	\$421,823,144	\$3,106	\$209,104	\$3,151,032	<1%	<1%	<1%
Township of Vernon	\$4,739,454,876	\$36,590	\$2,405,223	\$37,991,811	<1%	<1%	<1%
Township of Wantage	\$2,253,904,512	\$15,183	\$1,020,096	\$15,385,987	<1%	<1%	<1%
Sussex County Total	\$31,639,004,702	\$227,297	\$14,923,812	\$235,483,840	<1%	<1%	<1%

Source: HAZUS-MH 3.0

*Total Damages is the sum of damages for all occupancy classes (residential, commercial, industrial, agricultural, educational, religious and government).



Table 5.4.3-14. Estimated Value (Building and Contents) Damaged by the 500- and 2,500-Year MRP Earthquake Events (Continued)

Municipality	Total Improved Value (Building and Contents)	Estimated Residential Damage		Estimated Commercial Damage	
		500-Year	2,500-Year	500-Year	2,500-Year
Township of Andover	\$649,634,032	\$201,716	\$3,297,945	\$48,513	\$693,103
Township of Andover-Borough of Andover	\$803,077,000	\$292,241	\$4,835,486	\$56,932	\$818,889
Township of Byram	\$1,533,053,238	\$611,810	\$10,226,532	\$44,694	\$645,096
Township of Frankford	\$641,999,080	\$211,646	\$3,232,248	\$22,018	\$308,102
Township of Frankford-Borough of Branchville	\$1,188,788,696	\$301,728	\$4,781,721	\$77,334	\$1,096,987
Borough of Franklin	\$875,822,684	\$327,340	\$5,271,900	\$84,335	\$1,207,437
Township of Fredon	\$843,240,122	\$252,682	\$4,125,936	\$21,382	\$308,692
Township of Glen	\$964,670,747	\$330,326	\$5,393,746	\$12,149	\$173,114
Borough of Hamburg	\$742,375,475	\$324,725	\$5,208,645	\$61,748	\$869,266
Township of Hampton	\$1,405,498,363	\$520,329	\$8,151,309	\$40,804	\$579,103
Township of Hardyston	\$1,675,301,658	\$686,162	\$11,161,089	\$86,521	\$1,240,967
Borough of Hopatcong	\$2,226,722,745	\$962,150	\$16,039,588	\$48,994	\$707,467
Township of Lafayette	\$808,223,135	\$207,958	\$3,399,082	\$32,791	\$463,526
Township of Montague	\$855,315,939	\$271,266	\$3,943,872	\$23,126	\$308,560
Town of Newton	\$1,475,297,242	\$427,609	\$6,972,287	\$183,129	\$2,610,425
Borough of Ogdensburg	\$391,320,172	\$160,998	\$2,595,561	\$18,887	\$267,060
Township of Sandyston-Township of Walpack	\$608,071,520	\$138,886	\$2,080,409	\$21,343	\$290,921
Township of Sparta	\$4,748,450,586	\$2,031,975	\$33,322,103	\$139,106	\$1,975,813
Borough of Stanhope	\$863,394,252	\$396,037	\$6,528,411	\$42,058	\$605,769
Township of Stillwater	\$923,565,485	\$261,133	\$4,120,945	\$23,935	\$338,329
Borough of Sussex	\$421,823,144	\$126,931	\$1,977,331	\$52,116	\$724,490
Township of Vernon	\$4,739,454,876	\$1,994,033	\$32,058,087	\$270,780	\$3,883,011
Township of Wantage	\$2,253,904,512	\$672,774	\$10,577,499	\$69,066	\$950,379
Sussex County Total	\$31,639,004,702	\$11,712,456	\$189,301,730	\$1,481,759	\$21,066,504

Source: HAZUS-MH 3.0



HAZUS-MH estimates no damages for the 100-year earthquake event. HAZUS-MH estimates \$15 million (<1%) in damages to buildings in the County during a 500-year earthquake event. These damages include structural damage, non-structural damage and loss of contents, representing less than 1% of the total improved value for general building stock in Sussex County. For a 2,500-year MRP earthquake event, HAZUS-MH estimates greater than \$235 million in damages, or less than 1% of the total general building stock improved value. Residential and commercial buildings account for most of the damage for earthquake events.

Earthquakes can cause secondary hazard events such as fires. HAZUS-MH estimates zero fires are anticipated as a result of the 100-, 500- and 2,500-year MRP events.

Impact on Critical Facilities

After considering the general building stock exposed to, and damaged by, 100-, 500- and 2,500-year MRP earthquake events, critical facilities were evaluated. All critical facilities (essential facilities, transportation systems, lifeline utility systems, high-potential loss facilities and user-defined facilities) in Sussex County are considered exposed and potentially vulnerable to the earthquake hazard. Refer to subsection “Critical Facilities” in Section 4 (County Profile) of this Plan for a description of the critical facilities in the County.

HAZUS-MH 3.0 estimates the probability that critical facilities may sustain damage as a result of 100-, 500- and 2,500-year MRP earthquake events. Additionally, HAZUS-MH estimates percent functionality for each facility days after the event. As a result of a 100-Year MRP event, HAZUS-MH 3.0 estimates that emergency facilities (police, fire, EMS and medical facilities), schools, utilities and specific facilities identified by Sussex County as critical will be nearly 100% functional. Therefore, the impact to critical facilities is not significant for the 100-year event.

Table 5.4.3-15 and Table 5.4.3-16 lists the percent probability of critical facilities sustaining the damage category as defined by the column heading and percent functionality after the event for the 500-year and 2,500-year MRP earthquake events.

Table 5.4.3-15. Estimated Damage and Loss of Functionality for Critical Facilities and Utilities in Sussex County for the 500-Year MRP Earthquake Event

Name	Percent Probability of Sustaining Damage					Percent Functionality			
	None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Critical Facilities									
Medical	95	3	2	<1	0	95	99	100	100
Police	88-95	4-8	1-4	<1	<1	88-95	96-98	99-100	100
Fire	88-96	3-8	1-4	<1	<1	88-96	96-99	99-100	100
EOC	89-95	4-8	1-3	<1	<1	89-95	96-99	99-100	100
School	95-96	3-4	1	<1	0	95-96	98-99	100	100
Utilities									
Potable Water	98	1-2	<1	0	0	99	100	100	100
Wastewater	98	1.5	<1	0	0	99	100	100	100
Electric	98-99	1-2	<1	0	0	99	100	100	100
Communication	100	0	0	0	0	100	100	100	100

Source: HAZUS-MH 3.0

**Table 5.4.3-16. Estimated Damage and Loss of Functionality for Critical Facilities and Utilities in Sussex County for the 2,500-Year MRP Earthquake Event**

Name	Percent Probability of Sustaining Damage					Percent Functionality			
	None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Critical Facilities									
Medical	74	15	8-9	2	<1	74	89	98	99
Police	61-74	15-20	8-14	2-4	<1	61-74	80-89	95-98	97-99
Fire	61-77	14-20	7-14	1-5	<1	61-77	89-91	95-98	97-99
EOC	62-75	15-19	8-14	2-4	<1	62-75	91-90	95-98	97-99
School	72-77	14-17	7-9	1-2	<1	72-77	88-91	98	99
Utilities									
Potable Water	77-79	12-13	8-9	<1	<1	98-91	99	100	100
Wastewater	78	13	9	<1	<1	83	99	100	100
Electric	78-80	12-13	8-9	<1	<1	85-87	100	100	100
Communication	100	0	0	0	0	100	100	100	100

Source: HAZUS-MH 3.0

Impact on Economy

The risk of a damaging earthquake, in combination with the density of value of buildings in New Jersey, place the State 10th among all states for potential economic loss from earthquakes (Stanford 2003).

Impacts on the economy as a result of an earthquake may include the following: loss of business function, damage to inventory, relocation costs, wage loss and rental loss due to the repair/replacement of buildings. A Level 2 HAZUS-MH analysis estimates the total economic loss associated with each earthquake scenario, which includes building- and lifeline-related losses (transportation and utility losses) based on the available inventory (facility [or GIS point] data only). Direct building losses are the estimated costs to repair or replace the damage caused to the building. This is reported in the “Impact on General Building Stock” subsection. Lifeline-related losses include the direct repair cost to transportation and utility systems and are reported in terms of the probability of reaching or exceeding a specified level of damage when subjected to a given level of ground motion. Additionally, economic loss includes business interruption losses associated with the inability to operate a business due to the damage sustained during the earthquake as well as temporary living expenses for those displaced. These losses are discussed below.

HAZUS-MH estimates there will be no losses to income or capital as a result of the 100-year event. It is significant to note that for the 500-year event, HAZUS-MH 3.0 estimates the County will incur approximately \$1.8 million in income losses (wage, rental, relocation and capital-related losses) in addition to the 500-year event estimated structural, non-structural, content and inventory losses (\$14.95 million).

For the 2,500-year event, HAZUS-MH 3.0 estimates the County will incur approximately \$15.5 million in income losses, mainly to the commercial and residential occupancy classes associated with wage, rental, relocation and capital-related losses. In addition, HAZUS-MH estimates greater than an estimated \$236.2 million in structural, non-structural, content and inventory losses related to the 2,500-year MRP event.

Roadway segments and railroad tracks may experience damage due to ground failure and regional transportation and distribution of these materials will be interrupted as a result of an earthquake event. Losses to the community that result from damages to lifelines can be much greater than the cost of repair (HAZUS-MH 3.0 Earthquake User Manual, 2012).



Earthquake events can significantly impact road bridges. These are important because they often provide the only access to certain neighborhoods. Since softer soils can generally follow floodplain boundaries, bridges that cross watercourses should be considered vulnerable. A key factor in the degree of vulnerability will be the age of the facility or infrastructure, which will help indicate to which standards the facility was built. HAZUS-MH estimates the long-term economic impacts to the County for 15-years after the 2,500-year earthquake event. In terms of the transportation infrastructure, HAZUS-MH estimates \$1.18 million in direct repair costs to bridges, highway, railways, bus, and airport facilities in the County. There are no losses computed by HAZUS-MH for business interruption due to transportation or utility lifeline losses.

HAZUS-MH 3.0 also estimates the volume of debris that may be generated as a result of an earthquake event to enable the study region to prepare and rapidly and efficiently manage debris removal and disposal. Debris estimates are divided into two categories: (1) reinforced concrete and steel that require special equipment to break it up before it can be transported, and (2) brick, wood and other debris that can be loaded directly onto trucks with bulldozers (HAZUS-MH Earthquake User's Manual).

For the 100-year MRP event, HAZUS-MH 3.0 estimates 0 tons of debris will be generated. For the 500-year MRP event, HAZUS-MH 3.0 estimates greater than 5,000 tons of debris may be generated. For the 2,500-year MRP event, HAZUS-MH 3.0 estimates greater than 40,000 tons of debris may be generated. Table 5.4.3-21 summarizes the estimated debris generated as a result of these events by municipality (Census-tract).

Table 5.4.3-17. Estimated Debris Generated by the 500- and 2,500-year MRP Earthquake Events

Municipality	500-Year		2,500-Year	
	Brick/ Wood (tons)	Concrete/ Steel (tons)	Brick/ Wood (tons)	Concrete/ Steel (tons)
Township of Andover	101	26	632	252
Township of Andover-Borough of Andover	122	29	776	292
Township of Byram	253	51	1,608	518
Township of Frankford	88	19	524	172
Township of Frankford-Borough of Branchville	154	45	937	426
Borough of Franklin	129	34	802	329
Township of Fredon	122	32	760	305
Township of Glen	123	28	762	263
Borough of Hamburg	108	26	675	255
Township of Hampton	168	41	1,029	398
Township of Hardyston	304	70	1,908	691
Borough of Hopatcong	383	73	2,446	742
Township of Lafayette	108	34	666	328
Township of Montague	121	27	698	244
Town of Newton	183	47	1,140	472
Borough of Ogdensburg	68	16	427	155
Township of Sandyston-Township of Walpack	76	22	447	201
Township of Sparta	750	158	4,732	1,583
Borough of Stanhope	118	29	758	299
Township of Stillwater	124	32	759	300
Borough of Sussex	54	15	328	145
Township of Vernon	815	177	5,057	1,730
Township of Wantage	323	86	1,951	800
Sussex County Total	4,796	1,115	29,822	10,900

Source: HAZUS-MH 3.0



Future Growth and Development

As discussed in Section 4, areas targeted for future growth and development have been identified across the County. It is anticipated that the human exposure and vulnerability to earthquake impacts in newly developed areas will be similar to those that currently exist within the County. Current building codes require seismic provisions that should render new construction less vulnerable to seismic impacts than older, existing construction that may have been built to lower construction standards.

Change of Vulnerability

Sussex County continues to be vulnerable to the earthquake hazard. However, there are differences between the potential loss estimates between this plan update to the results in the 2011 HMP. For the 2016 update, probabilistic scenarios were evaluated using a Level 2 HAZUS-MH analysis. 2010 U.S. Census data, 2015 MODIV tax data, and an updated critical facility inventory were used for this update.

Effect of Climate Change on Vulnerability

Providing projections of future climate change for a specific region is challenging. Some scientists feel that melting glaciers could induce tectonic activity. As ice melts and water runs off, tremendous amounts of weight are shifted on the Earth's crust. As newly freed crust returns to its original, pre-glacier shape, it could cause seismic plates to slip and stimulate volcanic activity according to research into prehistoric earthquakes and volcanic activity. National Aeronautics and Space Administration (NASA) and USGS scientists found that retreating glaciers in southern Alaska might be opening the way for future earthquakes.

Secondary impacts of earthquakes could be magnified by future climate change. Soils saturated by repetitive storms could experience liquefaction during seismic activity because of the increased saturation. Dams storing increased volumes of water from changes in the hydrograph could fail during seismic events. There are currently no models available to estimate these impacts.

Additional Data and Next Steps

A Level 2 HAZUS-MH earthquake analysis was conducted for Sussex County using the default model data, with the exception of the updated building and critical facility. Additional data needed to further refine and enhance the County's vulnerability assessment include NEHRP soils to be integrated into the HAZUS-MH model. Identifying un-reinforced masonry critical facilities and privately-owned buildings (i.e., residences) using local knowledge and/or pictometry/orthophotos would be valuable as these buildings may not withstand earthquakes of certain magnitudes. This information will facilitate developing plans to provide emergency response/recovery efforts for these properties. Further mitigation actions include training of County and municipal personnel to provide post-hazard event rapid visual damage assessments, increase of County and local debris management and logistic capabilities, and revised regulations to prevent additional construction of non-reinforced masonry buildings.



5.4.4 Flood

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the flood hazard in Sussex County.

2016 Plan Update Changes

- The hazard profile has been significantly enhanced to include a detailed hazard description, location, extent, previous occurrences, probability of future occurrence, and potential change in climate and its impacts on the flood hazard is discussed. The flood hazard is now located in Section 5 of the plan update.
- New and updated figures from federal and state agencies are incorporated.
- Previous occurrences were updated with events that occurred between 2008 and 2015.
- A vulnerability assessment was conducted for the flood hazard and it now directly follows the hazard profile.

5.4.4.1 Profile

Hazard Description

Floods are one of the most common natural hazards in the U.S. They can develop slowly over a period of days or develop quickly, with disastrous effects that can be local (impacting a neighborhood or community) or regional (affecting entire river basins, coastlines and multiple counties or states). Most communities in the U.S. have experienced some kind of flooding after spring rains, heavy thunderstorms, coastal storms, or winter snow thaws (George Washington University 2001). Floods are frequent and costly natural hazards in New Jersey in terms of human hardship and economic loss, particularly to communities that lie within flood-prone areas or floodplains of a major water source.

Many floods fall into three categories: riverine, coastal, and shallow (FEMA 2005). Other types of floods may include ice-jam floods, alluvial fan floods, dam failure floods, and floods associated with local drainage or high groundwater (as indicated in the previous flood definition). Flooding in Sussex County can be the result of heavy rainfall produced by hurricanes or thunderstorms; flash flooding; ice jams and severe winter storms. Many areas of Sussex County near the Delaware River are susceptible to localized flooding due to snow melt combined with a rain event, heavy rains, or cyclonic events (including hurricanes, tropical storms, or nor'easters) (Sussex County HMP 2011). For the purpose of this HMP, and as deemed appropriate by the Sussex County Planning Committee, riverine/flash flooding and ice-jam floods are the main flood types of concern for the county. These types of flood are further discussed below.

Riverine/Flash Floods

Riverine floods occur along a channel and include overbank and flash flooding. Channels are defined, ground features that carry water through and out of a watershed. They may be called rivers, creeks, streams, or ditches. When a channel receives too much water, the excess water flows over its banks and inundates low-lying areas (FEMA 2015a; The Illinois Association for Floodplain and Stormwater Management 2006).

A flash flood is:

“a rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined flood level, beginning within six hours of the causative event (e.g., intense rainfall, dam failure, ice jam). However, the actual time threshold may vary in different parts of the country. Ongoing flooding can intensify to flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters” (National Weather Service [NWS] 2009).



Additionally, riverine flooding can lead to stormwater and urban drainage flooding in Sussex County. Stormwater flooding described below is due to local drainage issues and high groundwater levels. Locally, heavy precipitation may produce flooding in areas other than delineated floodplains or along recognizable channels. If local conditions cannot accommodate intense precipitation through a combination of infiltration and surface runoff, water may accumulate and cause flooding problems. During winter and spring, frozen ground and snow accumulations may contribute to inadequate drainage and localized ponding. Flooding issues of this nature generally occur in areas with flat gradients and generally increase with urbanization which speeds the accumulation of floodwaters because of impervious areas. Shallow street flooding can occur unless channels have been improved to account for increased flows (FEMA 1997).

High groundwater levels can be a concern and cause problems even where there is no surface flooding. Basements are susceptible to high groundwater levels. Seasonally high groundwater is common in many areas, while elsewhere high groundwater occurs only after a long periods of above-average precipitation (FEMA 1997).

Urban drainage flooding is caused by increased water runoff due to urban development and drainage systems. Drainage systems are designed to remove surface water from developed areas as quickly as possible to prevent localized flooding on streets and other urban areas. They make use of a closed conveyance system that channels water away from an urban area to surrounding streams. This bypasses the natural processes of water filtration through the ground, containment, and evaporation of excess water. Since drainage systems reduce the amount of time the surface water takes to reach surrounding streams, flooding in those streams can occur more quickly and reach greater depths than prior to development in that area (FEMA 2015a).

Ice Jam Flooding

As per the Northeast States Emergency Consortium and FEMA, an ice jam is an accumulation of ice that acts as a natural dam and restricts flow of a body of water. Ice jams occur when warm temperatures and heavy rains cause rapid snowmelt. The melting snow, combined with the heavy rain, causes frozen rivers to swell. The rising water breaks the ice layers into large chunks, which float downstream and often pile up near narrow passages and obstructions (bridges and dams). Ice jams may build up to a thickness great enough to raise the water level and cause flooding (FEMA 2015a). Ice jams may also be caused by frazil ice, which forms when mist freezes and then floats down a river, stream, or creek.

There are two different types of ice jams: freeze-up and breakup. Freeze-up jams occur in the early to mid-winter when floating ice may slow or stop due to a change in water slope as it reaches an obstruction to movement. Breakup jams occur during periods of thaw, generally in late winter and early spring. The ice cover breakup is usually associated with a rapid increase in runoff and corresponding river discharge due to a heavy rainfall, snowmelt, or warmer temperatures (White 2013).

Location

Flooding in New Jersey is often the direct result of frequent weather events such as thunderstorms, heavy rains, tropical storms, and hurricanes. Floods can happen almost anywhere in New Jersey, although they do tend to occur in and around areas near existing bodies of water, such as rivers, streams, and the Atlantic Ocean. The most damaging floods (particularly riverine floods) in New Jersey appear to occur in the northern half of the state, which includes Sussex County. This is a function of several physiographic and physical features of the landscape. Greater geographic relief in the northern half results in flowing water moving down steeper gradients and being naturally or artificially channelized through valleys and gullies.

Sussex County has primarily a mountainous terrain, with significant exposure to water and vulnerability to the flood hazard. Sussex County has several large waterways, including the Musconetcong River and Paulins Kill, as well as the Delaware River, which has a total drainage area of over 14,000 square miles. Larger lakes and



reservoirs include Lake Hopatcong, Lake Musconetcong and Lake Mohawk (FEMA FIS 2011). Over the years, Sussex County has been impacted by flooding, especially in the municipalities situated adjacent to these bodies of water.

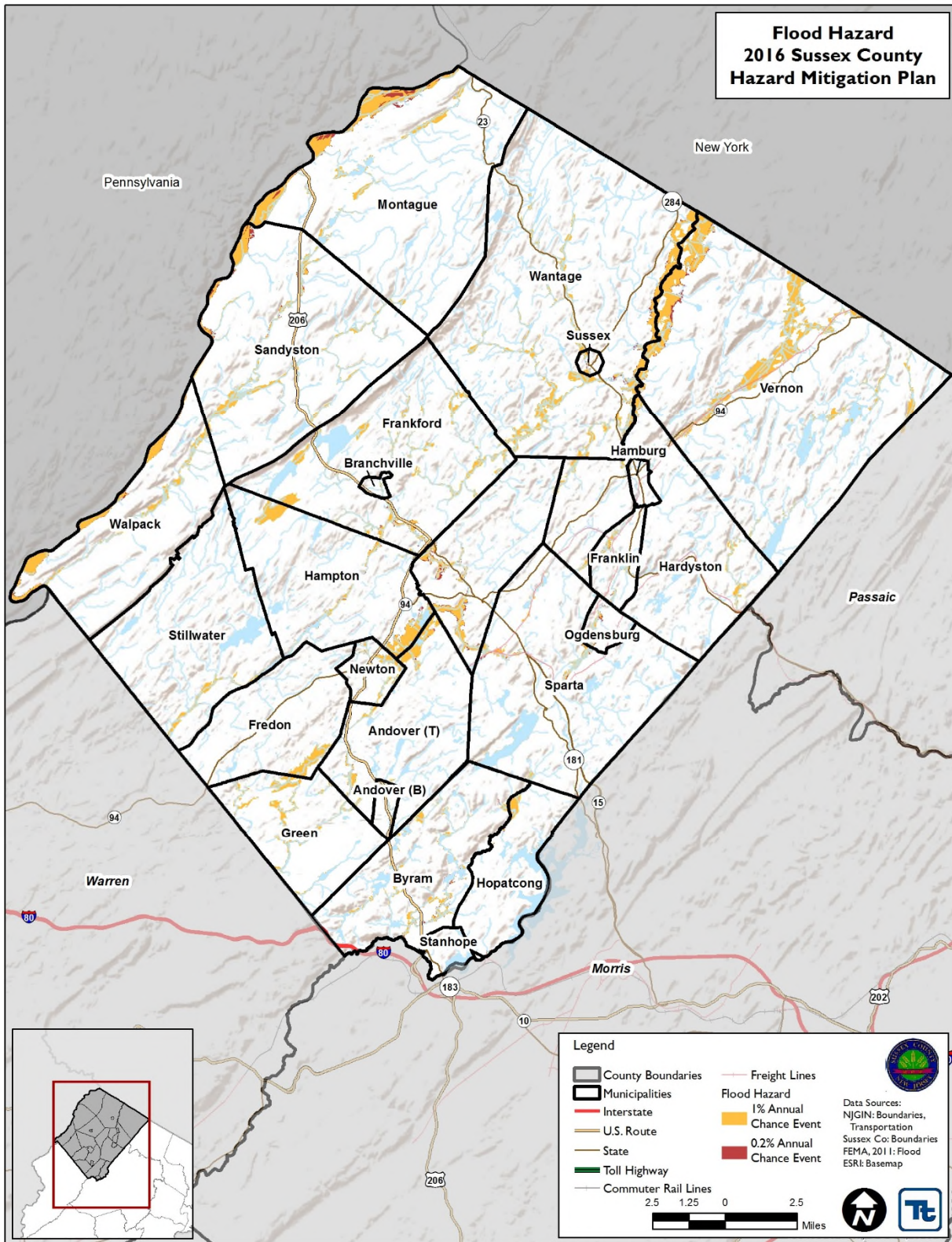
Development patterns have resulted in denser development in northern New Jersey. In addition, proximity to New York City boosts property values and therefore increases damage dollar totals. Extensive development also leaves fewer natural surfaces available to absorb rainwater, forcing water directly into streams and rivers, swelling them more than when more natural surface buffered the runoff rate. Since the Delaware, Raritan, and Passaic Rivers drain more than 90% of the northern New Jersey counties, these rivers and their tributaries are common locations for flooding.

A floodplain is defined as the land adjoining the channel of a river, stream, ocean, lake, or other watercourse or water body that becomes inundated with water during a flood. Most often floodplains are referred to as 100-year floodplains. A 100-year floodplain is not a flood that will occur once every 100 years, rather it is a flood that has a 1% chance of being equaled or exceeded each year. Thus, the 100-year flood could occur more than once in a relatively short period of time. Due to this misleading term, FEMA has properly defined it as the 1% annual chance flood. This 1% annual chance flood is now the standard used by most federal and state agencies and by the NFIP (FEMA 2002).

The 1% annual chance flood hazard zones are widely dispersed in Sussex County, generally following riverine corridors as shown in Figure 5.4.4-1. A significant concentration of 1% annual chance flood hazard zones is located in the northeastern portion of the County, around the Wallkill River, and the Pochuck and Wawayanda Creeks, especially as they near the New York State border in Wantage and Vernon Townships, respectively. Other 1% annual chance flood hazard zones exist along Lake Hopatcong as it forms the southeastern Sussex County boundary with Morris County, around Lake Mohawk in Sparta Township, and along Moore's Brook in Andover and Hampton Townships. Other 1% annual chance floodplains are scattered throughout the County tracing the footprints of numerous other creeks, rivers, and bodies of water, as shown in Figure 5.4.4-1 below.



Figure 5.4.4-1. FEMA Flood Hazard Areas in Sussex County



Source: FEMA 2011
FEMA Federal Emergency Management Agency





Floodprone Areas in Sussex County

Watersheds in New Jersey are referred to as the name of the water body to which the land area drains and the corresponding Hydrologic Unit Code (HUC). The HUC can range from 2 to 16 digits long- the longer the numeric code, the smaller the watershed area. NJDEP also has divided the state into 21 Watershed Management Areas (WMAs) based on large scale drainage pattern. Each WMA encompasses a particular group of major rivers. Sussex County falls within parts of 4 regions: WMA 01: Upper Delaware - Northwest Region; WMA 02: Wallkill - Northwest Region; WMA 03: Pompton, Pequannock, Wanaque, Ramapo - Northeast Region; and WMA 06: Middle Passaic, Whippany – Northeast Region. These areas delineate the principal stream systems that drain the county's land area. WMA 1, the Upper Delaware River Watershed, is the largest watershed in the county by area, with waters draining west and southwest to the Delaware River. The second largest is WMA 2, the Wallkill River Watershed. The Wallkill, which flows north into Orange County, New York, drains the north-central and northeastern section of Sussex County. WMA 3 (Pequannock River Watershed) and WMA 6 (Rockaway River Watershed) both drain to the southeast, and comprise small parts of the County.

Please refer to Section 9 for information regarding specific areas of flooding within each municipality.

Watershed Management Area 01 – Upper Delaware River

Located in the western and southern sections of Sussex County, the Upper Delaware River Watershed comprises greater than half of the county's land area, and includes the following principal waterways: the Flat Brook; the Paulins Kill; the Pequest River and a short stretch of the Musconetcong River. Waterways in WMA 01 run southwesterly, roughly parallel to one another, towards the Delaware River. Montague and Sandyston townships contain a large amount of these waterways, most of which are streams part of the Big and Little Flat Brook systems. The upper half of the Big Flat Brook flows through High Point State Park and Stokes State Forest. Clove Brook and Mill Brook also run through Montague Township. Walpack Township contains tributaries of the Flat Brook draining the west slope of the Kittatinny Ridge. Other waterways in this area include several stretches and tributaries of the Paulins Kill, Pequest River and Musconetcong River in Stillwater, Fredon, Green and Byram Townships, as well as parts of Kymer Brook and Lubbers Run (Sussex County, 2015).

Watershed Management Area 02 – Wallkill River

The Wallkill River watershed occupies the northern and northeastern parts of Sussex County, extending south through Sparta and northern Byram Townships. The Wallkill River flows northeast across the NJ state border and lets out on the Hudson River near Kingston, NY. Major tributaries of the Wallkill River that pass through Sussex County include Papakating Creek, which begins its run in Frankford Township, and Clove Brook, the upper reaches of which flow south from northern Wantage Township. Pochuck Creek drains parts of Vernon and Hardyston Townships east of Pochuck Mountain before merging with the Wallkill several miles over the NJ-NY border. Several branches of the Black Creek flow through Vernon Township (Sussex County 2015).

Watershed Management Area 03 – Pequannock River

A small area of eastern Sussex County is drained by the Pequannock River, which flows south out of Vernon Township continuing into Hardyston Township where it turns southeast, forming the border between Morris and Passaic Counties, before ultimately converging with the Passaic River in Essex County. Tributaries of the Pequannock in Sussex County include a stretch of the upper Pacack Brook and an unnamed tributary located in Hardyston Township (Sussex County 2015).



Watershed Management Area 6 – Rockaway River

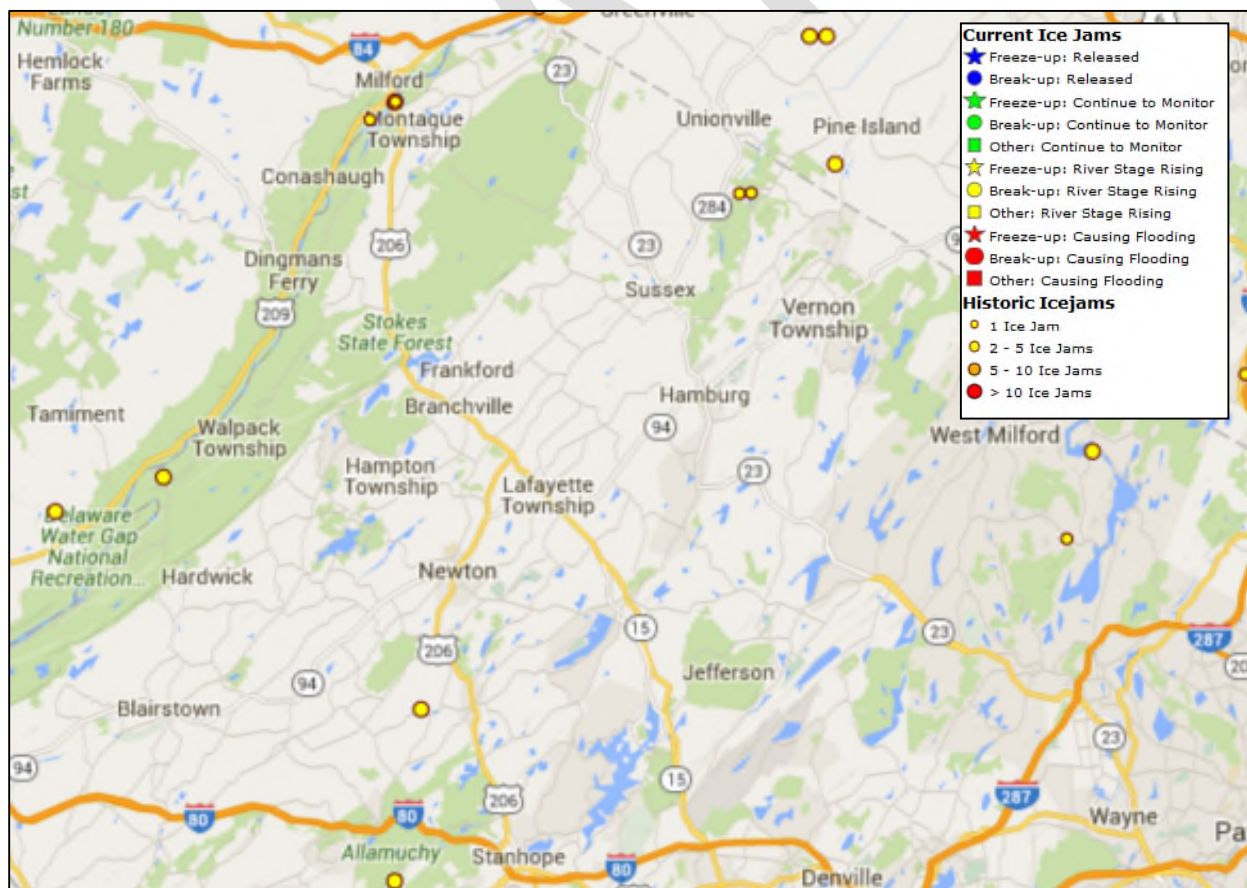
The Rockaway River itself does not pass through Sussex County, but the system’s upper reaches includes many tributaries in eastern Sparta Township, where several streams merge to form Russia Brook. Russia Brook flows into Jefferson Township (Morris County) where it meets the Rockaway River (Sussex County 2015).

Ice Jam Flooding

Ice jams are common in the northeast U.S. and New Jersey is not an exception. In fact, according to the USACE, there have been 108 incidents documented between 1780 and 2015, with the most recently documented event occurring in 2014. Five New Jersey counties, including Sussex County, accounted for 87% (94) of all those events. The Delaware River experienced more ice jams during this time period than any other river in the state (32 reported ice jams).

The Ice Jam Database, maintained by the Ice Engineering Group at the USACE Cold Regions Research and Engineering Laboratory (CRREL), currently consists of over 19,000 records from across the U.S. According to the USACE-CRREL, Sussex County experienced or may have been impacted by 11 historic ice jam incidents between 1780 and 2015 (USACE 2015). Ice Jams have formed in Sussex County along Flat Brook, and the Delaware and Pequest Rivers (CRREL 2015). Figure 5.4.4-2 shows the number of ice jam incidents in Sussex County during this time period. Historical events are further mentioned in the “Previous Occurrences” section of this hazard profile.

Figure 5.4.4-2. Ice Jams in Sussex County, 1780 to 2015



Source: CRREL 2015



Natural and Beneficial Floodplain Areas

Although typically associated as a hazard area, floodplains also serve beneficial and natural functions (on ecological/environmental, social, and economic levels). Disruption of these natural systems can have long-term consequences on entire regions; however, this potential impact has only recently been noted. Some of the more well-known water-related functions for floodplains include:

- Natural flood and erosion control
 - Provide flood storage and conveyance
 - Reduce flood velocities
 - Reduce flood peaks
 - Reduce sedimentation
- Surface water quality maintenance
 - Filter nutrients and impurities from runoff
 - Process organic wastes
 - Moderate temperatures of water
- Groundwater recharge
 - Promote infiltration and aquifer recharge
 - Reduce frequency and duration of low surface flows (FEMA)

Areas in the floodplain that typically provide these natural functions are wetlands, riparian areas, sensitive areas, and habitats for rare and endangered species. According to NJ DEP 2015 Land-Use Land-Cover data and 2012 NJDEP Landscape Project Data, the County has several floodplain areas that could serve natural and beneficial functions (Landscape Project contains the endangered species data). This information is summarized in Tables 5.4.4-1 and 5.4.4-2.

Table 5.4.4-1. Acreage of Wetlands by Municipality

Municipality	Total Area (acres)	Wetland Area (acres)	% of Total
Borough of Andover	870	76	8.7%
Township of Andover	13,310	1,843	13.8%
Borough of Branchville	380	5	1.3%
Township of Byram	14,505	1,209	8.3%
Township of Frankford	22,602	3,219	14.2%
Borough of Franklin	2,843	371	13.0%
Township of Fredon	11,521	1,322	11.5%
Township of Green	10,479	1,176	11.2%
Borough of Hamburg	753	82	10.9%
Township of Hampton	16,273	2,734	16.8%
Township of Hardyston	20,811	3,403	16.4%
Borough of Hopatcong	7,953	568	7.1%
Township of Lafayette	11,453	2,157	18.8%
Township of Montague	29,749	3,701	12.4%
Town of Newton	2,172	345	15.9%
Borough of Ogdensburg	1,431	256	17.9%



Municipality	Total Area (acres)	Wetland Area (acres)	% of Total
Township of Sandyston	27,041	2,168	8.0%
Township of Sparta	24,896	2,987	12.0%
Borough of Stanhope	1,404	114	8.1%
Township of Stillwater	18,081	2,060	11.4%
Borough of Sussex	399	34	8.5%
Township of Vernon	44,789	7,841	17.5%
Township of Walpack	15,923	731	4.6%
Township of Wantage	43,174	8,246	19.1%
Sussex County Total	342,814	46,646	13.6%

Table 5.4.4-1. Natural and Beneficial Land in Sussex County

Wetlands	Area (acres)	Forest	Area (acres)	Endangered Species	Area (acres)
Agricultural Wetlands (Modified)	1,675	Coniferous Brush/Shrubland	20	Special Concern	22,775
Artificial Lakes	65	Coniferous Forest (>50% Crown Closure)	244	State Endangered	1,844
Coniferous Forest (10-50% Crown Closure)	<5	Coniferous Forest (10-50% Crown Closure)	23	State Threatened	2,341
Coniferous Scrub/Shrub Wetlands	14	Cropland And Pastureland	247		
Coniferous Wooded Wetlands	133	Deciduous Brush/Shrubland	168		
Deciduous Forest (>50% Crown Closure)	<5	Deciduous Forest (>50% Crown Closure)	1,957		
Deciduous Forest (10-50% Crown Closure)	<5	Deciduous Forest (10-50% Crown Closure)	462		
Deciduous Scrub/Shrub Wetlands	1,840	Deciduous Wooded Wetlands	<5		
Deciduous Wooded Wetlands	6,191	Exposed Flats	<5		
Disturbed Wetlands (Modified)	48	Industrial	<5		
Former Agricultural Wetland (Becoming Shrubby, Not Built-Up)	298	Mixed Deciduous/Coniferous Brush/Shrubland	96		
Herbaceous Wetlands	3,235	Mixed Forest (>50% Coniferous With >50% Crown Closure)	209		
Managed Wetland In Built-Up Maintained Rec Area	16	Mixed Forest (>50% Coniferous With 10-50% Crown Closure)	33		
Managed Wetland In Maintained Lawn Greenspace	20	Mixed Forest (>50% Deciduous With >50% Crown Closure)	226		
Mixed Deciduous/Coniferous Brush/Shrubland	<5	Mixed Forest (>50% Deciduous With 10-50% Crown Closure)	56		



Wetlands	Area (acres)	Forest	Area (acres)	Endangered Species	Area (acres)
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	33	Old Field (< 25% Brush Covered)	310		
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	79	Orchards/Vineyards/Nurseries/Horticultural Areas	<5		
Mixed Wooded Wetlands (Coniferous Dom.)	164	Other Urban Or Built-Up Land	<5		
Mixed Wooded Wetlands (Deciduous Dom.)	146	Phragmites Dominate Old Field	<5		
Natural Lakes	15	Plantation	36		
Old Field (< 25% Brush Covered)	0	Residential, Rural, Single Unit	<5		
Phragmites Dominate Interior Wetlands	116	Streams And Canals	<5		
Streams And Canals	5	Transitional Areas	<5		
Unvegetated Flats	108				
Wetland Rights-Of-Way	36				

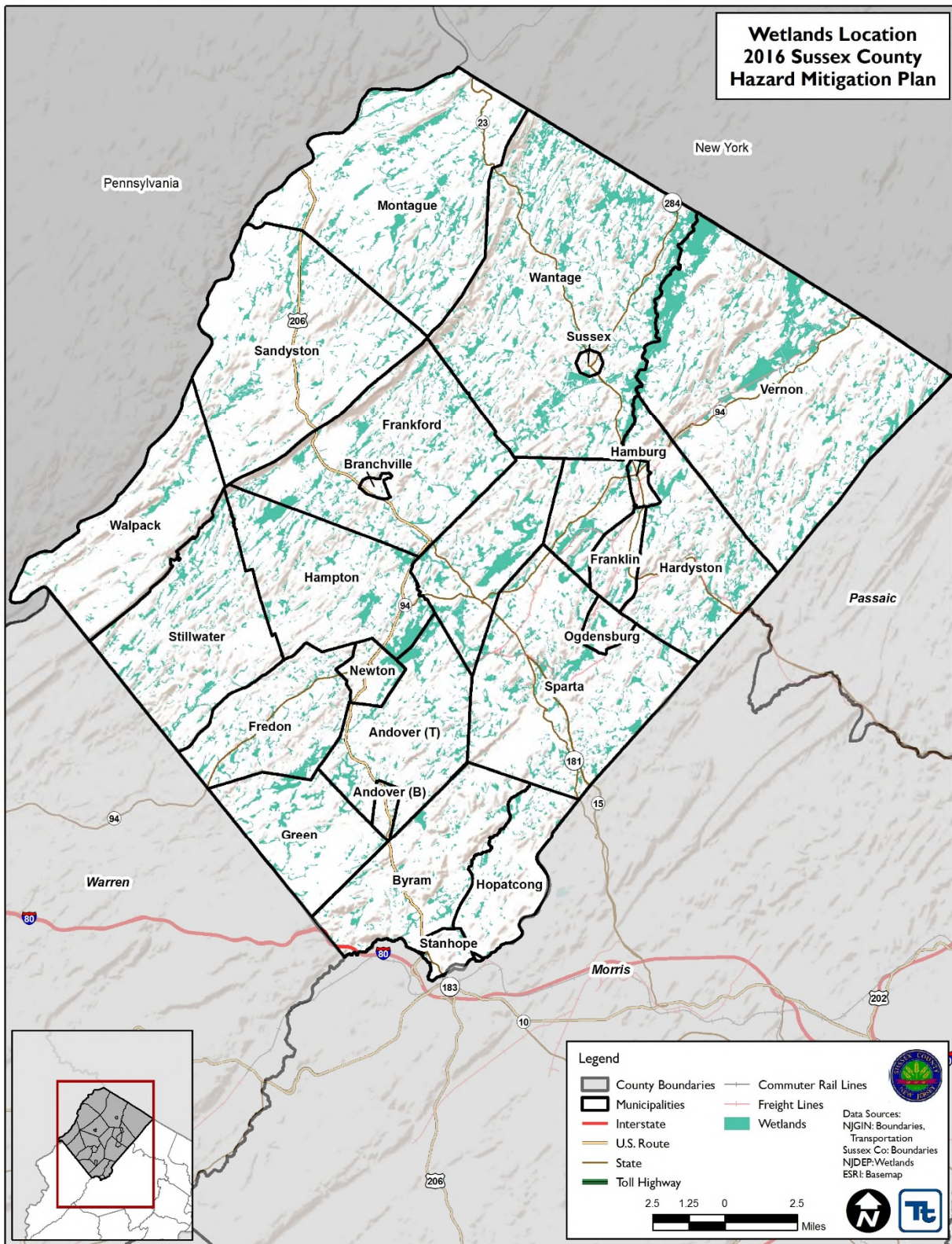
Source: NJDEP 2015; NJDEP 2012

Note: An additional 536 acres of land didn't have a joinable ID number for the Landscape Project data. This could be a miscellaneous potential habitat for endangered species.

According to the Landscape Project data, Sussex County contains potential habitats for over 70 endangered species from multiple taxonomic classes, including Amphibia, Aves, Bivalvia, Insecta, Mammalia, and Reptilia. Habitats for about 65 of these species are located within the 1-percent annual chance floodplain. These species include, the Indiana bat, the bald eagle, the blue-spotted salamander, and the bog turtle.



Figure 5.4.4-3. Wetlands in Sussex County



Source: NJDEP 2012





Extent

Once a river reaches flood stage, the flood extent or severity categories used by the NWS include minor flooding, moderate flooding, and major flooding. Each category has a definition based on property damage and public threat:

- Minor Flooding - minimal or no property damage, but possibly some public threat or inconvenience.
- Moderate Flooding - some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations are necessary.
- Major Flooding - extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations. (NWS 2011)

The severity of a flood depends not only on the amount of water that accumulates in a period of time, but also on the land's ability to manage this water. The size of rivers and streams in an area and infiltration rates are significant factors. When it rains, soil acts as a sponge. When the land is saturated or frozen, infiltration rates decrease and any more water that accumulates must flow as runoff (Harris 2008).

The frequency and severity of flooding are measured using a discharge probability, which is the probability that a certain river discharge (flow) level will be equaled or exceeded in a given year. Flood studies use historical records to determine the probability of occurrence for the different discharge levels. The flood frequency equals 100 divided by the discharge probability. For example, the 100-year discharge has a 1% chance of being equaled or exceeded in any given year. The “annual flood” is the greatest flood event expected to occur in a typical year. These measurements reflect statistical averages only; it is possible for two or more floods with a 100-year or higher recurrence interval to occur in a short time period. The same flood can have different recurrence intervals at different points on a river.

One hundred-year floodplains (or 1% annual chance floodplain) can be described as a bag of 100 marbles, with 99 clear marbles and one black marble. Every time a marble is pulled out from the bag, and it is the black marble, it represents a 100-year flood event. The marble is then placed back into the bag and shaken up again before another marble is drawn. It is possible that the black marble can be picked one out of two or three times in a row, demonstrating that a “100-year flood event” could occur several times in a row (Interagency Floodplain Management Review Committee 1994).

The 'base flood', previously known as the '100-year flood' is the floodplain management standard used by most federal and state agencies, including the NFIP. Inclusion within the base flood area (Special Flood Hazard Area or SFHA) determines the need for flood insurance. A structure located within a SFHA shown on an NFIP map has a 26% chance of suffering flood damage during the term of a 30-year mortgage.

The extent of flooding associated with a 1% annual probability of occurrence (the base flood or 100-year flood) is used as the regulatory boundary by many agencies. Also referred to as the SFHA, this boundary is a convenient tool for assessing vulnerability and risk in flood-prone communities. Many communities have maps that show the extent and likely depth of flooding for the base flood. Corresponding water-surface elevations describe the water elevation resulting from a given discharge level, which is one of the most important factors used in estimating flood damage.

The term “500-year flood” is the flood that has a 0.2% chance of being equaled or exceeded each year. The 500-year flood could occur more than once in a relatively short period of time. Statistically, the 0.2% (500-year) flood has a 6% chance of occurring during a 30-year period of time, the length of many mortgages.

The 500-year floodplain is referred to as Zone X500 for insurance purposes on FIRMs. Base flood elevations or depths are not shown within this zone and insurance purchase is not required in this zone.



Previous Occurrences and Losses

Many sources provided flooding information regarding previous occurrences and losses associated with flooding events throughout Sussex County. With so many sources reviewed for the purpose of this HMP update, loss and impact information for many events could vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

Between 1954 and 2015, FEMA declared that the State of New Jersey experienced 28 flood-related disasters (DR) or emergencies (EM) classified as flooding, or as flooding with one or a combination of the following disaster types: Severe Storms; Inland and Coastal Flooding; Mudslides; Coastal Storm; High Tides; Heavy Rain; High Winds; and Hurricane. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. Sussex County was included in 11 of these flood-related declarations between 1954 and 2015, and two declarations since the original 2011 Sussex County HMP. In 2011, Sussex County experienced flooding from Hurricane Irene and Remnants of Tropical Storm Lee, and was included in the disaster declarations for both events. While Sussex County was also included in the disaster declaration for Hurricane Sandy in 2012, the damages from that storm in the County were the result of other severe weather hazards, rather than flooding. Table 5.4.4-2 lists FEMA DR and EM declarations between 2008 and 2015 for this HMP Update.

Table 5.4.4-2. FEMA DR and EM Declarations since 2008 for Flood Events in Sussex County

FEMA Declaration Number	Date(s) of Event	Event Type	Location
DR-4021	August 26 – September 5, 2011	Hurricane Irene	All 21 counties, including Sussex County
DR-4039	September 5-14, 2011	Remnants of Tropical Storm Lee/ Flash Flood/ Flood	Hunterdon, Warren, Mercer, Passaic, and Sussex

Source: FEMA 2015

United States Department of Agriculture (USDA) crop losses provide another indicator of the severity of previous events. Additionally, crop losses can have a significant impact on the economy by reducing produce sales and purchases. Such impacts may have long-term consequences, particularly if crop yields are low the following years as well. Although Sussex County has experienced annual crop losses due to natural hazard events, the USDA does not note in its records that any losses from 2008 to 2015 are a result of flood damages (USDA 2015).

For this 2016 HMP update, flood events were summarized from 2008 to 2015. Known flood events, including FEMA disaster declarations, which have impacted Sussex County between 2008 and 2015 are identified in Appendix X. For events prior to 2008, please refer to the 2011 County HMP. Please note that not all events that have occurred in Sussex County are included due to the extent of documentation and the fact that not all sources may have been identified or researched. Loss and impact information could vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP Update. Please see Section 9 for detailed information regarding impacts and losses to each municipality.

Ice Jam Events

Based on review of the CRREL database, 12 ice-jam events have occurred in or near Sussex County between 1780 and 2015. Events that occurred outside of the County were included because they were close enough to the County borders to cause possible flooding impacts on Sussex County. Information regarding losses associated with these reported ice jams was limited. According to this database, there have been two ice jam events since 2008 in Sussex County, both along the Delaware River.



Probability of Future Occurrences

Based on the historic and more recent flood events in Sussex County, it is clear that the County has a high probability of flooding for the future. The fact that the elements required for flooding exist and that major flooding has occurred throughout the County in the past suggests that many people and properties are at risk from the flood hazard in the future. It is estimated that Sussex County will continue to experience direct and indirect impacts of flooding events annually that may induce secondary hazards such as coastal erosion, storm surge in coastal areas, infrastructure deterioration or failure, utility failures, power outages, water quality and supply concerns, and transportation delays, accidents and inconveniences.

According to the NOAA National Climate Data Center (NCDC) and the CRREL database, Sussex County experienced 49 flood events between 1950 and 2015, including 22 floods, 25 flash floods, and 2 ice jams. The table below shows these statistics, as well as the annual average number of events and the percent chance of these individual flood hazards occurring in Sussex County in future years (NOAA NCDC 2015).

Table 5.4.4-3. Probability of Future Occurrences of Flood Events

Hazard Type	Number of Occurrences Between 1950 and 2015	Rate of Occurrence or Annual Number of Events (average)	Recurrence Interval (in years) (# Years/Number of Events)	Probability of Event in any given year	% chance of occurrence in any given year
Flood	22	0.34	3.00	0.33	33.33
Flash Flood	25	0.38	2.64	0.38	37.88
Ice Jams	12	0.18	5.50	0.18	18.18
Total	59	0.91	1.12	0.89	89.39

Source: NOAA-NCDC 2015; CRREL 2015

In Section 5.3, the identified hazards of concern for Sussex County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Committee, the probability of occurrence for flood in the County is considered ‘frequent’ (likely to occur within 25 years, as presented in Table 5.3-3).

Climate Change Impacts

The climate of New Jersey is already changing and will continue to change over the course of this century. Since 1900, temperatures in the northeastern U.S. have increased an average of 1.5°F. The majority of this warming has occurred since 1970. From 1970 to 2010, average temperatures in New Jersey have increased 1.2°F (ONJSC 2013). In terms of winter temperatures, the northeastern U.S. has seen an increase in the average temperature by 4°F since 1970 (Northeast Climate Impacts Assessment [NECIA] 2007).

In addition to the effect of increased temperatures, precipitation is expected to increase over the next several decades. Average annual precipitation is projected to increase in the region by 0-10% by the 2020s and 5-10% by the 2050s. Most of the additional precipitation is expected to come during the winter months (New York City Panel on Climate Change [NPCC] 2013). Although precipitation is expected to increase, extreme precipitation is the most likely concern for New Jersey. Extreme precipitation has the potential to cause significant flooding and in the winter produce heavy snowfall. While exact projections are not available, it is estimated that the New York City region will see an increase of 10% to 25% of the frequency of intense precipitation events (Sustainable Jersey Climate Change Adaptation Task Force 2013).



Precipitation during 2012 was slightly below normal, averaging 43.21 inches statewide. It ranked as the eighth driest calendar year of the past 30 years. The central coastal area of New Jersey was wettest in 2012, with several stations in Ocean and Burlington Counties receiving more than 53 inches. Over the long term, there has been an upward trend in annual precipitation in New Jersey. Since 1895, annual precipitation has increased at a rate of 4.1 inches per century. Heavy precipitation events have increased in the past 20 years and it is expected that this trend may continue (Rutgers Climate Institute 2013).

With this increase in frequency of precipitation, New Jersey and Sussex County may experience more flooding events. More intense, frequent flooding could lead to significant habitat loss for wildlife. Salt marshes and estuaries that serve as critical feeding grounds for birds and waterfowl, and as nursery habitats for commercial fish, could be lost (State of New Jersey 2010). Climate change may also lead to sea level rise which will lead to more frequent and extensive flooding (NJDEP 2013c).



5.4.4.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed and vulnerable in the identified hazard area. For the flood hazard, areas identified as hazard areas include the 1-percent and 0.2-percent annual chance flood event boundaries (Figure 5.4.4-1). The following text evaluates and estimates the potential impact of flooding for Sussex County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impacts on: (1) life, health and safety of residents, (2) general building stock, (3) critical facilities, (4) economy, (5) environment, and (6) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2011 Sussex County Hazard Mitigation Plan
- Further data collections that will assist understanding this hazard over time

Overview of Vulnerability

Flood is a significant concern for Sussex County. To assess vulnerability, exposure to the 1- and 0.2-percent annual chance flood events was examined and potential losses were calculated for one- percent annual chance flood event. The flood hazard exposure and loss estimate analysis is presented below.

Data and Methodology

The 1- and 0.2-percent annual chance flood events were examined to evaluate the County's risk to the flood hazard. These flood events are generally those considered by planners and evaluated under federal programs such as the NFIP. The risk and vulnerability assessment was completed using FEMA effective DFIRM data dated September 2011.

To estimate potential losses, the Hazards U.S. Multi-Hazard (HAZUS-MH) version 3.0 flood model was used. The depth grid generated for the 2014 State HMP was incorporated into HAZUS-MH. The 1-percent annual chance depth grid was integrated into HAZUS-MH 3.0 and the riverine flood model was run to estimate potential losses at the structure level using the County's custom building and critical facility inventories. The HAZUS-MH 3.0 model uses 2010 U.S. Census demographic data, which was used to calculate displaced households and sheltering needs. Refer to Section 5.1 for additional details on the methodology.

Impact on Life, Health and Safety

The impact of the hydrologic hazards on life, health and safety is dependent upon several factors including the severity of the event and whether or not adequate warning time is provided to residents. Exposure represents the population living in or near the hazard areas that could be impacted should an event occur. Additionally, exposure should not be limited to only those who reside in a defined hazard zone, but everyone who may be affected by the cascading impacts of a hazard event (e.g., people are at risk while traveling in flooded areas, or their access to emergency services is compromised during an event). The degree of that impact will vary and is not strictly measurable.

Cascading impacts may also include exposure to pathogens such as mold. After flood events, excess moisture and standing water contribute to the growth of mold in buildings. Mold may present a health risk to building occupants, especially those with already compromised immune systems such as infants, children, the elderly and pregnant women. The degree of impact will vary and is not strictly measurable. Molds can grow in as short a period as 24-48 hours in wet and damaged areas of buildings that have not been properly cleaned. Very small mold spores can easily be inhaled, creating the potential for allergic reactions, asthma episodes, and other



respiratory problems. Buildings should be properly cleaned and dried out to safely prevent mold growth (CDC, 2015).

Molds and mildews are not the only public health risk associated with flooding. Floodwaters can be contaminated by pollutants such as sewage, human and animal feces, pesticides, fertilizers, oil, asbestos, and rusting building materials. Common public health risks associated with flood events also include:

- Unsafe food
- Contaminated drinking and washing water and poor sanitation
- Mosquitos and animals
- Carbon monoxide poisoning
- Secondary hazards associated with re-entering/cleaning flooded structures
- Mental stress and fatigue

Current loss estimation models such as HAZUS-MH are not equipped to measure public health impacts. The best level of mitigation for these impacts is to be aware that they can occur, educate the public on prevention, and be prepared to deal with these vulnerabilities in responding to flood events.

To estimate the population exposed to the 1- and 0.2-percent flood events, the floodplain boundaries were overlaid upon the 2010 Census population data in GIS (U.S. Census 2010). The 2010 Census blocks with their centroid in the flood boundaries were used to calculate the estimated population exposed to this hazard. Within the floodplain population, senior citizens and the population in poverty are two especially vulnerable groups that must be taken under special consideration when planning for disaster preparation, response, and recovery.

Census blocks do not follow the boundaries of the floodplain and can grossly over or under estimate the population exposed when using the centroid or intersect of the Census block with these zones. The limitations of these analyses are recognized, and as such the results are only used to provide a general estimate. The total land area located in the one-percent and 0.2-percent annual chance flood zones was calculated using the regulatory FIRM for each jurisdiction, as presented in Table 5.4.4-4.

Table 5.4.4-4. Total Land Area in the 1-Percent and 0.2-Percent Annual Chance Flood Zones (Acres)

Municipality	Total Area (acres)	1% Flood Event Hazard Area		0.2% Flood Event Hazard Area	
		Area (acres)	% of Total	Area (acres)	% of Total
Borough of Andover	869.6	91.8	10.6%	91.8	10.6%
Township of Andover	13,309.8	818.9	6.2%	840.3	6.3%
Borough of Branchville	380.3	22.9	6.0%	24.7	6.5%
Township of Byram	14,367.4	1,683.6	11.7%	1,725.2	12.0%
Township of Frankford	22,602.1	2,506.5	11.1%	2,550.2	11.3%
Borough of Franklin	2,842.8	275.3	9.7%	293.8	10.3%
Township of Fredon	11,500.3	357.6	3.1%	357.6	3.1%
Township of Green	10,295.6	896.5	8.7%	896.8	8.7%
Borough of Hamburg	753.1	36.5	4.9%	39.9	5.3%
Township of Hampton	16,273.3	1,271.4	7.8%	1,313.0	8.1%

**Table 5.4.4-4. Total Land Area in the 1-Percent and 0.2-Percent Annual Chance Flood Zones (Acres)**

Municipality	Total Area (acres)	1% Flood Event Hazard Area		0.2% Flood Event Hazard Area	
		Area (acres)	% of Total	Area (acres)	% of Total
Township of Hardyston	20,807.4	579.6	2.8%	587.2	2.8%
Borough of Hopatcong	7,907.4	1,132.5	14.3%	1,144.3	14.5%
Township of Lafayette	11,453.2	754.1	6.6%	869.0	7.6%
Township of Montague	29,703.6	2,685.6	9.0%	2,889.0	9.7%
Town of Newton	2,171.7	364.9	16.8%	370.4	17.1%
Borough of Ogdensburg	1,431.1	174.4	12.2%	204.0	14.3%
Township of Sandyston	27,015.5	2,082.1	7.7%	2,197.0	8.1%
Township of Sparta	24,874.7	1,267.4	5.1%	1,302.4	5.2%
Borough of Stanhope	1,338.2	192.1	14.4%	193.1	14.4%
Township of Stillwater	18,077.3	391.3	2.2%	391.6	2.2%
Borough of Sussex	399.1	61.4	15.4%	68.1	17.1%
Township of Vernon	44,712.5	5,461.1	12.2%	5,576.4	12.5%
Township of Walpack	15,888.0	1,625.0	10.2%	1,676.5	10.6%
Township of Wantage	43,164.2	3,175.0	7.4%	3,263.5	7.6%
Sussex County Total	342,138.2	27,907.6	8.2%	28,865.9	8.4%

Source: FEMA 2011

Note: % = Percent;

The area presented includes the area of inland waterways

The calculation of the 0.2-percent annual chance flood event results is cumulative in nature, as the population exposed to the 1-percent flood event will also be exposed to the 0.2-percent annual chance flood event. Using this approach, it was estimated that 3,034 people are exposed to the one-percent annual chance event and 3,121 people are exposed to the 0.2-percent annual chance flood event. Refer to Table 5.4.4-5 for results by municipality.

Table 5.4.4-5. Estimated Population Exposed to the Flood Hazard

Municipality	Total Population	1-Percent Chance Event		0.2-Percent Chance Event	
		Total in Hazard Area	% of Total Population	Total in Hazard Area	% of Total Population
Borough of Andover	606	23	3.8%	23	3.8%
Township of Andover	6,319	26	<1%	26	<1%
Borough of Branchville	841	18	2.1%	36	4.3%
Township of Byram	8,350	528	6.3%	569	6.8%
Township of Frankford	5,565	233	4.2%	233	4.2%
Borough of Franklin	5,045	73	1.4%	73	1.4%
Township of Fredon	3,437	1	<1%	1	<1%
Township of Green	3,601	358	9.9%	358	9.9%
Borough of Hamburg	3,277	0	0.0%	0	0.0%

**Table 5.4.4-5. Estimated Population Exposed to the Flood Hazard**

Municipality	Total Population	1-Percent Chance Event		0.2-Percent Chance Event	
		Total in Hazard Area	% of Total Population	Total in Hazard Area	% of Total Population
Township of Hampton	5,196	0	0.0%	0	0.0%
Township of Hardyston	8,213	9	<1%	9	<1%
Borough of Hopatcong	15,147	10	<1%	17	<1%
Township of Lafayette	2,538	100	3.9%	104	4.1%
Township of Montague	3,847	513	13.3%	522	13.6%
Town of Newton	7,997	140	1.8%	140	1.8%
Borough of Ogdensburg	2,410	56	2.3%	56	2.3%
Township of Sandyston	1,998	21	1.1%	21	1.1%
Township of Sparta	19,722	212	1.1%	218	1.1%
Borough of Stanhope	3,610	93	2.6%	93	2.6%
Township of Stillwater	4,099	34	<1%	34	<1%
Borough of Sussex	2,130	25	1.2%	25	1.2%
Township of Vernon	23,943	469	2.0%	471	2.0%
Township of Walpack	16	1	6.3%	1	6.3%
Township of Wantage	11,358	91	<1%	91	<1%
Sussex County Total	149,265	3,034	2.0%	3,121	2.1%

Sources: U.S. Census 2010; FEMA, 2011

The table above shows that approximately 2.0-percent of the total population is exposed to the 1-percent annual chance flood event and that approximately 2.1-percent of the total population is exposed to the 0.2-percent annual chance flood event. Montague has the greatest proportion of its population located in the floodplain; approximately 13.3% and 13.6% for the 1-percent chance event and 0.2-percent chance event, respectively. For this project, the potential population exposed is used as a guide for planning purposes.

Of the population exposed, the most vulnerable include the economically disadvantaged and the population over the age of 65. Economically disadvantaged populations are more vulnerable because they are likely to evaluate their risk and make decisions to evacuate based on the net economic impact to their family. The population over the age of 65 is also more vulnerable because they are more likely to seek or need medical attention which may not be available to due isolation during a flood event and they may have more difficulty evacuating. Special consideration should be taken when planning for disaster preparation, response, and recovery for these vulnerable groups.

Using 2010 U.S. Census data, HAZUS-MH 3.0 estimates the potential sheltering needs as a result of a 1-percent annual chance flood event. For the 1-percent flood event, HAZUS-MH 2.2 estimates 2,445 households will be displaced and 847 people will seek short-term sheltering. These statistics, by municipality, are presented in Table 5.4.4-6. The estimated displaced population and number of persons seeking short-term sheltering differs from the number of persons exposed to the 1-percent annual chance flood (Table 5.4.5-6), because the displaced population numbers take into consideration that not all residents will be significantly impacted enough to be displaced or to require short-term sheltering during a flood event.

**Table 5.4.4-6. Estimated Population Displaced or Seeking Short-Term Shelter from the 1-percent Annual Chance Flood Event**

Municipality	U.S. Census 2010 Population	1-percent Annual Chance Event	
		Displaced Households	Persons Seeking Short-Term Sheltering
Borough of Andover	606	32	7
Township of Andover	6,319	14	0
Borough of Branchville	841	42	3
Township of Byram	8,350	249	41
Township of Frankford	5,565	187	34
Borough of Franklin	5,045	92	18
Township of Fredon	3,437	3	0
Township of Green	3,601	108	20
Borough of Hamburg	3,277	0	0
Township of Hampton	5,196	14	0
Township of Hardyston	8,213	11	0
Borough of Hopatcong	15,147	74	40
Township of Lafayette	2,538	100	20
Township of Montague	3,847	199	101
Town of Newton	7,997	386	324
Borough of Ogdensburg	2,410	28	4
Township of Sandyston	1,998	63	5
Township of Sparta	19,722	163	44
Borough of Stanhope	3,610	10	0
Township of Stillwater	4,099	74	12
Borough of Sussex	2,130	37	7
Township of Vernon	23,943	333	143
Township of Walpack	16	5	0
Township of Wantage	11,358	221	24
Sussex County Total	149,265	2,445	847

Source: HAZUS-MH 3.0

The total number of injuries and casualties resulting from flooding is generally limited based on advance weather forecasting, blockades and warnings. Therefore, injuries and deaths generally are not anticipated if proper warning and precautions are in place. Warning time for flash flooding is often limited. Flash flood events are frequently associated with other natural hazard events such as earthquakes, landslides, or severe weather, which limits their predictability and compounds the hazard. Populations without adequate warning of the event are highly vulnerable to this hazard. Ongoing mitigation efforts should help to avoid the most likely cause of injury, which results from persons trying to cross flooded roadways or channels during a flood.



Impact on General Building Stock

After considering the population exposed and vulnerable to the flood hazard, the built environment was evaluated. Exposure to the flood hazard includes those buildings located in the flood zone. Potential damage is the modeled loss that could occur to the exposed inventory, including structural and content value.

To provide a general estimate of the structural/content replacement value exposure, the 1- and 0.2-percent DFIRM flood boundaries were overlaid upon the County's updated building stock inventory at the structure level. The buildings with their centroid in the hazard areas were totaled for each municipality. Table 5.4.4-7 and **Error! Reference source not found.** summarize these results. In summary, there are 577 buildings located in 1-percent annual chance flood boundary with approximately \$401 million of building/contents exposed. In total, this represents approximately 1.3% of the County's total general building stock inventory (approximately \$31.6 billion).

There are 667 buildings located in the 0.2-percent annual chance flood boundary with approximately \$447 million of building/contents exposed. This represents approximately 1.4% of the County's total general building stock inventory.

Table 5.4.4-7. Estimated General Building Stock Exposure to the 1-Percent Annual Chance Flood Event – All Occupancies

Municipality	Total # Buildings	Total Improved Value (Structure and Contents)	# Buildings	Total (All Occupancies)		
				% Total	Total Improved Value (Structure and Contents)	% Total
Borough of Andover	257	\$182,562,894	14	5.4%	\$7,833,353	4.3%
Township of Andover	2,248	\$1,259,872,091	8	<1%	\$4,689,338	<1%
Borough of Branchville	353	\$174,318,470	7	2.0%	\$3,813,930	2.2%
Township of Byram	3,401	\$1,543,404,464	51	1.5%	\$36,586,230	2.4%
Township of Frankford	2,716	\$1,653,244,645	71	2.6%	\$63,805,758	3.9%
Borough of Franklin	1,630	\$881,717,214	19	1.2%	\$10,492,325	1.2%
Township of Fredon	1,236	\$842,171,127	1	<1%	\$554,358	<1%
Township of Green	1,280	\$962,383,257	28	2.2%	\$25,076,647	2.6%
Borough of Hamburg	1,464	\$747,007,403	2	<1%	\$1,549,875	<1%
Township of Hampton	2,143	\$1,398,457,332	6	<1%	\$3,007,136	<1%
Township of Hardyston	3,731	\$1,652,499,901	4	<1%	\$1,929,690	<1%
Borough of Hopatcong	6,378	\$2,224,090,408	18	<1%	\$10,897,002	<1%
Township of Lafayette	1,020	\$802,389,890	29	2.8%	\$21,737,514	2.7%
Township of Montague	1,972	\$858,431,631	39	2.0%	\$12,396,929	1.4%
Town of Newton	2,320	\$1,504,040,803	41	1.8%	\$32,280,254	2.1%
Borough of Ogdensburg	915	\$390,034,452	11	1.2%	\$6,482,101	1.7%
Township of Sandyston	1,136	\$588,862,570	30	2.6%	\$25,738,467	4.4%
Township of Sparta	7,447	\$4,731,600,744	29	<1%	\$12,217,391	<1%
Borough of Stanhope	1,468	\$859,784,777	3	<1%	\$2,329,655	<1%
Township of Stillwater	1,871	\$931,811,957	9	<1%	\$9,759,944	1.0%
Borough of Sussex	579	\$424,677,833	9	1.6%	\$7,476,643	1.8%

**Table 5.4.4-7. Estimated General Building Stock Exposure to the 1-Percent Annual Chance Flood Event – All Occupancies**

Municipality	Total # Buildings	Total Improved Value (Structure and Contents)	Total (All Occupancies)			
			# Buildings	% Total	Total Improved Value (Structure and Contents)	% Total
Township of Vernon	11,280	\$4,759,388,701	59	<1%	\$42,000,012	<1%
Township of Walpack	25	\$16,093,258	9	36.0%	\$6,600,302	41.0%
Township of Wantage	4,156	\$2,250,158,879	80	1.9%	\$51,682,498	2.3%
Sussex County Total	61,026	\$31,639,004,702	577	<1%	\$400,937,352	1.3%

Source: FEMA 2011, Sussex County, NJ Department of the Treasury, 2015

Table 5.4.4-8. Estimated General Building Stock Exposure to the 0.2-Percent Annual Chance Flood Event – All Occupancies

Municipality	Total # Buildings	Total Improved Value (Structure and Contents)	Total (All Occupancies)			
			# Buildings	% Total	Total Improved Value (Structure and Contents)	% Total
Borough of Andover	257	\$182,562,894	14	5.4%	\$7,833,353	4.3%
Township of Andover	2,248	\$1,259,872,091	8	<1%	\$4,689,338	<1%
Borough of Branchville	353	\$174,318,470	8	2.3%	\$4,199,029	2.4%
Township of Byram	3,401	\$1,543,404,464	74	2.2%	\$46,942,082	3.0%
Township of Frankford	2,716	\$1,653,244,645	74	2.7%	\$68,341,330	4.1%
Borough of Franklin	1,630	\$881,717,214	24	1.5%	\$14,632,871	1.7%
Township of Fredon	1,236	\$842,171,127	1	<1%	\$554,358	<1%
Township of Green	1,280	\$962,383,257	28	2.2%	\$25,076,647	2.6%
Borough of Hamburg	1,464	\$747,007,403	2	<1%	\$1,549,875	<1%
Township of Hampton	2,143	\$1,398,457,332	8	<1%	\$4,432,821	<1%
Township of Hardyston	3,731	\$1,652,499,901	5	<1%	\$2,435,808	<1%
Borough of Hopatcong	6,378	\$2,224,090,408	18	<1%	\$10,897,002	<1%
Township of Lafayette	1,020	\$802,389,890	36	3.5%	\$25,709,371	3.2%
Township of Montague	1,972	\$858,431,631	47	2.4%	\$17,468,442	2.0%
Town of Newton	2,320	\$1,504,040,803	45	1.9%	\$34,535,528	2.3%
Borough of Ogdensburg	915	\$390,034,452	36	3.9%	\$13,180,254	3.4%
Township of Sandyston	1,136	\$588,862,570	36	3.2%	\$28,684,414	4.9%
Township of Sparta	7,447	\$4,731,600,744	29	<1%	\$12,217,391	<1%
Borough of Stanhope	1,468	\$859,784,777	3	<1%	\$2,329,655	<1%
Township of Stillwater	1,871	\$931,811,957	9	<1%	\$9,759,944	1.0%
Borough of Sussex	579	\$424,677,833	12	2.1%	\$10,026,439	2.4%
Township of Vernon	11,280	\$4,759,388,701	60	<1%	\$42,769,048	<1%
Township of Walpack	25	\$16,093,258	9	36.0%	\$6,600,302	41.0%
Township of Wantage	4,156	\$2,250,158,879	81	1.9%	\$52,453,334	2.3%
Sussex County Total	61,026	\$31,639,004,702	667	1.1%	\$447,318,638	1.4%

Source: FEMA 2011, Sussex County, NJ Department of the Treasury, 2015



The HAZUS-MH flood model estimated potential damages to the buildings in Sussex County at the structure level using the custom County structure inventory developed for this plan. The potential damage estimated by HAZUS-MH to the residential general building stock inventory associated with the 1-percent annual chance flood is approximately \$71 million or less than 1-percent of the total improved value.

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Table 5.4.4-9. Estimated General Building Stock Potential Loss to the 1-percent Annual Chance Flood Event

Municipality	Total Improved Value (Structure and Contents)	1% Annual Chance Event						Industrial, Religious, Education and Government	
		All Occupancies		Residential		Commercial			
		Estimated Loss	% of Total	Estimated Loss	% of Total	Estimated Loss	% of Total	Estimated Loss	% of Total
Borough of Andover	\$182,562,894	\$1,396,032	<1%	\$577,496	<1%	\$481,273	<1%	\$337,263	<1%
Township of Andover	\$1,259,872,091	\$381,533	<1%	\$137,847	<1%	\$95,922	<1%	\$147,765	<1%
Borough of Branchville	\$174,318,470	\$547,066	<1%	\$474,732	<1%	\$72,334	<1%	\$0	0.0%
Township of Byram	\$1,543,404,464	\$4,793,795	<1%	\$1,781,439	<1%	\$1,413,164	<1%	\$1,599,192	<1%
Township of Frankford	\$1,653,244,645	\$10,850,315	<1%	\$5,700,816	<1%	\$1,451,315	<1%	\$3,698,184	<1%
Borough of Franklin	\$881,717,214	\$1,533,181	<1%	\$899,219	<1%	\$115,106	<1%	\$518,856	<1%
Township of Fredon	\$842,171,127	\$73,470	<1%	\$73,470	<1%	\$0	0.0%	\$0	0.0%
Township of Green	\$962,383,257	\$3,695,734	<1%	\$2,315,129	<1%	\$0	0.0%	\$1,380,606	<1%
Borough of Hamburg	\$747,007,403	\$0	0.0%	\$0	0.0%	\$0	0.0%	\$0	0.0%
Township of Hampton	\$1,398,457,332	\$866,638	<1%	\$263,872	<1%	\$0	0.0%	\$602,766	<1%
Township of Hardyston	\$1,652,499,901	\$435,199	<1%	\$259,680	<1%	\$0	0.0%	\$175,519	<1%
Borough of Hopatcong	\$2,224,090,408	\$1,589,809	<1%	\$154,393	<1%	\$0	0.0%	\$1,435,416	<1%
Township of Lafayette	\$802,389,890	\$4,849,253	<1%	\$1,576,747	<1%	\$478,770	<1%	\$2,793,737	<1%
Township of Montague	\$858,431,631	\$3,356,748	<1%	\$2,999,568	<1%	\$0	0.0%	\$357,180	<1%
Town of Newton	\$1,504,040,803	\$3,855,216	<1%	\$1,731,438	<1%	\$809,495	<1%	\$1,314,284	<1%
Borough of Ogdensburg	\$390,034,452	\$739,115	<1%	\$283,849	<1%	\$200,846	<1%	\$254,420	<1%
Township of Sandyston	\$588,862,570	\$4,080,525	<1%	\$2,468,168	<1%	\$232,512	<1%	\$1,379,845	<1%
Township of Sparta	\$4,731,600,744	\$3,134,721	<1%	\$1,902,769	<1%	\$876,698	<1%	\$355,254	<1%
Borough of Stanhope	\$859,784,777	\$130,105	<1%	\$130,105	<1%	\$0	0.0%	\$0	0.0%
Township of Stillwater	\$931,811,957	\$1,354,583	<1%	\$202,603	<1%	\$0	0.0%	\$1,151,980	<1%
Borough of Sussex	\$424,677,833	\$402,760	<1%	\$49,920	<1%	\$295,283	<1%	\$57,557	<1%
Township of Vernon	\$4,759,388,701	\$8,851,442	<1%	\$2,498,547	<1%	\$3,186,825	<1%	\$3,166,070	<1%
Township of Walpack	\$16,093,258	\$3,056,909	19.0%	\$166,737	1.0%	\$604,668	3.8%	\$2,285,503	14.2 %
Township of Wantage	\$2,250,158,879	\$11,103,759	<1%	\$5,942,944	<1%	\$1,760,553	<1%	\$3,400,262	<1%



Table 5.4.4-9. Estimated General Building Stock Potential Loss to the 1-percent Annual Chance Flood Event

Municipality	Total Improved Value (Structure and Contents)	1% Annual Chance Event						Industrial, Religious, Education and Government	
		All Occupancies		Residential		Commercial			
		Estimated Loss	% of Total	Estimated Loss	% of Total	Estimated Loss	% of Total	Estimated Loss	% of Total
Sussex County Total	\$31,639,004,702	\$71,077,910	<1%	\$32,591,488	<1%	\$12,074,763	<1%	\$26,411,659	<1%

Source: HAZUS-MH 3.0, Sussex County



NFIP Statistics

In addition to total building stock modeling, individual data available on flood policies, claims, Repetitive Loss Properties (RLP) and severe RLP (SRLs) were analyzed. FEMA Region 2 provided a list of residential properties with NFIP policies, past claims and multiple claims (RLPs). According to the metadata provided: “The (sic National Flood Insurance Program) NFIP Repetitive Loss File contains losses reported from individuals who have flood insurance through the Federal Government. A property is considered a repetitive loss property when there are two or more losses reported which were paid more than \$1,000 for each loss. The two losses must be within 10 years of each other & be as least 10 days apart. Only losses from (sic since) 1/1/1978 that are closed are considered.”

SRLs were then examined for the County. According to section 1361A of the National Flood Insurance Act, as amended (NFIA), 42 U.S.C. 4102a, an SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

- Has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or
- For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.
- For both of the above, at least two of the referenced claims must have occurred within any 10- year period, and must be greater than 10 days apart.

Table 5.4.4-10 through Table 5.4.4-12 summarize the NFIP policies, claims and repetitive loss statistics for Sussex County. Table 5.4.4-X summarizes the occupancy classes of the repetitive loss and severe repetitive loss properties in Sussex County. The majority of the repetitive loss occupancy class is single family residences (85.7%). There are no severe repetitive loss properties in the County (FEMA Region 2, 2014). This information is current as of November 30, 2014.

The location of the properties with policies, claims and repetitive and severe repetitive flooding were geocoded by FEMA with the understanding that there are varying tolerances between how closely the longitude and latitude coordinates correspond to the location of the property address, or that the indication of some locations are more accurate than others.

Table 5.4.4-10. Occupancy Class of Repetitive Loss Structures in Sussex County

Occupancy Class	Total Number of Repetitive Loss Properties	Total Number of Severe Repetitive Loss Properties	Total (RL + SRL)
Single Family	6	0	6
Condo	0	0	0
2-4 Family	1	0	1
Other Residential	0	0	0
Non-Residential	0	0	0
Sussex County	7	0	7

Source: FEMA Region 2 2014

Note (1): Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA Region 2, and are current as of 11/30/2014..

RL Repetitive Loss

SRL Severe Repetitive Loss



Table 5.4.4-11. Occupancy Class of Repetitive Loss Structures in Sussex County, by Municipality

Municipality	Repetitive Loss Properties				
	2-4 Family	Assumed Condo	Non Residential	Other Residential	Single Family
Borough of Andover	0	0	0	0	0
Township of Andover	0	0	0	0	0
Borough of Branchville	1	0	0	0	1
Township of Byram	0	0	0	0	1
Township of Frankford	0	0	0	0	0
Borough of Franklin	0	0	0	0	1
Township of Fredon	0	0	0	0	0
Township of Green	0	0	0	0	0
Borough of Hamburg	0	0	0	0	0
Township of Hampton	0	0	0	0	0
Township of Hardyston	0	0	0	0	0
Borough of Hopatcong	0	0	0	0	0
Township of Lafayette	0	0	0	0	1
Township of Montague	0	0	0	0	1
Town of Newton	0	0	0	0	0
Borough of Ogdensburg	0	0	0	0	1
Township of Sandyston	0	0	0	0	0
Township of Sparta	0	0	0	0	0
Borough of Stanhope	0	0	0	0	0
Township of Stillwater	0	0	0	0	0
Borough of Sussex	0	0	0	0	0
Township of Vernon	0	0	0	0	0
Township of Walpack	0	0	0	0	0
Township of Wantage	0	0	0	0	0
Sussex County	1	0	0	0	6

Source: FEMA, 2014

Note (1): Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA Region 2, and are current as of 11/30/2014

Note (2): The statistics were summarized using the Community Name provided by FEMA Region 2.



Table 5.4.4-12. NFIP Policies, Claims and Repetitive Loss Statistics

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in the 1% Flood Boundary (3)
Borough of Andover	5	1	\$4,314	0	0	3
Township of Andover	7	1	\$304	0	0	0
Borough of Branchville	9	6	\$57,589	2	0	2
Township of Byram	34	10	\$129,878	1	0	3
Township of Frankford	24	5	\$61,459	0	0	7
Borough of Franklin	14	8	\$67,237	1	0	2
Township of Fredon	4	1	\$6,937	0	0	0
Township of Green	12	1	\$11,652	0	0	2
Borough of Hamburg	4	0	\$0	0	0	0
Township of Hampton	13	1	\$1,023	0	0	3
Township of Hardyston	10	1	\$60,787	0	0	1
Borough of Hopatcong	20	11	\$128,582	0	0	0
Township of Lafayette	12	6	\$125,200	1	0	5
Township of Montague	17	13	\$155,437	1	0	4
Town of Newton	26	3	\$58,654	0	0	13
Borough of Ogdensburg	8	8	\$53,266	1	0	0
Township of Sandyston	12	3	\$209,806	0	0	4
Township of Sparta	61	6	\$32,999	0	0	1
Borough of Stanhope	7	2	\$16,257	0	0	0
Township of Stillwater	7	3	\$87,323	0	0	0
Borough of Sussex	8	5	\$80,363	0	0	3
Township of Vernon	46	20	\$165,380	0	0	9
Township of Walpack	0	1	\$7,076	0	0	0
Township of Wantage	32	7	\$182,463	0	0	13
Sussex County	392	123	\$1,703,983	7	0	75

Source: FEMA Region 2, 2014

(1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA Region 2, and are current as of 11/30/2014.



Please note the total number of repetitive loss properties does not include the severe repetitive loss properties. The number of claims represents claims closed by 11/30/14.

(2) *Total building and content losses from the claims file provided by FEMA Region 2.*

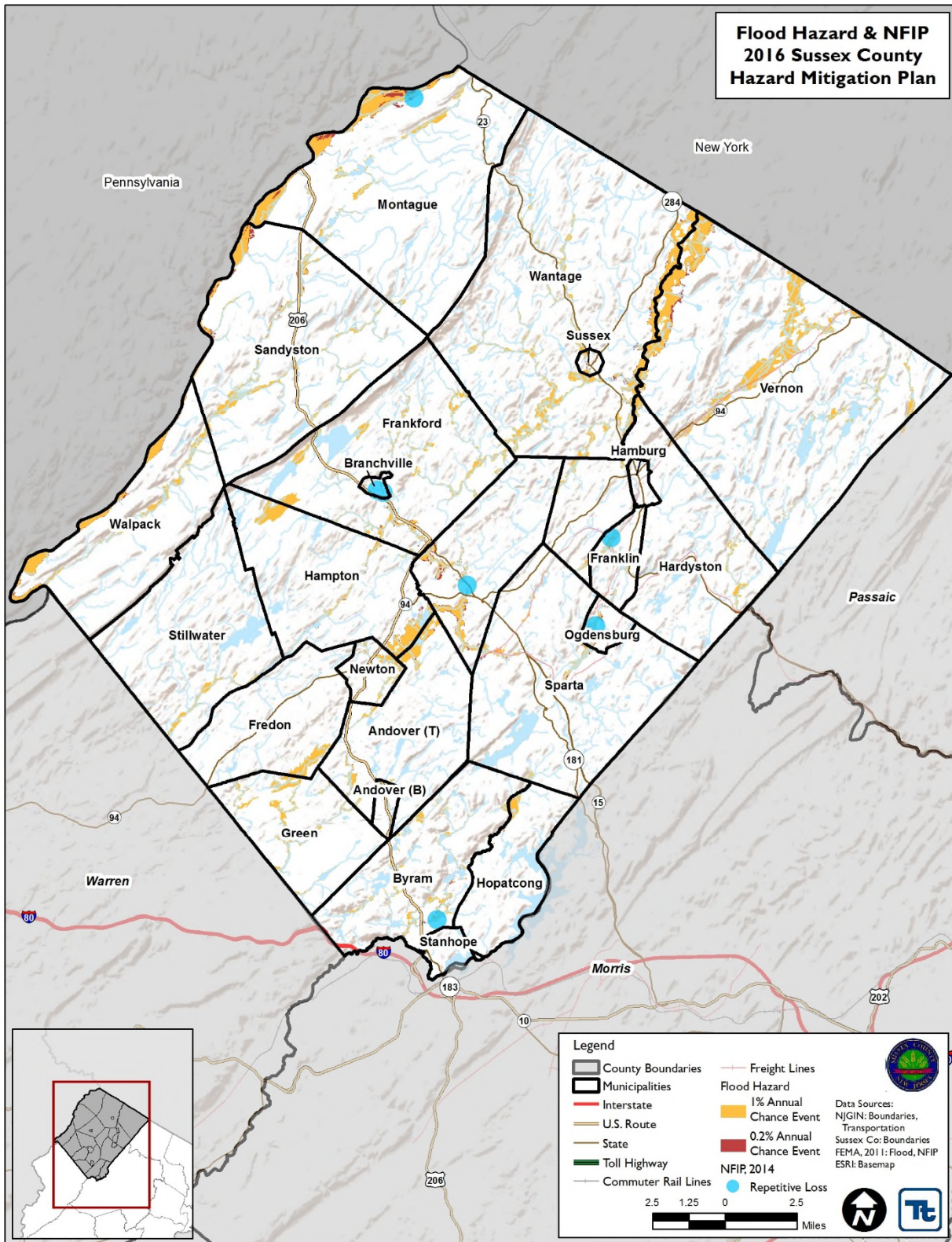
(3) *The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.*

Notes: *FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.
Number of policies and claims and claims total exclude properties located outside County boundary, based on provided latitude and longitude.*

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Figure 5.4.4-4. NFIP Repetitive Loss Areas – Sussex County



Source: FEMA Region 2 2011, 2014



Impact on Critical Facilities

HAZUS-MH was used to estimate the flood loss potential to critical facilities exposed to the flood risk. Using depth/damage function curves, HAZUS estimates the percent of damage to critical facilities. Table 5.4.4-13 and Table 5.4.4-14 summarize the number of critical facilities located in the FEMA flood zones by type and by jurisdiction.

In cases where short-term functionality is impacted by a hazard, other facilities of neighboring municipalities may need to increase support response functions during a disaster event. Mitigation planning should consider means to reduce impact to critical facilities and ensure sufficient emergency and school services remain when a significant event occurs. Actions addressing shared services agreements are included in Section 9 (Mitigation Strategies) of this plan.

Table 5.4.4-13. Number of Critical Facilities Located in the 1-percent Annual Chance Flood Zone

Municipality	Facility Types	
	Shelter	Wastewater Pump
Borough of Andover	0	0
Township of Andover	0	0
Borough of Branchville	0	0
Township of Byram	2	2
Township of Frankford	1	0
Borough of Franklin	0	0
Township of Fredon	0	0
Township of Green	0	0
Borough of Hamburg	0	0
Township of Hampton	0	0
Township of Hardyston	0	0
Borough of Hopatcong	0	0
Township of Lafayette	0	0
Township of Montague	0	0
Town of Newton	0	0
Borough of Ogdensburg	0	0
Township of Sandyston	0	0
Township of Sparta	0	0
Borough of Stanhope	0	0
Township of Stillwater	0	0
Borough of Sussex	0	0
Township of Vernon	1	0
Township of Walpack	0	0

**Table 5.4.4-13. Number of Critical Facilities Located in the 1-percent Annual Chance Flood Zone**

Municipality	Facility Types	
	Shelter	Wastewater Pump
Township of Wantage	0	0
Sussex County Total	4	2

Source: FEMA 2014, Sussex County

Table 5.4.4-14. Number of Critical Facilities Located in the 0.2-Percent Annual Chance Flood Zone

Municipality	Facility Types			
	DPW	Shelter	Substation	Wastewater Pump
Borough of Andover	0	0	0	0
Township of Andover	0	0	0	0
Borough of Branchville	0	0	0	0
Township of Byram	0	2	0	2
Township of Frankford	0	1	0	0
Borough of Franklin	0	0	0	0
Township of Fredon	0	0	0	0
Township of Green	0	0	0	0
Borough of Hamburg	0	0	0	0
Township of Hampton	0	0	0	0
Township of Hardyston	0	0	0	0
Borough of Hopatcong	0	0	0	0
Township of Lafayette	1	0	0	0
Township of Montague	0	0	0	0
Town of Newton	0	0	0	0
Borough of Ogdensburg	0	0	0	0
Township of Sandyston	0	0	0	0
Township of Sparta	0	0	0	0
Borough of Stanhope	0	0	0	0
Township of Stillwater	0	0	0	0
Borough of Sussex	0	0	1	0
Township of Vernon	0	1	0	0

**Table 5.4.4-14. Number of Critical Facilities Located in the 0.2-Percent Annual Chance Flood Zone**

Municipality	Facility Types			
	DPW	Shelter	Substation	Wastewater Pump
Township of Walpack	0	0	0	0
Township of Wantage	0	0	0	0
Sussex County Total	1	4	1	2

Source: FEMA 2014, Sussex County

Impact on the Economy

For impact on economy, estimated losses from a flood event are considered. Losses include but are not limited to general building stock damages, agricultural losses, business interruption, impacts to tourism and tax base to Sussex County. Damages to general building stock can be quantified using HAZUS-MH as discussed above. Other economic components such as loss of facility use, functional downtime and social economic factors are less measurable with a high degree of certainty.

Flooding can cause extensive damage to public utilities and disruptions to the delivery of services. Loss of power and communications may occur; and drinking water and wastewater treatment facilities may be temporarily out of operation. Flooded streets and road blocks make it difficult for emergency vehicles to respond to calls for service. Floodwaters can wash out sections of roadway and bridges (Foster, Date Unknown). In addition to travel along the roadways, public transit will be greatly impacted, causing problems for emergency responders.

Direct building losses are the estimated costs to repair or replace the damage caused to the building. Refer to the 'Impact on General Building Stock' subsection which discusses these potential losses. These dollar value losses to the County's total building inventory replacement value, in addition to damages to roadways and infrastructure, would greatly impact the local economy.

HAZUS-MH estimated the amount of debris generated from the 1-percent annual chance flood event. The model breaks down debris into three categories: 1) finishes (dry wall, insulation, etc.); 2) structural (wood, brick, etc.) and 3) foundations (concrete slab and block, rebar, etc.). The distinction is made because of the different types of equipment needed to handle the debris. Table 5.4.6-15 summarizes the debris estimated for the 1-percent flood annual chance event.

Please note this table only represents estimated debris generated by riverine flooding and does not include additional potential damage and debris which may be generated with the presence of wind.

Table 5.4.4-15. Estimated Debris Generated from the 1-percent Flood Event

Municipality	1% Flood Event			
	Total (tons)	Finish (tons)	Structure (tons)	Foundation (tons)
Borough of Andover	25	25	0	0
Township of Andover	6	6	0	0

**Table 5.4.4-15. Estimated Debris Generated from the 1-percent Flood Event**

Municipality	1% Flood Event			
	Total (tons)	Finish (tons)	Structure (tons)	Foundation (tons)
Borough of Branchville	33	33	0	0
Township of Byram	243	235	5	3
Township of Frankford	196	147	28	21
Borough of Franklin	96	85	7	4
Township of Fredon	0	0	0	0
Township of Green	82	59	13	9
Borough of Hamburg	0	0	0	0
Township of Hampton	12	12	0	0
Township of Hardyston	11	8	2	1
Borough of Hopatcong	28	27	1	1
Township of Lafayette	62	62	0	0
Township of Montague	439	241	115	83
Town of Newton	81	61	12	8
Borough of Ogdensburg	15	15	0	0
Township of Sandyston	123	77	27	19
Township of Sparta	797	312	288	197
Borough of Stanhope	12	7	3	2
Township of Stillwater	85	70	9	6
Borough of Sussex	67	28	23	16
Township of Vernon	904	605	179	120
Township of Walpack	119	26	53	40
Township of Wantage	271	189	48	33
Sussex County Total	3,707	2,331	814	562

Source: HAZUS-MH 3.0

Impact on the Environment

As discussed, floodplains serve beneficial and natural functions on ecological/environmental, social, and economic levels. Areas in the floodplain that typically provide these natural functions and benefits are wetlands, riparian areas, sensitive areas, and habitats for rare and endangered species. Floods however can also lead to negative impacts on the environment. Loss of riparian buffers, land use change within a watershed, and introduction of non-natural contaminants may cause environmental issues when floods occur (Montz and Tobin 1997; Rubin 2013).

To determine the exposure of the natural and beneficial land in Sussex County to the flood hazard, the acreage of wetlands, forested land, and endangered species was calculated. Refer to Table 5.4.4-XX.

Table 5.4.4-18. Acreage of Natural and Beneficial Land Located in the Floodplain

Wetlands	Area in the 1-Percent Annual Chance Floodplain (acres)	Area in the 0.2-Percent Annual Chance Floodplain (acres)
Wetlands	14,239	14,601
Forest	4,091	4,425



Wetlands	Area in the 1-Percent Annual Chance Floodplain (acres)	Area in the 0.2-Percent Annual Chance Floodplain (acres)
Endangered Species	141,182	171,555

Source: NJDEP 2015, NJDEP 2012, FEMA 2011

The basic environmental impact of major flooding is morphological; the shape of the river valley is often determined more by a catastrophic event. This process is a primary factor in forming the natural habitat for flora and fauna and may influence habitats beyond the river corridor (Hickey and Salas 1995).

Flooding can cause a wide range of environmental impacts. Impacts include but are not limited to erosion, loss of vegetation and habitats which may lead to decreased protection of the waterbody from adjacent land uses and degraded water quality. In addition, floods may generate large amounts of tree and construction debris (refer to Table 5.4.5-16), disperse household hazardous waste into the fluvial system, and contaminate water supplies and wildlife habitats with extremely toxic substances. Floods of greater depth are likely to result in greater environmental damage than floods of lesser depth. Long duration floods could exacerbate environmental problems because clean-up will likely be delayed and contaminants have the potential of remaining in the environment for a longer period of time. Cleaning up after a flood presents additional environmental concerns. The volume of debris to be collected, the extent to which public utilities (water supply systems and sewer operations) have been damaged, and the quantity of agricultural and industrial pollutants entering water bodies might present additional issues (Montz and Tobin 1997; Rubin 2013).

Effect of Climate Change on Vulnerability

Climate is defined not simply as average temperature and precipitation but also by the type, frequency and intensity of weather events. Both globally and at the local scale, climate change has the potential to alter the prevalence and severity of extremes such as flood events. While predicting changes of flood events under a changing climate is difficult, understanding vulnerabilities to potential changes is a critical part of estimating future climate change impacts on human health, society and the environment (U.S. Environmental Protection Agency [EPA], 2006).

Change of Vulnerability

Sussex County and its municipalities continue to be vulnerable to the flood hazard. However, there are several differences between the exposure and potential loss estimates between this plan update to the results in the 2011 HMP. Their differences are due to the new and updated population (U.S. Census 2010 is now available) and building inventories used, and more accurate flood depth grids used to estimate potential losses in HAZUS-MH due to the availability of their DFIRM.

For example, the 2010 HMP building inventory was the default HAZUS-MH MR4 Patch 2 general building stock with replacement values based on 2006 RS Means. For this plan update, the potential loss analysis was conducted using a custom County-wide building inventory using 2015 Sussex County and the MODIV tax assessment data. The 2010 HMP potential loss estimates were only summarized at the County level for each occupancy class; however the 2016 update estimates potential losses at the structure level using the updated building inventory and summarized for each municipality.

For this plan update, an updated depth grid, generated using 2011 FEMA effective FIRM maps for the 2014 New Jersey State HMP, was used for Sussex County. The depth grid was integrated into HAZUS-MH, and the model was run to estimate potential losses at the structure level utilizing the custom building inventory developed for this plan update.



Overall, this vulnerability assessment uses a more accurate and updated building inventory and updated flood mapping which provides more accurate estimated exposure and potential losses for Sussex County.

Future Growth and Development

As discussed in Section 4, areas targeted for future growth and development have been identified across the County. Any areas of growth could be potentially impacted by the flood hazard if located within the identified hazard areas. Figure 5.4.4-5 illustrates the identified areas of potential new development in relation to the flood boundaries. It is the intention of the County and all participating municipalities to discourage development in vulnerable areas or to encourage higher regulatory standards on the local level.

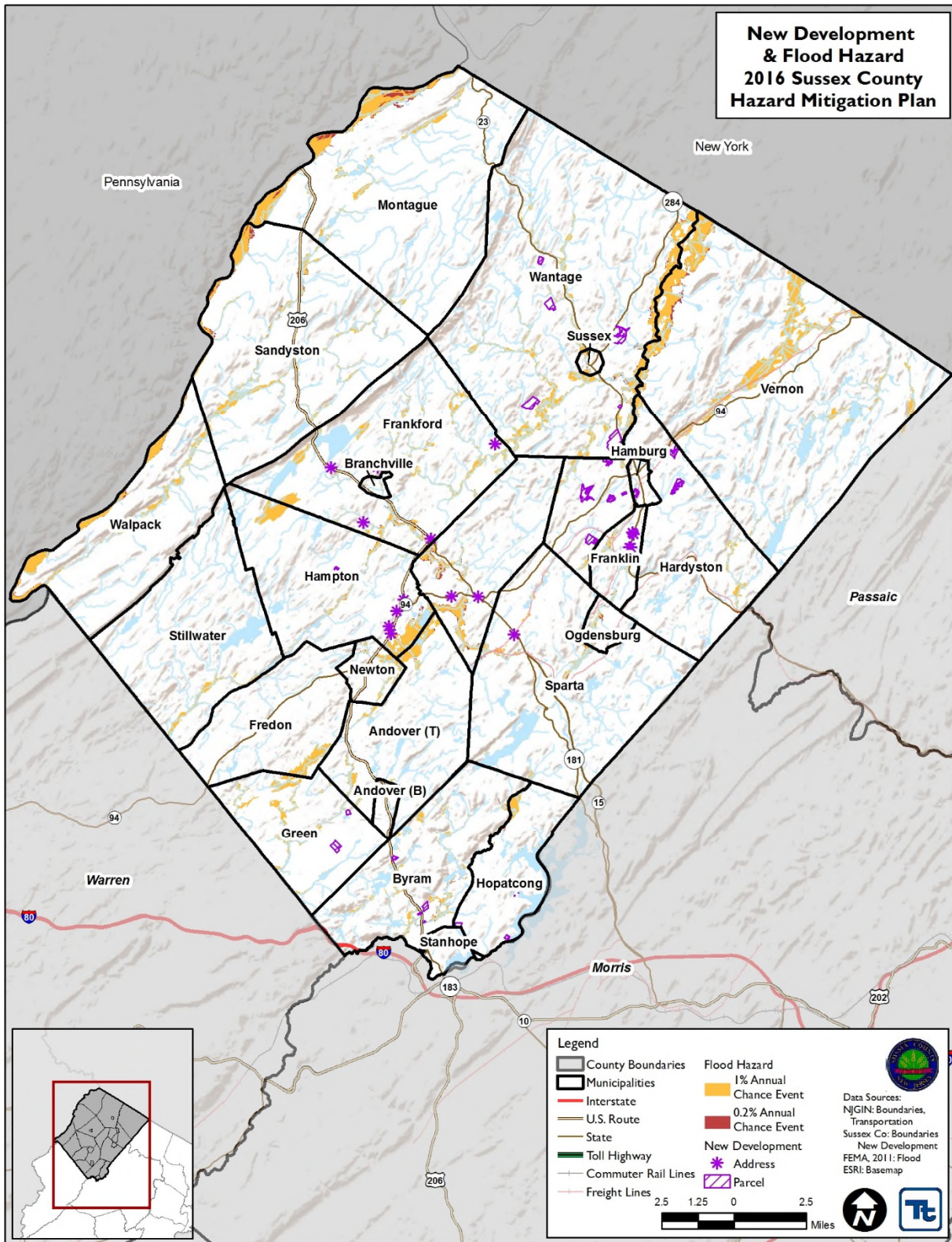
Additional Data and Next Steps

A HAZUS-MH flood analysis was conducted for Sussex County using the most current and best available data including updated population data, building and critical facility inventories, and DFIRM. As additional FEMA Risk Mapping, Assessment, and Planning (Risk MAP) products become available, these may be used to further enhance this assessment (e.g. depth grids for additional recurrence intervals).

Specific mitigation actions addressing improved data collection and further vulnerability analysis is included in Volume II, Section 9 of this plan.



Figure 5.4.4-5. Potential New Development and Flood Boundaries



Source: FEMA 2011, Sussex County



5.4.5 Geological Hazards

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the geological hazards in Sussex County.

2016 Plan Update Changes

- The hazard profile has been significantly enhanced to include a detailed hazard description, location, extent, previous occurrences, probability of future occurrence, and potential change in climate and its impacts on the geological hazards is discussed. The geological hazards is now located in Section 5 of the plan update. It includes landslide, land subsidence and sinkholes, all of which were profiled separately in the 2011 HMP.
- New and updated figures from federal and state agencies are incorporated. U.S. 2010 Census data was incorporated, where appropriate.
- Previous occurrences were updated with events that occurred between 2008 and 2015.
- A vulnerability assessment was conducted for the geological hazards and it now directly follows the hazard profile.

5.4.5.1 Profile

Hazard Description

Geological hazards are any geological or hydrological processes that pose a threat to humans and natural properties. Every year, severe natural events destroy infrastructure and cause injuries and deaths. Geologic hazards may include volcanic eruptions and other geothermal related features, earthquakes, landslides and other slope failures, mudflows, sinkhole collapses, snow avalanches, flooding, glacial surges and outburst floods, tsunamis, and shoreline movements. For the purpose of this HMP update, only landslides and land subsidence/sinkholes will be discussed in the Geological Hazard profile.

Landslides

According to the U.S. Geological Survey (USGS), the term landslide includes a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on an over steepened slope is the primary reason for a landslide, there are other contributing factors (NJGWS 2013). Among the contributing factors are: (1) erosion by rivers, glaciers, or ocean waves which create over-steepened slopes; (2) rock and soil slopes weakened through saturation by snowmelt or heavy rains; (3) earthquakes which create stresses making weak slopes fail; and (4) excess weight from rain/snow accumulation, rock/ore stockpiling, waste piles, or man-made structures. Scientists from the USGS also monitor stream flow, noting changes in sediment load in rivers and streams that may result from landslides. All of these types of landslides are considered aggregately in USGS landslide mapping.

In New Jersey, there are four main types of landslides: slumps, debris flows, rockfalls, and rockslides. Slumps are coherent masses that move downslope by rotational slip on surfaces that underlie and penetrate the landslide deposit (Briggs et al 1975). A debris flow, also known as a mudslide, is a form of rapid mass movement in which loose soil, rock, organic matter, air, and water mobilize as slurry that flows downslope. Debris flows are often caused by intense surface water from heavy precipitation or rapid snow melt. This precipitation loosens surface matter, thus triggering the slide. Rockfalls are common on roadway cuts and steep cliffs. These landslides are abrupt movements of geological material such as rocks and boulders. Rockfalls happen when these materials become detached. Rockslides are the movement of newly detached segments of bedrock sliding on bedrock, joint, or fault surfaces (Delano and Wilshusen 2001).



Landslides can cause several types of secondary effects, such as blocking access to roads, which can isolate residents and businesses and delay commercial, public, and private transportation. This could result in economic losses for businesses. Other potential problems resulting from landslides are power and communication failures. Vegetation or poles on slopes can be knocked over, resulting in possible losses to power and communication lines. Landslides also have the potential of destabilizing the foundation of structures, which may result in monetary loss for residents. They also can damage rivers or streams, potentially harming water quality, fisheries, and spawning habitat.

Subsidence/Sinkholes

Land subsidence can be defined as the sudden sinking or gradual downward settling of the earth's surface with little or no horizontal motion, owing to the subsurface movement of earth materials (USGS 2000). Subsidence often occurs through the loss of subsurface support in karst terrain, which may result from a number of natural- and human-caused occurrences. Karst describes a distinctive topography that indicates dissolution of underlying carbonate rocks (limestone and dolomite) by surface water or groundwater over time. The dissolution process causes surface depressions and the development of sinkholes, sinking stream, enlarged bedrock fractures, caves, and underground streams (New Jersey State HMP 2014).

Sinkholes, the type of subsidence most frequently seen in New Jersey, are a natural and common geologic feature in areas with underlying limestone, carbonate rock, salt beds, or other rocks that are soluble in water. Over periods of time, measured in thousands of years, the carbonate bedrock can be dissolved through acidic rain water moving in fractures or cracks in the bedrock. This creates larger openings in the rock through which water and overlying soil materials will travel. Over time the voids will enlarge until the roof over the void is unable to support the land above at which time it will collapse, forming a sinkhole. In this example the sinkhole occurs naturally, but in other cases the root causes of a sinkhole are anthropogenic. These anthropogenic causes can include changes to the water balance of an area such as: over-withdrawal of groundwater; diverting surface water from a large area and concentrating it in a single point; artificially creating ponds of surface water; and drilling new water wells. These actions can accelerate the natural processes of creation of soil voids, which can have a direct impact on sinkhole creation (New Jersey State HMP 2014).

The State's susceptibility to subsidence is also due in part to the number of abandoned mines throughout New Jersey. The mining industry in New Jersey dates back to the early 1600s when copper was first mined by Dutch settlers along the Delaware River in Warren County. There are approximately 450 underground mines in New Jersey, all of which are now abandoned. Although mines have closed in New Jersey, continued development in the northern part of the State has been problematic because of the extensive mining there which has caused widespread subsidence. One problem is that the mapped locations of some of the abandoned mines are not accurate. Another issue is that many of the surface openings were improperly filled in, and roads and structures have been built adjacent to or on top of these former mine sites (USGS 2006; New Jersey State HMP 2014).

Both natural and man-made sinkholes can occur without warning. Slumping or falling fence posts, trees, or foundations, sudden formation of small ponds, wilting vegetation, discolored well water, and/or structural cracks in walls and floors, are all specific signs that a sinkhole is forming. Sinkholes can range in form from steep-walled holes, to bowl, or cone-shaped depressions. When sinkholes occur in developed areas they can cause severe property damage, disruption of utilities, damage to roadways, injury, and loss of life (New Jersey State HMP 2014).



Location

Landslides

The entire U.S. experiences landslides, with 36 states having moderate to highly severe landslide hazards. Expansion of urban and recreational developments into hillside areas exposes more people to the threat of landslides each year. According to the USGS, Sussex County has low landslide potential. For a figure displaying the landslide potential of the conterminous United States, please refer to <http://pubs.usgs.gov/fs/2005/3156/2005-3156.pdf> (USGS 2005). Other resources, specifically the National Landslide Hazard Program (NLHP), provide a more detailed level of susceptibility analysis for the State. Based off this data and as visualized in Figure 5.4.5-1, Sussex County primarily has a low landslide potential except along parts of its north/northwestern border, where it has a high susceptibility/moderate incidence rate. The Townships of Montague, Sandyston, and Walpack are the only jurisdictions within the County to be impacted by this analysis.

Although the data from NLHP provides a starting place for the County to investigate where its land is more vulnerable to landslides, historic landslide locations also indicate potential risk areas. New Jersey has an extensive history of landslides, and they can occur for a variety of reasons. Based off historic landslide locations, the areas most susceptible to landslides are the western and southwestern portions of the County. Figure 5.4.5-1. Landslide Susceptibility in Sussex County

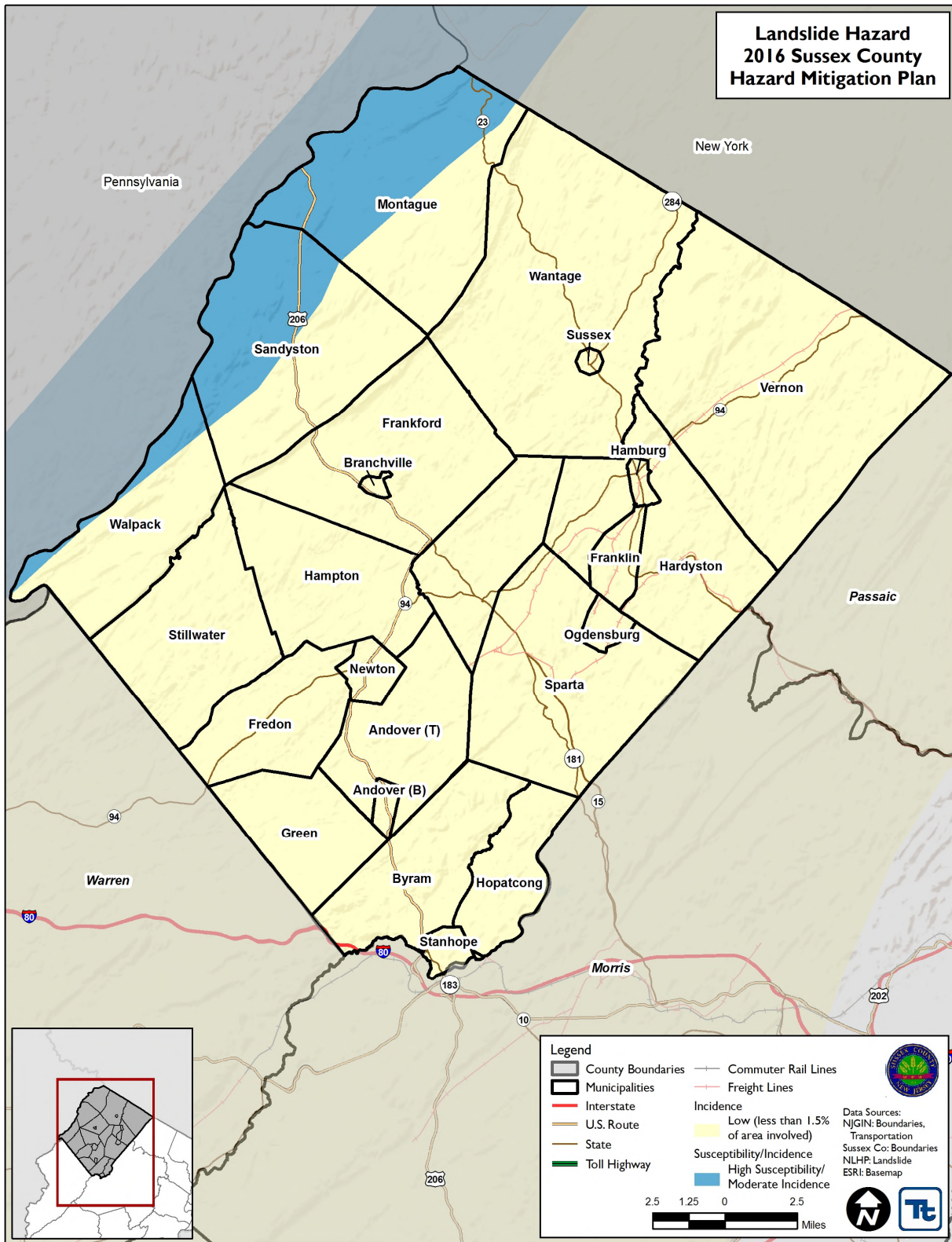


Figure 5.4.5-2 illustrates the historic landslide locations in Sussex County. According to the figure, landslides (particularly debris flows) have occurred throughout Sussex County with a large number occurring in Vernon.



Although the two figures appear to present contradictory information, the discrepancy in potential hazard areas and previous occurrences demonstrates that landslides can occur almost anywhere in the County. Many of the landslide incidents documented under Figure 5.4.5-2 are the result of Hurricane Irene and storm damage destabilizing roads and causing debris flows. This demonstrates how landslides can be an unexpected secondary hazard during another disaster event. More information on the Hurricane Irene-related landslides can be found later in this profile or in Appendix **X**.

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Figure 5.4.5-1. Landslide Susceptibility in Sussex County

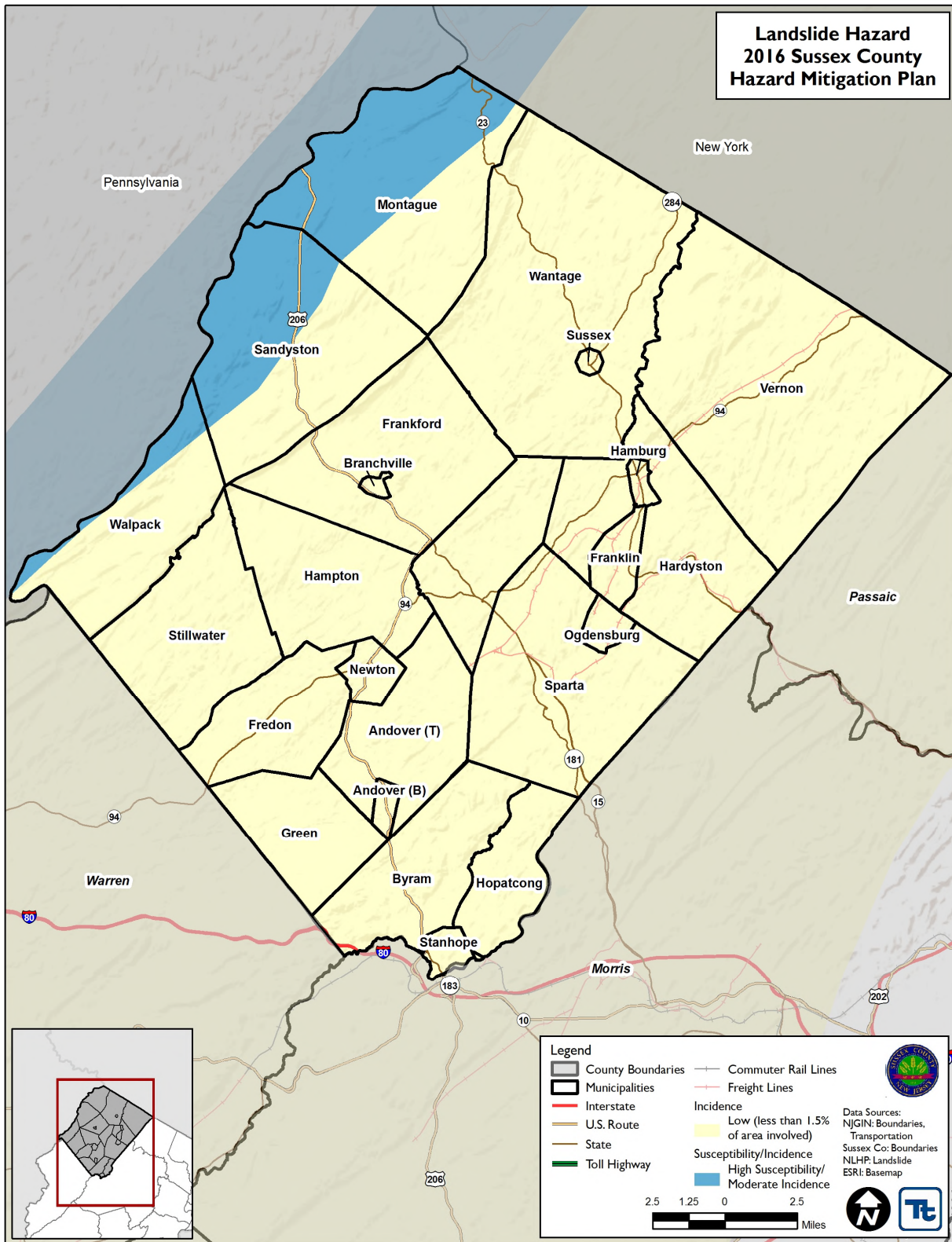
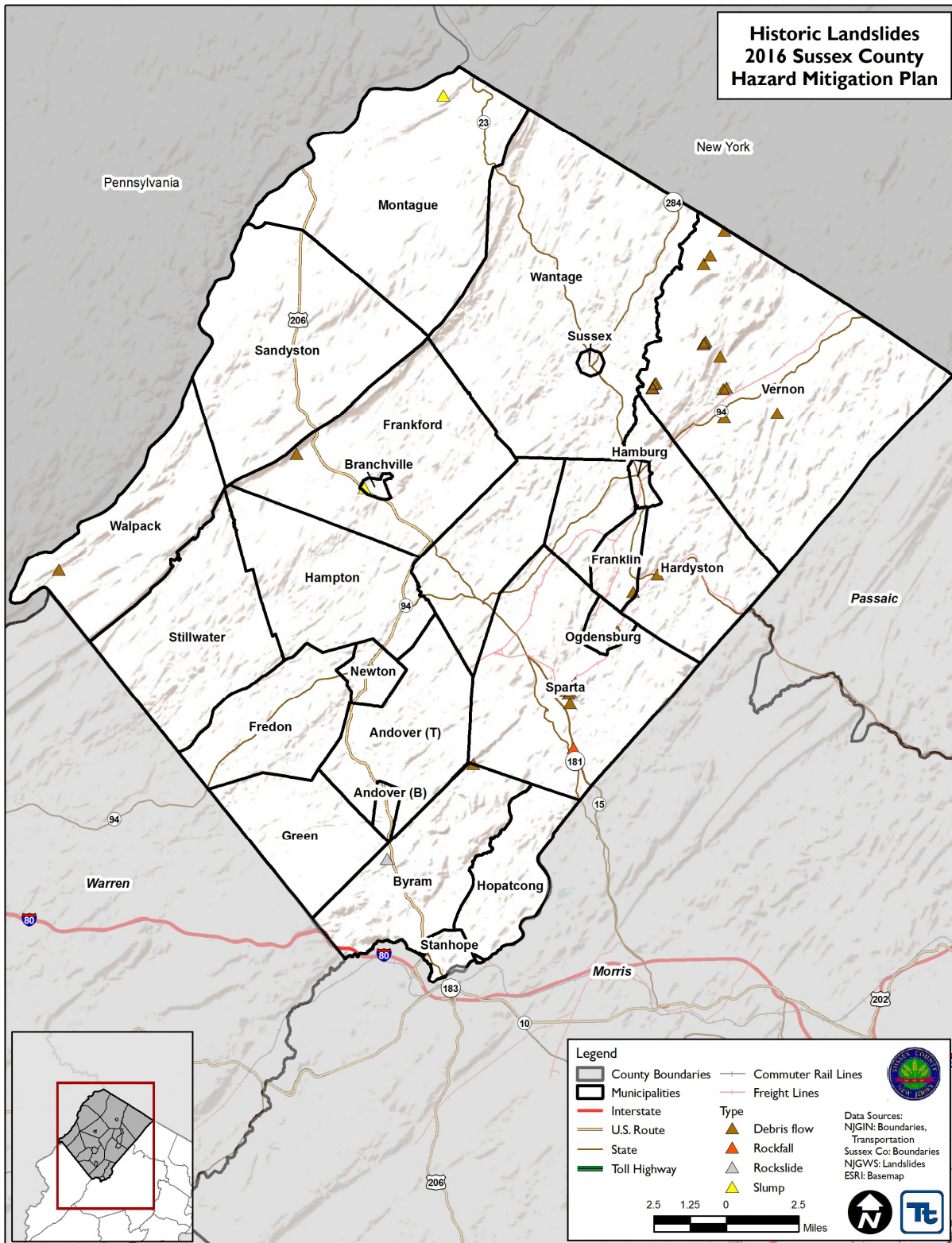




Figure 5.4.5-2. Historic Landslide Locations in Sussex County, 1869 –2015



Source: NJGWS 2014
NJGWS New Jersey Geological Water Survey



Subsidence/Sinkholes

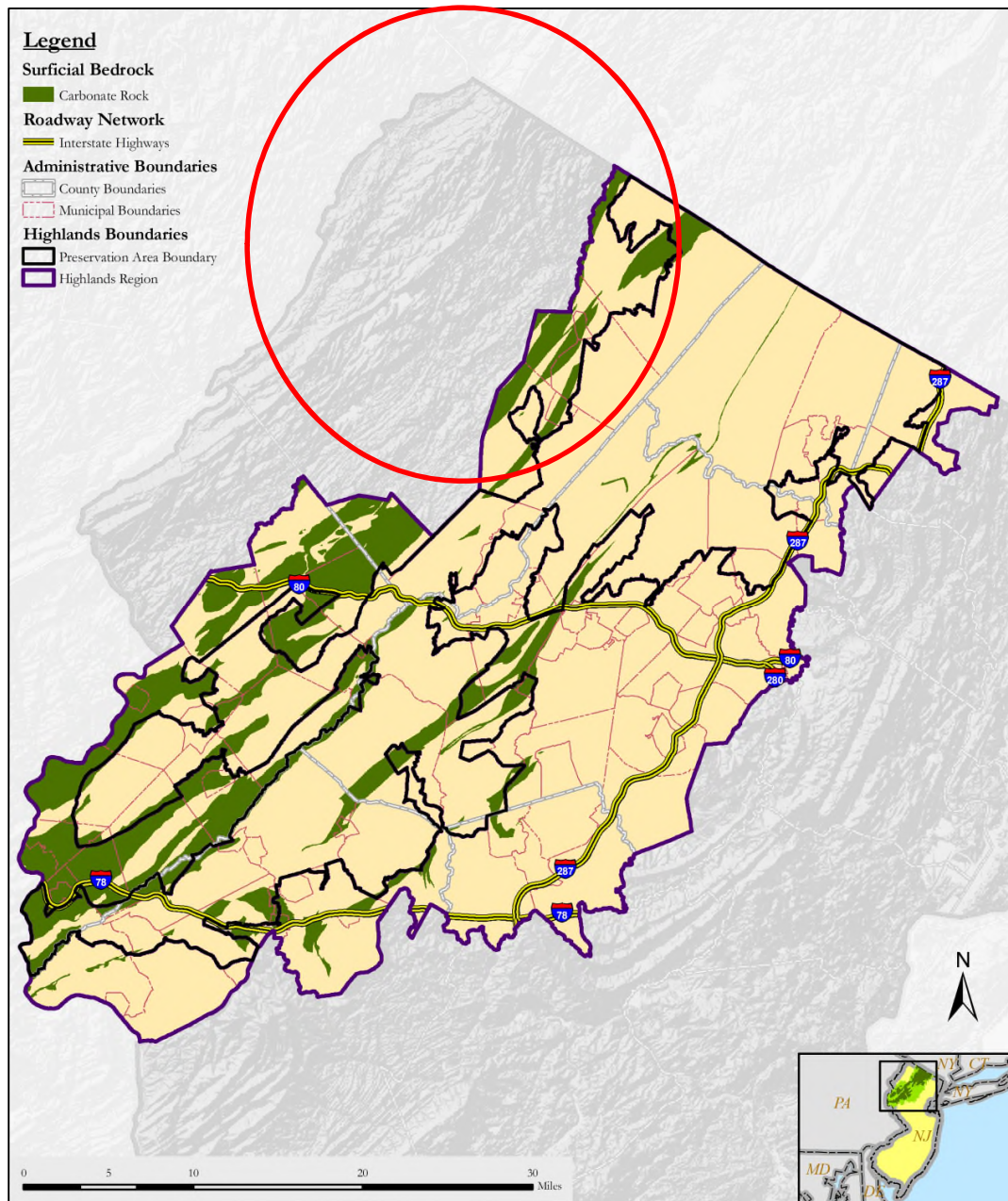
New Jersey is susceptible to the effects of subsidence and sinkholes, primarily in the northern and northwestern section of the State, which includes Sussex County. Land subsidence and sinkholes have been known to occur as a result of natural geologic phenomenon or as a result of human alteration of surface and underground geology. The only spatial coverage for historic sinkholes in the State of New Jersey is in Sussex County; however, limiting analysis of past occurrences for other counties in the state.

Naturally occurring subsidence and sinkholes in New Jersey occur within bands of carbonate bedrock. In northern New Jersey, there are more than 225 square miles that are underlain by limestone, dolomite, and marble. In some areas, no sinkholes have appeared, while in others, sinkholes are common. In southern New Jersey, there are approximately 100 miles which are locally underlain by a lime sand with thin limestone layers. No collapse sinkholes have been identified; however, there are some features which could be either very shallow solution depressions or wind blowout features. Sussex County has numerous bands of carbonate rock running throughout most of the County; the only areas not containing notable bands of carbonate rock are along the southwestern border and part of the northern section of the County. Overall, approximately 24.9% (133.1 square miles) of the County has carbonate rock formation (NJGWS 2005; Godt 2001).

Substantial areas of the New Jersey Highlands are underlain by carbonate rocks, including portions of Sussex County (Figure 5.4.5-3). These rock formations, consisting primarily of limestone, dolomite, and marble, have unique characteristics that require responses to both the policy level and in specific technical guidance to municipalities. According to the NJDEP, 59 of the 88 municipalities within the Highlands region contain carbonate rocks, with eight of those municipalities located in Sussex County. As seen in Figure 5.4.5-3, the Highlands Region has several large areas of carbonate rock formations and karst features exist in some, but not all, of these areas (Highlands Regional Master Plan 2008).



Figure 5.4.5-3. Carbonate Rock in the New Jersey Highlands



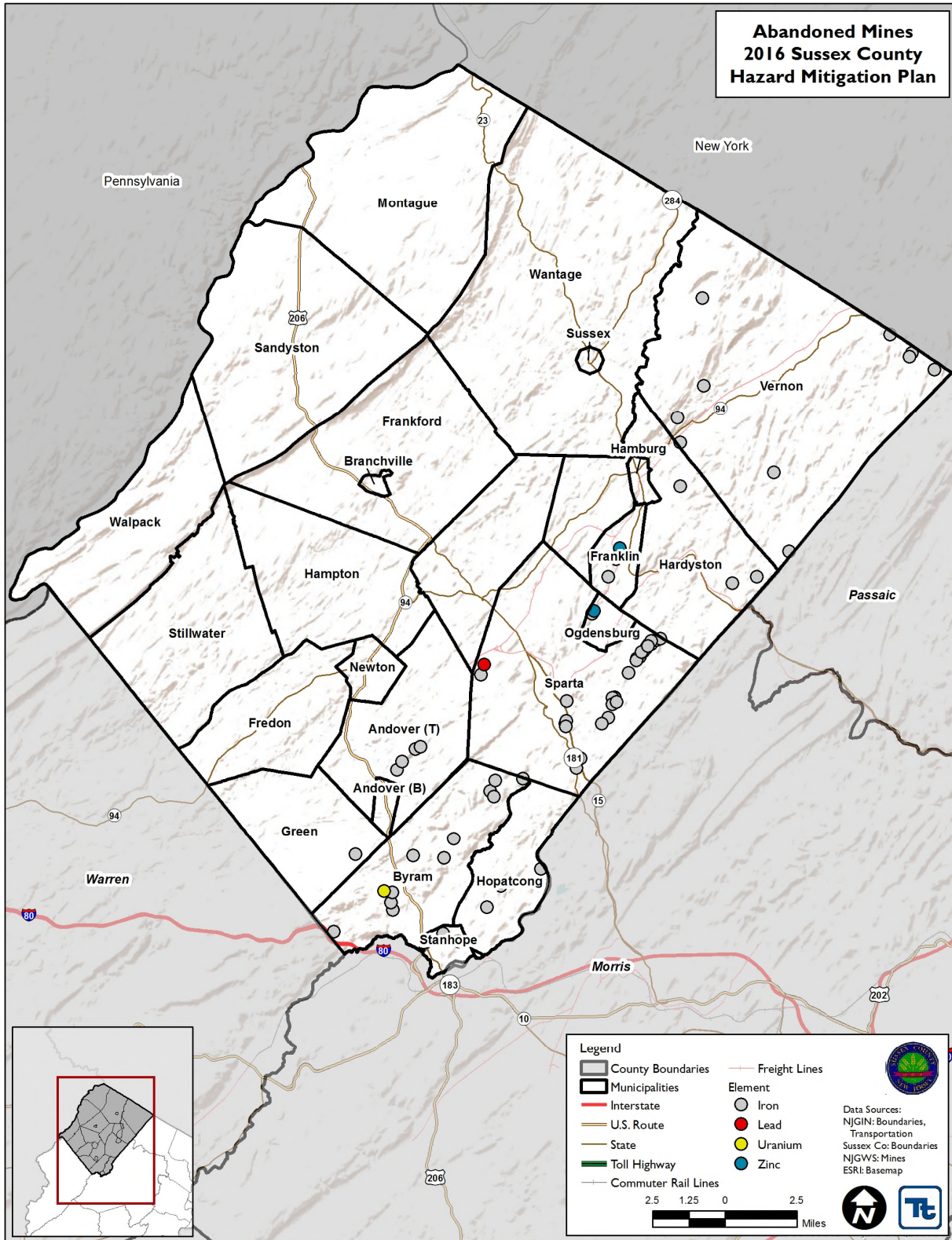
Source: New Jersey Highlands Council 2007

Note: The red circle indicates the approximate location of Sussex County.

As previously stated, abandoned mines are a source for sinkholes and subsidence in New Jersey. Mines create voids under the earth's surface, making areas above mines more susceptible to land subsidence. Sinkholes and subsidence occur from the collapse of the mine roof into a mine opening. Areas most vulnerable to sinkholes are those where mining occurred 20 to 30 feet below the surface. Figure 5.4.5-4 shows the location of the mapped abandoned mines in New Jersey. The data from NJGWS and the figure indicate that Sussex County has 75 abandoned mines, mainly iron mines with a few lead, zinc, and uranium mines. These mines are principally located in the eastern and southern portions of the County (NJGWS 2006).



Figure 5.4.5-4. Abandoned Mines in Sussex County



Source: NJGWS 2006





Extent

Landslide

To determine the extent of a landslide hazard, the affected areas need to be identified and the probability of the landslide occurring within some time period needs to be assessed. Natural variables that contribute to the overall extent of potential landslide activity in any particular area include soil properties, topographic position and slope, and historical incidence. Predicting a landslide is difficult, even under ideal conditions and with reliable information. As a result, the landslide hazard is often represented by landslide incidence and/or susceptibility, as defined below:

- Landslide incidence is the number of landslides that have occurred in a given geographic area. High incidence means greater than 15% of a given area has been involved in landsliding; medium incidence means that 1.5 to 15% of an area has been involved; and low incidence means that less than 1.5% of an area has been involved (State of Alabama Date Unknown).
- Landslide susceptibility is defined as the probable degree of response of geologic formations to natural or artificial cutting, to loading of slopes, or to unusually high precipitation. It can be assumed that unusually high precipitation or changes in existing conditions can initiate landslide movement in areas where rocks and soils have experienced numerous landslides in the past. Landslide susceptibility depends on slope angle and the geologic material underlying the slope. Landslide susceptibility only identifies areas potentially affected and does not imply a time frame when a landslide might occur. High, medium, and low susceptibility are delimited by the same percentages used for classifying the incidence of landsliding (State of Alabama Date Unknown).

Subsidence/Sinkhole

Landslide subsidence occurs slowly and continuously over time or abruptly for various reasons. Subsidence and sinkholes can occur due to either natural processes (karst sinkholes in areas underlain by soluble bedrock) or as a result of human activities. Subsidence in the U.S. has directly affected more than 17,000 square miles in 45 states, and associated annual costs are estimated to be approximately \$125 million. The principal causes of subsidence are aquifer-system compaction, drainage of organic soils, underground mining, hydrocompaction, natural compaction, sinkholes, and thawing permafrost (Galloway et al. 2000). There are several methods used to measure land subsidence. Global Positioning System (GPS) is a method used to monitor subsidence on a regional scale. Benchmarks (geodetic stations) are commonly space around four miles apart (State of California 2009).

Another method which is becoming increasingly popular is Interferometric Synthetic Aperture Radar (InSAR). InSAR is a remote sensing technique that uses radar signals to interpolate land surface elevation changes. It is a cost-effective solution for measuring land surface deformation for a region while offering a high degree of spatial detail and resolution (State of California 2009).

Previous Occurrences and Losses

Numerous sources provided historical information regarding previous occurrences and losses associated with geological hazard events throughout Sussex County. According to the NJDEP, Sussex County has experienced 36 landslide events between 1782 and 2015; however, sinkhole/subsidence history could not be determined due to limited historical records. Many sources were reviewed for the purpose of this HMP and loss and impact information could vary depending on the source. Therefore, the accuracy of monetary figures, if any, is based only on the available information identified during research for this HMP.



Between 1954 and 2015, FEMA issued a disaster (DR) or emergency (EM) declaration for the State of New Jersey for one geological hazard-related event, classified as severe storms, flooding and mudslide. This declaration did include Sussex County (FEMA 2015). Sussex County is included in the FEMA disaster declaration for the remnants of Tropical Storm Lee in 2011. Although this disaster is due to severe storms and flooding, it resulted in secondary geological hazard impacts in certain locations in the State. Sussex County did not specifically note geologic incidents tied to this storm event; however, multiple landslides (debris flows) were recorded in late August 2011. Table 5.4.5-1 lists FEMA DR and EM declarations since 2008 for this HMP update.

Table 5.4.5-1. FEMA DR and EM Declarations Since 2008 for Geologic Events in Sussex County

FEMA Declaration Number	Date(s) of Event	Event Type	Location
DR-4039	September 28, 2011 - October 6, 2011	Remnants of Tropical Storm Lee	Six Counties in New Jersey including Sussex County

Source: FEMA 2015

The New Jersey State HMP also documents notable geologic incidents, including both landslides and sinkholes/subsidence. None of these narrative events occurred in Sussex County, although neighboring counties experienced several events.

Known geological hazard events that have impacted Sussex County between 2008 and 2015 are identified in Appendix X. Refer to the 2011 Sussex County HMP for geological hazard events prior to 2008. With geological hazard documentation being so extensive, not all sources have been identified or researched. Therefore, Appendix X may not include all events that have occurred in Sussex County.

Probability of Future Occurrences

Based upon risk factors and past occurrences, it is likely that geological hazards will occur in Sussex County in the future. Landslide probabilities are largely a function of surface geology, but are also influenced by both weather and human activities. Because of the large number of landslides precipitated by Hurricane Irene in August 2011, landslide probability for Sussex County can be calculated in two ways. If each individual landslide during Hurricane Irene is considered a unique event, then based on NJGWS historic data, Sussex County can expect to experience 0.47 landslide events per year. In contrast, if all of the Hurricane Irene-related landslides are treated as a single event due to having the same cause, then Sussex County can expect to experience 0.2 landslide events per year. With these factors taken into consideration (and with treating landslides from Hurricane Irene as a single event), the County has experienced one landslide event every 1-2 years. Additionally, the County experiences sinkhole and subsidence events every 5-10 years. Specific analyses on the probability of future geologic hazard calculations can be seen in the following two tables, where the first table treats the landslides during Hurricane Irene each as unique events and the second table treats these landslides as one combined event.

There are presumably other smaller landslides and sinkholes that have occurred in the County that have not been reported to the NJGWS and are not included in these calculations. The County will continue to experience the direct and indirect impacts of geological hazards and its impacts on occasion, with the secondary effects causing potential disruption or damage to communities. The table below shows the probability of future geologic events impacting the County, as based on data from the previous occurrences table in Appendix X.

**Table 5.4.5-2. Probability of Future Occurrence of Geologic Events, Calculation One**

Hazard Type	Number of Occurrences Between 1950 and 2015	Rate of Occurrence	Recurrence Interval (in years)	Probability of event Occurring in Any Given Year	% Chance of Occurring in Any Given Year
Debris Flows	31	0.48	2.13	0.47	46.97
Rockfalls	2	0.03	33.00	0.03	3.03
Rockslide	1	0.02	66.00	0.02	1.52
Slump	2	0.03	33.00	0.03	3.03
Sinkhole	1	0.02	66.00	0.02	1.52
Total	37	0.57	1.78	0.56	56.06

Source: NJDEP 2012; NOAA-NCDC 2015; NJ.Com 2015; NJ State HMP 2011

Note: The calculations in this table are based off each landslide during Hurricane Irene being treated as unique events. The most notable differences in calculations for this table are for the debris flows.

Table 5.4.5-3. Probability of Future Occurrence of Geologic Events, Calculation Two

Hazard Type	Number of Occurrences Between 1950 and 2015	Rate of Occurrence	Recurrence Interval (in years)	Probability of event Occurring in Any Given Year	% Chance of Occurring in Any Given Year
Debris Flows	13	0.20	5.07	0.20	19.7
Rockfalls	2	0.03	33.00	0.03	3.03
Rockslide	1	0.02	66.00	0.02	1.52
Slump	2	0.03	33.00	0.03	3.03
Sinkhole	1	0.02	66.00	0.02	1.52
Total	19	0.29	3.47	0.29	28.81

Source: NJDEP 2012; NOAA-NCDC 2015; NJ.Com 2015; NJ State HMP 2011

Note: The calculations in this table are based off all the landslides during Hurricane Irene being treated as a single event. The most notable differences in calculations for this table are for the debris flows.

In Section 5.3, the identified hazards of concern for Sussex County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Committee, the probability of occurrence for geological hazards in the County is considered ‘frequent’ (likely to occur within 25 years, as presented in Table 5.3-3).

Climate Change Impacts

Providing projections of future climate change for a specific region is challenging. Shorter term projections are more closely tied to existing trends making longer term projections even more challenging. The further out a prediction reaches the more subject to changing dynamics it becomes.

Temperatures in the Northeast United States have increased 1.5 degrees Fahrenheit (°F) on average since 1900. Most of this warming has occurred since 1970. The State of New Jersey, for example, has observed an increase in average annual temperatures of 1.2°F between the period of 1971-2000 and the most recent decade of 2001-2010 (ONJSC, 2011). Winter temperatures across the Northeast have seen an increase in average temperature of 4°F since 1970 (Northeast Climate Impacts Assessment [NECIA] 2007). By the 2020s, the average annual temperature in New Jersey is projected to increase by 1.5°F to 3°F above the statewide baseline (1971 to 2000), which was 52.7°F. By 2050, the temperature is projected to increase 3°F to 5°F (Sustainable Jersey Climate



Change Adaptation Task Force 2013). Both northern and southern New Jersey have become wetter over the past century. Northern New Jersey's 1971-2000 precipitation average was over 5" (12%) greater than the average from 1895-1970. Southern New Jersey became 2" (5%) wetter late in the 20th century (Office of New Jersey State Climatologist).

Landslides

Climate change may impact storm patterns, increasing the probability of more frequent, intense storms with varying duration. Increase in global temperature could affect the snowpack and its ability to hold and store water. Warming temperatures also could increase the occurrence and duration of droughts, which would increase the probability of wildfire, reducing the vegetation that helps to support steep slopes. All of these factors would increase the probability for landslide occurrences.

Subsidence/Sinkholes

Similar to landslides, climate change will affect subsidence and sinkholes in New Jersey. As discussed throughout this profile, one of the triggers for subsidence and sinkholes is an abundance of moisture which has the potential to permeate the bedrock causing an event. Climatologists expect an increase in annual precipitation amounts. This increase will coincide with an increased risk in subsidence and sinkholes in vulnerable areas.

More recently, sinkholes have been correlated to land use practices, especially from groundwater pumping and from construction and development practices. Sinkholes may also form when the land surface is changed, such as when industrial and runoff-storage ponds are created. The substantial weight of the new material can trigger an underground collapse of supporting material, thus causing a sinkhole. Additionally, the overburden sediments that cover buried cavities in the aquifer systems are delicately balanced by groundwater fluid pressure. Groundwater is helping keep the surface soil in place. Pumping groundwater for urban water supply and for irrigation can produce new sinkholes in sinkhole-prone areas. If pumping results in a lowering of groundwater levels, then underground structural failure, sinkholes may occur as well (USGS 2014).



5.4.5.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For geological hazards, the known landslide and subsidence/sinkhole vulnerable areas as identified by the New Jersey Geologic and Water Survey have been identified as the hazard area. The following text evaluates and estimates the potential impact of geologic hazards on the County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health and safety of residents, (2) general building stock, (3) critical facilities, (4) economy and environment, and (5) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2011 Sussex County Hazard Mitigation Plan
- Further data collections that will assist understanding this hazard over time

Overview of Vulnerability

Vulnerability to ground failure hazards is a function of location, soil type, geology, type of human activity, use, and frequency of events. The effects of ground failure on people and structures can be lessened by total avoidance of hazard areas or by restricting, prohibiting, or imposing conditions on hazard-zone activity. Local governments can reduce ground failure effects by educating themselves on past hazard history of the site and by making inquiries to planning and engineering departments of local governments (National Atlas, 2007).

To determine vulnerability, a spatial analysis was conducted in GIS using the landslide susceptibility and geological hazard datasets discussed below. When the analysis determined the hazard area may potentially impact the area in a jurisdiction, or the location of critical facilities, these locations were deemed vulnerable to the hazard.

Data and Methodology

According to Radbruch-Hall et al., the Landslide Incidence and Susceptibility GIS layer from National Atlas "...was prepared by evaluating formations or groups of formations shown on the geologic map of the United States (King and Beikman 1974) and classifying them as having high, medium, or low landslide incidence (number of landslides) and being of high, medium, or low susceptibility to landsliding. Thus, those map units or parts of units with more than 15 percent of their area involved in landsliding were classified as having high incidence; those with 1.5 to 15 percent of their area involved in landsliding, as having medium incidence; and those with less than 1.5 percent of their area involved, as having low incidence. This classification scheme was modified where particular lithofacies are known to have variable landslide incidence or susceptibility. In continental glaciated areas, additional data were used to identify surficial deposits that are susceptible to slope movement. Susceptibility to landsliding was defined as the probable degree of response of the areal rocks and soils to natural or artificial cutting or loading of slopes or to anomalously high precipitation. High, medium, and low susceptibility are delimited by the same percentages used in classifying the incidence of landsliding. For example, it was estimated that a rock or soil unit characterized by high landslide susceptibility would respond to widespread artificial cutting by some movement in 15 percent or more of the affected area. We did not evaluate the effect of earthquakes on slope stability, although many catastrophic landslides have been generated by ground shaking during earthquakes. Areas susceptible to landslides under static conditions would probably also be susceptible to failure during earthquakes" (Radbruch-Hall 1982).



The NJGWS' Carbonate Formations GIS layer differentiates areas of carbonate and non-carbonate geological formations for New Jersey. According to the NJGS, the areas of carbonate have a potential for natural subsidence.

In an attempt to estimate Sussex County's vulnerability to landslides and subsidence and sinkholes, these layers were used to coarsely define the general hazard area. The layers were overlaid upon the Sussex County 2010 Census population data, updated building inventory, and Sussex County's critical facility inventory to estimate exposure.

The limitations of this analysis are recognized and are only used to provide a general estimate of exposure and vulnerability. Over time additional data will be collected to allow better analysis for this hazard. Available information and a preliminary assessment are provided below.

Impact on Life, Health and Safety

To estimate the population located within the geologic hazard areas, the hazard area boundaries were overlaid upon the 2010 Census population data (U.S. Census, 2010). The Census blocks with their center (centroid) within the landslide and carbonate area boundaries were used to calculate the estimated population considered exposed to the hazard. Please note the Census blocks do not align exactly with the hazard areas and, therefore, these estimates should be considered for planning purposes only. Table 5.4.5-4 summarizes the population within each identified hazard area by municipality (U.S. Census 2010). Specifically, the population located downslope of the landslide hazard areas are particularly vulnerable to this hazard. Due to the nature of Census block data and uncertain area impacted downslope of a landslide event, it is difficult to determine demographics of populations vulnerable to mass movements of geological material. The remainder of the County not vulnerable to the High Susceptibility/Moderate Incidence landslide area is located within the Low Incidence landslide area.

Table 5.4.5-4. Estimated Population Located in the Geologic Hazard Areas

Municipalities	Total Population (2010 U.S. Census)	NJGWS-Karst Area		High Susceptibility/Moderate Incidence Landslide Area	
		Population Exposed	% Total	Population Exposed	% Total
Borough of Andover	606	288	47.5%	0	0.0%
Township of Andover	6,319	2,889	45.7%	0	0.0%
Borough of Branchville	841	297	35.3%	0	0.0%
Township of Byram	8,350	531	6.4%	0	0.0%
Township of Frankford	5,565	268	4.8%	0	0.0%
Borough of Franklin	5,045	3,970	78.7%	0	0.0%
Township of Fredon	3,437	459	13.4%	0	0.0%
Township of Green	3,601	2,499	69.4%	0	0.0%
Borough of Hamburg	3,277	2,787	85.0%	0	0.0%
Township of Hampton	5,196	1,362	26.2%	0	0.0%
Township of Hardyston	8,213	4,151	50.5%	0	0.0%
Borough of Hopatcong	15,147	0	0.0%	0	0.0%
Township of Lafayette	2,538	1,068	42.1%	0	0.0%



Municipalities	Total Population (2010 U.S. Census)	NJGWS-Karst Area		High Susceptibility/Moderate Incidence Landslide Area	
		Population Exposed	% Total	Population Exposed	% Total
Township of Montague	3,847	2,292	59.6%	3,810	99.0%
Town of Newton	7,997	4,244	53.1%	0	0.0%
Borough of Ogdensburg	2,410	1,867	77.5%	0	0.0%
Township of Sandyston	1,998	620	31.0%	1,250	62.6%
Township of Sparta	19,722	3,109	15.8%	0	0.0%
Borough of Stanhope	3,610	0	0.0%	0	0.0%
Township of Stillwater	4,099	2,164	52.8%	0	0.0%
Borough of Sussex	2,130	0	0.0%	0	0.0%
Township of Vernon	23,943	4,715	19.7%	0	0.0%
Township of Walpack	16	9	56.3%	6	37.5%
Township of Wantage	11,358	445	3.9%	0	0.0%
Sussex County Total	149,265	40,034	26.8%	5,066	3.4%

Source: United States Census 2010; NJGWS

Impact on General Building Stock

In general, the built environment located in the high susceptibility/moderate incidence zones and the population, structures and infrastructure located downslope are vulnerable to this hazard. In an attempt to estimate the general building stock vulnerable to this hazard, the building improvement values (buildings and contents) were determined for the buildings with their centroids within the approximate geologic hazard areas. Table 5.4.5-5 summarizes the exposed building stock in the landslide susceptibility and subsidence hazard areas by municipality. As stated above, the remainder of the County not located in the High Susceptibility/Moderate Incidence area is located in the Low Incidence area (approximately \$30 billion). Municipalities with areas of Low Incidence include Montague, Sandyston and Walpack; refer to Figure 5.4.5-1 presented earlier in this section.

Table 5.4.5-5. Estimated Building Exposure in the Geologic Hazard Areas

Municipality	Total Number of Buildings	Total Improved Value (structure and contents)	NJGWS-Karst Area				High Susceptibility/Moderate Incidence Landslide Area			
			# Buildings	% Total	Exposed Improved Value	% Total	# Buildings	% Total	Exposed Improved Value	% Total
Borough of Andover	257	\$182,562,894	88	34.2%	\$57,441,735	31.5%	0	0.0%	\$0	0.0%
Township of Andover	2,248	\$1,259,872,091	832	37.0%	\$389,977,595	31.0%	0	0.0%	\$0	0.0%
Borough of Branchville	353	\$174,318,470	111	31.4%	\$48,198,523	27.6%	0	0.0%	\$0	0.0%
Township of Byram	3,401	\$1,543,404,464	218	6.4%	\$99,500,701	6.4%	0	0.0%	\$0	0.0%
Township of Frankford	2,716	\$1,653,244,645	102	3.8%	\$84,219,174	5.1%	0	0.0%	\$0	0.0%
Borough of Franklin	1,630	\$881,717,214	1,368	83.9%	\$710,251,061	80.6%	0	0.0%	\$0	0.0%
Township of Fredon	1,236	\$842,171,127	113	9.1%	\$67,425,407	8.0%	0	0.0%	\$0	0.0%
Township of Green	1,280	\$962,383,257	915	71.5%	\$743,457,272	77.3%	0	0.0%	\$0	0.0%
Borough of Hamburg	1,464	\$747,007,403	1,210	82.7%	\$625,285,229	83.7%	0	0.0%	\$0	0.0%
Township of Hampton	2,143	\$1,398,457,332	815	38.0%	\$620,791,042	44.4%	0	0.0%	\$0	0.0%
Township of Hardyston	3,731	\$1,652,499,901	2,312	62.0%	\$1,042,265,110	63.1%	0	0.0%	\$0	0.0%
Borough of Hopatcong	6,378	\$2,224,090,408	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Township of Lafayette	1,020	\$802,389,890	531	52.1%	\$388,321,883	48.4%	0	0.0%	\$0	0.0%
Township of Montague	1,972	\$858,431,631	1,133	57.5%	\$481,080,865	56.0%	1,929	97.8%	\$843,493,589	98.3%
Town of Newton	2,320	\$1,504,040,803	1,455	62.7%	\$808,978,405	53.8%	0	0.0%	\$0	0.0%
Borough of Ogdensburg	915	\$390,034,452	701	76.6%	\$302,371,341	77.5%	0	0.0%	\$0	0.0%
Township of Sandyston	1,136	\$588,862,570	334	29.4%	\$230,730,635	39.2%	585	51.5%	\$371,282,636	63.1%
Township of Sparta	7,447	\$4,731,600,744	1,286	17.3%	\$809,670,046	17.1%	0	0.0%	\$0	0.0%
Borough of Stanhope	1,468	\$859,784,777	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Township of Stillwater	1,871	\$931,811,957	965	51.6%	\$511,409,996	54.9%	0	0.0%	\$0	0.0%
Borough of Sussex	579	\$424,677,833	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Township of Vernon	11,280	\$4,759,388,701	2,675	23.7%	\$1,429,071,427	30.0%	0	0.0%	\$0	0.0%
Township of Walpack	25	\$16,093,258	12	48.0%	\$7,039,461	43.7%	7	28.0%	\$3,576,249	22.2%
Township of Wantage	4,156	\$2,250,158,879	166	4.0%	\$118,027,239	5.2%	0	0.0%	\$0	0.0%
Sussex County Total	61,026	\$31,639,004,702	17,342	28.4%	\$9,575,514,146	30.3%	2,521	4.1%	\$1,218,352,473	3.9%

Source: Sussex County, NJ Department of the Treasury, 2015, NJGWS

Impact on Critical Facilities

To estimate exposure, the approximate hazard areas were overlaid upon the essential and municipal facilities. As stated earlier, a majority of the Sussex County, with the exception of portions of Montague, Sandyston and Walpack, is located in the High Susceptibility/Moderate Incidence area. Critical facilities located in this defined hazard area are considered exposed to the landslide hazard; refer to Table 5.4.5-6. Table 5.4.5-7 summarizes the number of critical facilities located in the carbonate formation hazard area.

In addition to critical facilities, a significant amount of infrastructure can be exposed to mass movements of geological material:

- **Roads**—Access to major roads is crucial to life-safety after a disaster event and to response and recovery operations. Landslides can block egress and ingress on roads, causing isolation for neighborhoods, traffic problems, and delays for public and private transportation. This can result in economic losses for businesses.
- **Bridges**—Landslides can significantly impact road bridges. Mass movements can knock out bridge abutments or significantly weaken the soil supporting them, making them hazardous for use.
- **Power Lines**—Power lines are generally elevated above steep slopes; but the towers supporting them can be subject to landslides. A landslide could trigger failure of the soil underneath a tower, causing it to collapse and ripping down the lines. Power and communication failures due to landslides can create problems for vulnerable populations and businesses.
- **Rail Lines** – Similar to roads, rail lines are important for response and recovery operations after a disaster. Landslides can block travel along the rail lines, which would become especially troublesome, because it would not be as easy to detour a rail line as it is on a local road or highway. Many residents rely on public transport to get to work around the County and into New York City, and a landslide event could prevent travel to and from work.

Several other types of infrastructure may also be exposed to landslides, including water and sewer infrastructure. At this time all critical facilities, infrastructure, and transportation corridors located within the hazard areas are considered vulnerable until more information becomes available.

Table 5.4.5-6. Critical Facilities in the High Susceptibility/Moderate Incidence Landslide Hazard Area

Municipality	Facility Types							
	DPW	EMS	Fire	Municipal Hall	Potable Pump	School	Shelter	Substation
Borough of Andover	0	0	0	0	0	0	0	0
Township of Andover	0	0	0	0	0	0	0	0
Borough of Branchville	0	0	0	0	0	0	0	0
Township of Byram	0	0	0	0	0	0	0	0
Township of Frankford	0	0	0	0	0	0	0	0
Borough of Franklin	0	0	0	0	0	0	0	0
Township of Fredon	0	0	0	0	0	0	0	0



Section 5.4.5: Risk Assessment – Geological Hazards

Municipality	Facility Types							
	DPW	EMS	Fire	Municipal Hall	Potable Pump	School	Shelter	Substation
Township of Green	0	0	0	0	0	0	0	0
Borough of Hamburg	0	0	0	0	0	0	0	0
Township of Hampton	0	0	0	0	0	0	0	0
Township of Hardyston	0	0	0	0	0	0	0	0
Borough of Hopatcong	0	0	0	0	0	0	0	0
Township of Lafayette	0	0	0	0	0	0	0	0
Township of Montague	1	1	1	1	1	1	1	1
Town of Newton	0	0	0	0	0	0	0	0
Borough of Ogdensburg	0	0	0	0	0	0	0	0
Township of Sandyston	0	0	2	1	0	1	0	0
Township of Sparta	0	0	0	0	0	0	0	0
Borough of Stanhope	0	0	0	0	0	0	0	0
Township of Stillwater	0	0	0	0	0	0	0	0
Borough of Sussex	0	0	0	0	0	0	0	0
Township of Vernon	0	0	0	0	0	0	0	0
Township of Walpack	0	0	0	0	0	0	0	0
Township of Wantage	0	0	0	0	0	0	0	0
Sussex County Total	1	1	3	2	1	2	1	1

Source: Sussex County, NJGWS

Note: DPW – Department of Public Works

EMS – Emergency Medical Services

Table 5.4.5-7. Critical Facilities in the Carbonate Formation Hazard Area

Municipality	Facility Types														
	Air	Communication	DPW	EMS	EOC	Fire	Municipal Building	Police	Potable Pump	School	Senior	Shelter	Substation	Wastewater Pump	Well
Borough of Andover	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0
Township of Andover	2	3	1	1	1	3	0	1	0	1	2	1	0	0	0
Borough of Branchville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Township of Byram	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0



Section 5.4.5: Risk Assessment – Geological Hazards

Municipality	Facility Types														
	Air	Communication	DPW	EMS	EOC	Fire	Municipal Building	Police	Potable Pump	School	Senior	Shelter	Substation	Wastewater Pump	Well
Township of Frankford	0	0	1	0	1	0	0	0	0	1	0	1	0	0	0
Borough of Franklin	0	0	0	1	0	1	1	1	0	2	0	1	0	0	0
Township of Fredon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Township of Green	1	0	0	1	1	1	1	0	0	4	0	1	0	0	0
Borough of Hamburg	0	0	1	0	0	2	1	1	1	1	0	1	1	2	1
Township of Hampton	0	0	0	0	0	1	1	0	0	2	1	0	0	0	0
Township of Hardyston	0	0	0	1	0	1	1	1	0	1	0	0	0	0	0
Borough of Hopatcong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Township of Lafayette	0	0	1	0	0	1	1	0	0	1	0	2	0	0	0
Township of Montague	0	0	1	1	0	1	1	0	1	1	0	1	1	0	0
Town of Newton	0	0	0	1	0	2	0	0	0	4	0	0	0	0	0
Borough of Ogdensburg	0	0	0	1	0	1	1	1	0	1	0	0	0	0	0
Township of Sandyston	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0
Township of Sparta	0	0	0	1	1	0	1	1	1	4	0	1	1	0	0
Borough of Stanhope	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Township of Stillwater	0	0	1	0	0	2	0	0	0	1	0	2	0	0	0
Borough of Sussex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Township of Vernon	0	0	1	0	0	1	1	1	0	5	0	2	0	0	0
Township of Walpack	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Township of Wantage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sussex County Total	3	3	7	9	4	21	12	7	3	29	3	14	3	3	1

Source: Sussex County, NJGWS

Note: DPW – Department of Public Works

EMS – Emergency Medical Services

Impact on the Economy and Environment

Geologic hazards can impose direct and indirect impacts on society. Direct costs include the actual damage sustained by buildings, property and infrastructure. Indirect costs, such as clean-up costs, business interruption, loss of tax revenues, reduced property values, and loss of productivity are difficult to measure. Additionally, ground failure threatens transportation corridors, fuel and energy conduits, and communication lines (USGS 2003). Estimated potential damages to general building stock can be quantified as discussed above. For the purposes of this analysis, general building stock damages are discussed further.

A landslide or sinkhole/subsidence event will alter the landscape. In addition to changes in topography, vegetation and wildlife habitats may be damaged or destroyed, and soil and sediment runoff will accumulate downslope potentially blocking waterways and roadways and impacting quality of streams and other water bodies. Additional environmental impacts include loss of forest productivity.

Landslides, sinkhole and subsidence events can cause major damage to buildings if they occur on the property. There are 17,342 buildings located within karst areas and account for \$9.6 billion, or 30.3% of the County's total building assessed value (structure and estimated contents). Additionally, there are 2,521 buildings that account for \$1.2 billion (3.9%) of the County's total building assessed value located in other sinkhole/subsidence susceptible areas. These dollar value losses to Sussex County's total building inventory would impact Sussex County's tax base and the local economy.

Many of the major transportation routes in the County could be affected by a landslide or sinkhole/subsidence event in the designated susceptible areas. These include US-206 and NJ-94, NJ-23, and NJ-284.

Future Growth and Development

As discussed in Section 4 and Volume II, Section 9, areas targeted for future growth and development have been identified across Sussex County. It is anticipated that new development within the identified hazard area will be exposed to such risks. Figure 5.4.5-5 illustrates the identified areas of potential new development in relation to the geologic hazard boundaries.

Change of Vulnerability

Sussex County and all plan participants continue to be vulnerable to the geological hazards. The original 2011 HMP detailed past landslide events in the County, but did not provide a quantitative vulnerability assessment for the hazard. For this plan update, updated population data, an updated general building stock based upon replacement cost value from 2015 data provided by Sussex County and MODIV tax assessment data, and an updated critical facility inventory were used to assess the County's risk to the hazard areas.

Effect of Climate Change on Vulnerability

Providing projections of future climate change for a specific region is challenging. Some scientists feel that melting glaciers could induce tectonic activity. As ice melts and water runs off, tremendous amounts of weight are shifted on the Earth's crust. As newly freed crust returns to its original, pre-glacier shape, it could cause seismic plates to slip and stimulate volcanic activity according to research into prehistoric earthquakes and volcanic activity. National Aeronautics and Space Administration (NASA) and USGS scientists found that retreating glaciers in southern Alaska might be opening the way for future earthquakes.

Secondary impacts of earthquakes could be magnified by future climate change. Soils saturated by repetitive storms could experience liquefaction during seismic activity because of the increased saturation. Dams storing increased volumes of water from changes in the hydrograph could fail during seismic events. There are currently no models available to estimate these impacts.



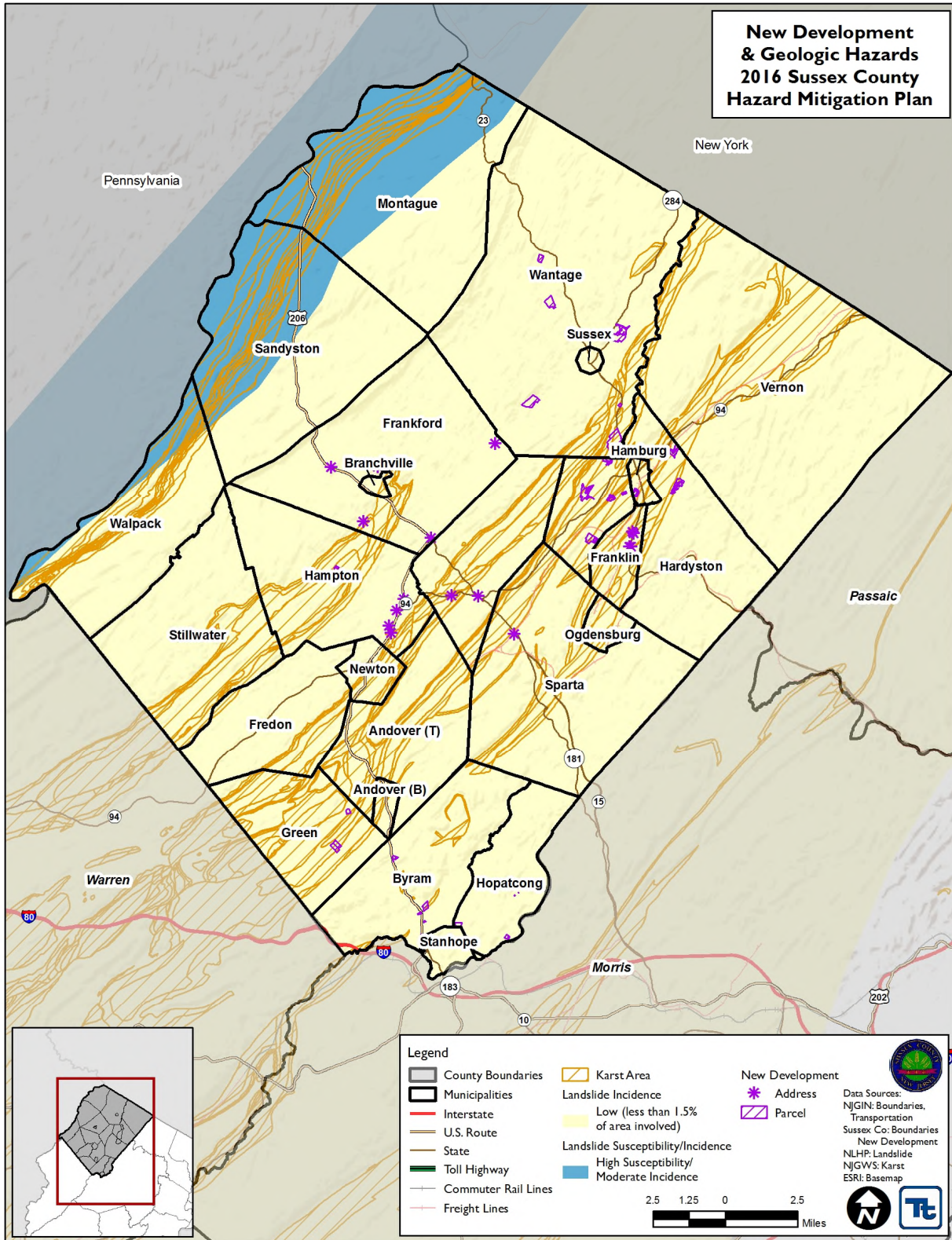
Additional Data and Next Steps

Obtaining historic damages to buildings and infrastructure incurred due to ground failure will help with loss estimates and future modeling efforts, given a margin of uncertainty. More detailed landslide susceptibility zones can be generated so that communities can more specifically identify high hazard areas. Further, research on rainfall thresholds for forecasting landslide potential may also be an option for Sussex County.

DRAFT



Figure 5.4.5-5. Potential New Development and Geologic Hazards



Source: NJGWS, NLHP, Sussex County



5.4.6 Hurricane and Tropical Storm

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the hurricane and tropical storm hazard in Sussex County.

2016 HMP update Changes

- The hazard profile has been significantly enhanced to include a detailed hazard description, location, extent, previous occurrences, probability of future occurrence, and potential change in climate and its impacts on the hurricane and tropical storm hazard.
- The Hurricane and Tropical Storm hazards are now discussed in their own hazard profile – they were previously incorporated into the High Wind – Straight Line Winds hazard.
- New and updated figures from federal and state agencies are incorporated.
- Previous occurrences were updated with events that occurred between 2008 and 2015.
- A vulnerability assessment was conducted for the hurricane and tropical storm hazard using a more accurate and updated building inventory; it now directly follows the hazard profile.

5.4.6.1 Profile

Hazard Description

A tropical cyclone is a rotating, organized system of clouds and thunderstorms that originates over tropical or sub-tropical waters and has a closed low-level circulation. Tropical depressions, tropical storms, and hurricanes are all considered tropical cyclones. These storms rotate counterclockwise around the center in the northern hemisphere and are accompanied by heavy rain and strong winds (NWS 2013a). Almost all tropical storms and hurricanes in the Atlantic basin (which includes the Gulf of Mexico and Caribbean Sea) form between June 1 and November 30 (hurricane season). August and September are peak months for hurricane development (NOAA 2013a).

Over a two-year period, the U.S. coastline is struck by an average of three hurricanes, one of which is classified as a major hurricane. Hurricanes, tropical storms, and tropical depressions pose a threat to life and property. These storms bring heavy rain, storm surge, and flooding (NOAA 2013b). The cooler waters off the coast of New Jersey can diminish the energy of storms that have traveled up the eastern seaboard. However, historical data show that a number of hurricanes/tropical storms have impacted New Jersey, often as the remnants of a larger storm hitting the Gulf or Atlantic Coast hundreds of miles south of New Jersey. These storms maintain sufficient wind and precipitation to cause substantial damage to the state.

Tropical cyclones most frequently affect New Jersey during the month of September, though the state has experienced tropical cyclones throughout the hurricane season, excluding November. Because of peak warm water temperatures in September, storms usually affect New Jersey during this time (Buchholz and Savadore 1993).

For the purpose of this HMP update, this hazard profile will include hurricanes and tropical storms. Detailed information regarding these hazards in Sussex County are discussed further in this section.

Hurricanes and Tropical Storm

A tropical storm system is characterized by a low-pressure center and numerous thunderstorms that produce strong winds and heavy rain (winds are at a lower speed than hurricane-force winds, therefore categorized as a tropical storm instead of a hurricane). Tropical storms strengthen when water evaporated from the ocean is



released as the saturated air rises, resulting in condensation of water vapor contained in the moist air. They are fueled by a different heat mechanism than other cyclonic windstorms such as Nor'easters and polar lows. The characteristic that separates tropical cyclones from other cyclonic systems is that at any height in the atmosphere, the center of a tropical cyclone will be warmer than its surroundings; a phenomenon called "warm core" storm systems (NOAA 2013).

A hurricane is a tropical storm that attains hurricane status when its wind speed reaches 74 or more miles per hour (mph). Tropical systems may develop in the Atlantic between the Lesser Antilles and the African coast, or may develop in the warm tropical waters of the Caribbean and Gulf of Mexico. These storms may move up the Atlantic Coast of the United States and impact the Eastern Seaboard, or move into the United States through the states along the Gulf Coast, bringing wind and rain as far north as New England, before moving offshore and heading east.

NWS issues hurricane and tropical storm watches and warnings. These watches and warnings are issued or will remain in effect after a tropical cyclone becomes post-tropical, when such a storm poses a significant threat to life and property. The NWS allows the National Hurricane Center (NHC) to issue advisories during the post-tropical stage. The following are the definitions of the watches and warnings:

- *Hurricane/Typhoon Warning* is issued when sustained winds of 74 mph or higher are expected somewhere within the specified area in association with a tropical, subtropical, or post-tropical cyclone. Because hurricane preparedness activities become difficult once winds reach tropical storm force, the warning is issued 36 hours in advance of the anticipated onset of tropical storm-force winds. The warning can remain in effect when dangerously high water or combination of dangerously high water and waves continue, even though winds may be less than hurricane force.
- *Hurricane Watch* is issued when sustained winds of 74 mph or higher are possible within the specified area in association with a tropical, subtropical, or post-tropical cyclone. Because hurricane preparedness activities become difficult once winds reach tropical storm force, the hurricane watch is issued 48 hours prior to the anticipated onset of tropical storm-force winds.
- *Tropical Storm Warning* is issued when sustained winds of 39 to 73 mph are expected somewhere within the specified area within 36 hours in association with a tropical, subtropical, or post-tropical storm.
- *Tropical Storm Watch* is issued when sustained winds of 39 to 73 mph are possible within the specified area within 48 hours in association with a tropical, sub-tropical, or post-tropical storm. (NWS 2013).

Location

All of Sussex County is vulnerable and at risk to flooding due to heavy rains and winds produced by hurricanes and tropical storms.

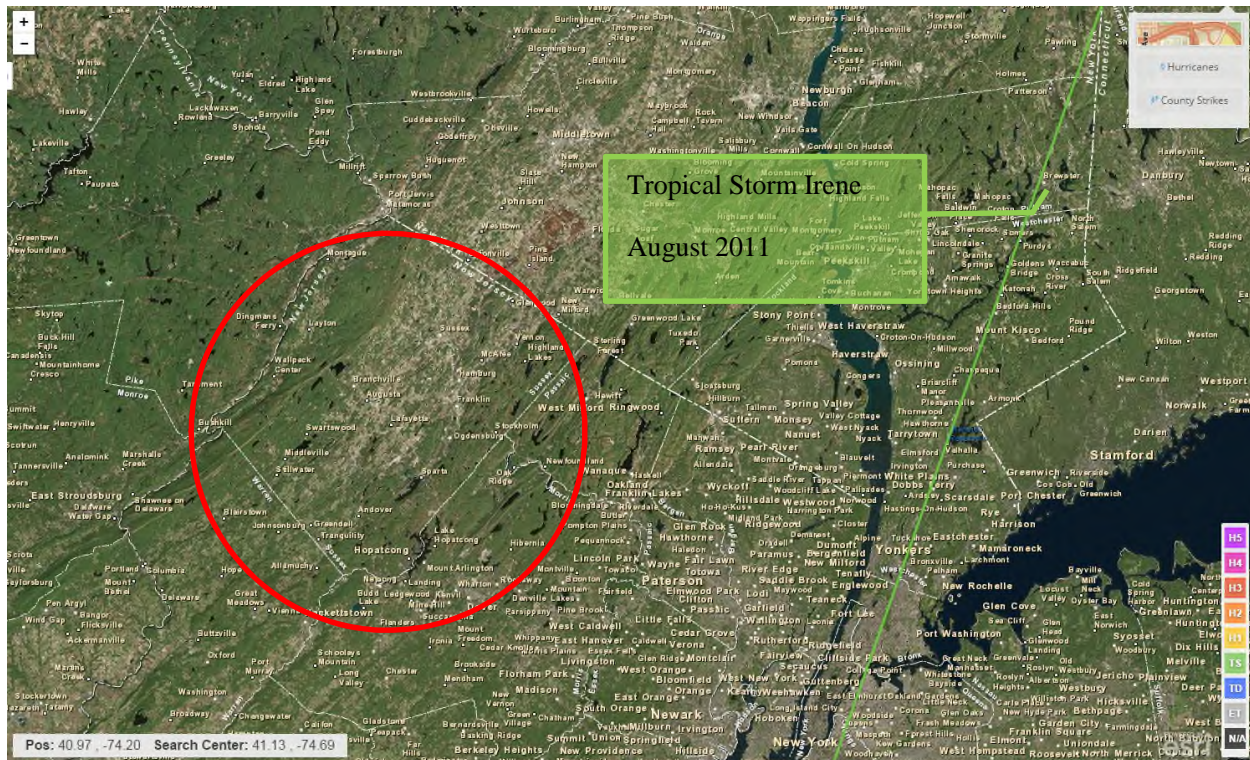
Tropical Storm and Hurricane Tracks

NOAA's Historical Hurricane Tracks tool is a public interactive mapping application that displays Atlantic Basin and East-Central Pacific Basin tropical cyclone data. This interactive tool catalogs tropical cyclones that have occurred from 1842 to 2014 (latest date available from data source). Between 1842 and 2014, 18 events classified as either a hurricane, tropical storm, or tropical depression tracked within 65 nautical miles of Sussex County. Figure 5.4.6-1 displays tropical cyclone tracks for Sussex County that tracked within 65 nautical miles between 2008 and 2015 (only one event – Hurricane Irene in 2011, identified as a tropical storm when passing by the county). Please note that this figure does not show Tropical Storm Lee or Hurricane Sandy because neither passed Sussex County within 65 nautical miles. However, these and other events severely impacted the



county with strong winds, power outages, and other damage. Refer to the “Previous Events and Losses” section for further information regarding hurricane and tropical storm events that impacted Sussex County.

Figure 5.4.6-1. Historical Tropical Storm and Hurricane Tracks 2008 to 2015



Source: NOAA 2015b

Note: Red circle indicates the location of Sussex County.

Extent

The extent of a hurricane is categorized in accordance with the Saffir-Simpson Hurricane Scale. The Saffir-Simpson Hurricane Wind Scale is a 1-to-5 rating based on a hurricane’s sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous and require preventative measures (NOAA 2013b). Table 5.4.5-1 presents this scale, which is used to estimate the potential property damage and flooding expected when a hurricane makes landfall.

Table 5.4.6-1. The Saffir-Simpson Hurricane Scale

Category	Wind Speed (mph)	Expected Damage
1	74-95	Very dangerous winds will produce some damage: Homes with well-constructed frames could have damage to roof, shingles, vinyl siding, and gutters. Large tree branches will snap and shallow-rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110	Extremely dangerous winds will cause extensive damage: Homes with well-constructed frames could sustain major roof and siding damage. Many shallow-rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129	Devastating damage will occur: Homes with well-built frames may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or



Category	Wind Speed (mph)	Expected Damage
		uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156	Catastrophic damage will occur: Homes with well-built frames can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	>157	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: NOAA 2013b

Notes:

mph Miles per hour

> Greater than

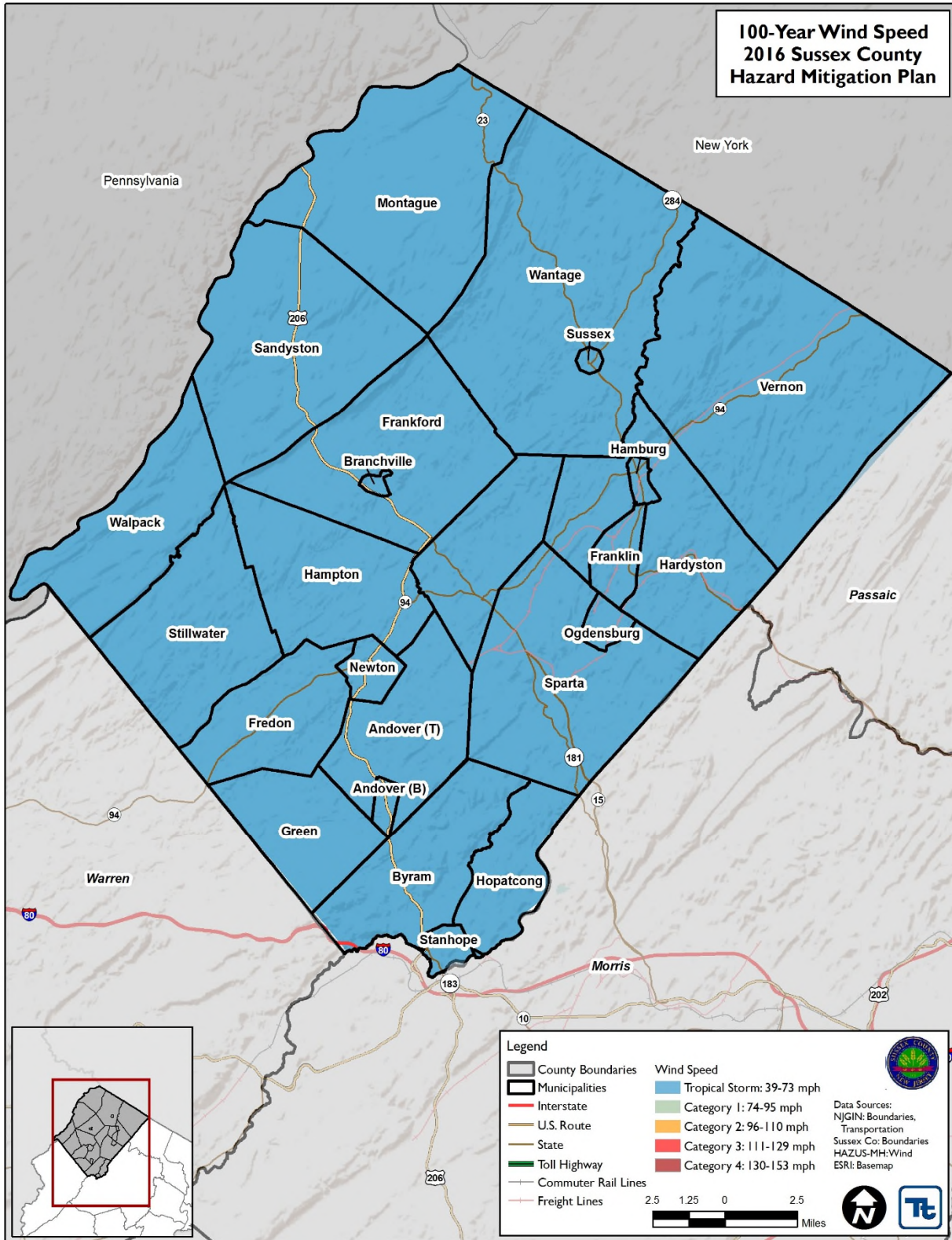
Mean Return Period

In evaluating the potential for hazard events of a given magnitude, a MRP is often used. The MRP provides an estimate of the magnitude of an event that may occur within any given year based on past recorded events. MRP is the average period of time, in years, between occurrences of a particular hazard event, equal to the inverse of the annual frequency of exceedance (Dinicola 2009).

Figure 5.4.6-2 and Figure 5.4.6-3 show the estimated maximum 3-second gust wind speeds that can be anticipated in the study area associated with the 100- and 500-year MRP events. These peak wind speed projections were generated using FEMA's HAZUS-MH wind model. The estimated hurricane track used for the 100- and 500-year event is also shown. The maximum 3-second gust wind speeds for Sussex County are 57-64 mph (Tropical Storm), for the 100-year MRP event (tropical storm). The maximum 3-second gust wind speeds for Sussex County are 74-79 mph (Category 1 hurricane) for the 500-year MRP event. The storm tracks for the 100- and 500-year event were not available in HAZUS-MH 3.0. The associated impacts and losses from these 100-year and 500-year MRP hurricane event model runs are discussed in the Vulnerability Assessment subsection.



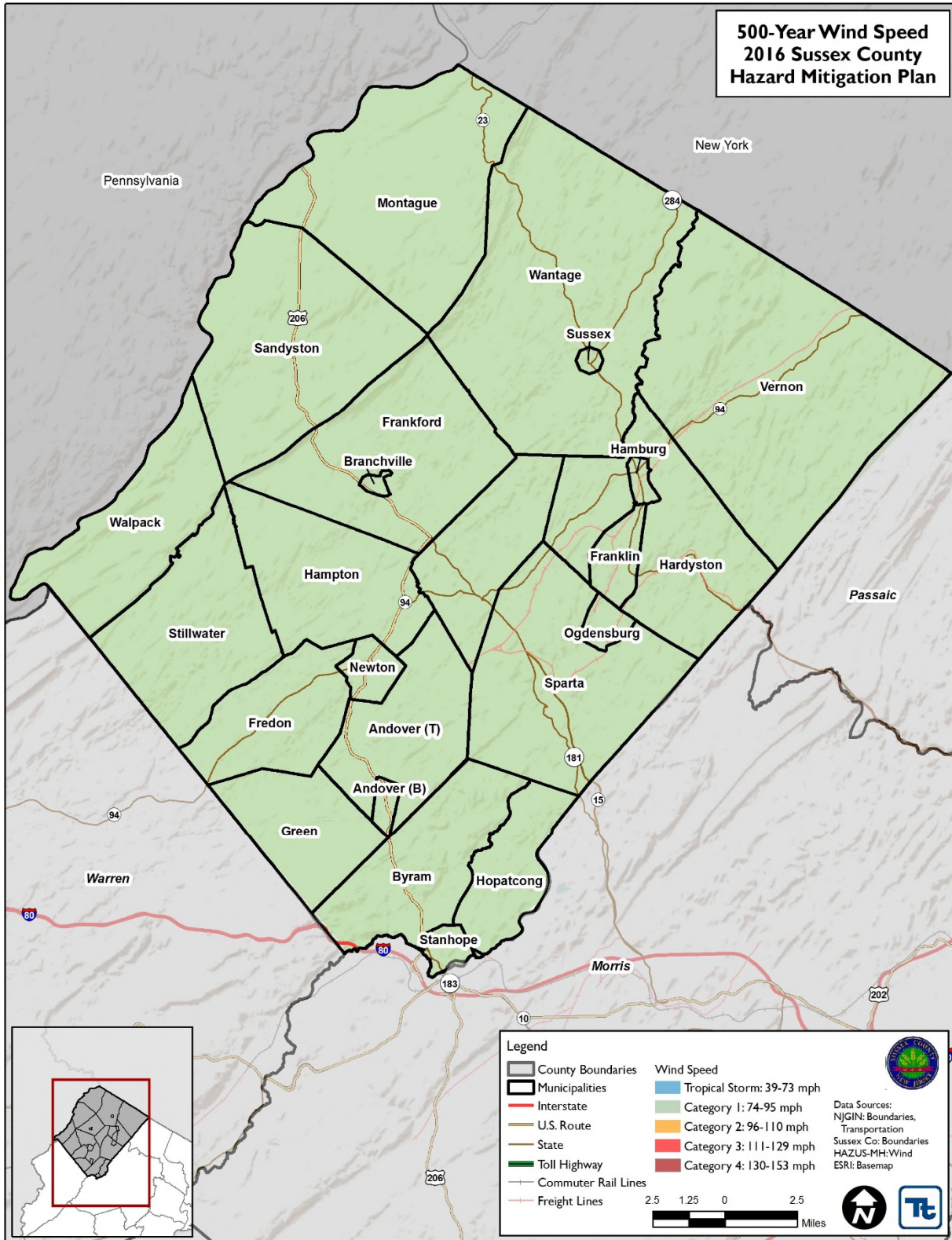
Figure 5.4.6-2. Wind Speeds for the 100-Year Mean Return Period Event



Source: HAZUS-MH 3.0



Figure 5.4.6-3. Wind Speeds for the 500-Year Mean Return Period Event





Source: HAZUS-MH 3.0

Previous Occurrences and Losses

Many sources provided historical information regarding previous occurrences and losses associated with hurricane and tropical storm events throughout Sussex County. With so many sources reviewed for the purpose of this HMP update, loss and impact information for many events may vary. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP update.

Between 1954 and 2015, FEMA issued a disaster (DR) or emergency (EM) declaration for the State of New Jersey for eight tropical cyclone-related events, classified as one or a combination of the following disaster types: one or a combination of the following disaster types: hurricane, tropical storm, severe storms, flooding, and tropical depression. Of those events, Sussex County has been included in three hurricane and tropical storm-related disaster declarations (FEMA 2015). Since the original 2011 HMP, Sussex County has been included in the following FEMA disaster declarations: Hurricane Irene and Remnants of Tropical Storm Lee in 2011, and Hurricane Sandy in 2012. Table 5.4.6-2 lists FEMA DR and EM declarations from 2008 to 2015 for this HMP update.

Table 5.4.6-2. FEMA DR and EM Declarations since 2008 for Hurricane and Tropical Storm Events in Sussex County

FEMA Declaration Number	Date(s) of Event	Event Type	Location
DR-4021	August 26 – September 5, 2011	Hurricane Irene	All 21 counties, including Sussex County
DR-4039	September 5-14, 2011	Remnants of Tropical Storm Lee	Sussex, Hunterdon, Warren, Mercer, Passaic
DR-4086	October 26 – November 8, 2012	Hurricane Sandy	All 21 counties, including Sussex County

Source: FEMA 2015

For this 2016 HMP update, hurricane and tropical storm events, including FEMA disaster declarations, which have impacted Sussex County between 2008 and 2015 are identified in Appendix X. For events prior to 2008, refer to the 2011 Sussex County HMP. For detailed information on damages and impacts to each jurisdiction, refer to Section 9.

Probability of Future Occurrences

Hurricane return periods are the frequency at which a certain intensity of hurricane can be expected within a given distance of a given location. For example, a return period of 20 years for a major hurricane means that on average during the previous 100 years, a Category 3 or greater hurricane passed within 58 miles of a specific location approximately 5 times. The return period of hurricanes for Sussex County was not calculated – however, the return period for surrounding counties is 18 to 19 years for a hurricane (greater than 64 mph winds) and 74 to 76 years for a major hurricane (greater than 110 mph winds) (NOAA 2013).

In order to determine the recurrence interval and the average annual number of events, data from 1950 to 2015 was looked at using NOAA's Historical Hurricane Tracks tool and the NHC 2015 Atlantic Hurricane Season map. A 100 nautical mile radius was used to identify any hurricane and tropical storm events Sussex County. The 100 nautical mile radius was used due to the fact that hurricane conditions typically affect a swath of approximately 100 nautical miles wide (NOAA 2000). Based on this data, 20 hurricanes, tropical storms, tropical depressions or extra-tropical storms passed within 100 nautical miles of Sussex County. The table below shows these statistics, as well as the annual average number of events and the estimated percent change of an event occurring in a given year (NHC 2015).



Table 5.4.6-3. Probability of Future Occurrences of Hurricane and Tropical Storm Events

Hazard Type	Number of Occurrences Between 1950 and 2015	Rate of Occurrence or Annual Number of Events (average)	Recurrence Interval (in years) (# Years/Number of Events)	Probability of Event in any given year	% chance of occurrence in any given year
Extra-Tropical Storms	2	0.03	33.00	0.03	3.03
Tropical Depression	3	0.05	22.00	0.05	4.55
Tropical Storm	13	0.20	5.08	0.08	7.69
Hurricanes (all categories)	2	0.03	33.00	0.03	3.03
TOTAL	20	0.31	3.30	0.30	30.30

Source: NHC 2015

It is estimated that Sussex County will continue to experience direct and indirect impacts of hurricane and tropical storms annually that may induce secondary hazards such as flooding, extreme wind, infrastructure deterioration or failure, utility failures, power outages, water quality and supply concerns, and transportation delays, accidents, and inconveniences.

In Section 5.3, the identified hazards of concern for Sussex County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Committee, the probability of occurrence for hurricane and tropical storms in the county is considered “frequent” (likely to occur within 25 years, as presented in Table 5.3-3).

Climate Change Impacts

Providing projections of future climate change for a specific region is challenging. Shorter-term projections are more closely tied to existing trends making longer-term projections even more challenging. The further out a prediction reaches the more subject to changing dynamics it becomes. According to the National Aeronautics and Space Administration (NASA), warmer temperatures may lead to an increase in frequency of storms, thus leading to more weather events that cause coastal erosion.

Temperatures in the northeastern United States have increased 1.5 degrees °F on average since 1900. Most of this warming has occurred since 1970. The State of New Jersey, for example, has observed an increase in average annual temperatures of 1.2°F between the period of 1971-2000 and 2001-2010 (ONJSC 2013). Winter temperatures across the Northeast have seen an increase in average temperature of 4°F since 1970 (Northeast Climate Impacts Assessment [NECIA] 2007). By the 2020s, the average annual temperature in New Jersey is projected to increase by 1.5°F to 3°F above the statewide baseline (1971 to 2000), which was 52.7°F. By 2050, the temperature is projected to increase 3°F to 5°F (Sustainable Jersey Climate Change Adaptation Task Force 2013).

Northern and southern New Jersey have become wetter over the past century. Northern New Jersey’s 1971-2000 precipitation average was over 5 inches (12%) greater than the average from 1895-1970. Southern New Jersey became 2 inches (5%) wetter late in the 20th century (ONJSC). Average annual precipitation is projected to increase in the region by 5% by the 2020s, and up to 10% by the 2050s. Most of the additional precipitation is expected to come during the winter months (New York City Panel on Climate Change [NPCC] 2013).



5.4.6.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For the hurricane and tropical storm hazard, all of Sussex County has been identified as exposed. Therefore, all assets in the county (population, structures, critical facilities, and lifelines), as described in the County Profile (Section 4), are at risk. The following text evaluates and estimates the potential impact of the hurricane and tropical storm hazard on the County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health, and safety of residents, (2) general building stock, (3) critical facilities, (4) economy, and (5) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2011 Sussex County HMP
- Further data collections that will assist understanding this hazard over time

Overview of Vulnerability

To protect life and property from wind events, all counties in New Jersey, including Sussex County, are required to comply with the design wind loads developed by the International Building Code (IBC) and the International Residential Code (IRC). The building code administered within the incorporated areas of Sussex County require all new construction to be designed and constructed to 90 or 100 mph wind loads (NJDOCA 2013).

The high winds and air speeds of a tropical storm or hurricane often result in power outages, disruptions to transportation corridors and equipment, loss of workplace access, significant property damage, injuries and loss of life, and the need to shelter and care for individuals impacted by the events. A large amount of damage can be inflicted by trees, branches, and other objects that fall onto power lines, buildings, roads, vehicles, and, in some cases, people.

The entire inventory of the County is at risk of being damaged or lost due to impacts of severe weather. Certain areas, infrastructure, and types of buildings are at greater risk than others due to proximity to flood waters, falling hazards, and their manner of construction. Potential losses associated with high winds were calculated for Sussex County for the 100-year and 500-year MRP wind events.

Data and Methodology

After reviewing historic data, the HAZUS-MH methodology and model were used to analyze the wind hazard for Sussex County. Data and tools used to assess this hazard include data available in the HAZUS-MH 3.0 wind model, professional knowledge, information provided by the Planning Committee.

A probabilistic scenario was run for the County for annualized losses and the 100- and 500-year MRPs were examined for the wind hazard using HAZUS-MH. Maximum peak gust wind speeds and storm tracks for these MRPs are displayed in Figures 5.4.6-2 and 5.4.6-3.

HAZUS-MH contains data on historic hurricane events and wind speeds. It also includes surface roughness and vegetation (tree coverage) maps for the area. Surface roughness and vegetation data support the modeling of wind force across various types of land surfaces. Impacts to life, health, and safety and structures are discussed below using the methodology described above. Updated general building stock data and critical facility inventories were used in the evaluation of this hazard.



Impact on Life, Health and Safety

For the purposes of this HMP, the entire population of Sussex County (149,265 people) is exposed to hurricane and tropical storm events (U.S. Census, 2010). Residents may be displaced or require temporary to long-term sheltering. In addition, downed trees, damaged buildings and debris carried by high winds can lead to injury or loss of life. Socially vulnerable populations are most susceptible, 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. HAZUS-MH estimates there will be 0 displaced households and 0 people will require temporary shelter as a result of the 100- and 500-year MRP events.

Economically disadvantaged populations are more vulnerable because they are likely to evaluate their risk and make decisions based on the major economic impact to their family and may not have funds to evacuate. The population over the age of 65 is also more vulnerable and, physically, they may have more difficulty evacuating. The elderly are considered most vulnerable because they require extra time or outside assistance during evacuations and are more likely to seek or need medical attention which may not be available due to isolation during a storm event. Please refer to Section 4 for the statistics of these populations.

Impact on General Building Stock

After considering the population exposed to the hurricane hazard, the value of general building stock exposed to and damaged by 100- and 500-year MRP hurricane wind events was considered. Potential damage is the modeled loss that could occur to the exposed inventory, including damage to structural and content value based on the wind-only impacts associated with a tropical storm or hurricane.

The entire study area is considered at risk to the hurricane wind hazard. Please refer to Section 4 (County Profile) which presents the total exposure value for general building stock by occupancy class for Sussex County. Expected building damage was evaluated by HAZUS-MH across the following wind damage categories: no damage/very minor damage, minor damage, moderate damage, severe damage, and total destruction. Table 5.4.6-4. summarizes the definition of the damage categories.

Table 5.4.6-4. Description of Damage Categories

Qualitative Damage Description	Roof Cover Failure	Window Door Failures	Roof Deck	Missile Impacts on Walls	Roof Structure Failure	Wall Structure Failure
No Damage or Very Minor Damage Little or no visible damage from the outside. No broken windows, or failed roof deck. Minimal loss of roof over, with no or very limited water penetration.	≤2%	No	No	No	No	No
Minor Damage Maximum of one broken window, door or garage door. Moderate roof cover loss that can be covered to prevent additional water entering the building. Marks or dents on walls requiring painting or patching for repair.	>2% and ≤15%	One window, door, or garage door failure	No	<5 impacts	No	No
Moderate Damage Major roof cover damage, moderate window breakage. Minor roof sheathing failure. Some resulting damage to interior of building from water.	>15% and ≤50%	> one and ≤ the larger of 20% & 3	1 to 3 panels	Typically 5 to 10 impacts	No	No
Severe Damage Major window damage or roof sheathing loss. Major roof cover loss. Extensive damage to	>50%	> the larger of 20% & 3 and ≤50%	>3 and ≤25%	Typically 10 to 20 impacts	No	No



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Qualitative Damage Description	Roof Cover Failure	Window Door Failures	Roof Deck	Missile Impacts on Walls	Roof Structure Failure	Wall Structure Failure
interior from water.						
Destruction Complete roof failure and/or, failure of wall frame. Loss of more than 50% of roof sheathing.	Typically >50%	>50%	>25%	Typically >20 impacts	Yes	Yes

Source: HAZUS-MH Hurricane Technical Manual

Table 5.4.6-4 summarizes the building value (structure only) damage estimated for the 100- and 500-year MRP wind-only events. Damage estimates are reported for the County's probabilistic HAZUS-MH model scenarios. The data shown indicates estimated potential losses associated with wind damage to building structure.



Table 5.4.6-5. Estimated Building Value (Structure Only) Damaged by the 100-Year and 500-Year MRP Wind Events

Municipality	Total Improved Value (Structure Only)	Estimated Total Damages*			Percent of Total Building Improved Value		
		Annualized Loss	100-Year	500-Year	Annualized Loss	100-Year	500-Year
Borough of Andover	\$110,720,294	\$2,167	\$35,567	\$277,684	<1%	<1%	<1%
Township of Andover	\$797,432,934	\$16,846	\$288,961	\$2,282,736	<1%	<1%	<1%
Borough of Branchville	\$105,787,947	\$1,665	\$25,242	\$256,819	<1%	<1%	<1%
Township of Byram	\$1,001,139,850	\$17,303	\$291,015	\$2,056,285	<1%	<1%	<1%
Township of Frankford	\$1,028,566,798	\$17,486	\$235,422	\$2,755,493	<1%	<1%	<1%
Borough of Franklin	\$555,083,580	\$10,253	\$215,622	\$1,109,779	<1%	<1%	<1%
Township of Fredon	\$524,017,917	\$10,233	\$141,647	\$1,574,454	<1%	<1%	<1%
Township of Green	\$617,892,936	\$13,840	\$227,207	\$1,955,312	<1%	<1%	<1%
Borough of Hamburg	\$478,777,394	\$8,445	\$169,219	\$908,528	<1%	<1%	<1%
Township of Hampton	\$898,127,786	\$13,957	\$167,978	\$2,248,401	<1%	<1%	<1%
Township of Hardyston	\$1,058,804,064	\$21,546	\$376,990	\$2,250,551	<1%	<1%	<1%
Borough of Hopatcong	\$1,459,447,874	\$30,693	\$639,558	\$2,920,265	<1%	<1%	<1%
Township of Lafayette	\$484,326,532	\$9,379	\$146,281	\$1,254,406	<1%	<1%	<1%
Township of Montague	\$550,631,281	\$8,449	\$51,076	\$1,525,789	<1%	<1%	<1%
Town of Newton	\$926,551,970	\$16,211	\$234,314	\$2,392,334	<1%	<1%	<1%
Borough of Ogdensburg	\$250,464,374	\$4,680	\$83,270	\$495,557	<1%	<1%	<1%
Township of Sandyston	\$359,643,031	\$4,502	\$27,921	\$846,807	<1%	<1%	<1%
Township of Sparta	\$3,083,993,131	\$66,034	\$1,298,365	\$7,146,354	<1%	<1%	<1%
Borough of Stanhope	\$557,098,000	\$10,106	\$194,327	\$1,050,050	<1%	<1%	<1%
Township of Stillwater	\$581,254,607	\$8,210	\$100,479	\$1,447,091	<1%	<1%	<1%
Borough of Sussex	\$259,651,457	\$3,951	\$55,658	\$554,374	<1%	<1%	<1%
Township of Vernon	\$3,063,072,948	\$57,212	\$1,058,261	\$5,431,322	<1%	<1%	<1%
Township of Walpack	\$8,710,816	\$45	\$383	\$7,962	<1%	<1%	<1%
Township of Wantage	\$1,396,272,081	\$25,409	\$368,225	\$3,780,791	<1%	<1%	<1%
Sussex County Total	\$20,157,469,603	\$378,623	\$6,432,989	\$46,529,142	<1%	<1%	<1%

Source: HAZUS-MH 3.0 *The Total Damages column represents the sum of damages for all occupancy classes (residential, commercial, industrial, agricultural, educational, religious and government) based on improved value.



Table 5.4.6-6. Estimated Residential and Commercial Building Value (Structure Only) Damaged by the 100-Year and 500-Year MRP Wind Events

Municipality	Total Improved Value (Structure Only)	Estimated Residential Damage		Estimated Commercial Damage	
		100-Year	500-Year	100-Year	500-Year
Borough of Andover	\$110,720,294	\$35,567	\$2,701,649	\$0	\$6,640
Township of Andover	\$797,432,934	\$288,797	\$22,556,726	\$0	\$13,268
Borough of Branchville	\$105,787,947	\$25,242	\$2,483,232	\$0	\$7,212
Township of Byram	\$1,001,139,850	\$285,516	\$20,424,195	\$3,621	\$7,395
Township of Frankford	\$1,028,566,798	\$234,797	\$27,055,467	<\$1,000	\$15,398
Borough of Franklin	\$555,083,580	\$206,704	\$10,966,206	\$6,357	\$9,166
Township of Fredon	\$524,017,917	\$141,647	\$15,441,418	\$0	\$4,984
Township of Green	\$617,892,936	\$227,008	\$19,374,397	<\$1,000	\$2,986
Borough of Hamburg	\$478,777,394	\$163,568	\$9,006,645	\$4,647	\$6,387
Township of Hampton	\$898,127,786	\$167,978	\$22,241,230	\$0	\$8,603
Township of Hardyston	\$1,058,804,064	\$372,200	\$22,315,257	\$3,869	\$8,697
Borough of Hopatcong	\$1,459,447,874	\$633,048	\$29,099,916	\$3,892	\$5,976
Township of Lafayette	\$484,326,532	\$146,281	\$12,189,468	\$0	\$7,472
Township of Montague	\$550,631,281	\$51,076	\$15,126,675	\$0	\$4,785
Town of Newton	\$926,551,970	\$234,314	\$23,341,274	\$0	\$44,268
Borough of Ogdensburg	\$250,464,374	\$80,569	\$4,926,810	\$1,424	\$1,599
Township of Sandyston	\$359,643,031	\$27,921	\$8,281,502	\$0	\$4,289
Township of Sparta	\$3,083,993,131	\$1,281,055	\$71,175,955	\$10,870	\$15,164
Borough of Stanhope	\$557,098,000	\$189,577	\$10,397,553	\$3,315	\$7,379
Township of Stillwater	\$581,254,607	\$100,411	\$14,240,636	<\$1,000	\$4,885
Borough of Sussex	\$259,651,457	\$55,658	\$5,352,364	\$0	\$12,783
Township of Vernon	\$3,063,072,948	\$1,042,437	\$53,920,928	\$12,261	\$26,840
Township of Walpack	\$8,710,816	\$383	\$73,005	\$0	\$0
Township of Wantage	\$1,396,272,081	\$367,076	\$37,047,835	<\$1,000	\$15,939
Sussex County Total	\$20,157,469,603	\$6,358,830	\$459,740,343	\$51,751	\$242,114

Source: HAZUS-MH 3.0



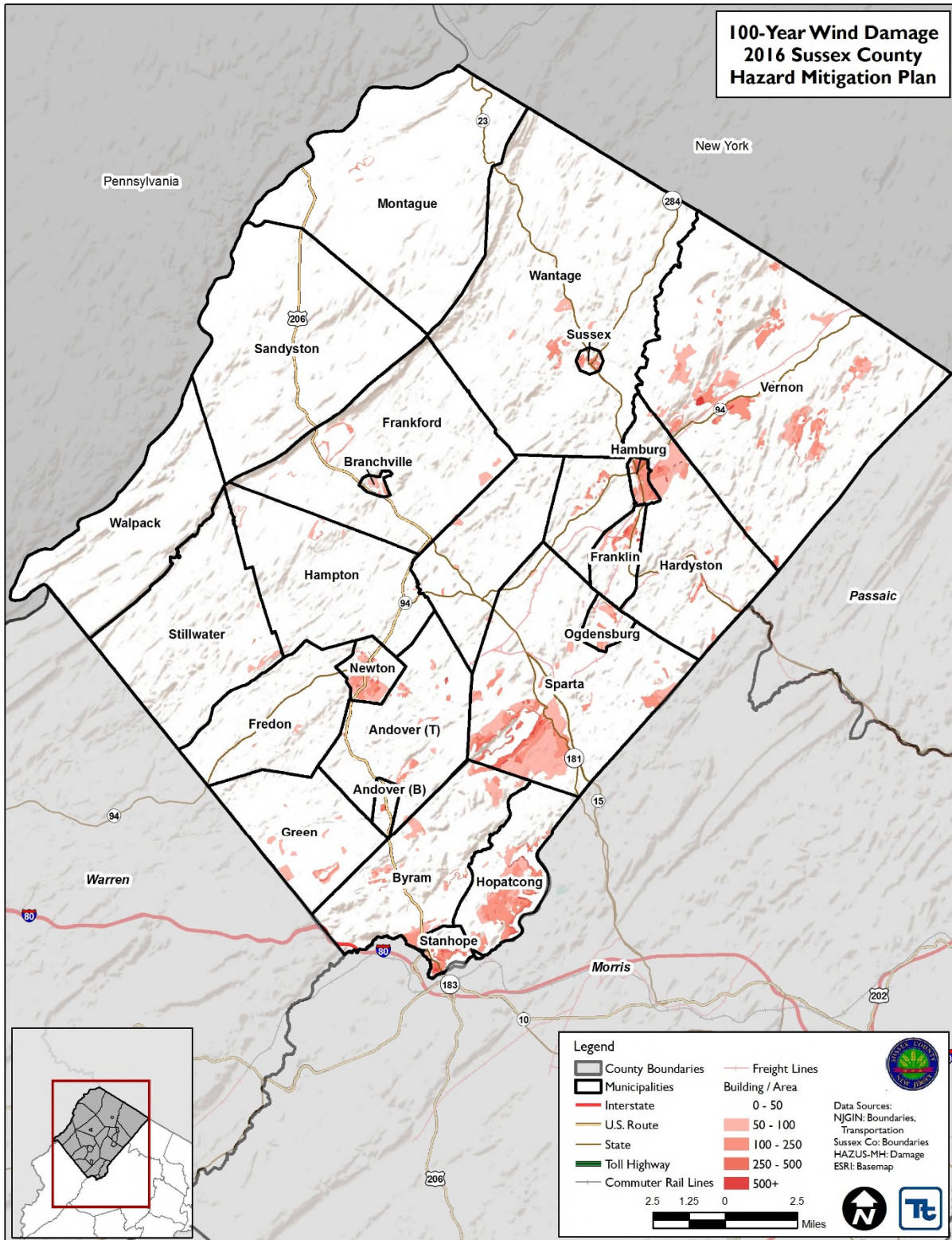
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The total damage to buildings (structure only) for all occupancy types across the County is estimated to be \$6.4 million for the 100-year MRP wind-only event, and approximately \$46.5 million for the 500-year MRP wind-only event. The majority of these losses are to the residential building category. Because of differences in building construction, residential structures are generally more susceptible to wind damage than commercial and industrial structures. The damage counts include buildings damaged at all severity levels from minor damage to total destruction. Total dollar damage reflects the overall impact to buildings at an aggregate level.

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Table 5.4.6-7. Density of Losses for Structures (All Occupancies) for the County 100-Year MRP Wind Event

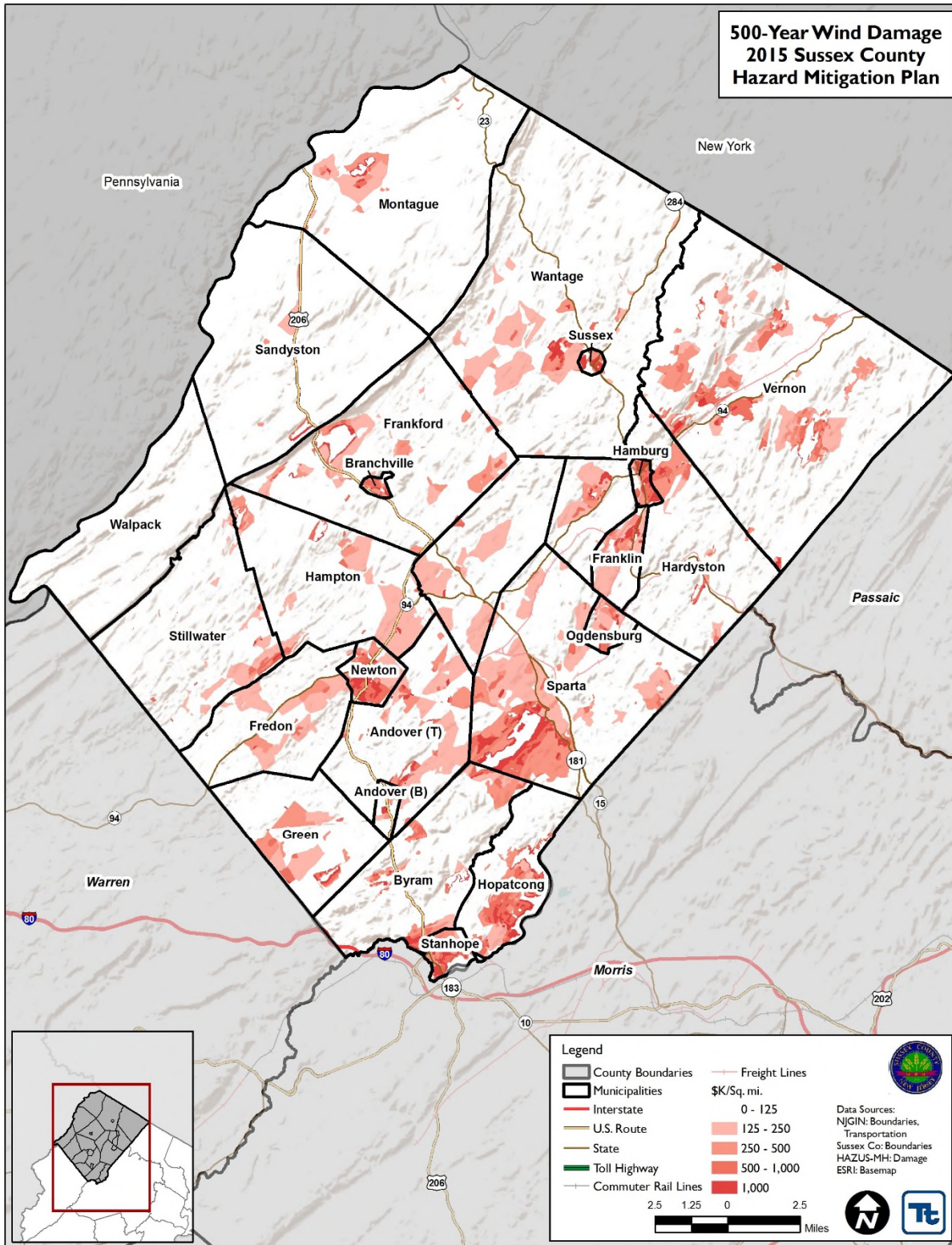


Source: HAZUS-MH 3.0





Table 5.4.6-8. Density of Losses for Structures (All Occupancies) for the County 500-Year MRP Wind Event



Source: HAZUS-MH 3.0





Impact on Critical Facilities

Overall, all critical facilities are exposed to the wind hazard. HAZUS-MH estimates the probability that critical facilities (i.e., medical facilities, fire/EMS, police, EOC, schools, and user-defined facilities such as shelters and municipal buildings) may sustain damage as a result of 100- and 500-year MRP wind-only events. Additionally, HAZUS-MH estimates the loss of use for each facility in number of days. Due to the sensitive nature of the critical facility dataset, individual facility estimated loss is not provided. Overall, HAZUS-MH estimates no damage to the critical facilities as a result of the 100-year event.

Table 5.4.6-9 summarizes the potential damages to the critical facilities in Sussex County as a result of the 500-year MRP wind event. The percent probability that each facility type may experience damage by category is indicated below.

Table 5.4.6-9. Estimated Impacts to Critical Facilities for the 500-Year Mean Return Period Hurricane-Related Winds

Facility Type	500-Year Event				
	Loss of Days	Percent-Probability of Sustaining Damage			
		Minor	Moderate	Severe	Complete
EOC	0	1-2	0	0	0
Medical	0	1	0	0	0
Police	0	1	0	0	0
Fire	0	0-1	0	0	0
Schools	0	0-3	0	0	0

Source: HAZUS-MH 3.0

Impact on Economy

Hurricanes and tropical storms also impact the economy, including: loss of business function (e.g., tourism, recreation), damage to inventory, relocation costs, wage loss and rental loss due to the repair/replacement of buildings. HAZUS-MH estimates the total economic loss associated with each storm scenario (direct building losses and business interruption losses). Direct building losses are the estimated costs to repair or replace the damage caused to the building. This is reported in the “Impact on General Building Stock” subsection discussed earlier. Business interruption losses are the losses associated with the inability to operate a business because of the wind damage sustained during the storm or the temporary living expenses for those displaced from their home because of the event.

For the 100-year MRP wind event, HAZUS-MH estimates less than \$500 in business interruption costs (income loss, relocation costs, rental costs and lost wages) and no inventory losses. For the 500-year MRP wind only event, HAZUS-MH estimates approximately \$610,000 in business interruption losses for the County, which includes loss of income, relocation costs, rental costs and lost wages, in addition to approximately \$2,750 in inventory losses.

Impacts to transportation lifelines affect both short-term (e.g., evacuation activities) and long-term (e.g., day-to-day commuting and goods transport) transportation needs. Utility infrastructure (power lines, gas lines, electrical systems) could suffer damage and impacts can result in the loss of power, which can impact business operations and can impact heating or cooling provision to the population.

HAZUS-MH 3.0 also estimates the amount of debris that may be produced a result of the 100- and 500-year MRP wind events. Table 5.4.6-10 summarizes the estimated debris by municipality. Because the estimated



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debris production does not include flooding, this is likely a conservative estimate and may be higher if multiple impacts occur.

According to the HAZUS-MH Hurricane User Manual: ‘The Eligible Tree Debris columns provide estimates of the weight and volume of downed trees that would likely be collected and disposed at public expense. As discussed in Chapter 12 of the HAZUS-MH Hurricane Model Technical Manual, the eligible tree debris estimates produced by the Hurricane Model tend to underestimate reported volumes of debris brought to landfills for a number of events that have occurred over the past several years. This indicates that there may be other sources of vegetative and non-vegetative debris that are not currently being modeled in HAZUS. For landfill estimation purposes, it is recommended that the HAZUS debris volume estimate be treated as an approximate lower bound. Based on actual reported debris volumes, it is recommended that the HAZUS results be multiplied by three to obtain an approximate upper bound estimate. It is also important to note that the Hurricane Model assumes a bulking factor of 10 cubic yards per ton of tree debris. If the debris is chipped prior to transport or disposal, a bulking factor of 4 is recommended. Thus, for chipped debris, the eligible tree debris volume should be multiplied by 0.4’.

Table 5.4.6-10. Debris Production for 100- and 500-Year Mean Return Period Wind Events

Municipality	Brick and Wood (tons)		Concrete and Steel (tons)		Tree (tons)		Eligible Tree Volume (cubic yards)	
	100 Year	500 Year	100 Year	500 Year	100 Year	500 Year	100 Year	500 Year
Borough of Andover	0	5	0	0	33	170	86	401
Township of Andover	0	59	0	0	582	2,661	750	3,448
Borough of Branchville	0	10	0	0	14	83	127	595
Township of Byram	0	82	0	0	227	1,370	557	2,650
Township of Frankford	0	84	0	0	1,018	4,705	1,008	4,679
Borough of Franklin	0	30	0	0	141	470	549	1,587
Township of Fredon	0	58	0	0	550	2,892	469	2,483
Township of Green	0	63	0	0	441	2,375	407	2,260
Borough of Hamburg	1	29	0	0	49	142	392	1,103
Township of Hampton	0	64	0	0	730	3,803	811	4,269
Township of Hardyston	2	72	0	0	554	2,005	1,056	3,246
Borough of Hopatcong	2	110	0	0	44	168	293	1,041
Township of Lafayette	0	40	0	0	579	2,565	396	1,806
Township of Montague	0	42	0	0	544	4,763	258	3,447
Town of Newton	0	83	0	0	77	513	509	2,891
Borough of Ogdensburg	0	11	0	0	45	194	203	720
Township of Sandyston	0	23	0	0	774	5,493	322	2,959
Township of Sparta	1	220	0	0	678	2,350	1,634	5,621
Borough of Stanhope	1	41	0	0	26	104	212	779
Township of Stillwater	0	37	0	0	573	2,795	678	3,157
Borough of Sussex	0	19	0	0	13	80	109	620
Township of Vernon	0	154	0	0	1,130	3,853	1,876	5,888
Township of Walpack	0	0	0	0	539	3,329	149	1,222
Township of Wantage	0	150	0	0	1,564	7,695	1,413	6,897
Sussex County Total	7	1,486	0	0	10,925	54,578	14,266	63,769



Source: HAZUS-MH 3.0

Effect of Climate Change on Vulnerability

Climate is defined not simply as average temperature and precipitation but also by the type, frequency and intensity of weather events. Both globally and at the local scale, climate change has the potential to alter the prevalence and severity of events like hurricanes. While predicting changes to the prevalence or intensity of hurricanes and the events affects under a changing climate is difficult, understanding vulnerabilities to potential changes is a critical part of estimating future climate change impacts on human health, society and the environment (U.S. Environmental Protection Agency [EPA], 2006).

Climate Change in New Jersey: Trends and Projections describes changes in temperature, precipitation, and sea level rise. Each section of the report summarizes observed recent changes in climate in New Jersey. Observations are based on recorded climate data collected by the ONJSC and other institutions, and on other reports summarizing climate change in the northeastern United States. Each section also presents a synthesis of the most current projections for future climate changes based on climate science modeling and techniques. The projections reflect potential average climate over a span of future years (2020, 2050, and 2080). The projections in the report illustrate the potential climate changes that could impact the northeastern United States based on future emissions scenarios (A2, A1B, and B1 – high, medium, and low scenarios). Each emissions scenario would result in a range of potential climate outcomes in the State (Rutgers 2013).

Change of Vulnerability

Sussex County and its municipalities continue to be vulnerable to the hurricane and tropical storm hazard. However, there are several differences between the exposure and potential loss estimates between the 2016 HMP update and the results in the original 2011 HMP. These differences are due to changes in the HAZUS model and updated U.S. Census data, building stock based upon 2015 MODIV tax data, and critical facility inventories used. For this plan update, the HAZUS-MH wind model was run for the entire County at the Census-block level and results reported at the municipal level. HAZUS-MH version 3.0 was utilized for this plan update; the HAZUS-MH hurricane model has been enhanced since the 2010 HMP. Model results from a scenario as if Hurricane Floyd had occurred and a probabilistic 100-year event were evaluated in the 2011 HMP. However for this plan update, results from probabilistic 100- and 500-year events were examined, in addition to annualized losses. The FEMA Wind Hurricane BCA module was not used for this HMP update as was used for the 2011 HMP.

Overall, this vulnerability assessment uses a more accurate and updated building inventory which provides more accurate estimated exposure and potential losses for Sussex County.

Future Growth and Development

As discussed and illustrated in Sections 4 and 9, areas targeted for future growth and development have been identified across the County. Any areas of growth could be potentially impacted by the Hurricane and Tropical Storm hazard because the entire Planning Area is exposed and vulnerable to the impacts associated with these events. The development of new buildings in these areas must meet or exceed the standards in Section R301.2.1.1 of the International Building Code (IBC) which will assist with mitigating future potential damages and losses. Areas targeted for potential future growth and development in the next five (5) years have been identified across the County at the jurisdiction level. Refer to the jurisdictional annexes in Volume II of this HMP.



Additional Data and Next Steps

Over time, the County will obtain additional data to support the analysis of this hazard. Data that will support the analysis would include additional detail on past hazard events and impacts, building footprints and specific building information such as details on protective features (for example, hurricane straps).

DRAFT



5.4.7 Nor'Easter

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the Nor'Easter hazard in Sussex County.

2016 Plan Update Changes

- For the 2016 Plan Update, the Nor'Easter hazard is profiled on its own, which differs from the 2011 HMP where Nor'Easter was included in the High-Wind – Straight Line Winds hazard.
- The hazard profile has been significantly enhanced to include a detailed hazard description, location, extent, previous occurrences, probability of future occurrence, and potential change in climate and its impacts on the Nor'Easter hazard is discussed. The Nor'Easter hazard is now located in Section 5 of the plan update.
- New and updated figures from federal and state agencies are incorporated.
- Previous occurrences were updated with events that occurred between 2008 and 2015.
- A vulnerability assessment was conducted and it now directly follows the hazard profile.

5.4.7.1 Profile

Hazard Description

A Nor'Easter is a cyclonic storm that moves along the East Coast of North America. It is called a Nor'Easter because the damaging winds over coastal areas blow from a northeasterly direction. Nor'Easters can occur any time of the year, but are most frequent and strongest between September and April. These storms usually develop between Georgia and New Jersey within 100 miles of the coastline and typically move from southwest to northeast along the Atlantic Coast of the United States (NOAA 2013b).

In order to be called a Nor'Easter, a storm must have the following conditions, as per the Northeast Regional Climate Center (NRCC):

- Must persist for at least a 12-hour period
- Have a closed circulation
- Be located within the quadrilateral bounded at 45°N by 6 and 70°W and at 30°N by 85°W and 75°W
- Show general movement from the south-southwest to the north-northeast
- Contain wind speeds greater than 23 miles per hour (mph)

A Nor'Easter event can cause storm surges, waves, heavy rain, heavy snow, wind, and coastal flooding. Nor'Easters have diameters that can span 1,200 miles, impacting large areas of coastline. The forward speed of a Nor'Easter is usually much slower than a hurricane, so with the slower speed, a Nor'Easter can linger for days and cause tremendous damage to those areas impacted. Approximately 20 to 40 Nor'Easters occur in the northeastern United States every year, with at least two considered severe (Storm Solution, 2014). New Jersey can be impacted by 10 to 20 Nor'Easters each year, with approximately five to 10 of those having significant impact on the State. The intensity of a Nor'Easter can rival that of a tropical cyclone in that, on occasion, it may flow or stall off the mid-Atlantic coast resulting in prolonged episodes of precipitation, coastal flooding, and high winds.



Location

The entire State of New Jersey, including Sussex County, is susceptible to the effects of Nor'Easters; however, coastal communities and other low-lying areas are particularly vulnerable. Sussex County is bordered to the west by the Delaware River which is considered a coastal boundary in New Jersey. Therefore, the County is exposed to the direct and indirect impacts of a Nor'Easter.

Extent

The magnitude or severity of a severe winter storm or Nor'Easter depends on several factors including a region's climatological susceptibility to snowstorms, snowfall amounts, snowfall rates, wind speeds, temperatures, visibility, storm duration, topography, and time of occurrence during the day (e.g., weekday versus weekend), and time of season.

The extent of a severe winter storm can be classified by meteorological measurements and by evaluating its societal impacts. NOAA's National Climatic Data Center (NCDC) is currently producing the Regional Snowfall Index (RSI) for significant snowstorms that impact the eastern two-thirds of the United States. The RSI ranks snowstorm impacts on a scale from 1 to 5. It is based on the spatial extent of the storm, the amount of snowfall, and the interaction of the extent and snowfall totals with population (based on the 2000 Census). The NCDC has analyzed and assigned RSI values to over 500 storms since 1900 (NOAA-NCDC 2011). Table 5.4.7-1 presents the five RSI ranking categories.

Table 5.4.7-1. RSI Ranking Categories

Category	Description	RSI Value
1	Notable	1-3
2	Significant	3-6
3	Major	6-10
4	Crippling	10-18
5	Extreme	18.0+

Source: NOAA-NCDC 2011

Note: RSI = Regional Snowfall Index

Previous Occurrences and Losses

Many sources provided winter storm information regarding previous occurrences and losses associated with Nor'Easters throughout Sussex County. With so many sources reviewed for the purpose of this Hazard Mitigation Plan (HMP), loss and impact information for many events may vary. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

Between 1954 and 2015, FEMA declared that the State of New Jersey experienced six Nor'Easter-related disasters (DR) or emergencies (EM) classified as one or a combination of the following disaster types: severe storm, high tide, flooding, coastal storm, heavy rain, inland and coastal flooding, and tropical depression. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. Since the original 2011 HMP, Sussex County was included in one FEMA disaster declaration for the Severe Weather (Snowstorm / Nor'Easter) on October 29, 2011. Table 5.4.7-2 lists FEMA DR and EM declarations from January 1, 2008 to August 31, 2015 for this HMP Update.

**Table 5.4.7-2. FEMA Declarations since 2008 for Nor'Easter Events in Sussex County**

FEMA Declaration Number	Date(s) of Event	Event Type	Counties Included
DR-4048	October 29, 2011	Severe Weather (Snowstorm / Nor'Easter)	Bergen, Cape May, Essex, Hunterdon, Middlesex, Morris, Passaic, Somerset, Sussex, Union, and Warren Counties

Source: FEMA 2015

For this 2016 Plan update, Nor'Easter events were summarized from 2008 to 2015. Known Nor'Easter events, including FEMA disaster declarations, which have impacted Sussex County between 2008 and 2015 are identified in Appendix X. For information regarding Nor'Easter events prior to 2008, refer to the 2011 Sussex County HMP. For detailed information on damages and impacts to each municipality, refer to Section 9 (jurisdictional annexes).

Probability of Future Occurrences

Sussex County will continue to experience the direct and indirect impacts of Nor'Easters. Secondary hazards may include flooding, extreme wind, erosion, infrastructure deterioration or failure, utility failures, power outages, water quality and supply concerns, and transportation delays, accidents, and inconveniences.

As with any weather phenomenon, it is nearly impossible to assign probabilities to Nor'Easters, except over the long-term. High activity seasons are when storm activity exceeds the historical 75th percentile. This means that seasons with this number of storms are expected to occur during one out of four years. Lower activity seasons are defined as when storm activity falls below the historical 75th percentile; meaning this number of storms are expected to occur during three out of four years (East Coast Winter Storms, 2013).

According to the NOAA NCDC Storm Events Database, Sussex County experienced nine Nor'Easter events between 1950 and 2015. This data was used to determine the recurrence interval and the average annual number of events for Sussex County. The table below shows these statistics, as well as the annual average number of events and the estimated percent chance of an incident occurring in a given year (NOAA NCDC 2015).

Table 5.4.7-3. Probability of Future Occurrences of Nor'Easter Events

Hazard Type	Number of Occurrences Between 1950 and 2015	Rate of Occurrence or Annual Number of Events (average)	Recurrence Interval (in years) (# Years/Number of Events)	Probability of Event in any given year	% chance of occurrence in any given year
Nor'Easter	9	0.14	7.33	0.14	13.64

Source: NOAA-NCDC 2015

In Section 5.3, the identified hazards of concern for Sussex County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Committee, the probability of occurrence for Nor'Easters in the County is considered 'frequent' (likely to occur within 25 years, as presented in Table 5.3-3).

Climate Change Impacts

In terms of snowfall and ice storms, there is a lack of quantitative data to predict how future climate change will affect this hazard. It is likely that the number of winter weather events may decrease, and the winter weather season may shorten; however, it is also possible that the intensity of winter storms may increase. The exact



effect on winter weather is still highly uncertain (Sustainable Jersey Climate Change Adaptation Task Force 2013).

Temperatures in the Northeast United States have increased 1.5 degrees Fahrenheit (°F) on average since 1900. Most of this warming has occurred since 1970. The State of New Jersey, for example, has observed an increase in average annual temperatures of 1.2°F between the period of 1971-2000 and the most recent decade of 2001-2010 (ONJSC, 2011). Winter temperatures across the Northeast have seen an increase in average temperature of 4°F since 1970 (Northeast Climate Impacts Assessment [NECIA] 2007). By the 2020s, the average annual temperature in New Jersey is projected to increase by 1.5°F to 3°F above the statewide baseline (1971 to 2000), which was 52.7°F. By 2050, the temperature is projected to increase 3°F to 5°F (Sustainable Jersey Climate Change Adaptation Task Force 2013). Due to the increase in temperature, snow cover and sea ice extent are predicted to likely decrease over the next century and the snow season length is very likely to decrease over North America. However, warming of the lower atmosphere could potentially lead to more ice storms by allowing snow to more frequently melt as it falls and then refreeze near or at surface (NPCC 2010).





5.4.7.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For the Nor'Easter hazard, all of Sussex County has been identified as the hazard area. Therefore, all assets in the County (population, structures, critical facilities and lifelines), as described in the County Profile (Section 4), are vulnerable to a Nor'Easter. The following text evaluates and estimates the potential impact of the Nor'Easter hazard on the County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health and safety of residents, (2) general building stock, critical facilities, economy, and (3) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2011 Sussex County HMP
- Further data collections that will assist understanding this hazard over time

Overview of Vulnerability

There are many similarities between Nor'Easter and hurricane events. Both types of events can bring high winds and heavy rainfalls or severe winter weather events, resulting in similar impacts on the population, structures, and the economy. Refer to Sections 5.4.4 (Flood) and 5.4.8 (Severe Weather) for a detailed and quantitative assessment on these hazards using Hazards U.S. Multi-hazard (HAZUS-MH). The section below discusses Nor'Easter events in a qualitative nature.

Data and Methodology

Spatial datasets for the Nor'Easter hazard do not exist. Refer to Sections 5.4.4 (Flood) and 5.4.8 (Severe Weather) for the data and methodology used in those analyses.

Impact on Life, Health and Safety

The impact of a Nor'Easter on life, health and safety is dependent upon several factors including the severity of the event and whether or not adequate warning time was provided to residents. Typically, a Nor'Easter has a longer duration (potentially lasting days) than a hurricane or tropical storm event, which normally pass through an area in a matter of hours. It is assumed that the entire County's population could be exposed to this hazard (wind and rain/snow and secondary impacts discussed earlier). Further, residents may be displaced or require temporary to long-term sheltering. Refer to Figures 5.4.6-2 and 5.4.6-3 in Section 5.4.6 (Hurricane and Tropical Storm) which display the peak gust wind speeds of the 100- and 500-year mean return period probabilistic wind events modeled in HAZUS-MH. In addition, Nor'Easter events may bring large volumes of precipitation (e.g. rain or snow). Refer to Section 5.4.9 for further discussion on the Severe Winter Weather hazard.

Impact on General Building Stock, Critical Facilities, and the Economy

The entire County's building stock and critical facilities are exposed to the wind and/or rain/snow from the Nor'Easter hazard. Nor'Easter events can greatly impact the economy, including: loss of business function, damage to inventory (utility outages), relocation costs, wage loss, and rental loss due to the repair/replacement of buildings. Damages to buildings can impact a community's economy and tax base. In addition, damages to buildings and critical infrastructure, as well as road closures, can delay emergency response services during these events. Refer to Sections 5.4.4 (Flood), 5.4.8 (Severe Weather), and 5.4.9 (Severe Winter Weather) for estimated potential loss statistics by municipality as a result of flood, wind, and winter weather events, respectively.

Effect of Climate Change on Vulnerability



Climate is defined not simply as average temperature and precipitation but also by the type, frequency and intensity of weather events. Both globally and at the local scale, climate change has the potential to alter the prevalence and severity of events like hurricanes. While predicting changes to the prevalence or intensity of Nor'Easter events and their affects under a changing climate is difficult, understanding vulnerabilities to potential changes is a critical part of estimating future climate change impacts on human health, society and the environment (U.S. Environmental Protection Agency [EPA], 2006).

Change of Vulnerability

For the 2016 Plan Update, the Nor'Easter hazard is profiled on its own, which differs from the 2011 HMP where Nor'Easter was included in the High-Wind – Straight Line Winds hazard. There was no quantitative vulnerability assessment conducted for Nor'Easter events in the 2011 or 2016 HMP. Overall, the County's vulnerability has not changed; the entire County continues to be exposed and vulnerable to the Nor'Easter hazard.

Future Growth and Development

As discussed and illustrated in Sections 4 and 9, areas targeted for future growth and development have been identified across the County. Any areas of growth could be potentially impacted by the Nor'Easter hazard because the entire Planning Area is exposed and vulnerable. Areas targeted for potential future growth and development in the next five (5) years have been identified at the jurisdiction level. Refer to the jurisdictional annexes in Volume II (Section 9) of this HMP.

Additional Data and Next Steps

Over time, the County will obtain additional data to support the analysis of this hazard. Data that will support the analysis would include additional detail on past hazard events and impacts, building footprints and specific building information such as details on protective features (for example, hurricane straps).

For future plan updates, the County can track data on extreme temperature events, obtain additional information on past and future events, particularly in terms of any injuries, deaths, shelter needs, pipe freeze, agricultural losses and other impacts. This will help to identify any concerns or trends for which mitigation measures should be developed or refined. In time, quantitative modeling of estimated extreme heat and cold events may be feasible as data is gathered and improved.



5.4.8 Severe Weather

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the severe weather hazard in Sussex County.

2016 Plan Update Changes

- For the 2016 Plan Update, the severe weather hazard groups together hail, high wind, tornadoes, lightning and extreme temperature. This differs from the 2011 HMP which provide each separately. The hazard profile has been significantly enhanced to include a detailed hazard description, location, extent, previous occurrences, probability of future occurrence, and potential change in climate and its impacts on the severe weather hazard is discussed. The severe weather hazard is now located in Section 5 of the plan update.
- New and updated figures from federal and state agencies are incorporated.
- Previous occurrences were updated with events that occurred between 2008 and 2015.
- A vulnerability assessment was conducted for the severe weather hazard and it now directly follows the hazard profile.

5.4.8.1 Profile

Hazard Description

For the purpose of this HMP Update and as deemed appropriated by the Sussex County Planning Committee, the severe weather hazard includes high winds, tornadoes, thunderstorms and lightning, extreme temperatures, and hail, which are defined below.

High Winds

High winds, other than tornadoes, are experienced in all parts of the United States. Areas that experience the highest wind speeds are coastal regions from Texas to Maine, and the Alaskan coast; however, exposed mountain areas experience winds at least as high as those along the coast (FEMA 1997; Kosiba et al. 2013). Wind begins with differences in air pressures. It is rough horizontal movement of air caused by uneven heating of the earth's surface. Wind occurs at all scales, from local breezes lasting a few minutes to global winds resulting from solar heating of the earth (Ilicak 2005). High winds have the potential to down trees, tree limbs and power lines which lead to widespread power outages and damaging residential and commercial structures throughout Sussex County. High winds are often associated by other severe weather events such as thunderstorms, tornadoes, hurricanes and tropical storms (all discussed further in this section).

A type of windstorm that is experienced often during rapidly moving thunderstorms is a derecho. A derecho is a long-lived windstorm that is associated with a rapidly moving squall line of thunderstorms. It produces straight-line winds gusts of at least 58 miles per hour (mph) and often has isolated gusts exceeding 75 mph. This means that trees generally fall and debris is blown in one direction. To be considered a derecho, these conditions must continue along a path of at least 240 miles. Derechos are more common in the Great Lakes and Midwest regions of the U.S., though, on occasion, can persist into the mid-Atlantic and northeast U.S. (ONJSC Rutgers University 2013a).

Tornadoes

Tornadoes are nature's most violent storms and can cause fatalities and devastate neighborhoods in seconds. A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 250 mph. Damage paths can be greater than one mile in width and 50 miles in length.



Tornadoes typically develop from either a severe thunderstorm or hurricane as cool air rapidly overrides a layer of warm air. Tornadoes typically move at speeds between 30 and 125 mph and can generate internal winds exceeding 300 mph. The lifespan of a tornado rarely is longer than 30 minutes (FEMA 1997).

Tornadoes occur in the State of New Jersey including Sussex County; however, they are generally weak and short lived. Tornado season in the State begins approximately in March and continues through August, but tornadoes can occur any time of the year.

Tornado watches and warning are issued by the local NWS office. A tornado watch is released when tornadoes are possible in an area. A tornado warning means a tornado has been sighted or indicated by weather radar. The current average lead time for tornado warnings is 13 minutes; however, warning times for New Jersey may be shorter due to the fact that the State experiences smaller tornadoes that are difficult to warn. Occasionally, tornadoes develop so rapidly, that little, if any, advance warning is possible (NOAA 2013; FEMA 2015; Robinson 2013).

Thunderstorms and Lightning

A thunderstorm is a local storm produced by a cumulonimbus cloud and accompanied by lightning and thunder (NWS 2009d). A thunderstorm forms from a combination of moisture, rapidly rising warm air, and a force capable of lifting air such as a warm and cold front, a sea breeze, or a mountain. Thunderstorms form from the equator to as far north as Alaska. Although thunderstorms generally affect a small area when they occur, they have the potential to become dangerous due to their ability in generating tornadoes, hailstorms, strong winds, flash flooding, and lightning. The NWS considers a thunderstorm severe only if it produces damaging wind gusts of 58 mph or higher or large hail one-inch (quarter size) in diameter or larger or tornadoes (NWS 2010a).

Lightning is a bright flash of electrical energy produced by a thunderstorm. The resulting clap of thunder is the result of a shock wave created by the rapid heating and cooling of the air in the lightning channel. All thunderstorms produce lightning and are very dangerous. It ranks as one of the top weather killers in the United States and kills approximately 50 people and injures hundreds each year. Lightning can occur anywhere there is a thunderstorm.

Thunderstorms can lead to flooding, landslides, strong winds, and lightning. Roads may become impassable from flooding, downed trees or power lines, or a landslide. Downed power lines can lead to utility losses, such as water, phone and electricity. Lightning can damage homes and injure people. In the U.S., an average of 300 people are injured and 80 people are killed by lightning each year. Typical thunderstorms are 15 miles in diameter and last an average of 30 minutes. An estimated 100,000 thunderstorms occur each year in the U.S., with approximately 10% of them classified as severe. During the warm season, thunderstorms are responsible for most of the rainfall.

Hailstorms

Hail forms inside a thunderstorm where there are strong updrafts of warm air and downdrafts of cold water. If a water droplet is picked up by the updrafts, it can be carried well above the freezing level. Water droplets freeze when temperatures reach 32°F or colder. As the frozen droplet begins to fall, it may thaw as it moves into warmer air toward the bottom of the thunderstorm. However, the droplet may be picked up again by another updraft and carried back into the cold air and re-freeze. With each trip above and below the freezing level, the frozen droplet adds another layer of ice. The frozen droplet, with many layers of ice, falls to the ground as hail. Most hail is small and typically less than two inches in diameter (NWS 2010c).



Extreme Temperatures

Extreme temperature includes both heat and cold events, which can have significant impact to human health, commercial/agricultural businesses, and primary and secondary effects on infrastructure (e.g., burst pipes and power failures). What constitutes as extreme cold or extreme heat can vary across different areas of the U.S., based on what the population is accustomed to.

Extreme cold events are when temperatures drop well below normal in an area. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered “extreme cold.” Extreme cold temperatures are generally characterized in temperate zones by the ambient air temperature dropping to approximately 0°F or below (Centers of Disease Control and Prevention [CDC] 2013). Extremely cold temperatures often accompany a winter storm, which can cause power failures and icy roads. Although staying indoors as much as possible can help reduce the risk of car crashes and falls on the ice, individuals may also face indoor hazards. Many homes will be too cold—either due to a power failure or because the heating system is not adequate for the weather. The use of space heaters and fireplaces to keep warm increases the risk of household fires and carbon monoxide poisoning (CDC 2007).

Conditions of extreme heat are defined as summertime temperatures that are substantially hotter and/or more humid than average for a location at that time of year (CDC 2009). An extended period of extreme heat of three or more consecutive days is typically called a heat wave and is often accompanied by high humidity (NWS 2005). There is no universal definition of a heat wave because the term is relative to the usual weather in a particular area. The term heat wave is applied both to routine weather variations and to extraordinary spells of heat which may occur only once a century (Meehl and Tebaldi 2004). A basic definition of a heat wave implies that it is an extended period of unusually high atmosphere-related heat stress, which causes temporary modifications in lifestyle and which may have adverse health consequences for the affected population (Robinson 2013). A heat wave is defined as three consecutive days of temperatures $\geq 90^{\circ}\text{F}$.

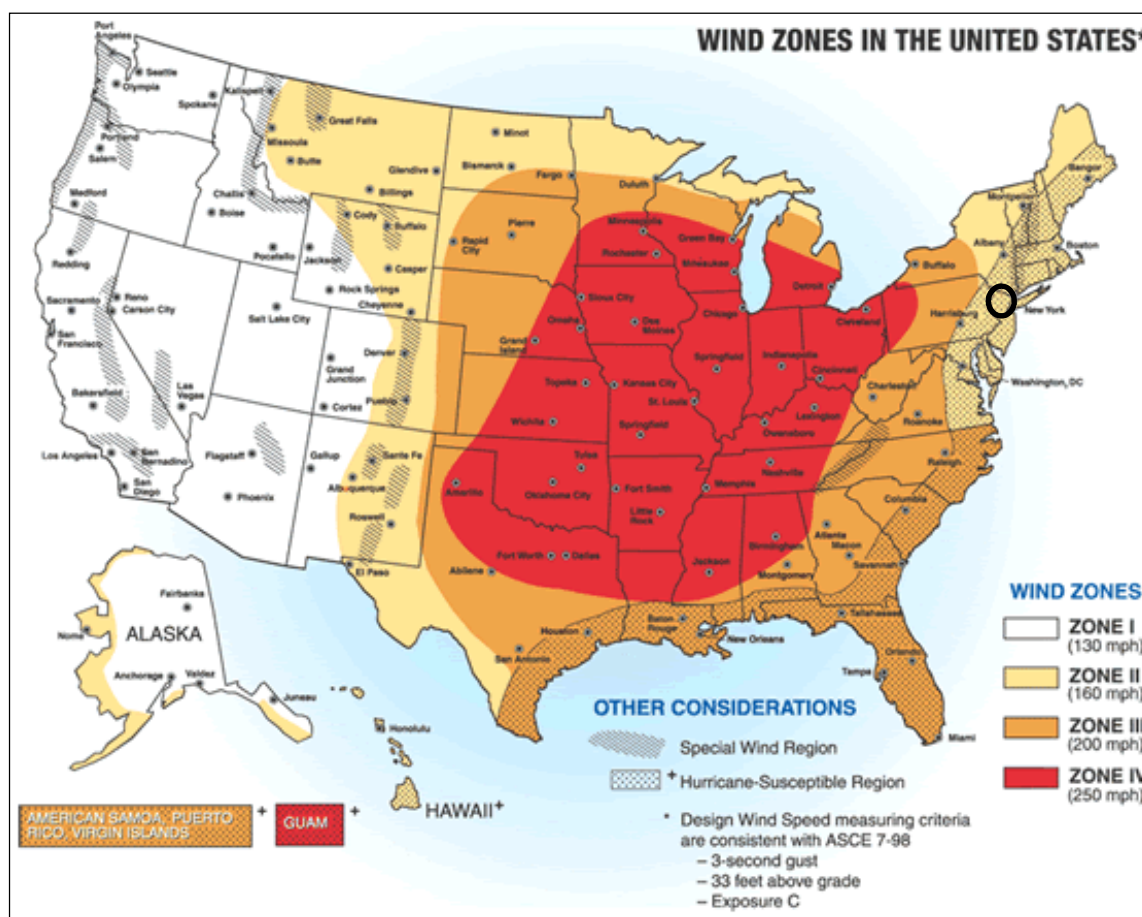
Extreme heat is the number one weather-related cause of death in the U.S. In a ten-year average of weather fatalities across the nation from 2005-2014, excessive heat claimed more lives each year than floods, lightning, tornadoes, and hurricanes. In 2014, heat claimed 20 lives, though none of them were in the State of New Jersey (NWS 2015).

Location

High Winds

All of Sussex County is subject to high winds from thunderstorms, tornadoes, and other severe weather events. According to the FEMA Winds Zones of the United States map, Sussex County is located in Wind Zone II, where wind speeds can reach up to 160 mph. The County is also located in the Hurricane Susceptible Region, which extends along the entire east coast from Maine to Florida, the Gulf Coast, and Hawaii. The figure below indicates how the frequency and strength of windstorms impacts the United States and the general location of the most wind activity. This figure is based on 40 years of tornado data and 100 years of hurricane data, collected by FEMA. Further information on tornados in Sussex County is provided immediately after the figure.

Figure 5.4.8-1. Wind Zones in the United States



Source: FEMA 2010

Note: Sussex County is within the black circle.

Tornadoes

Tornadoes have been documented in every state in the United States, and on every continent with the exception of Antarctica. Approximately 1,200 tornadoes occur in the United States each year, with the central portion of the country experiencing the most. Tornadoes can occur at any time of the year, with peak seasons at different times for different states (NSSL 2015). The potential for a tornado strike is about equal across locations in New Jersey, except in the northern section of the State which typically has steeper terrain and therefore is less likely to experience tornadoes. New Jersey experienced an average of two tornadoes annually between 1991 and 2010 (NCDC Date Unknown). Between 1950 and 2014, Sussex County experienced three tornadoes, which averages approximately 0.047 tornadoes each year. The most recent tornado was reported in the County in 2009 (SPC 2015).

Thunderstorms and Lightning

Thunderstorms affect relatively small localized areas, rather than large regions like winter storms and hurricane events. Thunderstorms can strike in all regions of the United States; however, they are most common in the central and southern states. The atmospheric conditions in these regions of the country are ideal for generating these powerful storms. It is estimated that there are as many as 40,000 thunderstorms each day worldwide. The most thunderstorms are seen in the southeast United States, with Florida having the highest incidences (80 to



over 100 thunderstorm days each year). Sussex County can experience an average of 30 to 40 thunderstorm days each year (NWS 2010a).

Thunderstorms spawned in Pennsylvania and New York State often move into northern New Jersey (which includes Sussex County), where they usually reach maximum development during the evening hours. This region of the State has about twice as many thunderstorms as the coastal zone. The conditions most favorable to thunderstorm development occur between June and August, with July being the peak month in New Jersey.

Hailstorms

Hailstorms are most frequent in the southern and central plains states in the United States, where warm moist air off of the Gulf of Mexico and cold dry air from Canada collide, and thereby spawning violent thunderstorms. This area of the United States is known as hail alley and lies within the states of Texas, Oklahoma, Colorado, Kansas, Nebraska, and Wyoming. While this area has the greatest frequency of hailstorms, they have been observed nearly everywhere thunderstorms occur, including New Jersey and Sussex County. According to the SPC, Sussex County has experienced 41 hail events between 1955 and 2014 (0.7 events per year) with the average size of hail being 1.01 inch diameter.

Extreme Temperatures

According to the ONJSC, New Jersey has five distinct climate regions. Elevations, latitude, distance from the Atlantic Ocean, and landscape (e.g. urban, sandy soil) produce distinct variations in the daily weather between each of the regions. The five regions include: Northern, Central, Pine Barrens, Southwest, and Coastal (ONJSC Rutgers University 2015). Sussex County is located within the North Climate Region.

The Northern Region covers about one-quarter of New Jersey and consists mainly of elevated highlands and valleys which are part of the Appalachian Uplands. Being in the northernmost portion of the State, and with small mountains up to 1,800 feet in elevation, this Region normally exhibits a colder temperature regime than other climate regions of the State. This difference is most dramatic in winter when average temperatures in the Northern Region can be more than 10°F cooler than in the Coastal Zone (ONJSC Rutgers University 2015).

Temperature extremes can occur throughout the entire State. In New Jersey, average days per year where temperatures reach 90°F or higher range from five days to over 30 days, depending on location. Sussex County has an average of 11 to 14 days of temperatures in excess of 90°F; one to three of temperatures in excess of 95°F; and 0.1 to 0.8 days of temperatures in excess of 100°F (ONJSC 2013b).

Average days per year when temperatures reached less than 32°F in New Jersey range from six days in the southern part of the State to over 45 days in northern New Jersey. Sussex County has an average of 29 to 49 days of temperatures below 32°F; and 6.6 to seven days of temperatures below 0°F (ONJSC 2013b).

Extent

High Winds

The following table summarizes the wind descriptions used by the NWS during wind-producing events.

Table 5.4.8-1. NWS Wind Descriptions

Descriptive Term	Sustained Wind Speed (mph)
Strong, dangerous, or damaging	≥40
Very Windy	30-40



Descriptive Term	Sustained Wind Speed (mph)
Windy	20-30
Breezy, brisk, or blustery	15-25
None	5-15 or 10-20
Light or light and variable wind	0-5

Source: NWS 2010
mph miles per hour

The NWS issues advisories and warnings for winds. Issuance is normally site-specific. High wind advisories, watches and warnings are products issued by the NWS when wind speeds may pose a hazard or is life threatening. The criterion for each of these varies from state to state. Wind warnings and advisories for New Jersey are as follows:

- High Wind Warnings are issued when sustained winds of 40 mph or greater are forecast for one hour or longer, or wind gusts of 58 mph or greater for any duration
- Wind Advisories are issued when sustained winds of 30 to 39 mph are forecast for one hour or longer, or wind gusts of 46 to 57 mph for any duration (NWS, 2010b).

Tornadoes

The magnitude or severity of a tornado was originally categorized using the Fujita Scale (F-Scale) or Pearson Fujita Scale introduced in 1971. This used to be the standard measurement for rating the strength of a tornado. The F-Scale categorized tornadoes by intensity and area and was divided into six categories, F0 (gale) to F5 (incredible). Table 5.4.8-2 summarizes each of the six F-Scale categories.

Table 5.4.8-2. Fujita Damage Scale

Scale	Wind Estimate (mph)	Typical Damage
F0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261-318	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena occur.

Source: Storm Prediction Center (SPC) Date Unknown
mph miles per hour

The Enhanced Fujita Scale (EF-Scale) is now the standard used to measure the strength of a tornado. It is used to assign tornadoes a 'rating' based on estimated wind speeds and related damage. When tornado-related damage



is surveyed, it is compared to a list of Damage Indicators (DI) and Degree of Damage (DOD), which help better estimate the range of wind speeds produced by the tornado. From that, a rating is assigned, similar to that of the F-Scale, with six categories from EF0 to EF5, representing increasing degrees of damage. The EF-Scale was revised from the original F-Scale to reflect better examinations of tornado damage surveys. This new scale considers how most structures are designed (NOAA 2008). Table 5.4.8-3 displays the EF-Scale and each of its six categories.

Table 5.4.8-3. Enhanced Fujita Damage Scale

EF-Scale Number	Intensity Phrase	Wind Speed (mph)	Type of Damage Done
EF0	Light tornado	65–85	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	Moderate tornado	86–110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	Significant tornado	111–135	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	Severe tornado	136–165	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	Devastating tornado	166–200	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	Incredible tornado	>200	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); high-rise buildings have significant structural deformation; incredible phenomena occur.

Source: SPC Date Unknown

EF-Scale Enhanced Fujita Scale

mph miles per hour

Tornado watches and warning are issued by the local NWS office. A tornado watch is released when tornadoes are possible in an area. A tornado warning means a tornado has been sighted or indicated by weather radar. The current average lead time for tornado warnings is 13 minutes. Occasionally, tornadoes develop so rapidly, that little, if any, advance warning is possible (NOAA 2013; FEMA 2013).

Thunderstorms and Lightning

Severe thunderstorm watches and warnings are issued by the local NWS office and SPC. The NWS and SPC will update the watches and warnings and will notify the public when they are no longer in effect. Watches and warnings for thunderstorms in New Jersey are as follows:

- Severe Thunderstorm Warnings are issued when there is evidence based on radar or a reliable spotter report that a thunderstorm is producing, or forecast to produce, wind gusts of 58 mph or greater, structural wind damage, and/or hail one-inch in diameter or greater. A warning will include where the storm was located, what municipalities will be impacted, and the primary threat associated with the severe thunderstorm warning. After it has been issued, the NWS office will follow up periodically with Severe Weather Statements which contain updated information on the severe thunderstorm and will let the public know when the warning is no longer in effect (NWS 2010b).
- Severe Thunderstorm Watches are issued by the SPC when conditions are favorable for the development of severe thunderstorms over a larger-scale region for a duration of at least three hours. Tornadoes are not expected in such situations, but isolated tornado development may also occur. Watches are normally



issued well in advance of the actual occurrence of severe weather. During the watch, the NWS will keep the public informed on what is happening in the watch area and also let the public know when the watch has expired or been cancelled (NWS 2010b).

- Special Weather State for Near Severe Thunderstorms are issued for strong thunderstorms that are below severe levels, but still may have some adverse impacts. Usually, they are issued for the threat of wind gusts of 40 to 58 mph or small hail less than one-inch in diameter (NWS 2010b).

Hailstorms

The severity of hail is measured by duration, hail size, and geographic extent. All of these factors are directly related to thunderstorms, which creates hail. There is wide potential variation in these severity components. The most significant impact of hail is damage to crops. Hail also has the potential to damage structures and vehicles during hailstorms.

Hail can be produced from many different types of storms. Typically, hail occurs with thunderstorm events. The size of hail is estimated by comparing it to a known object. Most hailstorms are made up of a variety of sizes, and only the very largest hail stones pose serious risk to people, when exposed. Table 5.4.8-4 shows the different sizes of hail and the comparison to real-world objects.

Table 5.4.8-4. Hail Size

Size	Inches in Diameter
Pea	0.25 inch
Marble/mothball	0.50 inch
Dime/Penny	0.75 inch
Nickel	0.875 inch
Quarter	1.0 inch
Ping-Pong Ball	1.5 inches
Golf Ball	1.75 inches
Tennis Ball	2.5 inches
Baseball	2.75 inches
Tea Cup	3.0 inches
Grapefruit	4.0 inches
Softball	4.5 inches

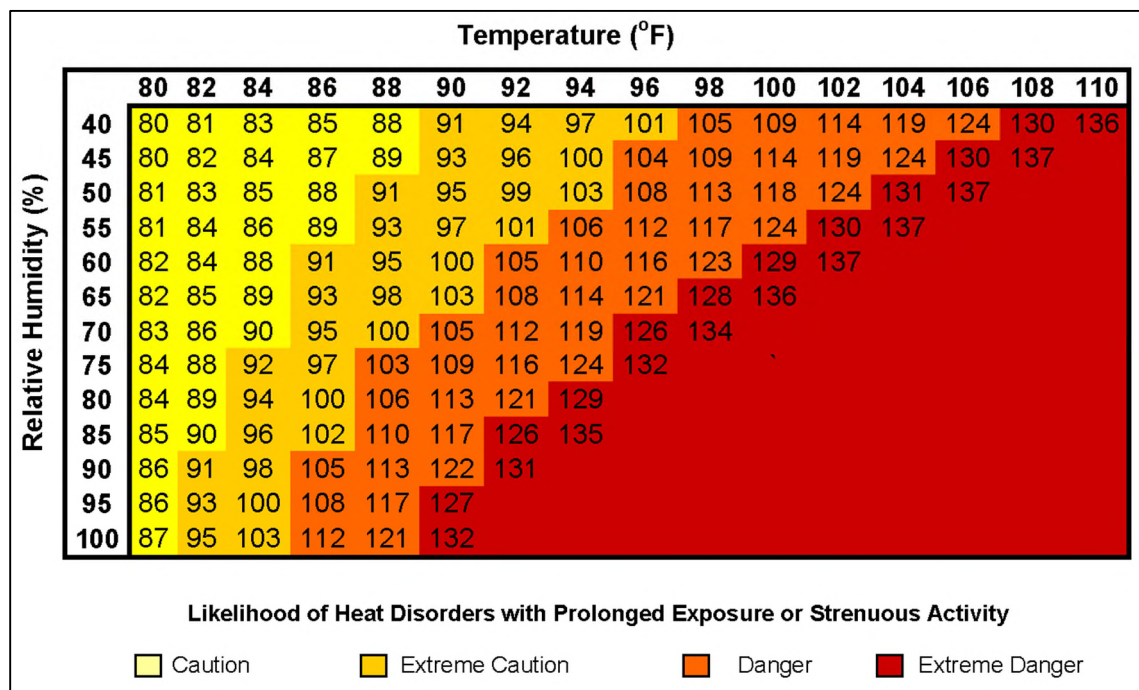
Source: NOAA 2012

Extreme Heat

NOAA's heat alert procedures are based mainly on Heat Index values. The Heat Index is given in degrees Fahrenheit. The Heat Index is a measure of how hot it really feels when relative humidity is factored in with the actual air temperature. To find the Heat Index temperature, the temperature and relative humidity need to be known. Once both values are known, the Heat Index will be the corresponding number with both values (Figure 5.4.8-2). The Heat Index indicated the temperature the body feels. It is important to know that the Heat Index values are devised for shady, light wind conditions. Exposure to full sunshine can increase heat index values by up to 15°F. Strong winds, particularly with very hot dry air, can also be extremely hazardous (NWS 2013d).



Figure 5.4.8-2. NWS Heat Index Chart



Source: NWS 2015c
 °F degrees Fahrenheit
 % percent

Figure 5.4.8-3. Adverse Effects of Prolonged Exposures to Heat on Individuals

Category	Heat Index	Health Hazards
Extreme Danger	130 °F – Higher	Heat Stroke / Sunstroke is likely with continued exposure.
Danger	105 °F – 129 °F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Extreme Caution	90 °F – 105 °F	Sunstroke, muscle cramps, and/or heat exhaustions possible with prolonged exposure and/or physical activity.
Caution	80 °F – 90 °F	Fatigue possible with prolonged exposure and/or physical activity.

Source: NWS 2009a
 °F degrees Fahrenheit

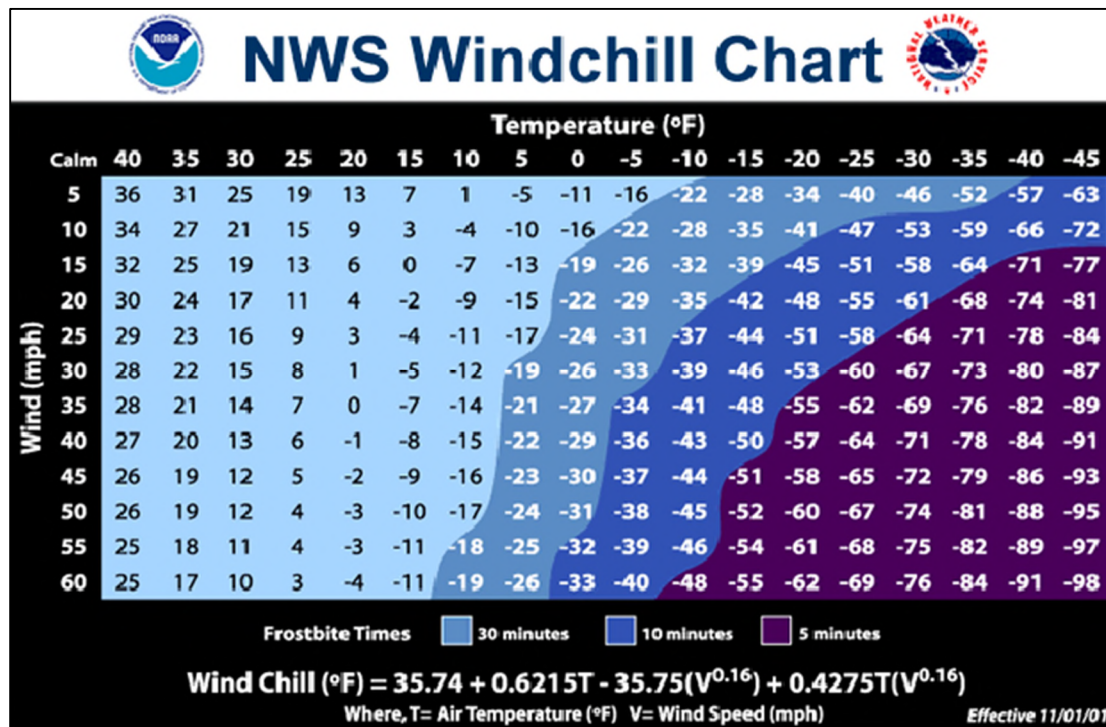
Extreme Cold

The extent (severity or magnitude) of extreme cold temperatures are generally measured through the Wind Chill Temperature (WCT) Index. Wind Chill Temperature is the temperature that people and animals feel when outside and it is based on the rate of heat loss from exposed skin by the effects of wind and cold. As the wind increases, the body is cooled at a faster rate causing the skin's temperature to drop (NWS Date Unknown).

On November 1, 2001, the NWS implemented a new WCT Index. It was designed to more accurately calculate how cold air feels on human skin. The table below shows the new WCT Index. The WCT Index includes a frostbite indicator, showing points where temperature, wind speed, and exposure time will produce frostbite to humans. Figure 5.4.8-4 shows three shaded areas of frostbite danger. Each shaded area shows how long a person can be exposed before frostbite develops (NWS Date Unknown).



Figure 5.4.8-4. NWS Wind Chill Index



Source: NWS Date Unknown
°F degrees Fahrenheit
mph miles per hour

Warning Time

Meteorologists can accurately forecast extreme temperature event development and the severity of the associated conditions with several days lead time. These forecasts provide an opportunity for public health and other officials to notify vulnerable populations. For heat events, the NWS issues excessive heat outlooks when the potential exists for an excessive heat event in the next three to seven days. Watches are issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. Excessive heat warning/advisories are issued when an excessive heat event is expected in the next 36 hours (NWS 2013d). Winter temperatures may fall to extreme cold readings with no wind occurring. Currently, the only way to headline very cold temperatures is with the use of the NWS-designated Wind Chill Advisory or Warning products. When actual temperatures reach Wind Chill Warning criteria with little to no wind, extreme cold warnings may be issued (NWS Date Unknown).

Previous Occurrences and Losses

Many sources provided historical information regarding previous occurrences and losses associated with severe weather events throughout Sussex County. With so many sources reviewed for the purpose of this HMP, loss and impact information for many events may vary. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

Each year, the U.S. Natural Hazards Statistics provided statistical information on fatalities, injuries, and damages caused by weather-related hazards. These statistics were compiled by the Office of Services and the National Climatic Data Center (NCDC) from information contained in the publication *Storm Data*. According to this most recent data, Sussex County had seven injuries, one fatality over \$100 million in property damages from 2008 through 2015 due to severe weather events (extreme temperature, funnel cloud, tornado, hail, heavy rain, wind, lightning and thunderstorms) (NOAA NCDC 2015).



The NWS Forecast Office operates an online annual temperature extremes database, known as “NOWData”. The data set contains annual maximum and minimum temperature records for stations in the U.S. Each station has a cooperative observer system identification number (coop number). There is one station in Sussex County, located in the Borough of Sussex. Based on the Midwestern Regional Climate Center (MRCC) data, Table 5.4.8-5 presents the extreme cold (minimum) and hot (maximum) temperature records for the weather stations located in Sussex County between 1893 and 2015.

Table 5.4.8-5. MRCC Temperature Extremes

Station Name	Average Maximum (°F)	Average Minimum (°F)	Highest Max (°F)	Date	Lowest Minimum (°F)	Date
SUSSEX 2 NW	84	16.2	106	July 10, 1936	-29	Jan. 21, 1994

Source: MRCC 2015

Note: There may be some potential problems with the data collected at the stations. The values of the all-time records for stations with brief histories are limited in accuracy and could vary from nearby stations with longer records. Although the data sets have been through quality control, there is still a need for more resources to quality control extremes. The record sets are for single stations in the cooperative observer network and are limited to the time of operation of each station under one coop number. The records for a place may need to be constructed from several individual station histories. Some of the data may vary from NWS records due to NWS using multiple stations and additional sources like record books (MRCC, Date Unknown).

Between 1954 and 2015, the State of New Jersey was included in 19 FEMA declared severe weather-related disasters (DR) or emergencies (EM) classified as one or a combination of the following hazards: severe storm, straight-line winds, heavy rains, flooding, hail, tornadoes, and high wind. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. Of those declarations, Sussex County has been included in 11 declarations since 1954 (FEMA 2015). Since the original 2011 HMP, Sussex County has been included in four FEMA declarations for severe weather events: Hurricane Irene, Remnants of Tropical Storm Lee, the October 29 Severe Storm in 2011, and Hurricane Sandy in 2012. Table 5.4.8-6 lists FEMA DR and EM declarations from January 1, 2008 to August 31, 2015 for this HMP update.

Table 5.4.8-6. FEMA DR and EM Declarations since 2008 for Severe Weather Events in Sussex County

FEMA Declaration Number	Date(s) of Event	Event Type	Location
DR-4021	August 26 – September 5, 2011	Hurricane Irene	All 21 Counties, including Sussex County
DR-4039	September 5-14, 2011	Remnants of Tropical Storm Lee	Sussex, Hunterdon, Warren, Mercer, Passaic
DR-4048	October 29, 2011	New Jersey Severe Storm	Bergen, Cape May, Essex, Hunterdon, Middlesex, Morris, Passaic, Somerset, Sussex, Union and Warren Counties
DR-4086	October 26 – November 8, 2012	Hurricane Sandy	All 21 Counties, including Sussex County

Source: FEMA 2015

Agriculture-related severe weather disasters are quite common. One-half to two-thirds of the counties in the U.S. have been designated as disaster areas in each of the past several years. The USDA Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and in counties that are contiguous to a designated county. Between 2012 and 2015, Sussex County has not been included in five of these declarations, four of which were the result of one or more of the following severe weather conditions: Excessive rain, moisture, humidity; Hail; Heat, Excessive Heat, High Temperature (including low humidity); Severe Storms, thunderstorms; and Wind, High Winds; Frost, freeze.



For this 2016 HMP update, known severe weather events, including FEMA disaster declarations, which have impacted Sussex County between 2008 and 2015 are identified in Appendix X. For detailed information on damages and impacts to each municipal, refer to Section 9 (jurisdictional annexes). For events that occurred prior to 2008, refer to the 2011 Sussex County HMP.

Probability of Future Occurrences

Predicting future severe weather events in a constantly changing climate has proven to be a difficult task. Predicting extremes in New Jersey and Sussex County is particularly difficult because of their geographic location. Both are positioned roughly halfway between the equator and the North Pole and are exposed to both cold and dry airstreams from the south. The interaction between these opposing air masses often leads to turbulent weather across the region (Keim1997).

It is estimated that Sussex County will continue to experience direct and indirect impacts of severe weather events annually that may induce secondary hazards such as flooding, infrastructure deterioration or failure, utility failures, power outages, water quality and supply concerns, and transportation delays, accidents and inconveniences.

Extreme temperatures are expected to occur more frequently as part of regular seasons. Specifically, extreme heat will continue to impact New Jersey and its counties and, based upon data presented, will increase in the next several decades. As previously stated, several extreme temperature events occur each year in Sussex County. It is estimated that the County will continue to experience these events annually.

According to the NOAA National Climate Data Center (NCDC), Sussex County has experienced 612 severe weather events between 1950 and 2015. This data was used to determine the recurrence interval and the average annual number of events for the County. The table below summarizes these statistics, as well as the annual average number of events and the estimated percent chance of an incident occurring in a given year (NOAA NCDC 2015).

Table 5.4.8-7. Probability of Future Occurrences of Severe Weather Events

Hazard Type	Number of Occurrences Between 1950 and 2015	Rate of Occurrence or Annual Number of Events (average)	Recurrence Interval (in years) (# Years/Number of Events)	Probability of Event in any given year	% chance of occurrence in any given year
Extreme Temperature	86	1.32	0.77	1.30	130.30
Hail	41	0.63	1.61	0.62	62.12
Heavy Rain	43	0.66	1.53	0.02	2.33
High/Strong Wind	127	1.95	0.52	1.92	192.42
Lightning	24	0.37	2.75	0.36	36.36
Thunderstorm Wind	161	2.48	0.41	2.44	243.94
Tornado / Funnel Cloud	5	0.08	13.20	0.08	7.58
High Winds	33	0.51	2.00	0.50	50.00
Strong Winds	92	1.42	0.72	1.39	139.39
Total	612	9.42	0.11	9.27	927.27

Source: NOAA-NCDC 2015



In Section 5.3, the identified hazards of concern for Sussex County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Committee, the probability of occurrence for severe weather events in the County is considered 'frequent' (likely to occur within 25 years, as presented in Table 5.3-3).

Climate Change Impacts

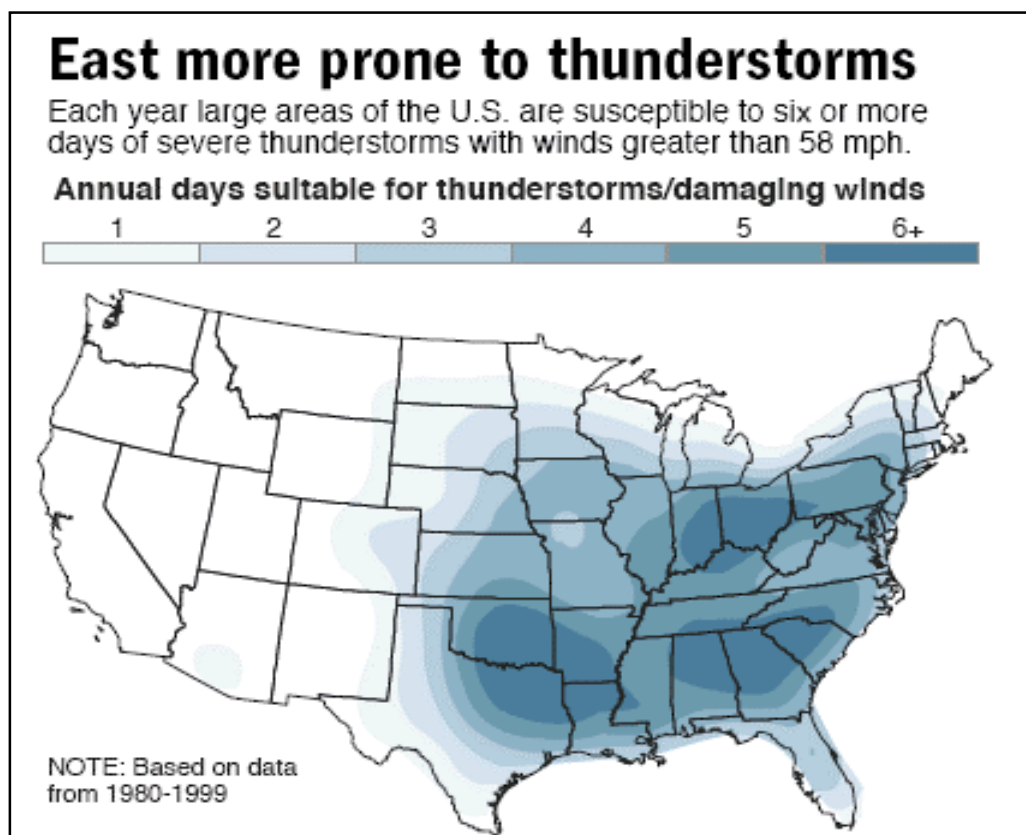
Providing projections of future climate change for a specific region is challenging. Shorter term projections are more closely tied to existing trends making longer term projections even more challenging. The further out a prediction reaches the more subject to changing dynamics it becomes.

Both northern and southern New Jersey have become wetter over the past century. Northern New Jersey's 1971-2000 precipitation average was over five inches (12%) greater than the average from 1895-1970 (Sustainable Jersey Climate Change Adaptation Task Force [CATF] 2011). Average annual precipitation is projected to increase in the region by four to 11% by the 2050s and five to 13% by the 2080s (New York City Panel on Climate Change [NPCC] 2013).

As the climate changes, temperatures and the amount of moisture in the air will both increase, thus leading to an increase in the severity of thunderstorms which can lead to derechos and tornadoes. Studies have shown that an increase in greenhouse gases in the atmosphere would significantly increase the number of days that severe thunderstorms occur in the southern and eastern United States (National Aeronautics and Space Administration [NASA] 2013). As prepared by the NWS, Figure 5.4.8-4 identifies those areas, particularly within the eastern U.S., that are more prone to thunderstorms, including New Jersey.

NASA scientists suggest that the U.S. will face more severe thunderstorms in the future, with deadly lightning, damaging hail, and the potential for tornadoes in the event of climate change. A recent study conducted by NASA predicts that smaller storm events like thunderstorms will also be more dangerous due to climate change.

Figure 5.4.8-5 Annual Days Suitable for Thunderstorms/Damaging Winds

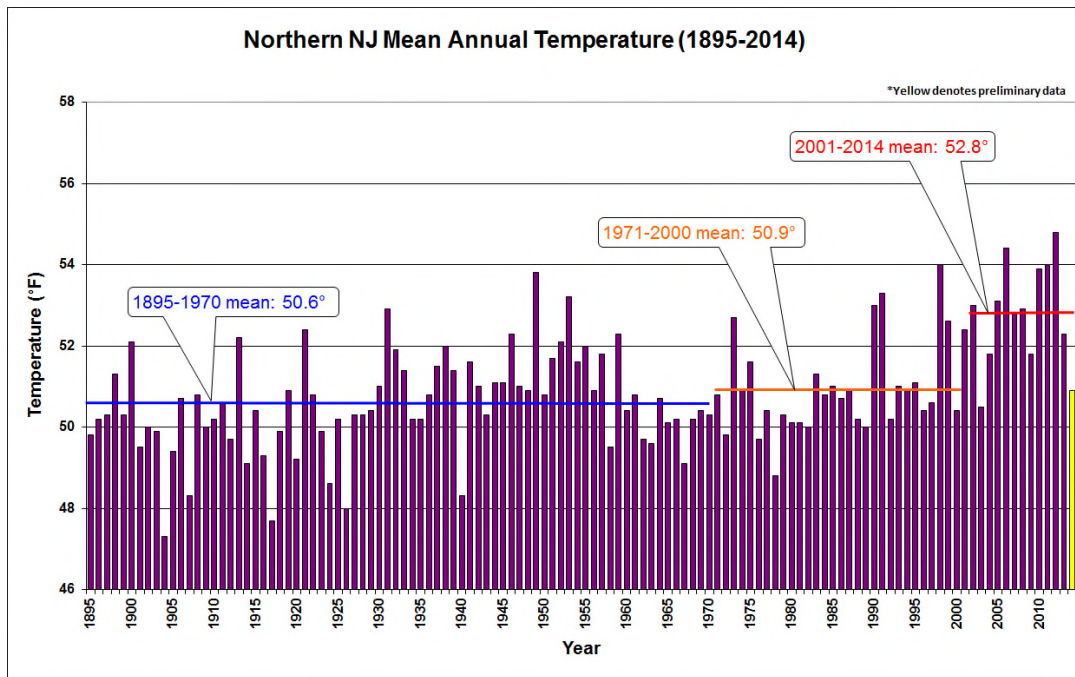


Source: Borenstein, 2007
mph miles per hour

Temperatures in the Northeast United States have increased 1.5 degrees Fahrenheit (°F) on average since 1900, with the regional warming trend greater in the Northeast than in the United States as a whole. Most of this warming has occurred since 1970. The State of New Jersey, for example, has observed an increase in average annual temperatures of 1.2°F between the period of 1971-2000 and the most recent decade of 2001-2010 (CATF 2011). Winter temperatures across the Northeast have seen an increase in average temperature of 4°F since 1970 (Northeast Climate Impacts Assessment [NECIA] 2007). By the 2020s, the average annual temperature in New Jersey is projected to increase by 1.5°F to 3°F above the statewide baseline (1971 to 2000), which was 52.7°F. By 2050, the temperature is projected to increase 3°F to 5°F (Sustainable Jersey Climate Change Adaptation Task Force 2011). Figure 5.8.4 illustrates the monthly mean temperatures in northern New Jersey from 1895 to 2015. As shown in this figure, the mean temperature for northern New Jersey has steadily increased. More recently, the yearly average for 2004 to 2013 have all been above the calculated normal for this climate division.



Figure 5.4.8-6. Monthly Mean Temperatures in Northern New Jersey, 1895 to 2014



Source: Rutgers 2015a



5.4.8.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For the severe weather hazard, all of Sussex County is exposed and vulnerable. Therefore, all assets in the County (population, structures, critical facilities and lifelines), as described in Section 4 (County Profile), are exposed and potentially vulnerable. The following text evaluates and estimates the potential impact of severe weather events on the County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health and safety of residents, (2) general building stock, (3) critical facilities, (4) economy, and (5) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2011 Sussex County HMP
- Further data collections that will assist understanding this hazard over time

Overview of Vulnerability

People and property in virtually the entire United States are exposed to damage, injury, and loss of life from severe storm events (thunderstorms, lightning, wind, hail, tornadoes). Everywhere they occur; thunderstorms are responsible for significant structural damage to buildings, forest and wildfires, downed power lines and trees, and loss of life. For the purposes of this HMP, the entire County is exposed to severe storm events. Refer to Section 5.4.6 (Hurricane and Tropical Storm) for a detailed and quantitative assessment on the wind hazards. The section below discusses severe storm events in a qualitative nature.

The high winds and air speeds of a tornado, hail, or wind storm often result in power outages, disruptions to transportation corridors and equipment, loss of workplace access, significant property damage, injuries and loss of life, and the need to shelter and care for individuals impacted by the events. A large amount of damage can be inflicted by trees, branches, and other objects that fall onto power lines, buildings, roads, vehicles, and, in some cases, people.

Extreme temperatures generally occur for a short period of time but can cause a range of impacts, particularly to vulnerable populations that may not have access to adequate cooling or heating. This natural hazard can also cause impacts to agriculture (crops and animals), infrastructure (e.g., through pipe bursts associated with freezing, power failure) and the economy.

The entire inventory of the County is at risk of being damaged or lost due to impacts of severe weather. Certain areas, infrastructure, and types of buildings are at greater risk than others due to proximity to flood waters, falling hazards, and their manner of construction.

Data and Methodology

After reviewing historic data, the 2010 U.S. Census population and a custom general building stock data were used to support an evaluation of assets exposed to this hazard and the potential impacts associated with this hazard. Refer to Section 5.4.6 (Hurricane and Tropical Storm) for additional information on the methodology and modeling results pertaining to the estimated potential impacts from the 100- and 500-year MRP wind events.

At the time of this HMP, insufficient data is available to model the long-term potential impacts of extreme temperature on Sussex County. Over time, additional data will be collected to allow better analysis for this hazard. Available information and a preliminary assessment are provided below.



Impact on Life, Health and Safety

For the purposes of this HMP, the entire population of Sussex County (145,992 people) is exposed to severe weather events (U.S. Census, 2010). Residents may be displaced or require temporary to long-term sheltering due to severe weather events. In addition, downed trees, damaged buildings, and debris carried by high winds can lead to injury or loss of life. Socially vulnerable populations are most susceptible, 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.

People located outdoors (i.e., recreational activities and farming) are considered most vulnerable to hailstorms, thunderstorms and tornadoes. This is because there is little to no warning and shelter may not be available. Moving to a lower risk location will decrease a person's vulnerability.

Extreme temperature events have potential health impacts including injury and death. According to the Centers for Disease Control and Prevention, populations most at risk to extreme cold and heat events include the following: 1) the elderly, who are less able to withstand temperatures extremes due to their age, health conditions and limited mobility to access shelters; 2) infants and children up to four years of age; 3) individuals who are physically ill (e.g., heart disease or high blood pressure), 4) low-income persons that cannot afford proper heating and cooling; and 5) the general public who may overexert during work or exercise during extreme heat events or experience hypothermia during extreme cold events (CDC, 2007; CDC 2009).

Meteorologists can accurately forecast extreme heat event development and the severity of the associated conditions with several days of lead time. These forecasts provide an opportunity for public health and other officials to notify vulnerable populations, implement short-term emergency response actions and focus on surveillance and relief efforts on those at greatest risk. Adhering to extreme temperature warnings can significantly reduce the risk of temperature-related deaths.

Impact on General Building Stock and Critical Facilities

Damage to buildings is dependent upon several factors including wind speed and duration, and building construction. Refer to Section 5.4.6 (Hurricane and Tropical Storm) for a presentation on potential wind losses associated with 100- and 500-year mean return period events. Damage will result from hail stones themselves and will have a specific impact on roofs. The extent of damage will depend on the size of the hailstorm.

Extreme heat generally does not impact buildings. Losses may be associated with the overheating of heating, ventilation, and air conditioning (HVAC) systems. Extreme cold temperature events can damage buildings through freezing/bursting pipes and freeze/thaw cycles. Additionally, manufactured homes (mobile homes) and antiquated or poorly constructed facilities may have inadequate capabilities to withstand extreme temperatures.

It is essential that critical facilities remain operational during natural hazard events. Extreme heat events can sometimes cause short periods of utility failures, commonly referred to as "brown-outs", due to increased usage from air conditioners, appliances, etc. Similarly, heavy snowfall and ice storms, associated with extreme cold temperature events, can cause power interruption as well. Backup power is recommended for critical facilities and infrastructure.

Impact on Economy

As discussed, severe storm events can impact structures and the economy. Impacts to transportation lifelines affect both short-term (e.g., evacuation activities) and long-term (e.g., day-to-day commuting and goods transport) transportation needs. Utility infrastructure (power lines, gas lines, electrical systems) could suffer



damage and impacts can result in the loss of power, which can impact business operations and can impact heating or cooling provision to the population.

Extreme temperature events also have impacts on the economy, including loss of business function and damage/loss of inventory. Business-owners may be faced with increased financial burdens due to unexpected repairs caused to the building (e.g., pipes bursting), higher than normal utility bills or business interruption due to power failure (i.e., loss of electricity, telecommunications).

The agricultural industry is most at risk in terms of economic impact and damage due to extreme temperature events. Extreme heat events can result in drought and dry conditions and directly impact livestock and crop production. See the ‘Impact on the Economy’ subsection of the Drought hazard profile (Section 5.4.2) for information regarding the impacts on the agriculture as result of a drought in the County.

Effect of Climate Change on Vulnerability

Climate is defined not simply as average temperature and precipitation but also by the type, frequency and intensity of weather events. Both globally and at the local scale, climate change has the potential to alter the prevalence and severity of events like hurricanes. While predicting changes to the prevalence or intensity of hurricanes and the events affects under a changing climate is difficult, understanding vulnerabilities to potential changes is a critical part of estimating future climate change impacts on human health, society and the environment (U.S. Environmental Protection Agency [EPA], 2006).

Climate Change in New Jersey: Trends and Projections describes changes in temperature, precipitation, and sea level rise. Each section of the report summarizes observed recent changes in climate in New Jersey. Observations are based on recorded climate data collected by the ONJSC and other institutions, and on other reports summarizing climate change in the northeastern United States. Each section also presents a synthesis of the most current projections for future climate changes based on climate science modeling and techniques. The projections reflect potential average climate over a span of future years (2020, 2050, and 2080). The projections in the report illustrate the potential climate changes that could impact the northeastern United States based on future emissions scenarios (A2, A1B, and B1 – high, medium, and low scenarios). Each emissions scenario would result in a range of potential climate outcomes in the State (Rutgers 2013b).

In the coming years, most studies project that the State of New Jersey can expect an increase in average annual temperature, and steady or increasing amounts of precipitation with more rain in the winter. More frequent extreme events are likely, including heat waves, short-term droughts, and extreme precipitation events with subsequent flooding. Sea level rise in New Jersey is already occurring faster than the global average rate because of land subsidence and ground water withdrawal, and a continued rate of rise is expected to lead to more frequent and more severe coastal flooding events, including those associated with hurricane and tropical storms (Rutgers 2013b).

An increase in the number of extreme heat days may lead to an increase in heat related illnesses. Also, with an increase in severe weather events there will be an increase in stormwater runoff which may be polluted and sicken individuals (Kaplan and Herb 2012). The effect on public health will likely increase the need for vulnerable population planning and may place heavier burdens on the healthcare system.

Change of Vulnerability

Sussex County and its municipalities continue to be vulnerable to the severe weather hazard. See Section 5.4.6 (Hurricane and Tropical Storm) for a description on the differences between the risk assessment for the wind hazard for the 2011 HMP and 2016 HMP Update.



Future Growth and Development

As discussed and illustrated in Sections 4 and 9, areas targeted for future growth and development have been identified across the County. Any areas of growth could be potentially impacted by the severe weather hazard because the entire Planning Area is exposed and vulnerable to the impacts associated with these events. The development of new buildings in these areas must meet or exceed the standards in Section R301.2.1.1 of the International Building Code (IBC) which will assist with mitigating future potential damages and losses. Any areas of growth could be potentially impacted by the extreme temperature hazard because the entire County is exposed and vulnerable. Areas targeted for potential future growth and development in the next five (5) years have been identified across the County at the jurisdiction level. Refer to the jurisdictional annexes in Volume II of this HMP.

Additional Data and Next Steps

Over time, the County will obtain additional data to support the analysis of this hazard. Data that will support the analysis would include additional detail on past hazard events and impacts, building footprints and specific building information such as details on protective features (for example, hurricane straps).

For future plan updates, the County can track data on extreme temperature events, obtain additional information on past and future events, particularly in terms of any injuries, deaths, shelter needs, pipe freeze, agricultural losses and other impacts. This will help to identify any concerns or trends for which mitigation measures should be developed or refined. In time, quantitative modeling of estimated extreme heat and cold events may be feasible as data is gathered and improved.



5.4.9 Severe Winter Weather

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the severe winter weather hazard in Sussex County.

2016 Plan Update Changes

- For the 2016 Plan Update, the severe winter weather hazard groups together heavy snow, blizzards, and ice storms. The Nor'Easter hazard is discussed separately in the 2016 HMP (Section 5.4.7) to align with the hazards in the 2014 State of New Jersey HMP.
- The hazard profile has been significantly enhanced to include a detailed hazard description, location, extent, previous occurrences, probability of future occurrence, and potential change in climate and its impacts on the severe winter weather hazard is discussed. The severe winter weather hazard is now located in Section 5 of the plan update (previously Section 3).
- New and updated figures from federal and state agencies are incorporated.
- Previous occurrences were updated with events that occurred between 2008 and 2015.
- A vulnerability assessment was conducted for the severe winter weather hazard; it now directly follows the hazard profile.

5.4.9.1 Profile

Hazard Description

A winter storm is a weather event in which the main types of precipitation are snow, sleet or freezing rain. They can be a combination of heavy snow, blowing snow, and/or dangerous wind chills. There are three basic components needed to make a winter storm. Below freezing temperatures (cold air) in the clouds and near the ground are necessary to make snow and ice. Lift, something to raise the moist air to form clouds and cause precipitation, is needed. Examples of this is warm air colliding with cold air and being forced to rise over the cold dome or air flowing up a mountainside. The last thing needed to generate a winter storm is moisture to form clouds and precipitation such as air blowing across a body of water (e.g., a large lake or the ocean) (National Severe Storms Laboratory 2014).

Some winter storms are large enough to immobilize an entire region while others may only affect a single community. Winter storms are typically accompanied by low temperatures, high winds, freezing rain or sleet, and heavy snowfall. The aftermath of a winter storm can have an impact on a community or region for days, weeks, or even months; potentially causing cold temperatures, flooding, storm surge, closed and/or blocked roadways, downed utility lines, and power outages. In Sussex County, winter storms include blizzards, snow storms, Nor'Easters and ice storms. Extreme cold temperatures, wind chills and Nor'Easters are also associated with winter storms; however, based on input from the Planning Committee, these events are further discussed in this Plan in Section 5.4.7 (Nor'Easters) and Section 5.4.8 (Severe Weather) to align with the New Jersey HMP. Winter storms in Sussex County have led to localized damage, most notably, power outages, trees and vegetative debris, and snow-covered roads that require DPW overtime to clear.

Heavy Snow

According to the National Snow and Ice Data Center (NSIDC), snow is precipitation in the form of ice crystals. It originates in clouds when temperatures are below the freezing point (32°F), when water vapor in the atmosphere condenses directly into ice without going through the liquid stage. Once an ice crystal has formed, it absorbs and freezes additional water vapor from the surrounding air, growing into a snow crystals or snow pellet, which then falls to the earth. Snow falls in different forms: snowflakes, snow pellets, or sleet. Snowflakes



are clusters of ice crystals that form from a cloud. Snow pellets are opaque ice particles in the atmosphere. They form as ice crystals fall through super-cooled cloud droplets, which are below freezing but remain a liquid. The cloud droplets then freeze to the crystals. Sleet is made up of drops of rain that freeze into ice as they fall through colder air layers. They are usually smaller than 0.30 inches in diameter (NSIDC 2013).

Blizzards

A blizzard is a winter snowstorm with sustained or frequent wind gusts of 35 mph or more, accompanied by falling or blowing snow reducing visibility to or below 0.25 mile. These conditions must be the predominant over a 3-hour period. Extremely cold temperatures are often associated with blizzard conditions, but are not a formal part of the definition. The hazard, created by the combination of snow, wind, and low visibility, significantly increases when temperatures are below 20°F. A severe blizzard is categorized as having temperatures near or below 10°F, winds exceeding 45 mph, and visibility reduced by snow to near zero. Storm systems powerful enough to cause blizzards usually form when the jet stream dips far to the south, allowing cold air from the north to clash with warm, moist air from the south. Blizzard conditions often develop on the northwest side of an intense storm system. The difference between the lower pressure in the storm and the higher pressure to the west creates a tight pressure gradient, resulting in strong winds and extreme conditions caused by the blowing snow (The Weather Channel 2012).

Ice Storms

An ice storm describes those events when damaging accumulations of ice are expected during freezing rain situations. Significant ice accumulations are typically accumulations of 0.25-inches or greater (NWS 2013). Heavy accumulations of ice can bring down trees, power lines and utility poles, and communication towers. Ice can disrupt communications and power for days. Even small accumulations of ice can be extremely dangerous to motorists and pedestrians (NWS 2008).

Location

Snow and Blizzards

The trajectory of the storm center—whether it passes close to the New Jersey coast or at a distance—largely determines both the intensity and the duration of the snowfall over the State. Winter storms tend to have the heaviest snowfall within a 150-mile wide swath to the northwest of what are generally southwest to northeast moving storms. Depending on whether all or a portion of New Jersey falls within this swath, the trajectory determines which portion of the State (or all of the State) receives the heaviest amount of snow.

Normal seasonal snowfall in New Jersey varies from 14.9 inches annually in Cape May County to over 40 inches in Sussex County. However, there is great variability from year to year. Normal seasonal snowfall in Sussex County ranges from approximately 38.9 inches to 40.7 inches (ONJSC 2013).

Ice Storms

Sussex County, like all regions of New Jersey, are subject to ice storms. The distribution of ice storms often coincides with general distribution of snow within several zones in the State. A cold rain may be falling over the southern portion of the State, freezing rain over the central region, and snow over the northern counties as a coastal storm moves northeastward offshore. A locality's distance to the passing storm center is often the crucial factor in determining the temperature and type of precipitation during a winter storm.



Extent

The magnitude or severity of a severe winter storm depends on several factors including a region’s climatological susceptibility to snowstorms, snowfall amounts, snowfall rates, wind speeds, temperatures, visibility, storm duration, topography, and time of occurrence during the day (e.g., weekday versus weekend), and time of season.

The extent of a severe winter storm can be classified by meteorological measurements and by evaluating its societal impacts. NOAA’s National Climatic Data Center (NCDC) is currently producing the Regional Snowfall Index (RSI) for significant snowstorms that impact the eastern two-thirds of the United States. The RSI ranks snowstorm impacts on a scale from 1 to 5. It is based on the spatial extent of the storm, the amount of snowfall, and the interaction of the extent and snowfall totals with population (based on the 2000 Census). The NCDC has analyzed and assigned RSI values to over 500 storms since 1900 (NOAA 2015). Table 5.4.9-1 presents the five RSI ranking categories.

Table 5.4.9-1. RSI Ranking Categories

Category	Description	RSI Value
1	Notable	1-3
2	Significant	3-6
3	Major	6-10
4	Crippling	10-18
5	Extreme	18.0+

Source: NOAA 2015

Note: RSI = Regional Snowfall Index

The NWS operates a widespread network of observing systems such as geostationary satellites, Doppler radars, and automated surface observing systems that feed into the current state-of-the-art numerical computer models to provide a look into what will happen next, ranging from hours to days. The models are then analyzed by NWS meteorologists who then write and disseminate forecasts (NWS 2013).

The NWS uses winter weather watches, warnings and advisories to ensure that people know what to expect in the coming hours and days. A winter storm watch means that severe winter conditions (heavy snow, ice, etc.) may affect a certain area, but its occurrence, location and timing are uncertain. A watch is issued to provide 12 to 48 hour notice of the possibility of severe winter weather. A watch is upgraded to a winter storm warning when hazardous winter weather, in the form of heavy snow, heavy freezing rain or heavy sleet, is imminent or occurring. They are usually issued 12 to 24 hours before the event is expected to begin. Winter weather advisories inform people that winter weather conditions are expected to cause significant inconveniences that may be hazardous. The NWS may also issue a blizzard warning when snow and strong winds combine and produce a blinding snow, deep drifts, and wind chill (NWS 2013).

Previous Occurrences and Losses

Many sources provided winter storm information regarding previous occurrences and losses associated with winter storm events throughout Sussex County. With so many sources reviewed for the purpose of this Hazard Mitigation Plan (HMP), loss and impact information for many events may vary. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

Between 1954 and 2015, FEMA declared that the State of New Jersey experienced eight winter storm-related disasters (DR) or emergencies (EM) classified as one or a combination of the following disaster types: severe winter storm, severe storm, snowstorm, blizzard, and ice conditions. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. Sussex County was included in four of



these declarations since 1954. Since the original 2011 HMP, Sussex County was included in one FEMA disaster declaration: October 29, 2011 event. Table 5.4.9-2 lists the FEMA DR and EM declarations, between 2008 and 2015, in which Sussex County was included.

Table 5.4.9-2. FEMA Declarations since 2008 for Severe Winter Weather Events in Sussex County

FEMA Declaration Number	Date(s) of Event	Event Type	Counties Included
DR-4048	October 29, 2011	Severe Weather (Snowstorm / Nor'Easter)	Bergen, Cape May, Essex, Hunterdon, Middlesex, Morris, Passaic, Somerset, Sussex, Union, and Warren Counties

Source: FEMA 2015

For this 2016 HMP update, winter weather events were summarized from 2008 to 2015. Known severe winter weather events, including FEMA disaster declarations, which impacted Sussex County between 2008 and 2015 are identified in Appendix X. For information regarding severe winter weather events prior to 2008, refer to the 2011 Sussex County HMP. For detailed information on damages and impacts to each municipality, refer to Section 9 (jurisdictional annexes).

Probability of Future Occurrences

Severe winter weather is a common occurrence each winter season in New Jersey. The majority of the State will receive at least one measureable snow event during the winter months. The months of January, February, March, April, October, November and December are typically when a vast majority of New Jersey has been observed to receive measurable snow. Generally, counties in the northern region experience more snow events than those in the southern region. It is estimated that Sussex County will continue to experience the direct and indirect impacts of severe winter weather events annually that many induce secondary hazards such as: structural damage (snow and ice load), wind damage, impact to life safety, disruption of traffic, loss of productivity, economic impact, loss of ability to evacuate, taxing first-responder capabilities, service disruption (power, water, etc.), and communication disruption.

According to the NOAA-NCDC storm events database, Sussex County has been impacted by 138 winter weather-related events (blizzard, ice storm, heavy snow, winter storm, and winter weather) between 2008 and 2015; this number increases to 310 winter weather-related events when traced back to 1950. These events resulted in \$1.15 million in property damage. The table below lists the probability of future occurrences for each type of severe winter weather event to occur in Sussex County. Based on data from NOAA-NCDC, Sussex County can expect an average of 4.77 winter storm-related events each year.

Table 5.4.9-3. Probability of Future Occurrence of Severe Winter Weather Events

Hazard Type	Number of Occurrences Between 1950 and 2015	Annual Number of Events (average)	Recurrence Interval* (in years)	Probability of Event Occurring in Any Given Year	% Chance of Occurring in Any Given Year
Blizzard	1	0.02	66.00	0.02	1.52
Heavy Snow	46	0.71	1.43	0.70	69.70
Ice Storm	10	0.15	6.60	0.15	15.15
Sleet	5	0.08	13.20	0.08	7.58
Winter Storm	60	0.92	1.10	0.91	90.91
Winter Weather	188	2.89	0.35	2.85	284.85
Total	310	4.77	0.21	4.70	469.70

Source: NOAA-NCDC Storm Events Database 2015

*Estimate of the likelihood of an event to occur



In Section 5.3, the identified hazards of concern for Sussex County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Committee, the probability of occurrence for severe winter weather in the County is considered 'frequent' (likely to occur within 25 years, as presented in Table 5.3-3).

Climate Change Impacts

In terms of snowfall and ice storms, there is a lack of quantitative data to predict how future climate change will affect this hazard. It is likely that the number of winter weather events may decrease, and the winter weather season may shorten; however, it is also possible that the intensity of winter storms may increase. The exact effect on winter weather is still highly uncertain (Sustainable Jersey Climate Change Adaptation Task Force 2013).

Temperatures in the Northeast United States have increased 1.5 degrees Fahrenheit (°F) on average since 1900. Most of this warming has occurred since 1970. The State of New Jersey, for example, has observed an increase in average annual temperatures of 1.2°F between the period of 1971-2000 and the most recent decade of 2001-2010 (ONJSC, 2011). Winter temperatures across the Northeast have seen an increase in average temperature of 4°F since 1970 (Northeast Climate Impacts Assessment [NECIA] 2007). By the 2020s, the average annual temperature in New Jersey is projected to increase by 1.5°F to 3°F above the statewide baseline (1971 to 2000), which was 52.7°F. By 2050, the temperature is projected to increase 3°F to 5°F (Sustainable Jersey Climate Change Adaptation Task Force 2013). Due to the increase in temperature, snow cover and sea ice extent are predicted to likely decrease over the next century and the snow season length is very likely to decrease over North America. However, warming of the lower atmosphere could potentially lead to more ice storms by allowing snow to more frequently melt as it falls and then refreeze near or at surface (NPCC 2010).



5.4.9.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For the severe winter weather hazard, all of Sussex County has been identified as the hazard area. Therefore, all assets in the County (population, structures, critical facilities and lifelines), as described in the County Profile (Section 4), are exposed and vulnerable to a winter storm. The following text evaluates and estimates the potential impact of the severe winter weather hazard on the County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health and safety of residents, (2) general building stock, (3) critical facilities, (4) economy, and (5) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2011 Sussex County HMP
- Further data collections that will assist understanding this hazard over time

Overview of Vulnerability

Severe winter storms are of significant concern to the County because of the frequency and magnitude of these events in the region. In addition, the impacts from these events can be great, for example: direct and indirect costs associated with preparation, response and recovery stressing community resources; transportation delays; impacts on the people and facilities of the region related to snow and ice removal; health problems; and cascade effects such as utility failure (power outages) and traffic accidents.

Data and Methodology

Updated population and general building stock data were used to support an evaluation of assets exposed and potentially impacted by this hazard. Additionally, economic losses provided by the Planning Committee to support this vulnerability assessment were included.

Impact on Life, Health and Safety

According to the NOAA National Severe Storms Laboratory (NSSL); every year, winter weather indirectly and deceptively kills hundreds of people in the U.S., primarily from automobile accidents, overexertion and exposure. Winter storms are often accompanied by strong winds creating blizzard conditions with blinding wind-driven snow, drifting snow and extreme cold temperatures and dangerous wind chill. They are considered deceptive killers because most deaths and other impacts or losses are indirectly related to the storm. People can die in traffic accidents on icy roads, heart attacks while shoveling snow, or of hypothermia from prolonged exposure to cold. Heavy accumulations of ice can bring down trees and power lines, disabling electric power and communications for days or weeks. Heavy snow can immobilize a region and paralyze a city, shutting down all air and rail transportation and disrupting medical and emergency services. Storms near the coast can cause coastal flooding and beach erosion as well as sink ships at sea. The economic impact of winter weather each year is huge, with costs for snow removal, damage and loss of business in the millions (NSSL 2015; Disaster Center 1999).

Heavy snow can immobilize a region and paralyze a city, stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can collapse buildings and knock down trees and power lines. In rural areas, homes and farms may be isolated for days, and unprotected livestock may be lost. In the mountains, heavy snow can lead to avalanches. The cost of snow removal, repairing damages, and loss of business can have large economic impacts on cities and towns (NWS 2015).



Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days while utility companies work to repair the extensive damage. Even small accumulations of ice may cause extreme hazards to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces (NSSL, 2006).

For the purposes of this HMP, the entire population of Sussex County (149,265 people) is exposed to severe winter storm events (U.S. Census, 2010). Snow accumulation and frozen/slippery road surfaces increase the frequency and impact of traffic accidents for the general population, resulting in personal injuries. Refer to Section 4 (County Profile) for population statistics for each participating municipality.

The elderly are considered most susceptible to this hazard due to their increased risk of injuries and death from falls and overexertion and/or hypothermia from attempts to clear snow and ice. In addition, severe winter storm events can reduce the ability of these populations to access emergency services. Residents with low incomes may not have access to housing or their housing may be less able to withstand cold temperatures (e.g., homes with poor insulation and heating supply).

Impact on General Building Stock

The entire general building stock inventory is exposed and vulnerable to the severe winter storm hazard. In general, structural impacts include damage to roofs and building frames, rather than building content. Table 5.4.8-2 presents the total exposure value for general building stock for each participating municipality.

Current modeling tools are not available to estimate specific losses for this hazard. As an alternate approach, this plan considers percentage damages that could result from severe winter storm conditions. Table 5.4.8-2 below summarizes percent damages that could result from severe winter storm conditions for the Planning Area's total general building stock. Given professional knowledge and the currently available information, the potential loss for this hazard is many times considered to be overestimated because of varying factors (building structure type, age, load distribution, building codes in place, etc.). Therefore, the following information should be used as estimates only for planning purposes with the knowledge that the associated losses for severe winter storm events vary greatly.

Table 5.4.9-4. General Building Stock Exposure and Estimated Losses from Severe Winter Storm Events

Municipality	Total (All Occupancies)	1% Damage Loss Estimate	5% Damage Loss Estimate	10% Damage Loss Estimate
Borough of Andover	\$110,720,294	\$1,107,202.94	\$5,536,014.70	\$11,072,029.40
Township of Andover	\$797,432,934	\$7,974,329.34	\$39,871,646.70	\$79,743,293.40
Borough of Branchville	\$105,787,947	\$1,057,879.47	\$5,289,397.35	\$10,578,794.70
Township of Byram	\$1,001,139,850	\$10,011,398.50	\$50,056,992.50	\$100,113,985.00
Township of Frankford	\$1,028,566,798	\$10,285,667.98	\$51,428,339.90	\$102,856,679.80
Borough of Franklin	\$555,083,580	\$5,550,835.80	\$27,754,179.00	\$55,508,358.00
Township of Fredon	\$524,017,917	\$5,240,179.17	\$26,200,895.85	\$52,401,791.70
Township of Green	\$617,892,936	\$6,178,929.36	\$30,894,646.80	\$61,789,293.60
Borough of Hamburg	\$478,777,394	\$4,787,773.94	\$23,938,869.70	\$47,877,739.40
Township of Hampton	\$898,127,786	\$8,981,277.86	\$44,906,389.30	\$89,812,778.60
Township of Hardyston	\$1,058,804,064	\$10,588,040.64	\$52,940,203.20	\$105,880,406.40
Borough of Hopatcong	\$1,459,447,874	\$14,594,478.74	\$72,972,393.70	\$145,944,787.40
Township of Lafayette	\$484,326,532	\$4,843,265.32	\$24,216,326.60	\$48,432,653.20

**Table 5.4.9-4. General Building Stock Exposure and Estimated Losses from Severe Winter Storm Events**

Municipality	Total (All Occupancies)	1% Damage Loss Estimate	5% Damage Loss Estimate	10% Damage Loss Estimate
Township of Montague	\$550,631,281	\$5,506,312.81	\$27,531,564.05	\$55,063,128.10
Town of Newton	\$926,551,970	\$9,265,519.70	\$46,327,598.50	\$92,655,197.00
Borough of Ogdensburg	\$250,464,374	\$2,504,643.74	\$12,523,218.70	\$25,046,437.40
Township of Sandyston	\$359,643,031	\$3,596,430.31	\$17,982,151.55	\$35,964,303.10
Township of Sparta	\$3,083,993,131	\$30,839,931.31	\$154,199,656.55	\$308,399,313.10
Borough of Stanhope	\$557,098,000	\$5,570,980.00	\$27,854,900.00	\$55,709,800.00
Township of Stillwater	\$581,254,607	\$5,812,546.07	\$29,062,730.35	\$58,125,460.70
Borough of Sussex	\$259,651,457	\$2,596,514.57	\$12,982,572.85	\$25,965,145.70
Township of Vernon	\$3,063,072,948	\$30,630,729.48	\$153,153,647.40	\$306,307,294.80
Township of Walpack	\$8,710,816	\$87,108.16	\$435,540.80	\$871,081.60
Township of Wantage	\$1,396,272,081	\$13,962,720.81	\$69,813,604.05	\$139,627,208.10
Sussex County Total	\$20,157,469,603	\$201,574,696.03	\$1,007,873,480.15	\$2,015,746,960.30

Source: Sussex County

A specific area that is vulnerable to the severe winter storm hazard is the floodplain. Severe winter storms can cause flooding through blockage of streams or through snow melt. At-risk residential infrastructures are presented in the flood hazard profile (Section 5.4.4). Generally, losses resulting from flooding associated with severe winter storms should be less than that associated with a 100-year flood. Please refer to the Severe Weather (Section 5.4.8) profile for losses resulting from high winds which may also accompany severe winter weather.

Impact on Critical Facilities

Full functionality of critical facilities such as police, fire and medical facilities is essential for response during and after a severe winter storm event. These critical facility structures are largely constructed of concrete and masonry; therefore, they should only suffer minimal structural damage from severe winter storm events. Because power interruption can occur, backup power is recommended. Infrastructure at risk for this hazard includes roadways that could be damaged due to the application of salt and intermittent freezing and warming conditions that can damage roads over time. Severe snowfall requires the clearing roadways and alerting citizens to dangerous conditions; following the winter season, resources for road maintenance and repair are required.

Impact on Economy

The cost of snow and ice removal and repair of roads from the freeze/thaw process can drain local financial resources. Another impact on the economy includes impacts on commuting into, or out of, the area for work or school. The loss of power and closure of roads prevents the commuter population traveling to work within and outside of the County. Placeholder for County annual cost for snow/ice removal/response.

Future Growth and Development

As discussed in Sections 4 and 9, areas targeted for future growth and development have been identified across Sussex County. Any areas of growth could be potentially impacted by the severe winter storm hazard because the entire planning area is exposed and vulnerable. Please refer to the specific areas of development indicated in tabular form and/or on the hazard maps included in the jurisdictional annexes in Volume II, Section 9 of this plan.



Effect of Climate Change on Vulnerability

Climate is defined not simply as average temperature and precipitation but also by the type, frequency and intensity of weather events. Both globally and at the local scale, climate change has the potential to alter the prevalence and severity of extremes such as winter storms. While predicting changes of winter storm events under a changing climate is difficult, understanding vulnerabilities to potential changes is a critical part of estimating future climate change impacts on human health, society and the environment (U.S. Environmental Protection Agency [EPA], 2006).

Both northern and southern New Jersey have become wetter over the past century. Northern New Jersey's 1971-2000 precipitation average was over five inches (12%) greater than the average from 1895-1970. Southern New Jersey became two inches (5%) wetter late in the 20th century (Office of New Jersey State Climatologist). Average annual precipitation is projected to increase in the region by 5% by the 2020s and up to 10% by the 2050s. Most of the additional precipitation is expected to come during the winter months (New York City Panel on Climate Change [NPCC] 2009).

In terms of snowfall and ice storms in New Jersey, there is a lack of quantitative data to predict how future climate change will affect this hazard. It is likely that the number of winter weather events may decrease, and the winter weather season may shorten; however, it is also possible that the intensity of winter storms may increase. The exact effect on winter weather is still highly uncertain (Sustainable Jersey Climate Change Adaptation Task Force 2013). Future enhancements in climate modeling will provide an improved understanding of how the climate will change and impact the Northeast.

Change of Vulnerability

The entire County continues to be vulnerable to the severe winter weather hazard. The 2011 HMP used data from SHELDCUS 7.0, the NCDC, and the NWS that was collected between 1960 and 2008 to determine the risk potential. The 2016 HMP update provided damage estimates using an update custom building stock based on 2015 MODIV tax assessment data. The updated vulnerability assessment provides a more current assessment for the County.

Additional Data and Next Steps

The assessment above identifies vulnerable populations and economic losses associated with this hazard of concern. Historic data on structural losses to general building stock are not adequate to predict specific losses to this inventory; therefore, the percent of damage assumption methodology was applied. This methodology is based on FEMA's How to Series (FEMA 386-2), Understanding Your Risks, Identifying and Estimating Losses (FEMA, 2001) and FEMA's Using HAZUS-MH for Risk Assessment (FEMA 433) (FEMA, 2004). The collection of additional/actual valuation data for general building stock and critical infrastructure losses would further support future estimates of potential exposure and damage for the general building stock inventory. Mitigation strategies addressing early warning, dissemination of hazard information, provisions for snow removal and back-up power are included in Volume II, Section 9 of this plan.



5.4.10 Wildfire

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the wildfire hazard in Sussex County.

2016 HMP update Changes

- The hazard profile has been significantly enhanced to include a detailed hazard description, location, extent, previous occurrences, probability of future occurrence, and potential change in climate and its impacts on the wildfire hazard is discussed. The wildfire hazard is now located in Section 5 of the plan update.
- New and updated figures from federal and state agencies are incorporated. New Jersey Forest Fire Service (NJFFS) Wildfire Fuel Hazard data was used to identify wildfire fuel rankings in Sussex County. The 2010 NJFFS wildfire risk and fuel maps were also used to identify hazard areas in the County. The U.S. 2010 Census data was incorporated, where appropriate.
- Previous occurrences were updated with events that occurred between 2008 and 2015.
- A vulnerability assessment was conducted for the wildfire hazard; it now directly follows the hazard profile. To determine exposure, a spatial analysis was conducted using the NJFFS Fuel Hazard Area guidelines.

5.4.10.1 Profile

Hazard Description

A wildland fire can be defined as any non-structural fire that occurs in the wildland. Three distinct types of wildland fires have been defined and include: naturally occurring wildfire, human-caused wildfire, and prescribed fire. Many of these are highly destructive and can be difficult to control. They occur in forested, semi-forested, or less developed areas. Wildland fires can be caused by lightning, human carelessness, and arson. Most frequently, wildland fires in the State of New Jersey are caused by humans. Wildfires result in the uncontrolled destruction of forests, brush, field crops, grasslands, real estate, and personal property, and have secondary impacts on other hazards such as flooding, by removing vegetation and destroying watersheds.

Wildfires can increase the probability of other natural disasters, specifically floods and mudflows. Wildfires, particular large-scale fires, can dramatically alter the terrain and ground conditions, making land already devastated by fire susceptible to floods. Lands impacted by wildfire increase the risk of flooding and mudflow in those areas impacted by wildfire. Normally, vegetation absorbs rainfall, reducing runoff. However, wildfires leave the ground charred, barren, and unable to absorb water; thus, creating conditions perfect for flash flooding and mudflows. Flood risk in these impacted areas remain significantly higher until vegetation is restored, which can take up to five years after a wildfire (FEMA 2013).

Flooding after a wildfire is often more severe, as debris and ash left from the fire can form mudflows. During and after a rain event, as water moves across charred and denuded ground, it can also pick up soil and sediment and carry it in a stream of floodwaters. These mudflows have the potential to cause significant damage to impacted areas. Areas directly affected by fires and those located below or downstream of burn areas are most at risk for flooding (FEMA 2013). For detailed information regarding flooding, see Section 5.4.4 (Flood).

The height of wildland fire season in New Jersey is typically in spring (March through May) and culminates in early May, corresponding with the driest live fuel moisture periods of the year. Although the spring months are the most severe, the summer and fall months may also experience extensive fires in the state. While the spring



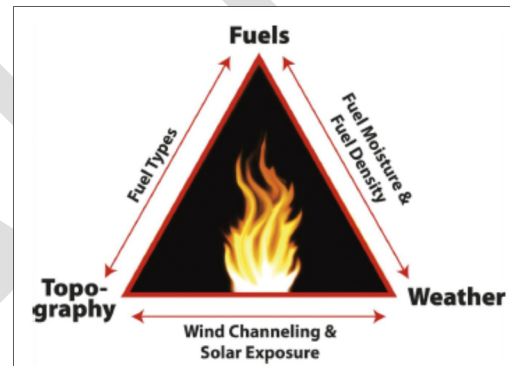
season is historically the period in which wildfire danger is the highest, wildland fires can occur every month of the year. Drought, snow pack, and local weather conditions can expand the length of the fire season. The early and late shoulders of the fire season usually are associated with human-caused fires. Lightning generally is the cause of most fires in the peak season.

NJFFS, a division of NJDEP, is responsible for protecting the 3.15 million acres of public and private wildland in the state. NJFFS is under the direction of the state fire warden and is headquartered in Trenton. NJFFS has 85 full-time employees that provide an array of services including staffing the state's 21 fire towers, which are operational during the months of March, April, May, October, and November.

According to the NJFFS, each year in New Jersey, an average of 1,500 wildfires damage or destroy 7,000 acres of the state's forests. Wildfires not only damage woodlands, but threaten homeowners who live within or adjacent to forest environments. From January 1, 2015, to September 14, 2015, there were 814 wildfires in New Jersey that burned 2,563.5 acres. In contrast, during this same period in 2014, the State experienced 757 fires, which burned 6,433 acres (NJFFS 2015).

Fire Ecology and Wildfire Behavior

The “wildfire behavior triangle” illustrates how three primary factors influence wildfire behavior: fuel, topography, and weather. Each point of the triangle represents one of the three factors; the sides represent the interplay between the factors. For example, drier and warmer weather combined with dense fuel loads and steeper slopes will cause more hazardous fires than light fuels on flat ground.



A fire needs all of the following three elements in the right combination to start and grow: a heat source, fuel, and oxygen. The growth of the fire primarily depends on the characteristics of available fuel, weather conditions, and terrain. Climate change is also considered a potential source of influence. These four factors are described below:

- Fuel
 - Lighter fuels such as grasses, leaves, and needles quickly expel moisture and burn rapidly, while heavier fuels such as tree branches, logs, and trunks take more time to warm and ignite.
 - Snags and hazard trees—especially those that are diseased, dying, or dead—are quickly engulfed and allow fires to spread quickly.
- Weather
 - Strong winds within the vicinity of the flames produce extreme fire conditions. Of particular concern are wind events that potentially persist for longer periods of time, or ones with significant wind speeds, which can sustain and quickly promote the spread of fire through movement of embers or exposure within tree crowns.
 - Spring and summer months, which can experience drought-like conditions extending beyond the normal season, also expand the average fire season. Likewise, the passage of a dry, cold front through the region can result in a sudden increase in wind speeds and a change in wind direction affecting fire spread.
 - Thunderstorm activity, which typically begins with wet storms, turns dry with little or no precipitation reaching the ground as the seasons progress.
- Terrain
 - Regional and local topography influence the amount and moisture of fuel.



- Barriers such as highways and lakes can affect the spread of fire.
- Elevation and slope of landforms affect fire spread; flames move more easily uphill than downhill.
- Changes to Environment
 - Without an increase in summer precipitation (greater than any predicted by climate models), areas susceptible to future burning are very likely to increase.
 - Infestation from insects is also of concern as it may impact forest health. Potential insect populations may increase with warmer temperatures as a result of warmer temperatures. Infested, stressed trees increase the fuel load.
 - Tree species composition will change as species respond uniquely to a changing climate.
 - Wildfires cause both short-term and long-term losses. Short-term losses can include destruction of timber, wildlife habitat, scenic vistas, and watersheds. Long-term effects include smaller timber harvests, reduced access to affected recreational areas, and the destruction of cultural and economic resources and community infrastructure.

Location

The NJFFS is broken up into three divisions (A, B, C). Each division is responsible for responding to wildfire events within their boundaries. Sussex County is located in Division A. All of Sussex County is susceptible to wildfire, and they can occur anywhere in the County. Additionally, a portion of Sussex County (i.e., involving eight municipalities) is located within the New Jersey Highlands Regions (New Jersey Highlands). The New Jersey Highlands is an area of 859,358 acres located in northwest New Jersey and includes 88 municipalities and parts of seven counties (Bergen, Hunterdon, Morris, Passaic, Somerset, Sussex, and Warren). The New Jersey Highlands Region serves as a significant green belt along the eastern coast. Forests comprise 47% of the Highland's landscape and is predominately hardwood forests, which provides a fuel hazard for wildfires.

NJFFS has developed Wildfire Fuel Hazard data for the state based upon NJDEP's 2002 Land Use/Land Cover (LU/LC) datasets and NJDEP's 2002 10-meter Digital Elevation Grid datasets. NJFFS took the NJDEP Modified Anderson LU/LC Classification System 2002 and assigned Wildfire Fuel Hazard rankings to it. NJFFS used NJDEP's 2002 10-meter Digital Elevation Grids and calculated areas of 30% or greater slope throughout New Jersey. For areas of Wildfire Fuel Hazard with a ranking of 1 to 4 (i.e. "Low" to "Very High") that were coincident with areas of 30% or greater slope, the Wildfire Fuel Hazard Ranking was increased by one value (i.e. "Low" was increased to "Moderate", "Moderate" to "High", etc.). For areas of Wildfire Fuel Hazard with a ranking of 0, and 5 through 8, the Wildfire Fuel Hazard ranking remained the same. Once the LU/LC was coded according to the Wildfire Fuel Hazard, taking into account 30% or greater slopes, the data were divided by county. For Sussex County, this project was completed in May 2009.

Figure 5.4.10-1 and Figure 5.4.10-2 illustrate the wildfire fuel hazard and wildfire risk for Sussex County. For additional details regarding these figures, please refer to: http://www.state.nj.us/dep/parksandforests/fire/wildfire_hazard_mitigation.htm. According to these figures, a majority of Sussex County has a low fuel hazard and low risk. Every municipality in Sussex County has at least a small portion of the community located within the high to extreme risk area, with Walpack Township having largest percentage of land within the high to extreme risk area (29.9%). Table 5.4.10-1 indicates the land area in each of the wildfire fuel hazard ranking zones for Sussex County. Table 5.4.10-2 summarizes the approximate land area in the NJFFS risk areas in the County.

Table 5.4.10-1. Area in the Wildfire Fuel Hazard Ranking Zones in Sussex County

Hazard Area	Area (Square Miles)
Extreme	31.8
Very High	11.8



Hazard Area	Area (Square Miles)
High	25.4
Moderate	98.0
Low	247.5

Source: NJFFS 2015

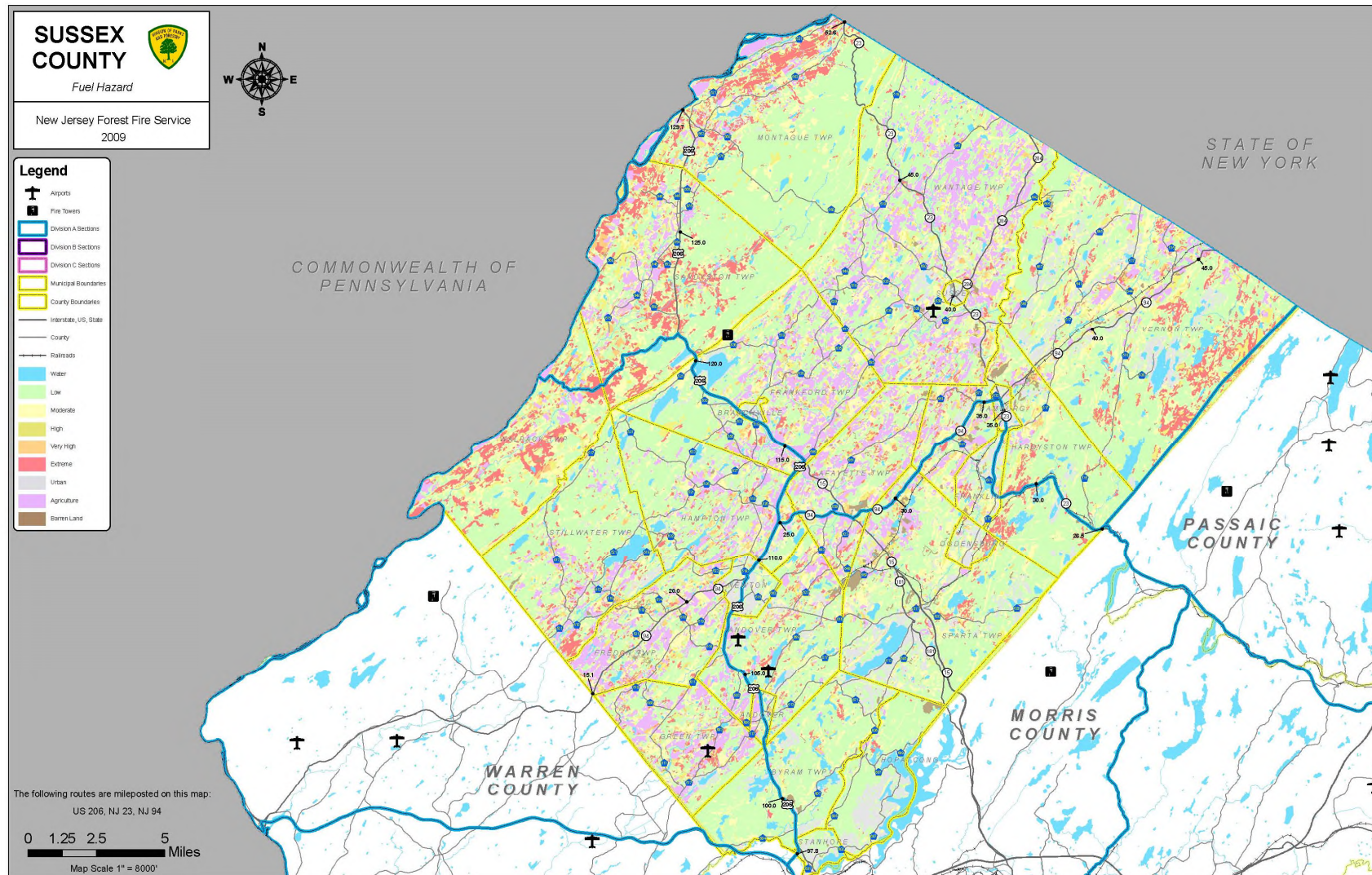
Table 5.4.10-2. Approximate Area in Wildfire Fuel Hazard Ranking Zones in Sussex County

Municipality	Total Area (Square Miles)	New Jersey Forest Fire Service Risk Areas			
		Low to Moderate	% in Hazard Area	High to Extreme	% in Hazard Area
Borough of Andover	1.4	0.7	46.6%	0.1	8.7%
Township of Andover	21.0	13.5	64.2%	2.3	10.8%
Borough of Branchville	0.6	0.2	37.7%	0.03	5.3%
Township of Byram	22.4	17.6	78.8%	0.8	3.5%
Township of Frankford	35.3	21.1	59.8%	3.9	11.0%
Borough of Franklin	4.4	2.0	46.5%	0.6	14.2%
Township of Fredon	18.0	10.1	55.9%	2.6	14.5%
Township of Green	16.1	9.0	56.0%	2.0	12.7%
Borough of Hamburg	1.2	0.3	28.5%	0.1	10.3%
Township of Hampton	25.4	16.8	66.2%	2.4	9.6%
Township of Hardyston	32.5	23.3	71.8%	3.8	11.8%
Borough of Hopatcong	12.3	7.2	58.4%	0.2	1.5%
Township of Lafayette	17.9	9.5	52.9%	2.5	13.8%
Township of Montague	46.4	34.6	74.6%	6.7	14.5%
Town of Newton	3.4	1.5	44.8%	0.1	3.6%
Borough of Ogdensburg	2.2	1.0	47.1%	0.4	20.4%
Township of Sandyston	42.2	27.9	66.0%	9.9	23.6%
Township of Sparta	38.9	25.7	66.0%	2.9	7.6%
Borough of Stanhope	2.2	1.0	46.7%	0.02	1.0%
Township of Stillwater	28.2	19.9	70.6%	3.0	10.7%
Borough of Sussex	0.6	0.1	23.2%	0.01	1.4%
Township of Vernon	69.9	46.4	66.3%	10.7	15.2%
Township of Walpack	24.8	15.2	61.5%	7.4	29.9%
Township of Wantage	67.4	40.8	60.5%	6.2	9.2%
Sussex County Total	534.7	345.5	64.6%	68.9	12.9%

Source: NJFFS 2015



Figure 5.4.10-1. Wildfire Fuel Hazard for Sussex County

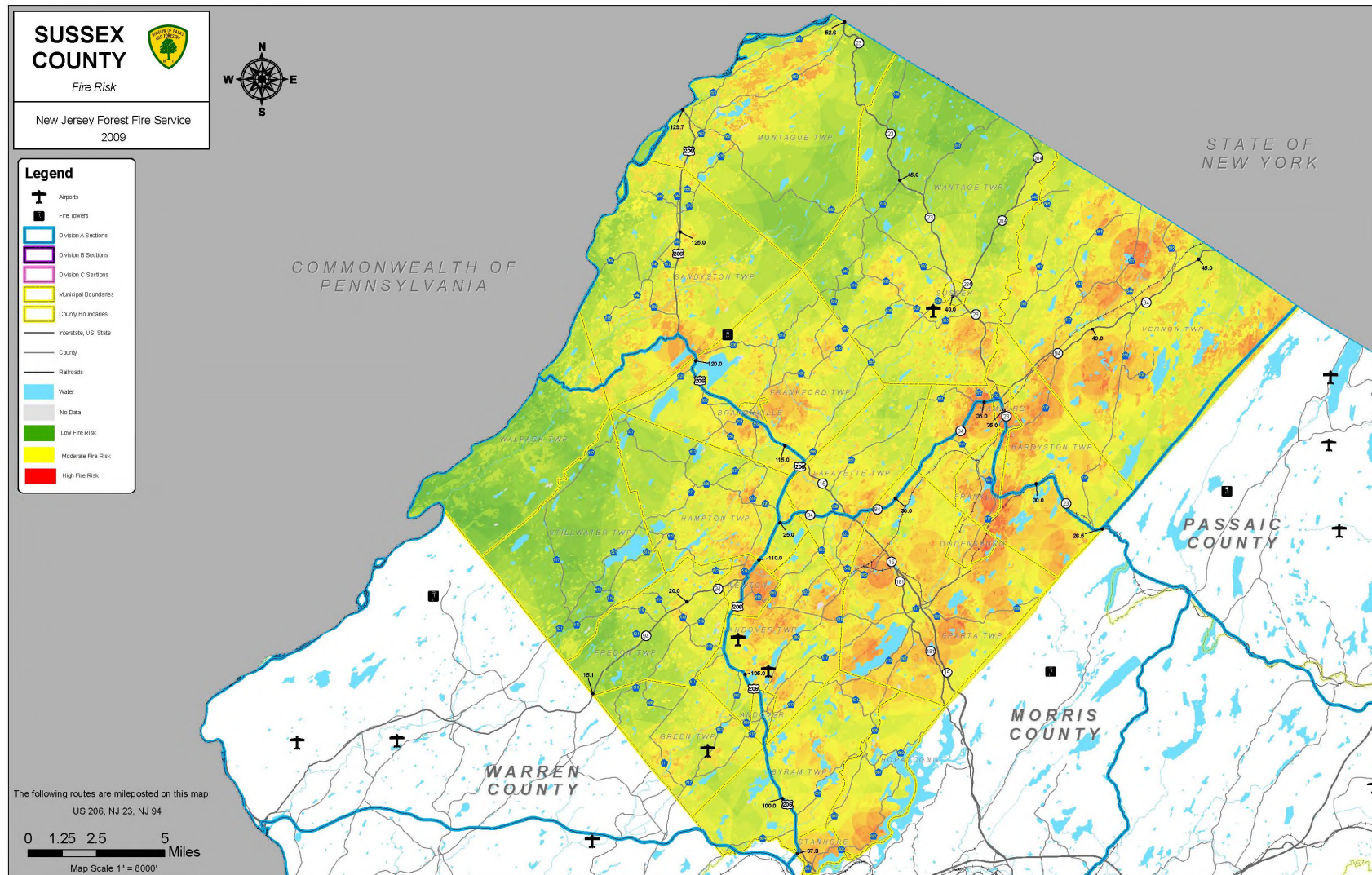


Source: New Jersey Forest Fire Service 2010





Figure 5.4.10-2. Wildfire Risk for Sussex County



Source: New Jersey Forest Fire Service 2010





Extent

The extent (that is, magnitude or severity) of wildfires depends on weather and human activity. NJFFS uses two indices to measure and monitor dryness of forest fuels and the possibility of fire ignitions becoming wildfires. These indices include the National Fire Danger Rating System's (NFDRS) Buildup Index (BUI), and the Keetch-Byram Drought Index (KBDI). Both are used for fire preparedness planning, which includes the following: campfire and burning restrictions, fire patrol assignments, fire lookout tower staffing, and readiness status for both observation and firefighting aircraft (NJFFS 2015).

The **Buildup Index (BUI)** is a number that reflects the combined cumulative effects of daily drying and precipitation in fuels with a 10-day time lag constant. The BUI can represent three to four inches of compacted litter or can represent up to six inches or more of loose litter (North Carolina Forest Service 2009).

The **Keetch-Byram Drought Index (KBDI)** is a drought index designed for fire potential assessment as defined by the U.S. Forest Service (USFS). It is a number representing the net effect of evapotranspiration and precipitation in producing cumulative moisture deficiency in deep duff and upper soil layers. It is a continuous index, relating to the flammability of organic material in the ground. The KBDI attempts to measure the amount of precipitation necessary to return the soil to full field capacity. It is a closed system ranging from 0 to 800 units and represents a moisture regime from 0 to 8 inches of water through the soil layer. Zero is the point of no moisture deficiency and 800 is the maximum drought that is possible. At any point along the scale, the index number indicates the amount of net rainfall that is required to reduce the index to 0, or saturation (USFS-Wildland Fire Assessment System [WFAS] 2015; Florida Forest Service N.D.).

Additionally, the NFDRS is used to provide a measure of the relative seriousness of burning conditions and threat of fire throughout the United States. It allows fire managers to estimate the day's fire danger for a given area. The NFDRS uses a five color-coded system to help the public understand fire potential; this color scale has been adapted slightly for NJFFS purposes. The NFDRS (with the NJFFS color scheme) is as follows:

Table 5.4.10-3. Fire Danger Rating and Color Code

Fire Danger Rating and Color Code	Description
Low (L) (Green)	Fuels do not ignite readily from small firebrands although a more intense heat source, such as lightning, may start fires in duff or punky wood. Fires in open cured grasslands may burn freely a few hours after rain, but woods fires spread slowly by creeping or smoldering, and burn in irregular fingers. There is little danger of spotting.
Moderate (M) (Blue)	Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low. Fires in open-cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel, especially draped fuel, may burn hot. Short-distance spotting may occur, but is not persistent. Fires are not likely to become serious and control is relatively easy.
High (H) (Yellow)	All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High-intensity burning may develop on slopes or in concentrations of fine fuels. Fires may become serious and their control difficult unless they are attacked successfully while small.
Very High (VH) (Orange)	Fires start easily from all causes and, immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high-intensity characteristics such as long-distance spotting and fire whirlwinds when they burn into heavier fuels.
Extreme (E) (Red)	Fires start quickly, spread furiously, and burn intensely. All fires are potentially serious. Development into high-intensity burning will usually be faster and occur from smaller fires than in the very high fire danger class. Direct attack is rarely possible and may be dangerous except immediately after ignition. Fires that develop headway in heavy slash (trunks, branches, and tree tops) or in conifer stands may be unmanageable while the extreme burning condition lasts. Under



Fire Danger Rating and Color Code	Description
	these conditions the only effective and safe control action is on the flanks until the weather changes or the fuel supply lessens.

Source: NJFFS 2015, WFAS 2015

Previous Occurrences and Losses

Many sources were used to identify wildfire previous occurrences and losses in Sussex County. With so many sources reviewed loss and impact information may vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP update.

Between 1954 and 2015, New Jersey was included in two FEMA fire management assistance (FMA) declarations. These two events occurred prior to 2008 and were discussed in the 2011 HMP; however, neither impacted Sussex County. There have been no additional declarations since the 2011 HMP. For the 2016 HMP update, wildfire events from 2008 to 2015 are summarized in Appendix X. For events prior to 2008, please refer to the 2011 Sussex County HMP.

Probability of Future Occurrences

Estimating the approximate number of wildfires to occur in Sussex County is difficult to predict in a probabilistic manner. This is because a number of variable factors impact the potential for a fire to occur and because some conditions (for example, ongoing land use development patterns, location, fuel sources, and construction sites) exert increasing pressure on the WUI zone. Based on available data, urban fires and wildfires will continue to present a risk to Sussex County. Given the numerous factors that can impact urban fire and wildfire potential, the likelihood of a fire event starting and sustaining itself should be gauged by professional fire managers on a daily basis. Although a definite prediction of future wildfire events cannot be noted, an analysis of the frequency of past occurrences can give professionals a rough guide as to how many potential events may occur each year if current trends continue.

For the purpose of this HMP update, the most up-to-date data was collected to calculate the probability of future occurrence. Information from the 2011 HMP and the NOAA-NCDC storm events database were used to identify the number of wildfires that occurred between 1950 and 2015. Using these sources ensures the most accurate probability estimates possible. The table below shows these statistics, as well as the annual average number of events and the estimated percent chance of a wildfire occurring in a given year (NOAA-NCDC 2016; Sussex County HMP 2011). Based on these statistics, there is an estimated 16.67% chance of a wildfire occurring in any given year in Sussex County.

Table 5.4.10-4. Probability of Future Occurrence of Wildfire Events

Hazard Type	Number of Occurrences Between 1950 and 2015	Rate of Occurrence	Recurrence Interval (in years)	Probability of event Occurring in Any Given Year	% Chance of Occurring in Any Given Year
Wildfire	11	0.17	6.00	0.17	16.67

Source: NOAA-NCDC 2016; Sussex County HMP 2011

In Section 5.3, the identified hazards of concern for Sussex County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for ranking hazards. Based on historical records and input from the Planning Committee, the probability of occurrence for wildfire in the County is considered ‘frequent’ (likely to occur within 25 years, as presented in Table 5.3-3).



Climate Change Impacts

A gradual change in temperatures will alter the growing environment of many tree species throughout the United States and New Jersey, reducing the growth of some trees and increasing the growth of others. Tree growth and regeneration may be affected more by extreme weather events and climatic conditions than by gradual changes in temperature or precipitation. Warmer temperatures may lead to longer dry seasons and multi-year droughts, creating triggers for wildfires, insects, and invasive species. Increased temperature and change in precipitation will also affect fuel moisture during wildfire season and the length of time during which wildfires can burn during a given year (U.S. Department of Agriculture [USDA] 2012). Climate change may also increase the frequency of lightning flashes. A warmer atmosphere holds more moisture which is one of the key items for triggering a lightning strike. Lightning strikes cause approximately half the wildfires in the United States. If the frequency of lightning strikes increases, the potential for wildfires from these strikes also increases (Lee 2014). Wildfire incidents are predicted to increase throughout the United States due to climate change, causing at least a doubling of areas burned within the next century (USDA 2012).

By the 2020s, the average annual temperature in New Jersey is projected to increase by 1.5°F to 3°F above the statewide baseline (1971 to 2000), which was 52.7°F. By 2050, the temperature is projected to increase 3°F to 5°F (Sustainable Jersey Climate Change Adaptation Task Force 2013). As for precipitation, Northern New Jersey's 1971-2000 precipitation average was over five inches (12%) greater than the average from 1895-1970 (Office of New Jersey State Climatologist). Average annual precipitation is projected to increase in the region up to 10% by the 2020s and up to 15% by the 2050s. Most of the additional precipitation is expected to come during the winter months (New York City Panel on Climate Change [NPCC] 2013).

As stated above, according to the temperature projections for Northern New Jersey, including Sussex County, this area can expect warmer and drier conditions which may increase the frequency and intensity of wildfires. Higher temperatures are expected to increase the amount of moisture that evaporates from land and water. These changes have the potential to lead to more frequent and severe droughts, which, in turn, increases the likelihood of wildfires (U.S. EPA 2014; Northern Arizona University 2012).



5.4.10.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For the wildfire hazard, the portions of Sussex County in the NJFFS Wildfire Fuel Hazard ‘high’, ‘very high’ and ‘extreme’ areas are identified as the wildfire hazard area. Therefore, all assets in the County (population, structures, critical facilities and lifelines), as described in the County Profile (Section 4), located in the hazard area are exposed and potentially vulnerable to wildfire. The following text evaluates and estimates the potential impact of the wildfire hazard on the County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health and safety of residents, (2) general building stock, (3) critical facilities, (4) economy, and (5) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2011 Sussex County HMP
- Further data collections that will assist understanding this hazard over time

Overview of Vulnerability

Wildfire hazards can impact significant areas of land, as evidenced by wildfires throughout the State of New Jersey and United States over the past several years. Fire in urban areas has the potential for great damage to infrastructure, loss of life, and strain on lifelines and emergency responders because of the high density of population and structures that can be impacted in these areas. Wildfire, however can spread quickly, become a huge fire complex consisting of thousands of acres, and present greater challenges for allocating resources, defending isolated structures, and coordinating multi-jurisdictional response. If a wildfire occurs at a WUI, it can also cause an urban fire and in this case has the potential for great damage to infrastructure, loss of life, and strain on lifelines and emergency responders because of the high density of population and structures that can be impacted in these areas.

Potential losses from wildfire include human life, structures and other improvements, and natural resources. Given the immediate response times to reported wildfires, the likelihood of injuries and casualties is minimal. Smoke and air pollution from wildfires can be a health hazard, especially for sensitive populations including children, the elderly, and those with respiratory and cardiovascular diseases. Wildfire may also threaten the health and safety of those fighting the fires. First responders are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke. In addition, wildfire can lead to ancillary impacts such as landslides in steep ravine areas and flooding caused by the impacts of silt in local watersheds.

Data and Methodology

The NJFFS uses Wildfire Fuel Hazard data to assign wildfire fuel hazard rankings across the State. This data, developed in 2009, is based upon NJDEP's 2002 Land Use/Land Cover datasets and NJDEP's 2002 10-meter Digital Elevation Grid datasets. Figure 5.4.10-1 presented earlier in this section illustrates the defined wildfire fuel hazard rankings for Sussex County. For the wildfire hazard, the NJFFS Wildfire Fuel Hazard “extreme”, ‘very high’ and ‘high’ areas are identified as the wildfire hazard area. The statistics in the ‘moderate’ to ‘low’ areas are also reported below.

To determine vulnerability, a spatial analysis was conducted using the NJFFS Fuel Hazard Area guidelines. When the analysis determined the hazard area would impact an area in a jurisdiction, or the location of critical facilities, these locations were deemed vulnerable to the hazard. The limitations of this analysis are recognized, and as such the analysis is only used to provide a general estimate.



Impact on Life, Health and Safety

As demonstrated by historic wildfire events in New Jersey and other parts of the country, potential losses include impacts to human health and life of residents and responders, structures, infrastructure and natural resources. In addition, wildfire events can have major economic impacts on a community from the initial loss of structures and the subsequent loss of revenue from destroyed business and decrease in tourism. The most vulnerable populations include emergency responders and those within a short distance of the interface between the built environment and the wildland environment.

Wildfires can cost thousands of taxpayer dollars to suppress and control and involve hundreds of operating hours on fire apparatus and thousands of volunteer man hours from the volunteer firefighters. There are also many direct and indirect costs to local businesses that excuse volunteers from work to fight these fires.

As a way to estimate the County's population vulnerable to the wildfire hazard, the population located within the NJFFS hazard areas were overlaid upon the 2010 Census population data (U.S. Census, 2010). The Census blocks with their center within the high/very high/extreme hazard area were used to calculate the estimated population exposed to the wildfire hazard. Population located in the moderate and low zones are reported as well. Table 5.4.10 -5 summarizes the estimated population exposed by municipality.

Based on the analysis, an estimated 11,033 people, or 7.4% of the County's population, is located in the high, very high and extreme wildfire hazard area. Overall, the Township of Montague, Township of Sandyston, and Township of Hardyston have the greatest number of individuals located in the extreme/very high/high hazard areas.

Table 5.4.10-5. Estimated Population Located in the NJFFS Fuel Hazard Areas

Municipality	US. Census 2010 Population	Estimated Population Exposed			
		Extreme, Very High and High	% of Total Exposed	Moderate and Low	% of Total Exposed
Borough of Andover	606	0	0.0%	175	28.9%
Township of Andover	6,319	232	3.7%	3,523	55.8%
Borough of Branchville	841	0	0.0%	381	45.3%
Township of Byram	8,350	156	1.9%	4,816	57.7%
Township of Frankford	5,565	931	16.7%	3,446	61.9%
Borough of Franklin	5,045	515	10.2%	1,329	26.3%
Township of Fredon	3,437	612	17.8%	1,772	51.6%
Township of Green	3,601	395	11.0%	1,918	53.3%
Borough of Hamburg	3,277	305	9.3%	870	26.5%
Township of Hampton	5,196	147	2.8%	3,917	75.4%
Township of Hardyston	8,213	1,766	21.5%	4,138	50.4%
Borough of Hopatcong	15,147	0	0.0%	4,359	28.8%
Township of Lafayette	2,538	237	9.3%	1,588	62.6%
Township of Montague	3,847	892	23.2%	1,928	50.1%
Town of Newton	7,997	0	0.0%	2,446	30.6%
Borough of Ogdensburg	2,410	90	3.7%	912	37.8%
Township of Sandyston	1,998	436	21.8%	1,176	58.9%
Township of Sparta	19,722	872	4.4%	11,913	60.4%
Borough of Stanhope	3,610	8	<1%	400	11.1%
Township of Stillwater	4,099	545	13.3%	2,238	54.6%



Table 5.4.10-5. Estimated Population Located in the NJFFS Fuel Hazard Areas

Municipality	US. Census 2010 Population	Estimated Population Exposed			
		Extreme, Very High and High	% of Total Exposed	Moderate and Low	% of Total Exposed
Borough of Sussex	2,130	0	0.0%	384	18.0%
Township of Vernon	23,943	1,924	8.0%	12,298	51.4%
Township of Walpack	16	0	0.0%	15	93.8%
Township of Wantage	11,358	970	8.5%	6,623	58.3%
Sussex County Total	149,265	11,033	7.4%	72,565	48.6%

Source: 2010 US Census, NJFFS 2015

Impact on General Building Stock

The most vulnerable structures to wildfire events are those located within the NJFFS identified extreme, very high or high fuel hazard areas. Buildings constructed of wood or vinyl siding are generally more likely to be impacted by the fire hazard than buildings constructed of brick or concrete. To estimate the buildings exposed to the wildfire hazard, the hazard areas were overlaid upon the custom building inventory in the County. The improvement value of the structures with their center in the hazard area were totaled. Table 5.4.10-6 summarizes the estimated building stock inventory exposed by municipality. The limitations of this analysis are recognized, and as such the analysis is only used to provide a general estimate.



Table 5.4.10-6. Buildings Located in Wildfire Fuel Hazard Zones

Municipality	Total Number of Structures	Total Improved Value (Structure and Estimated Contents)	Number of Structures Exposed				Building Improved Value Exposed			
			Extreme, Very High and High	% of Total Exposed	Moderate and Low	% of Total Exposed	Extreme, Very High and High	% of Total Exposed	Moderate and Low	% of Total Exposed
Borough of Andover	257	\$182,562,894	2	<1%	55	21.4%	\$1,345,767	<1%	\$36,527,564	20.0%
Township of Andover	2,248	\$1,259,872,091	93	4.1%	756	33.6%	\$85,352,230	6.8%	\$567,081,072	45.0%
Borough of Branchville	353	\$174,318,470	2	<1%	53	15.0%	\$1,035,772	<1%	\$24,268,367	13.9%
Township of Byram	3,401	\$1,543,404,464	16	<1%	869	25.6%	\$10,536,361	<1%	\$440,177,839	28.5%
Township of Frankford	2,716	\$1,653,244,645	105	3.9%	1,227	45.2%	\$106,366,352	6.4%	\$786,832,232	47.6%
Borough of Franklin	1,630	\$881,717,214	30	1.8%	143	8.8%	\$19,252,499	2.2%	\$91,265,580	10.4%
Township of Fredon	1,236	\$842,171,127	105	8.5%	736	59.5%	\$81,432,841	9.7%	\$502,012,283	59.6%
Township of Green	1,280	\$962,383,257	93	7.3%	634	49.5%	\$85,197,298	8.9%	\$557,603,621	57.9%
Borough of Hamburg	1,464	\$747,007,403	42	2.9%	42	2.9%	\$32,280,095	4.3%	\$29,312,170	3.9%
Township of Hampton	2,143	\$1,398,457,332	53	2.5%	894	41.7%	\$49,421,978	3.5%	\$584,096,287	41.8%
Township of Hardyston	3,731	\$1,652,499,901	257	6.9%	814	21.8%	\$137,125,045	8.3%	\$465,356,617	28.2%
Borough of Hopatcong	6,378	\$2,224,090,408	14	<1%	293	4.6%	\$10,988,987	<1%	\$162,395,688	7.3%
Township of Lafayette	1,020	\$802,389,890	68	6.7%	564	55.3%	\$66,236,221	8.3%	\$431,297,639	53.8%
Township of Montague	1,972	\$858,431,631	227	11.5%	613	31.1%	\$116,618,913	13.6%	\$294,556,886	34.3%
Town of Newton	2,320	\$1,504,040,803	4	<1%	110	4.7%	\$2,455,940	<1%	\$72,641,940	4.8%
Borough of Ogdensburg	915	\$390,034,452	17	1.9%	60	6.6%	\$8,743,647	2.2%	\$32,528,377	8.3%
Township of Sandyston	1,136	\$588,862,570	113	9.9%	558	49.1%	\$62,747,631	10.7%	\$306,462,047	52.0%
Township of Sparta	7,447	\$4,731,600,744	156	2.1%	2,116	28.4%	\$109,041,519	2.3%	\$1,513,321,708	32.0%
Borough of Stanhope	1,468	\$859,784,777	1	<1%	97	6.6%	\$655,396	<1%	\$63,487,442	7.4%
Township of Stillwater	1,871	\$931,811,957	71	3.8%	829	44.3%	\$48,558,461	5.2%	\$467,162,675	50.1%
Borough of Sussex	579	\$424,677,833	2	<1%	21	3.6%	\$1,034,252	<1%	\$16,210,669	3.8%
Township of Vernon	11,280	\$4,759,388,701	209	1.9%	2,829	25.1%	\$143,230,061	3.0%	\$1,602,814,658	33.7%
Township of Walpack	25	\$16,093,258	7	28.0%	15	60.0%	\$4,130,648	25.7%	\$9,712,129	60.3%
Township of Wantage	4,156	\$2,250,158,879	252	6.1%	2,215	53.3%	\$143,771,815	6.4%	\$1,192,258,390	53.0%
Sussex County Total	61,026	\$31,639,004,702	1,939	3.2%	16,543	27.1%	\$1,327,559,728	4.2%	\$10,249,383,882	32.4%

Source: Sussex County; NJ Department of the Treasury, 2015; NJFFS 2015



Impact on Critical Facilities

It is recognized that a number of critical facilities are located in the wildfire hazard area, and are also vulnerable to the threat of wildfire. Many of these facilities are the locations for vulnerable populations (i.e., schools, senior facilities) and responding agencies to wildfire events (i.e., fire, police). Table 5.4.10-6 and 5.4.10-7 summarize the critical facilities located within the wildfire fuel hazard ranking zones by jurisdiction.

Table 5.4.10-7. Facilities in Extreme, Very High, or High Wildfire Fuel Hazard Ranking Zones in Sussex County

Municipality	Facility Types			
	Dam	Government Building	Public Health	Potable Pump
Borough of Andover	1	0	0	0
Township of Andover	1	0	0	0
Borough of Branchville	0	0	0	0
Township of Byram	2	0	0	0
Township of Frankford	0	0	0	0
Borough of Franklin	0	0	0	0
Township of Fredon	2	0	0	0
Township of Green	0	0	0	0
Borough of Hamburg	0	0	0	0
Township of Hampton	1	0	0	0
Township of Hardyston	0	1	0	1
Borough of Hopatcong	0	0	0	0
Township of Lafayette	0	0	0	0
Township of Montague	0	0	0	0
Town of Newton	0	0	0	0
Borough of Ogdensburg	1	0	0	0
Township of Sandyston	2	0	0	0
Township of Sparta	3	0	1	0
Borough of Stanhope	0	0	0	0
Township of Stillwater	0	0	0	0
Borough of Sussex	0	0	0	0
Township of Vernon	3	0	0	0
Township of Walpack	0	0	0	0
Township of Wantage	0	0	0	0
Sussex County Total	16	1	1	1

Source: NJFFS 2015; Sussex County, NJDEP



Table 5.4.10-8. Facilities in Moderate and Low Wildfire Fuel Hazard Ranking Zones in Sussex County

Municipality	Facility Types														
	Communication	Dam	DPW	Emergency Operation Center	Fire Station	Government Building	Municipal Hall	Police Station	Potable Pump	School	Senior	Shelter	Substation	Wastewater Pump	Well
Borough of Andover	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Township of Andover	2	12	1	0	1	0	0	0	1	0	0	0	0	1	0
Borough of Branchville	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Township of Byram	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
Township of Frankford	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Borough of Franklin	0	4	0	0	0	0	1	0	0	0	0	0	0	0	0
Township of Fredon	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Township of Green	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Borough of Hamburg	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Township of Hampton	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0
Township of Hardyston	0	8	0	1	0	0	0	0	0	0	0	0	0	0	0
Borough of Hopatcong	0	2	1	0	0	0	0	0	0	0	0	0	0	1	0
Township of Lafayette	0	2	1	1	0	0	0	1	0	0	0	0	1	0	0
Township of Montague	0	6	1	0	0	0	0	0	0	0	0	0	0	1	0
Town of Newton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Borough of Ogdensburg	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Township of Sandyston	0	12	1	0	0	0	0	0	0	0	0	0	0	0	0
Township of Sparta	0	15	0	0	0	0	0	0	0	0	0	0	0	1	0
Borough of Stanhope	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Township of Stillwater	0	7	1	0	0	0	0	0	0	0	0	0	0	0	0
Borough of Sussex	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Township of Vernon	0	30	1	0	0	0	0	0	0	0	0	0	0	0	0
Township of Walpack	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Township of Wantage	0	5	1	1	0	1	0	0	0	0	0	0	0	0	0
Sussex County Total	4	122	8	3	1	2	1	1	1	1	1	1	1	6	1

Source: NJFFS 2015; Sussex County; NJDEP

Note: DPW – Department of Public Works

EMS – Emergency Medical Services



Impact on Economy

Wildfire events can have major economic impacts on a community from the initial loss of structures and the subsequent loss of revenue from destroyed business and decrease in tourism. Wildfires can cost thousands of taxpayer dollars to suppress and control and involve hundreds of operating hours on fire apparatus and thousands of volunteer man hours from the volunteer firefighters. There are also many direct and indirect costs to local businesses that excuse volunteers from working to fight these fires.

Future Growth and Development

Areas targeted for potential future growth and development in the next five years have been identified across Sussex County at the municipal level. Refer to the jurisdictional annexes in Volume II of this HMP. It is anticipated that any new development and new residents in the extreme, very high or high fuel hazard areas will be exposed to the wildfire hazard (refer to Figure 5.4.10-3 below).

Effect of Climate Change on Vulnerability

According to the U.S. Fire Service (USFS), climate change will likely alter the atmospheric patterns that affect fire weather. Changes in fire patterns will, in turn, impact carbon cycling, forest structure, and species composition. Climate change associated with elevated greenhouse gas concentrations may create an atmospheric and fuel environment that is more conducive to large, severe fires (USFS, 2011). Under a changing climate, wildfires are expected to increase by 50% across the U.S. (USFS, 2013).

Fire interacts with climate and vegetation (fuel) in predictable ways. Understanding the climate/fire/vegetation interactions is essential for addressing issues associated with climate change that include:

- Effects on regional circulation and other atmospheric patterns that affect fire weather
- Effects of changing fire regimes on the carbon cycle, forest structure, and species composition, and
- Complications from land use change, invasive species and an increasing wildland-urban interface (USFS, 2011).

It is projected that higher summer temperatures will likely increase the high fire risk by 10 to 30-percent. Fire occurrence and/or area burned could increase across the U.S. due to the increase of lightning activity, the frequency of surface pressure and associated circulation patterns conducive to surface drying, and fire-weather conditions, in general, which is conducive to severe wildfires. Warmer temperatures will also increase the effects of drought and increase the number of days each year with flammable fuels and extending fire seasons and areas burned (USFS, 2011).

Future changes in fire frequency and severity are difficult to predict. Global and regional climate changes associated with elevated greenhouse gas concentrations could alter large weather patterns, thereby affecting fire-weather conducive to extreme fire behavior (USFS, 2011).

Change of Vulnerability

A wildfire exposure analysis was conducted as part of the 2011 HMP risk assessment. For the 2011 HMP, spatial data from the LANDFIRE project was used to conduct the exposure analysis. The spatial data is generated at 30-meter resolution, so a County-wide analysis was conducted. For the 2016 Update, Wildfire Fuel Hazard data from NJDEP was utilized to conduct the exposure analysis at the municipal level. The 2016 Update also used 2010 Census data, 2015 MODIV tax data, and an updated critical facility inventory. Overall, the updated vulnerability assessment provides a more current exposure analysis for the County.



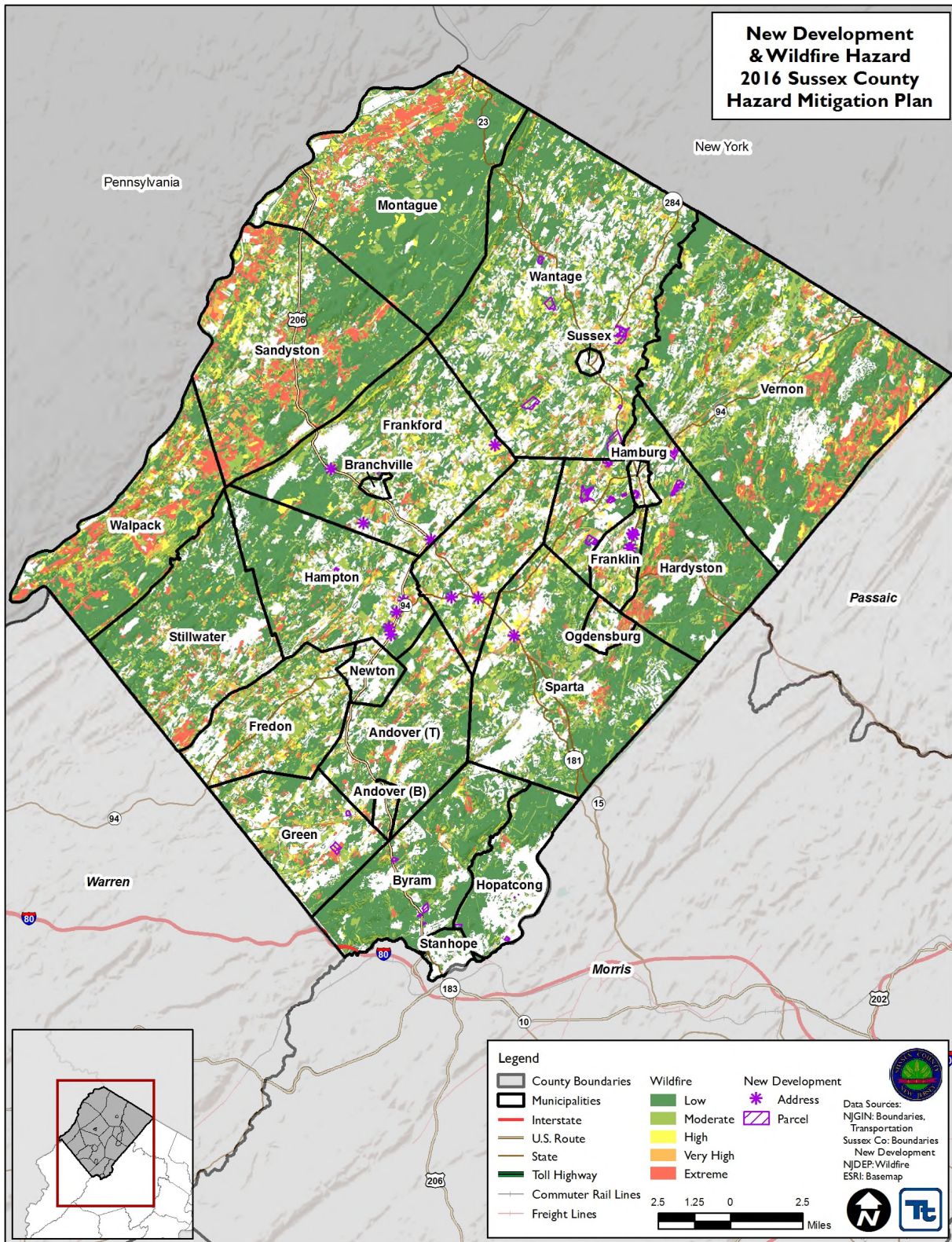
Additional Data and Next Steps

As the custom building inventory is updated additional building attributes regarding the construction of structures, such as roofing material, fire detection equipment, structure age, etc. may be incorporated as available. As stated earlier, buildings constructed of wood or vinyl siding are generally more likely to be impacted by the fire hazard than buildings constructed of brick or concrete. The proximity of these building types to the fuel hazard areas should be identified for further evaluation. Development and availability of such data would permit a more detailed estimate of potential vulnerabilities, including loss of life and potential structural damages.

DRAFT



Figure 5.4.10-3. Potential New Development and Wildfire Hazard



Source: NJDEP, Sussex County



5.4.11 Hazardous Materials Release

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the hazardous materials hazard in Sussex County.

2016 Plan Update Changes

- For the 2016 Plan Update, the hazardous materials profile has been significantly enhanced to include a detailed hazard description, location, extent, previous occurrences, probability of future occurrence, and potential change in climate and its impacts on the hazardous materials hazard is discussed. The hazardous materials hazard is now located in Section 5 of the plan update.
- New and updated figures from federal and state agencies are incorporated.
- Previous occurrences were updated with events that occurred between 2008 and 2015.
- A vulnerability assessment was conducted for the hazardous materials hazard and it now directly follows the hazard profile.

5.4.11.1 Profile

Hazard Description

Hazardous materials are substances that are considered severely harmful to human health and the environment, as defined by the United States Environmental Protection Agency (USEPA) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Superfund Law). Many are commonly used substances which are harmless in their normal uses, but are quite dangerous if released. The Superfund law designates more than 800 substances as hazardous and identifies many more as potentially hazardous due to their characteristics and the circumstances of their release (USEPA 2013). Superfund's definition of a hazardous substance includes the following:

- Any element, compound, mixture, solution, or substance designated as hazardous under section 102 of CERCLA.
- Any hazardous substance designated under section 311(b)(2)(a) of the Clean Water Act (CWA), or any toxic pollutant listed under section 307(a) of the CWA. There are over 400 substances designated as either hazardous or toxic under the CWA.
- Any hazardous waste having the characteristics identified or listed under section 3001 of the Resource Conservation and Recovery Act.
- Any hazardous air pollutant listed under section 112 of the Clean Air Act, as amended. There are over 200 substances listed as hazardous air pollutants under the Clean Air Act (CAA).
- Any imminently hazardous chemical substance or mixture which the EPA Administrator has "taken action under" section 7 of the Toxic Substances Control Act (USEPA 2010).

If released or misused, hazardous substances can cause death, serious injury, long-lasting health effects, and damage to structures and other properties, as well as the environment. Many products containing hazardous substances are used and stored in homes and these products are shipped daily on highways, railroads, waterways, and pipelines.

Transportation of hazardous substances on highways involves tanker trucks or trailers, which are responsible for the greatest number of hazard substance release incidents. New Jersey contains over 39,000 miles of highway, many of which are used to transport hazardous substances (New Jersey Department of Transportation [NJDOT] 2015). These roads cross rivers and streams at many points; hazardous substance spills on roads have the



potential to pollute watersheds that serve as domestic water supplies for parts of the State. Potential also exists for hazardous substance releases to occur along rail lines as collisions and derailments of train cars can result in large spills.

Additionally, oil is shipped by rail throughout New Jersey. The adoption of hydraulic fracturing ("fracking") to extract oil and gas, there has been an increase in the production and shipment of energy products. Lack of pipelines connecting the energy-producing regions with refineries or ports, coupled with the flexibility that railroad transportation provides, have resulted in significant shipments of oil by rail. Refineries in New Jersey are experiencing a surge in petroleum shipments by rail unit train ("rolling pipelines"). The top three rail-transported commodities in New Jersey are freight of all kinds, chemical products, and waste or scrap materials (NJ Transit 2012).

Pipelines can also transport hazardous liquids and flammable substances such as natural gas and petroleum. Incidents can occur when pipes corrode, when they are damaged during excavation, incorrectly operated, or damaged by other forces. In Sussex County, there are natural gas transmission pipelines in the Townships of Montague, Wantage, and Vernon. The pipeline operators for these systems are Tennessee Gas Pipeline Company and Elizabethtown Gas Company (National Pipeline Mapping System 2015).

Nuclear incidents can also be considered a form of environmental hazard. Nuclear incidents generally refer to incidents involving (1) release of significant levels of radioactive materials or (2) exposure of workers or the general public to radiation. Primary concerns following a nuclear incident or accident are: impact on public health from direct exposure to a radioactive plume; inhalation of radioactive materials; ingestion of contaminated food, water, and milk; and long-term exposure to deposited radioactive materials in the environment that may lead to either acute (radiation sickness or death) or chronic (cancer) health effects.

The Sussex County Hazardous Materials (HAZMAT) Team was developed to support the County in the response of any HAZMAT or Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) incident. The team is comprised of approximately 20 full-time County employees who have completed the Hazardous Materials Technician course and is a collaborative effort between the County's Sheriff's Office, Office of the Prosecutor, Division of Public Works, and Department of Environmental and Public Health Services. It has also been recognized by the New Jersey Department of Environmental Protection as a Model Program for HAZMAT response (Sussex County 2015).

Location

The following provides information regarding the location of hazardous substance incidents.

Hazardous Substances Fixed Site

Many years ago, numerous wastes were dumped on the ground, in rivers, or left out in the open. As a result, thousands of uncontrolled or abandoned contaminated sites were created. These sites included abandoned warehouses, manufacturing facilities, processing plants, and landfills. In response to concerns regarding health and environmental risks, Congress established the Superfund program in 1980 to clean up these sites. The Superfund program is administered by the USEPA in cooperation with individual states (USEPA 2014). In New Jersey, the Department of Environmental Protection (NJDEP) Site Remediation Program oversees the Superfund program (NJDEP 2015).

Federal regulations, include the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA) required that a National Priorities List (NPL) of sites throughout the United States be maintained and revised at least annually (NJDEP 2015).



Fixed-site facilities that use, manufacture, or store hazardous substances in New Jersey pose risk and must comply with Title III of the federal SARA. SARA was signed into law on October 17, 1986. It is a federal law that applies nationwide. It must be realized that this law is linked to N.J.S.A. 34:5A, the New Jersey Worker and Community Right to Know Act. SARA requires the governor of each state to establish a State Emergency Response Commission (SERC). New Jersey's SERC was established by Executive Order on February 13, 1987. SARA also requires that the emergency planning districts be established by the SERC. The Act specified that these districts can be existing political subdivisions. The function of the emergency planning district is to facilitate preparation and implementation of emergency plans. In New Jersey, all municipalities and counties have been designated emergency planning districts (total of 588). The Local Emergency Planning Committees (LEPC) is the policy body for the emergency planning district (NJOEM 2002).

The State enacted the Toxic Catastrophe Prevention Act (TCPA), N.J.S.A. 13:1K-19 et seq. Currently, implementation of the requirements established under this Act is facilitated by the TCPA Program. Certain industrial facilities using materials considered extraordinarily hazardous must take steps to prevent releases and protect public safety. New Jersey has also mandated that facilities storing large quantities of hazardous substances take preventative measures to reduce the likelihood of a leak or discharge. Established under the New Jersey Spill Compensation and Control Act (N.J.S.A. 58:10-23.11), these requirements include testing and inspection of storage tanks, training of employees, and emergency response planning. The Discharge Prevention Containment and Countermeasure (DPCC) program facilitates implementation of these requirements. Regulations related to reporting of chemical and petroleum discharges are also administered under this program. The Program is sometimes referred to by the acronym DPCC, which refers to an important preparedness document that major facilities develop under the program (NJDEP 2015).

The Community Right to Know (CRTK) program collects, processes, and disseminates the chemical inventory, environmental release and materials accounting data required to be reported under the New Jersey Worker and Community Right to Know Act, N.J.S.A.34:5A and the federal Emergency Planning and Community Right to Know Act of 1986 (EPCRA). EPCRA is also known as Title III of the SARA. This information is used by the public, emergency planners, and first responders to determine the chemical hazards in the community (NJOEM 2014). In Sussex County, there are nine Superfund sites (USEPA 2015).

New Jersey employers, whose businesses are assigned covered North American Industry Classification System (NAICS) codes listed in the New Jersey Worker and Community Right to Know (CRTK) regulations, are required to submit CRTK surveys listing the environmental hazardous substances (EHSs) present at their facilities in quantities that exceed 500 pounds, unless the EHS is on the federal Emergency Planning and Community Right to Know Act (EPCRA) Section 302 list of extremely hazardous substances with a lower reporting threshold. In addition, Section 312 of EPCRA requires owners and operators of federal facilities and private sector facilities that are subject to the United States Occupational Safety and Health Administration's (OSHA) Hazard Communication Standard to report their inventories of any chemical that requires a Materials Safety Data Sheet (MSDS) of safety data sheets (SDS) and is present on site in quantities that exceed 10,000 pounds, unless the chemical is an Extremely Hazardous Substance with a lower reporting threshold (NJDEP 2011).

Owners and operators of manufacturing, and select non-manufacturing companies, having the equivalent of 10 or more full-time employees, and manufacturing, importing, processing or otherwise using toxic chemicals listed on the EPCRA Section 313 (TRI) list in quantities that exceed specified thresholds, are required to annually report their releases of these chemicals for the previous year. Approximately 500 New Jersey companies are required to file federal Toxic Chemical Release Inventory (TRI) forms. TRI Form R requires the listing of environmental releases, on-site waste management and off-site transfers while the simplified Form A Certification Statement requires the listing of the chemical only. These companies are also required to submit to



NJDEP the Release and Pollution Prevention Report (RPPR) listing the quantities of environmental release, on-site waste management, waste transfer, and chemical throughput information. Most of these facilities are also subject to Pollution Prevention Planning Requirements and, therefore, required to report pollution prevention progress information on the RPPR (NJDEP 2011). In 2011, New Jersey had a total of over 11 million pounds of on-and off-site disposal and other releases under TRI (EPA 2015). As of October 2015, Sussex County had 10 facilities reporting under TRI (EPA 2015).

The NJDEP maintains a list of Known Contaminated Sites of New Jersey (KCSNJ). It is an inventory that includes all sites in the State where contamination is known to exist. The remediation for these sites is currently active or pending in the NJDEP's Site Remediation Program (SRP). As of April 17, 2012, there are over 13,000 active KCSNJ sites in New Jersey, with 315 of those sites in Sussex County (NJDEP 2012).

The Right-to-Know Network

The Right-to-Know Network provides access to databases and resources on the environment. The databases include: Toxic Release Inventory (TRI), National Response Center Spills and Accidents (ERNS), Risk Management Plans (RMP), Hazardous Waste Biennial Reporting System (BRS), and Resource Conservation and Recovery Act Information System - violations and permits (RCRIS).

- Toxic Release Inventory (TRI) Database - TRI is a database of information about releases and transfers of toxic chemicals from facilities in certain industrial sectors, including manufacturing, waste handling, mining, and electricity generation. Facilities must also report the total amount of toxic chemicals in waste that they produce.
- National Response Center (NRC) Spills and Accidents database - the Spills and Accidents database contains data on toxic chemical spills and other accidents reported to the NRC. This database used to be called ERNS, the Emergency Response Notification System, and is still referred to as ERNS in many situations. Incidents reported to NRC range from minor to serious, from an oil-sheen on water to a release of thousands of gallons. NRC reports are extensive, but also known to be incomplete, as many incidents are never reported, and those that are reported generally are not subject to verification.
- Risk Management Plan (RMP) database - Federal law requires industrial facilities that use large amounts of extremely hazardous substances to file a RMP with the U.S. Environmental Protection Agency (EPA). These RMP data are intended to save lives, protect property, and prevent pollution. In particular, some industrial facilities are switching to safer and more secure chemicals that reduce the danger to employees and surrounding communities. EPA does not release to the public some of the most important data in the RMP database; these data can only be obtained by going to a federal reading room.
- Biennial Reporting System (BRS) database – the BRS database contains data on the generation, shipment, and receipt of hazardous waste. BRS contains information from the Hazardous Waste Reports that must be filed every two years under the Resource Conservation and Recovery Act (RCRA), the Federal statute that regulates the generation, treatment, storage, disposal, or recycling of solid and hazardous waste.
- Resource Conservation and Recovery Act Information System (RCRIS) database – this database contains data on hazardous waste handler permits and activities. The RCRIS database, unlike many EPA databases, does not have "reporting years". It is a continuously updated set of data that includes records from the early years of RCRA through the present.

Between 1989 and 2011, there were 82 facilities in Sussex County that generated 29,759 tons of hazardous waste. Most of the waste was generated (76%) was part of production processes at facilities within the County, while 20.7% was from pollution control, spills and remediation and 3.3% was from intermittent events. The Town of Hamburg had the largest amount of waste generated between 1989 and 2011 (22,529 tons). The other



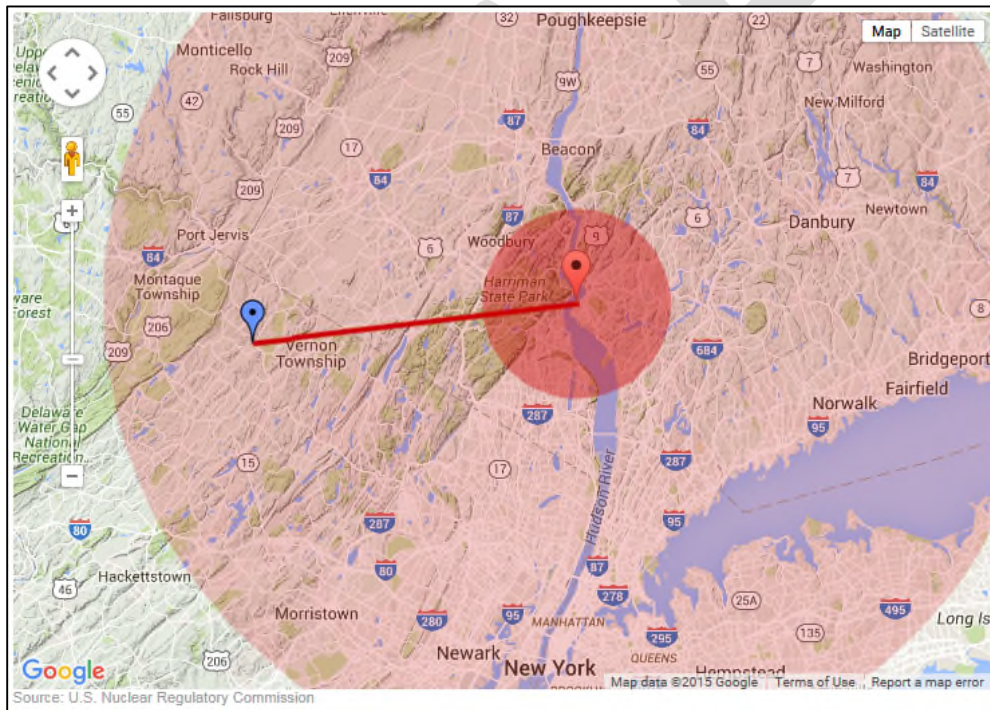
top cities in the County for generated waste include Lake Hopatcong, Edison, Newton, and Franklin (Right to Know Network 2015).

Nuclear Facilities

Although there are no nuclear facilities within Sussex County limits, the County is within 50 miles of Indian Point Energy Center. Indian Point Energy Center is located in Buchanan, New York, and provides about 25 percent of New York City and Westchester's power (Safe.Secure.Vital 2015).

In nuclear preparedness planning, the 10 mile and 50 mile radiuses around nuclear facilities are important location boundaries. The Nuclear Regulatory Commission encourages the use of Probabilistic Risk Assessments (PRA) to estimate quantitatively the potential risk to public health and safety considering the design, operations, and maintenance practices at nuclear power plants. Preparedness plans typically consider the Plume Exposure Pathway Emergency Planning Zone (EPZ), which has a radius of 10 miles from the facility, and the Ingestion Exposure Pathway (IEP), which has a radius of 50 miles from each facility. Sussex County is located within the 50-mile IEP. Should an accident occur at the Indian Point Energy Center, the area within the IEP could receive some radioactive contamination. Figure 5.4.11-1 provides visual representation of where Sussex County falls in Indian Point Energy Center's EPZ and IEP.

Figure 5.4.11-1. Indian Point Energy Center's EPZ and IEP



Source: CNN 2015

Note: The red marker indicates the nuclear facility and the blue marker indicates Sussex, NJ.

Hazardous Substances In-Transit

Incidents involving hazardous substances in transit can occur anywhere in Sussex County. The main concerns in the County are highways and railroads. While the County does not offer passenger service, it does maintain freight rail. This freight rail is operated by regional and short line railroads. The County rail lines move between



100,001 and 300,000 tons of inbound rail freight and less than 10,000 tons of outbound rail freight (New Jersey Rail System 2012).

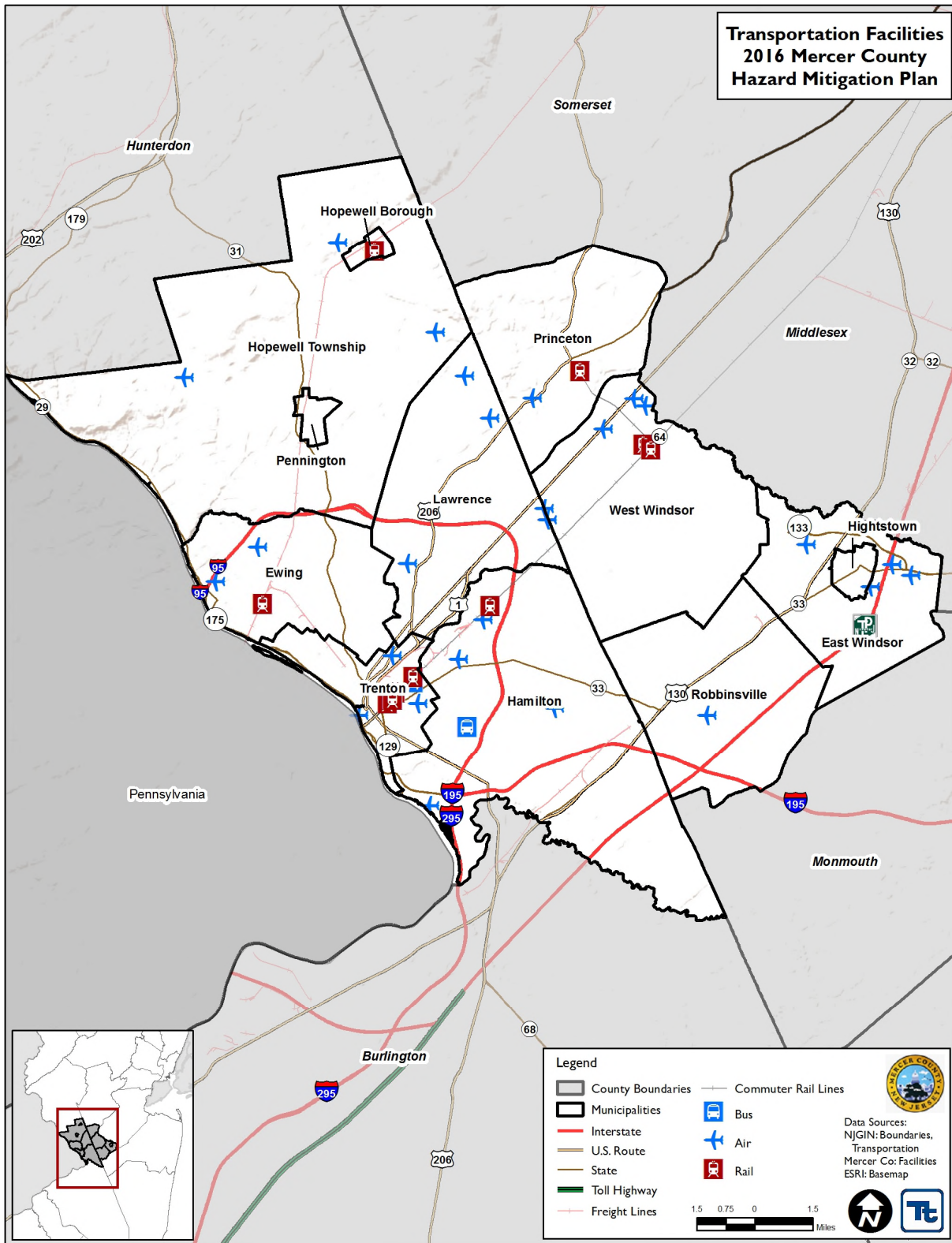
Bakken oil is a concern for the County based off the relatively high number of related derailments and fires and off the potential impact to residents living near rail lines. Additionally, in January 2014, PHMSA issued a safety alert advising the general public, emergency responders, shippers and carriers that the Bakken crude oil may be more flammable than traditional crude oil. Bakken oil is a light oil with a low flashpoint, which results in a significant fire risk when the material is released from packaging in an accident (PHMSA 2014).

An investigation by PHMSA into the transportation of Bakken oil also highlighted another concern for this material. Results from Operation Classification show that crude oil taken from cargo tanks en route to rail loading facilities was not properly classified. Testing indicated that 11 of the 18 samples were not assigned to the correct packing group, meaning that the oil was not necessarily stored in the type of container that offers the most appropriate level of safety (Transportation.Gov 2014). Improper storage and classification increases the risk of accidents and of harm to rail operators, other rail employees, and residents along freight lines.

Major highways in the County over which hazardous materials are transported daily include U.S. Route 206 and State Highway 15. A very small portion of Interstate 80 runs through and near the southern portion of the County, and U.S. Route 209 runs parallel and close to the northwestern border of Sussex County although it does not enter County limits.



Figure 5.4.11-2. Major Transportation in Mercer County



Source: Mercer County; NJGIN





Extent

The extent (or severity) of a hazardous material release relates primarily to its impact on human health and safety and on the threat to the environment. As for hazardous material incidents through transportation, the severity is similar to that of a fixed-site incident. Threat to human health and safety includes: poisoning of water or food sources and/or supply; presence of toxic fumes or explosive conditions; damage to personal property; need for the evacuation of people; and interference with public or commercial transportation. Threats to the environment include: injury or loss of animals or plants or habitats that are of economic or ecological importance such as commercial, recreation, or subsistence fisheries or livestock; impact to recreational areas such as public beaches; and impact to ecological reserves, forests, parks, archaeological and cultural sites.

There is a system used for classifying hazardous material responses. The classification is broken down into three categories which are based on three levels of response function:

- Level 1 – emergencies involving minor situations requiring defensive actions only
- Level 2 – emergencies often requiring only defensive actions but may involve some offensive response
- Level 3 – emergencies requiring more involved defensive and offensive actions and will most likely involve consideration such as public exposure and/or evacuation.

Concerning nuclear threats, as indicated earlier, locations within the IEP could receive some radioactive contamination in the event of a nuclear incident. The amounts are of little concern in terms of external exposure. A bigger threat is internal exposure, through the contamination of the food chain, particularly milk from local dairy cattle. Should an accident occur, state and federal agencies would sample and monitor milk, livestock feed, storage crops, and water supplies within the IEP. The Sussex County's Sheriff's Office may be asked to assist in gathering samples, and if requested by the state agencies, also participate in implementing control of foods, foodstuffs and water.

Previous Occurrences and Losses

The U.S. Department of Transportation (USDOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) provides an incident report database for information on incidents throughout the U.S. The data is from the hazardous materials incident report. According to this database, between 2008 and 2014, there have been 3 incidents in Sussex County (all highway) (PHMSA 2015). Hazardous substances incidents on-site or in-transit occur frequently across the State and in Sussex County. These incidents are typically small, localized events. EPA maintains records of the amount of chemicals released at facilities each year in the EPA Release Chemical Report. Between 2008 and 2014, Sussex County had a total of 80,795 pounds of on-site disposal or other releases reported by facilities within the TRI Program. No off-site disposals or other releases were reported during this time period for the County (U.S. EPA 2015). There have been no major incidents at the Indian Point Energy Center, although minor incidents and fires have occurred. Both local and New York State agencies are actively involved in ensuring the continued safety of the site (NY Times 2015).

Between 1954 and 2015, the State of New Jersey was not included in any FEMA declared disasters (DR) or emergencies (EM) related to hazardous substances incidents (FEMA 2015).

For this 2016 HMP update, known hazardous substances incidents that have impacted Sussex County between 2008 and 2015 are identified in **Appendix X**. For events prior to 2008, please refer to the 2011 Sussex County HMP.

Probability of Future Occurrences





Predicting future hazardous substance incidents in Sussex County is difficult. They can occur at anytime and anywhere in the County. Incidents can be sudden without any warning or slowly develop. Small spills, both fixed site and in-transit, occur throughout the year and the probability for these events are high. The risk of major incidents in a given year is rare. It is estimated that the County will continue to experience direct and indirect impacts of hazardous substance incidents annually that may induce secondary hazards such as infrastructure deterioration or failure, water quality and supply concerns, and transportation delays, accidents and inconveniences.

According to the 2011 County HMP, the Right-to-Know Network database, and the Pipeline and Hazardous Materials Safety Administration (PHMSA), Sussex County experienced 96 hazardous material incidents (fixed site and in-transit) between 1950 and 2015. Please note that only readily available data was used for the calculations and not all events may have been included. Based on the number of occurrences, the County has a 145.45% chance of a hazardous material incident (fixed site or in-transit) of occurring in any given year. The table below shows these statistics, as well as the annual average number of events and the percent chance of these incidents occurring in Sussex County in future years (Sussex County HMP 2011; Right-to-Know Network 2016; PHMSA 2016).

Table 5.4.11-1. Probability of Future Occurrences of Hazardous Materials Incidents

Hazard Type	Number of Occurrences Between 1950 and 2015	Rate of Occurrence or Annual Number of Events (average)	Recurrence Interval (in years) (# Years/Number of Events)	Probability of Event in any given year	% chance of occurrence in any given year
Hazardous Materials (fixed site)	54	0.83	1.22	0.82	81.82
Hazardous Materials (in-transit)	42	0.65	1.57	0.64	63.64
TOTAL:	96	1.48	0.69	1.45	145.45

Source: Sussex County HMP 2011; Right-to-Know Network 2016; PHMSA 2016

In Section 5.3, the identified hazards of concern for Sussex County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Committee, the probability of occurrence for the release of hazardous materials in the County is considered ‘frequent’ (likely to occur within 25 years, as presented in Table 5.3-3).

Climate Change Impacts

Hazardous substance incidents are non-natural incidents; therefore, there are no implications for impacts from climate change.



5.4.11.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For the hazardous substances hazard, all of Sussex County is exposed to the hazard. Therefore, all assets in the County (population, structures, critical facilities and lifelines), as described in the County Profile (Section 4), are exposed and potentially vulnerable to the release of hazardous substances. The following text evaluates and estimates the potential impact of the hazardous substances hazard on the County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health and safety of residents, (2) general building stock, (3) critical facilities, (4) economy, and (5) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2011 Sussex County HMP
- Further data collections that will assist understanding this hazard over time

Overview of Vulnerability

Overall, it is difficult to quantify potential losses of hazardous substances incidents due to the many variables and human elements. Human safety and welfare can become compromised from negative health effects of poisoning or exposure to toxic substances, fires, or explosions.

Data and Methodology

For this hazard, data was obtained from the U.S. Environmental Protection Agency.

Impact on Life, Health and Safety

The U.S. EPA Hazardous Waste Report, which is a biennial report, collects data on the generation, management, and minimization of hazardous waste. This report provides detailed data on the generation of hazardous waste from large quantity generators and data on waste management practices from treatment, storage, and disposal facilities. This report lists 542 EPA-regulated facilities in Sussex County.

As noted earlier, Superfund is a program administered by the U.S. EPA to locate, investigate, and cleanup the worst hazardous waste sites throughout the U.S. Data from the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database indicated that Sussex County has nine Superfund sites located throughout the County; two in Hamburg, two in Sparta, one in Sussex, one in Vernon, one in Byram Township, one in Franklin Borough, and one in Andover. However, the CERCLIS database has been retired by the EPA in favor of the Superfund Enterprise Management System (SEMS). SEMS includes the same data and content as CERCLIS. The SEMS database also indicated that Sussex County has nine Superfund sites, but the locations for these are listed as two in Hamburg, two in Sparta, two in Byram/Byram Township, one in Wantage, one in Vernon, and one in Franklin Borough (U.S. EPA 2015).

Depending on the type and quantity of chemicals released and the weather conditions, an incident can affect larger areas that cross jurisdictional boundaries. When hazardous substances are released in the air, water or on land they may contaminate the environment and pose greater danger to human health. The general population may be exposed to a hazardous substances release through inhalation, ingestion, absorption, injection or dermal exposure. Exposure may be either acute or chronic, depending upon the nature of the substance and extent of release and contamination.



Sussex County residents and animals could be exposed to radiation contamination from a nuclear event both internally and externally. External contamination consists of direct contact with radioactive gases and particles lying on the surface of an object or the ground. More concerning is internal contamination, which occurs by breathing radioactive gases and particles, eating contaminated food, or drinking contaminated milk or water. Such contamination can lead to long-term health complications (NJ OEM N.D.).

Due to the location of these different hazardous substances and wastes sites in Sussex County, the entire County is considered vulnerable to this hazard. Those particularly vulnerable to the effects of hazardous substances incidents are populations located along major transportation routes because of the quantities of chemicals transported on these major thoroughfares. Potential losses from hazardous substances incidences include human health and life and property resources. These types of incidents can lead to injury, illnesses, and/or death from both the involved persons and those living in the impacted areas.

Impact on General Building Stock

Potential losses to the general building stock caused by a hazardous substances incident is difficult to quantify. The degree of damages to the general building stock depends on the scale of the incident. Potential losses may include inaccessibility, loss of service, contamination and/or potential structural and content losses if an explosion occurs.

Impact on Critical Facilities

Potential losses to critical facilities caused by a hazardous substances incident is also difficult to quantify. Potential losses may include inaccessibility, loss of service, contamination and/or potential structural and content losses if an explosion occurs. Refer to Section 4 (County Profile) which summarizes the number and type of critical facilities in Sussex County.

Impact on Economy

If a significant hazardous substances incident occurred, not only would life, safety, and building stock be at risk, but the economy of Sussex County may be impacted as well. A significant incident in an urban area may force businesses to close for an extended period of time because of contamination or direct damage caused by an explosion, if one occurred. The exact impact on the economy is difficult to determine, given the uncertain nature of the size and scope of incidents.

Hazardous substances incidents have the potential to lead to major transportation route closures in Sussex County. The closure of waterways, railroads, airports, and highways as a result of these incidents has the potential to impact the ability to deliver goods and services efficiently. Potential impacts may be local, regional, or statewide, depending on the magnitude of the event and the level of services disruptions.

Future Growth and Development

As discussed in Sections 4 and 9, areas targeted for future growth and development have been identified across Sussex County. Any areas of growth could be potentially impacted by hazardous substances incidents because the entire County is exposed and vulnerable. An increase in development and population has the ability to increase the likelihood of a hazardous substance incident. Future migration to larger jurisdictions may also increase the likelihood of an incident. Please refer to the specific areas of development indicated in tabular form and/or on the hazard maps included in the jurisdictional annexes in Volume II, Section 9 of this plan.

Effect of Climate Change on Vulnerability



A hazardous substance incident is human-caused hazard; therefore, no climate change impacts are associated with the hazard.

Change of Vulnerability

Overall, the County's vulnerability has not changed; however, the increased transport of Bakken oil via rail through the County may increase the risk to areas along the rail lines. The entire County will continue to be exposed and vulnerable to hazardous substances incidents.

Additional Data and Next Steps

For the Plan Update, any additional information regarding localized concerns and past impacts will be collected and analyzed. This data will be developed to support future revisions to the plan. Mitigation efforts could include building on existing New Jersey, Sussex County, and local efforts.

DRAFT



SECTION 6 MITIGATION STRATEGY

This section presents mitigation actions for Sussex County to reduce potential exposure and losses identified as concerns in the Risk Assessment portion of this HMP update. The county and planning partnership reviewed the risk assessment to identify and develop these mitigation actions, which are presented herein.

This section includes:

- 1) Background and Past Mitigation Accomplishments
- 2) General Mitigation Planning Approach
- 3) Review and Update of Mitigation Goals and Objectives
- 4) Capability Assessment
- 5) Mitigation Strategy Development and Update

Hazard mitigation reduces the potential impacts of, and costs associated with, emergency and disaster-related events. Mitigation actions address a range of impacts, including impacts on the population, property, the economy, and the environment.

Mitigation actions can include activities such as: revisions to land-use planning, training and education, and structural and nonstructural safety measures.

2016 Plan Update Changes

- For the 2016 HMP update, the mitigation strategy remains in Section 6.
- The goals and objectives were updated to align with the county and state's current mitigation priorities.
- A Strength, Weakness, Obstacles and Opportunities (SWOO) exercise was conducted for Sussex County and summarized in this section.
- An NJOEM/FEMA Region II mitigation strategy workshop was conducted for Sussex County and all plan participants as summarized in this section.
- The 2011 HMP capability assessment section was presented in Section 5. For the 2016 HMP update, the capability assessment was expanded and presented in Section 6 (Volume I) and Section 9 (Volume II).
- The mitigation strategy evaluation and prioritization methodology was updated and expanded.

6.1 BACKGROUND AND PAST MITIGATION ACCOMPLISHMENTS

In accordance with DMA 2000 requirements, a discussion regarding past mitigation activities and an overview of past efforts is provided as a foundation for understanding the mitigation goals, objectives, and activities outlined in this HMP. The county, through previous and ongoing hazard mitigation activities, has demonstrated that it is pro-active in protecting its physical assets and citizens against losses from natural and human-caused hazards. Examples of previous and ongoing actions, projects and capabilities include the following:

- The Sussex County Sheriff's Office facilitated the development of the original 2011 Sussex County HMP.
- Four counties (Hunterdon, Mercer, Sussex and Warren Counties) worked together to develop their original HMPs. Each county had representation on the Northern Delaware River Region Steering Committee which met regularly throughout the planning process. For the 2016 HMP update, Sussex County led the planning process independent of the other three counties.
- The 2016 HMP update planning process is also being led by the Sussex County Sheriff's Office DEM and includes participation of all 24 municipalities as well as Sussex County. This update represents the regulatory five-year local plan update process.
- All 24 municipalities in Sussex County participate in the National Flood Insurance Program (NFIP), which requires the adoption of FEMA floodplain mapping and certain minimum construction standards for building within the floodplain.



- Sussex County DEM is currently developing a regional rail emergency plan for hazardous materials in transit; a regional effort with Somerset, Hunterdon and Warren Counties.
- Sussex County DEM is developing a regional damage assessment plan; a regional effort with Somerset, Hunterdon, and Warren Counties.
- Sussex County DPW regularly conducts activities that reduce the county's risk to natural hazards including installing snow fencing; annually cleaning storm drains; and inspecting storm drains pre- and post-storm events.
- Municipalities have actively participated in available mitigation grant funding opportunities to implement mitigation projects, including the Hazard Mitigation Grant Program funding available in the wake of Tropical Storm Irene and Super Storm Sandy.
- The county and municipalities have implemented mitigation actions to protect critical facilities and infrastructure throughout the planning area.

These past and ongoing activities have contributed to the county's understanding of its hazard preparedness and future mitigation activity needs, costs, and benefits. These efforts provide an ongoing foundation for the planning partnership to use in developing this HMP update.

6.2 GENERAL MITIGATION PLANNING APPROACH

The overall approach used to update the county and local hazard mitigation strategies are based on FEMA and State of New Jersey regulations and guidance regarding local mitigation plan development, including:

- DMA 2000 regulations, specifically 44 CFR 201.6 (local mitigation planning)
- FEMA Local Mitigation Planning Handbook, March 2013
- FEMA Local Mitigation Plan Review Guide, October 1, 2011
- FEMA Integrating Hazard Mitigation into Local Planning, March 1, 2013
- FEMA Plan Integration: Linking Local Planning Efforts, July 2015
- FEMA Mitigation Planning How-To Guide #3, Identifying Mitigation Actions and Implementing Strategies (FEMA 386-3)
- FEMA Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards, January 2013

The mitigation strategy update approach includes the following steps that are further detailed in later sections of this section:

- Review and update mitigation goals and objectives.
- Identify mitigation capabilities, and evaluate their capacity and effectiveness to mitigate and manage hazard risk.
- Identify progress on previous county and local mitigation strategies.
- Develop updated county and local mitigation strategies.
- Prepare an implementation strategy, including the prioritization of projects and initiatives in the updated mitigation strategy.



6.3 REVIEW AND UPDATE OF MITIGATION GOALS AND OBJECTIVES

This section documents the efforts to update the guiding principle (mission statement), and hazard mitigation goals and objectives established to reduce or avoid long-term vulnerabilities to the identified hazards.

6.3.1 Goals and Objectives

According to 44 CFR 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.*” Further, FEMA mitigation planning guidance recommends establishing objectives to better tie mitigation goals to specific mitigation strategies (e.g. projects, activities, and initiatives).

For the purposes of this HMP update, goals are defined as follows:

Goals are general guidelines that explain what is to be achieved. They are usually broad, long-term, policy-type statements and represent global visions. Goals help define the benefits the HMP is trying to achieve. The success of the HMP, once implemented, should be measured by the degree to which its goals have been met (that is, by the actual benefits in terms of hazard mitigation).

A goals and objectives meeting was held on April 15, 2015 to specifically review and receive input on the 2011 HMP goals and objectives. Consideration was given to the following criteria: (1) hazard events and losses since the 2011 plan, (2) the updated hazard profiles and vulnerability assessment, (3) the goals and objectives established in the updated State of New Jersey HMP, (4) county and local risk management plans, as well as (5) direct input on how the Steering Committee (representing the county and participating municipalities) recognized the need to move forward to best manage their hazard risk.

Through facilitated discussion and brainstorming, it was decided to revise all of the HMP goals. In essence, the 2011 HMP goals remain as a part of the 2016 HMP update goals and new objectives; however the goals were broadened and new objectives were added to provide a more specific course of action to meet the goals.

The following are the updated goals for the 2016 Sussex County HMP update:

1. Protect life
2. Protect property
3. Increase public preparedness and awareness
4. Develop and maintain an understanding of risks from hazards
5. Enhance mitigation capabilities to reduce hazard vulnerabilities
6. Support continuity of operations pre-, during and post-hazard events

Sussex County HMP goals are compatible with the needs and goals expressed in other available community planning documents as well as the State of New Jersey HMP. Each goal has a number of corresponding objectives that further define the specific actions or implementation steps. Achievement of these goals will define the effectiveness of a mitigation strategy. The goals also are used to help establish priorities.

FEMA defines **Goals** as general guidelines that explain what should be achieved. Goals are usually broad, long-term, policy statements, and represent a global vision.

FEMA defines **Objectives** as strategies or implementation steps to attain mitigation goals. Unlike goals, objectives are specific and measurable, where feasible.

FEMA defines **Mitigation Actions** as specific actions that help to achieve the mitigation goals and objectives.



Objectives are short-term aims which, when combined, form a strategy or course of action to meet a goal. Unlike goals, objectives are specific and measurable. The objectives were developed by the Steering Committee through its knowledge of the local area, review of past efforts, findings of the risk assessment, qualitative evaluations, and identification of mitigation options. The objectives are used to (1) measure the success of the HMP once implemented, and (2) to help prioritize identified mitigation actions.

Table 6-1 presents Sussex County's goals and objectives for the 2016 HMP update. Although several objectives are listed for each goal, the objectives were developed to meet multiple goals as demonstrated in Table 6-2.

Table 6-1. Goals and Objectives for the 2016 Hazard Mitigation Plan Update

Goal	Objective
Goal 1: Protect life	1.1: Identify the need for, and acquire, any special health and emergency services, training, and equipment to enhance response and recovery capabilities for specific hazards to vulnerable populations (<i>NEW</i>).
	1.2: Maintain and enhance local regulatory standards including full and effective building code enforcement, floodplain management and other vulnerability-reducing regulations (<i>2011 Objective 12</i>).
	1.3: Develop, enhance and protect early warning and emergency communications systems (<i>NEW</i>).
	1.4: Identify and train non-traditional first responders to increase response capabilities (<i>NEW</i>).
Goal 2: Protect property	2.1: Pursue cost-effective mitigation actions to reduce the impacts of hazards on people, property and the economy (<i>modified 2011 Goal 4, modified Objective 10</i>).
	2.2: Preserve, restore and enhance natural environmental resources including open space and agricultural resources that serve a natural hazard mitigation function (<i>NEW</i>).
	2.3: Facilitate the development and timely submittal of project applications meeting state and federal guidelines for funding to reduce the number of repetitive and severe repetitive loss properties and hardening/retrofitting infrastructure and critical facilities with identified needs (<i>2011 Goal 4, Objective 11</i>).
Goal 3: Increase preparedness and awareness (similar to 2011 Goal 1)	3.1: Increase awareness of hazard risks and understanding of the advantages of mitigation to the general public, business and community members, and by local government officials (<i>2011 Objective 1</i>).
	3.2: Increase local government official awareness regarding funding opportunities for mitigation (<i>2011 Objective 2</i>).
	3.3: Provide government officials and local practitioners with educational opportunities and information regarding best practices for hazard mitigation planning, project identification, and implementation (<i>2011 Objective 4</i>).
Goal 4: Develop and maintain an understanding of risks from hazards	4.1: Improve data collection and sharing; and increase data availability to the county and municipalities to reduce the impacts of hazards and for use in future planning efforts (<i>2011 Goal 2 and Objective 3</i>).
	4.2: Acquire and maintain detailed data regarding critical facilities and infrastructure such that these sites can be prioritized and risk-assessed for possible mitigation actions (<i>2011 Objective 5</i>).
	4.3: Continue support of hazard mitigation planning, project identification, and implementation at the municipal and county level (<i>2011 Objective 6</i>).
Goal 5: Enhance mitigation capabilities to reduce hazard vulnerabilities (similar to 2011 Goal 3 and Objective 6)	5.1: Support increased participation in the National Flood Insurance Program Community Rating System (<i>2011 Objective 7</i>).
	5.2: Support increased integration of municipal/county hazard mitigation planning and floodplain management with effective municipal zoning regulation, and effective municipal/county subdivision regulation, and comprehensive planning (<i>2011 Objective 8</i>).
	5.3: Provide user-friendly hazard-data accessibility for mitigation planning, other planning efforts and for private citizens (<i>2011 Objective 9</i>).



Table 6-1. Goals and Objectives for the 2016 Hazard Mitigation Plan Update

Goal	Objective
	5.4: Provide direct support, where possible, to municipal mitigation programs (2011 Objective 11).
Goal 6: Support continuity of operations pre-, during, and post- hazard events	6.1: Ensure continuity of operations of government, non-government, commerce, private sector, and infrastructure (NEW).
	6.2: Support and encourage the implementation of back-up and alternative energy sources (NEW).
	6.3: Develop, enhance and identify systems and procedures to help facilitate and prioritize an expedient response during disaster recovery efforts (NEW).

Note: After each objective, it is noted whether the objective is new to the 2016 HMP update, or references the original document.



Table 6-2. Sussex County Hazard Mitigation Plan Objectives

Obj. #	Objective Statement	Goal 1: Protect Life	Goal 2: Protect Property	Goal 3: Increase public preparedness and awareness	Goal 4: Develop and maintain an understanding of risks from hazards	Goal 5: Enhance county and local mitigation capabilities to reduce hazard vulnerabilities	Goal 6: Support continuity of operations pre-, during and post-hazard events
1.1	Identify the need for, and acquire, any special health and emergency services, training, and equipment to enhance response and recovery capabilities for specific hazards to vulnerable populations (<i>NEW</i>).	X			X	X	X
1.2	Maintain and enhance local regulatory standards including full and effective building code enforcement, floodplain management and other vulnerability-reducing regulations (<i>2011 Objective 12</i>).	X	X		X	X	X
1.3	Develop, enhance and protect early warning and emergency communications systems (<i>NEW</i>).	X		X		X	X
1.4	Identify and train non-traditional first responders to increase response capabilities (<i>NEW</i>).	X	X		X	X	X
2.1	Pursue cost-effective mitigation actions to reduce the impacts of hazards on people, property and the economy (<i>modified 2011 Goal 4, modified Objective 10</i>).	X	X				X
2.2	Preserve, restore and enhance natural environmental resources including open space and agricultural resources that serve a natural hazard mitigation function (<i>NEW</i>).	X	X			X	X
2.3	Facilitate the development and timely submittal of project applications meeting state and federal guidelines for funding to reduce the number of repetitive and severe repetitive loss properties and hardening/retrofitting infrastructure and critical facilities with identified needs (<i>2011 Goal 4, Objective 11</i>).	X	X			X	X
3.1	Increase awareness of hazard risks and understanding of the advantages of mitigation to the general public, business and community members, and by local government officials (<i>2011 Objective 1</i>).				X	X	
3.2	Increase local government official awareness regarding funding opportunities for mitigation (<i>2011 Objective 2</i>).				X	X	
3.3	Provide government officials and local practitioners with educational opportunities and information regarding best practices for hazard				X	X	X



Section 6: Mitigation Strategies

Obj. #	Objective Statement	Goal 1: Protect Life	Goal 2: Protect Property	Goal 3: Increase public preparedness and awareness	Goal 4: Develop and maintain an understanding of risks from hazards	Goal 5: Enhance county and local mitigation capabilities to reduce hazard vulnerabilities	Goal 6: Support continuity of operations pre-, during and post-hazard events
	mitigation planning, project identification, and implementation (2011 Objective 4).						
4.1	Improve data collection and sharing; and increase data availability to the county and municipalities to reduce the impacts of hazards and for use in future planning efforts (2011 Goal 2 and Objective 3).				X	X	X
4.2	Acquire and maintain detailed data regarding critical facilities and infrastructure such that these sites can be prioritized and risk-assessed for possible mitigation actions (2011 Objective 5).				X	X	
4.3	Continue support of hazard mitigation planning, project identification, and implementation at the municipal and county level (2011 Objective 6).					X	
5.1	Support increased participation in the National Flood Insurance Program Community Rating System (2011 Objective 7).	X	X	X			
5.2	Support increased integration of municipal/county hazard mitigation planning and floodplain management with effective municipal zoning regulation, and effective municipal/county subdivision regulation, and comprehensive planning (2011 Objective 8).			X	X	X	
5.3	Provide user-friendly hazard-data accessibility for mitigation planning, other planning efforts and for private citizens (2011 Objective 9).				X	X	
5.4	Provide direct support, where possible, to municipal mitigation programs (2011 Objective 11).			X	X	X	
6.1	Ensure continuity of operations of government, non-government, commerce, private sector, and infrastructure (NEW).	X	X				X
6.2	Support and encourage the implementation of back-up and alternative energy sources (NEW).	X	X				X
6.3	Develop, enhance and identify systems and procedures to help facilitate and prioritize an expedient response during disaster recovery efforts (NEW).					X	X



6.4 CAPABILITY ASSESSMENT

According to FEMA 386-3, a capability assessment is an inventory of a community's missions, programs and policies; and an analysis of its capacity to carry them out. This assessment is an integral part of the planning process. The assessment process enables identification, review and analysis of local and state programs, policies, regulations, funding and practices currently in place that may either facilitate or hinder mitigation.

For the 2016 HMP update, the county and all municipalities identified and assessed their capabilities in the areas of planning and regulatory, administrative and technical, and fiscal. By completing this assessment, the county and each municipality learned how or whether they would be able to implement certain mitigation actions by determining the following:

- Limitations that may exist on undertaking actions;
- The range of local and/or state administrative, programmatic, regulatory, financial and technical resources available to assist in implementing their mitigation actions;
- Action is currently outside the scope of capabilities;
- Types of mitigation actions that may be technically, legally (regulatory) administratively, politically or fiscally challenging or infeasible;
- Opportunities to enhance local capabilities to support long term mitigation and risk reduction.

During the 2016 HMP update process, all participating jurisdictions were tasked with developing their capability assessment, paying particular attention to evaluating the effectiveness of these capabilities in supporting hazard mitigation, and identifying opportunities to enhance local capabilities. This purpose of this section is to provide a summary of these capabilities for the purposes of mitigation and does not describe all responsibilities of each entity. The following subsections and tables present a summary of these assessments.

More detailed county and municipal capabilities in the areas of planning and regulatory, administrative and technical, and fiscal may be found in the Capability Assessment section of their jurisdictional annexes in Section 9. Further, within each annex participating jurisdictions have identified how they have 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.

6.4.1 Planning and Regulatory Capability

According to the FEMA *Local Mitigation Handbook*, planning and regulatory capabilities are based on the implementation of ordinances, policies, local laws and State statutes, and plans and programs that relate to guiding and managing growth and development. Sussex County and its municipalities have various federal, state, county and local policies, programs and plans available to promote and support mitigation and reduce future damages. Refer to Section 9 which summarizes the planning and regulatory capabilities per municipality.

State of New Jersey Hazard Mitigation Plan

The State of New Jersey HMP includes an evaluation of the state's overall pre- and post-hazard mitigation policies, programs, and capabilities; the policies related to development in hazard-prone areas; and the state's funding capabilities. The State of New Jersey HMP thoroughly describes the federal and state programs available to Sussex County to promote mitigation. The State of New Jersey HMP (2014) was used as a resource in developing Sussex County's HMP update.



National Flood Insurance Program (NFIP)

The U.S. Congress established the National Flood Insurance Program (NFIP) with the passage of the National Flood Insurance Act of 1968 (FEMA's 2002 National Flood Insurance Program). The NFIP is a Federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages.

There are three components to the NFIP: flood insurance, floodplain management and flood hazard mapping. Communities participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities. Community participation in the NFIP is voluntary. Flood insurance is designed to provide an alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. Flood damage in the U.S. is reduced by nearly \$1 billion each year through communities implementing sound floodplain management requirements and property owners purchasing flood insurance. Additionally, buildings constructed in compliance with NFIP building standards suffer approximately 80% less damage annually than those not built in compliance (FEMA, 2008).

All jurisdictions in Sussex County participate in the NFIP. The effective Flood Insurance Rate Maps (FIRMs) for the county and all jurisdictions are dated September 2011. Further details on the county's flood vulnerability may be found in the flood hazard profile in Section 5.4.4.

NFIP Community Rating System (CRS)

As an additional component of the NFIP, the Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance (FEMA, 2012).

Currently, there are no municipalities in the county participating in the CRS.

Critical Area Protection Policy

The following programs provide funding for the State of New Jersey, municipalities, and counties to purchase land for open-space preservation and recreation:

- Green Acres Program
- Blue Acres Program
- Historical Preservation Program
- Farmland Preservation
- Wetlands Act of 1970 (N.J.S.A. 13:9A)
- Soil and Erosion and Sediment Control Act (N.J.S.A. 4:24)
- Highlands Water Protection and Planning Act (N.J.S.A. 13:20-1)



The Wetlands Act of 1970 (N.J.S.A. 13:9A) provide rules and regulations governing development in wetland areas of New Jersey. New Jersey has 15 soil conservation districts, following county boundaries that implement the New Jersey Soil Erosion and Sediment Control Act (N.J.S.A. 4:24), which governs certain aspects of new development. The Highlands Act calls for a prohibition on development on steep slopes as defined in the act.

Land Use Planning Policy

The State of New Jersey Municipal Land Use Law (L.1975, c. 291, s. 1, eff. Aug. 1, 1976) is the legislative foundation for the land use process in the State of New Jersey, including decisions by Planning Boards and Zoning Boards of Adjustment. It defines the powers and responsibilities of boards and is essential to their functions and decisions. It also provides the required components of a municipal Master Plan.

Every municipal agency shall adopt and may amend reasonable rules and regulations, not inconsistent with this act or with any applicable ordinance, for the administration of its functions, powers, and duties. These plans help jurisdictions review their land use plans and policies with public participation. The Municipal Land Use Law requires that each municipality prepare a comprehensive plan and update that plan every 6 years.

The county and all municipalities have master plans. The master plans were reviewed and consulted when developing the goals and objectives of the HMP update, as well as updating each community's mitigation strategy. The following summaries of various planning documents and reports relevant to managing land use and hazard risk within the county.

Highlands Regional Master Plan (2008)

As noted in Section 4, Sussex County is partially located within the New Jersey Highlands Region. It is one of the seven counties protected by and subject to the provisions of the Highlands Water Protection and Planning Act.

The Highlands Regional Master Plan guides implementation of the Highlands Water Protection and Planning Act of 2004. The Act establishes a goal to protect, restore and enhance water quality and water quantity in the region, and includes the protection of agricultural viability, ecosystems, species and communities, and scenic and historic resources. The Highlands Regional Master Plan seeks to evaluate how to protect the natural and cultural resources of the Highlands Region while accommodating a sustainable economy. Overall, the Highlands Regional Master Plan provides a framework to base future land use decisions that fosters regional cooperation and community participation.

Sussex County Strategic Growth Plan Update (2014)

According to the Sussex County's Strategic Growth Plan Update, Sussex County faces several challenges regarding future economic growth and development. These challenges include a decline in population growth, especially the workforce of the future (ages 20 to 29 years); under-representation of higher-paying industries in the county; and limited transit services and public-use air facilities. A key asset to the county is its rural character in proximity to the urban core and the work that has been done to promote recreational and tourism potential in the county.

Six priority focus areas were identified to support and encourage future economic growth and development in the county: 1. Tourism; 2. Transportation; 3. Housing; 4. Economic development; 5. Reducing regulatory burden; 6. Agricultural development.



Sussex County Comprehensive Farmland Preservation Plan (2008)

According to the Sussex County Comprehensive Farmland Preservation Plan, the State Development and Redevelopment Plan designates most of Sussex County as Rural and Environmentally-sensitive lands, and encourages the clustering of development within defined centers in order to preserve the county's rural environment. In line with the 2003 Comprehensive Farmland Preservation Plan, the county's mission continues to include farmland preservation. The county has undertaken initiatives to promote the economic well-being of local farmers and has identified additional initiatives to promote the local agricultural industry.

Sussex County Ten-Year Mobility Study

The Sussex County Ten-Year Mobility Study presents steps that the county will need to take in order to address transportation challenges in the coming ten-year period. There are four strategies and associated projects identified to address congestion and traffic/transportation issues: 1. Smart Growth; 2. Transportation Demand Management; 3. Transit Option Development; and Traffic Operations and Roadway Management. The study stresses a smart growth approach to transportation management planning to accommodate future growth and facilitate the movement through the county's transportation network, and to ensure the county does not 'fall behind'.

Sussex County Open Space and Recreation Plan (2003)

To preserve the county's rich heritage of open space and to build on this legacy, county residents supported the establishment of the "Farmland, Recreation and Open Space Trust Fund." The County Board of Chosen Freeholders began to collect the tax in July 2001 at a rate approved by the voters. In March 2002, the Freeholders appointed an Open Space Advisory Committee to recommend properties and oversee a grant process that allocates the proceeds of the Trust to municipalities.

The Open Space program uses trust fund dollars to acquire land and/or water areas for the protection of ecologically sensitive areas; preservation of areas of scenic, cultural or historic value; public outdoor recreational facilities (active or passive); preservation of lands of exceptional flora or fauna; and for the protection of critical water supplies.

Projects are selected through an open and competitive process, governed by state and local statutes. Funds can only be used to purchase land in Sussex County from willing sellers on a voluntary basis. The County does not condemn property if the owner is unwilling to sell.

Floodplain Management Policy

New Jersey State Law Flood Hazard Area Control Act (NJSA 58:16A-52): The Act and regulations attempts to minimize damage to life and property from flooding caused by development within fluvial and tidal flood hazard areas, to preserve the quality of surface waters, and to protect the wildlife and vegetation that exist within and depend upon such areas for sustenance and habitat. While it does not require local adoption, as it is enforced by the NJDEP, the floodplain ordinances of each municipality need to be reviewed to be in compliance with this new regulation.

All municipalities participate in the NFIP and have a Floodplain Ordinance. Communities are encouraged to adopt standards which exceed NFIP requirements.

Building Codes Policy

Uniform Construction Code (Uniform Construction Code Act of 1975 [UCC]) requires all jurisdictions to have current land use master plans, zoning, and other land development ordinances. The UCC adopts up-to-date



building codes as its Building Sub code and One- and Two-Family Sub code. These Sub codes contain requirements that address construction in both A and V flood zones.

Building codes mandate best practices and technology, much of which is designed to reduce or prevent damage from occurring when structures are under stress. New Jersey State Law requires that all municipalities adopt ordinances that follow the UCC. In January 2013, the State established by emergency rule the best available data from FEMA's latest flood maps, plus one foot of freeboard, as the general rebuilding standard to adapt to changing flood hazard risks and corresponding federal flood insurance rates. All municipalities in Sussex County have an active building code.

Emergency Management Plan

According to State Police Directive 101, each county and municipality shall prepare, adopt and maintain an Emergency Operation Plan that meets the requirements of the State Emergency Operations Plan guidelines and checklist. The plan describes the hazards faced by the jurisdiction as well as the jurisdictions capabilities, needs, demands and emergency management structure. Sussex County and each municipality have an Emergency Operations Plan.

6.4.2 Administrative and Technical Capabilities

According to the FEMA Local Mitigation Handbook, administrative and technical capability refers to a community's staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. It also refers to the ability to access and coordinate these resources effectively. Local mitigation is further supported by county, regional, state and federal administrative and technical capabilities.

The following summarizes the administrative and technical capabilities available in Sussex County. Based upon the capability assessment conducted, municipal administrative and technical capabilities vary across the county. Refer to Section 9 which describes each municipality's administrative and technical capabilities.

6.4.2.1 Administrative and Technical Capabilities – Federal and State

New Jersey State Police – Office of Emergency Management (NJOEM)

The Governor of New Jersey has the overall responsibility for emergency management activities in the state. The Superintendent of the New Jersey State Police is the State Director of the NJOEM. On behalf of the Governor, all activities and departments are coordinated, directed, and controlled from the NJOEM's Emergency Operations Center.

The State Director of Emergency Management supervises, directs, and appoints deputies and/or assistants to control the daily activities of NJOEM. The function and staffing of NJOEM is with the approval of the Attorney General. The State Hazard Mitigation Officer is the representative of state government acting as the primary point of contact with FEMA, other federal agencies, and county and local units of government in the planning and implementation of pre- and post-disaster mitigation programs and activities required under the Stafford Act. Currently, the New Jersey State Hazard Mitigation Officer is Acting Sergeant First Class Michael Gallagher of NJOEM.

Recovery Bureau

The Chief of the Recovery Bureau supervises the Mitigation, Public Assistance, and Finance Units. The Mitigation Unit undertakes hazard mitigation planning and the review of mitigation projects in advance of



potential disasters, and is also activated during and immediately after disasters to evaluate existing and proposed mitigation measures in the affected areas.

The Public Assistance Unit accepts and reviews applications for funds for emergency work submitted by local individuals, households, and businesses, as well as from local governments during and immediately after a disaster. The 2013 reorganization of the Recovery Bureau added a dedicated Finance Unit to support the fiscal functions of both the Public Assistance and Mitigation Units. The Finance Unit ensures timely reimbursements and fiduciary responsibility.

Mitigation Unit

The Mitigation Unit, within the Emergency Management Section, has the mission of enhancing state, county, and municipal risk reduction through the development and implementation of mitigation strategies. Hazard mitigation, by definition, is any sustained action that prevents or reduces the loss of property or human life from recurring hazards. The Mitigation Unit accomplishes this task by implementing and administering several grant-based programs in conjunction with FEMA.

Preparedness Bureau

The Preparedness Unit in the Preparedness Bureau is responsible for disseminating preparedness information in advance of a disaster or potential disaster. The Preparedness Unit maintains an extensive library of natural disaster preparedness and recovery information on its Family and Community Emergency Preparedness website, accessible at www.nj.gov/njoem or www.njsp.org/njoem. The disaster preparedness and recovery information featured prominently on the New Jersey State Police and NJOEM website home pages is a critical part of New Jersey's efforts to protect public health and safety and to minimize loss of life and property in the event of a disaster.

Hazard Mitigation Administrative Plan

In the event that an active disaster declaration has necessitated a FEMA-approved Hazard Mitigation Grant Program (HMGP) Administrative Plan, the plan is reviewed to ensure compliance with the prevailing guidance and to set forth the administrative procedures, organization, and requirements for administering the HMGP in New Jersey. The HMGP Administrative Plan is developed by the state and details the process for prioritizing post-disaster mitigation funding of local mitigation projects.

New Jersey Department of Environmental Protection

Bureau of Dam Safety & Flood Control

The Bureau of Dam Safety & Flood Control leads the state's efforts filling the State NFIP Coordinator position and providing Community Rating System (CRS) support. In addition, the section's responsibilities include the funding of construction and operation of federal, state, and local flood control mitigation projects throughout the state. The section has also taken a lead role on the development and adoption of NJ Flood Hazard Area mapping, as well as an active partnership with FEMA on their Map Modernization Program efforts. The bureau provides assistance to communities participating in the NFIP and interested in joining CRS thru the NJDEP Community Assistance Program Unit.

NJDEP Dam Safety Section

The NJDEP Dam Safety Section under the Bureau of Dam Safety & Flood Control has responsibility for overseeing dam safety in the state. In 1912, the New Jersey legislature passed a series of safety regulations related to the construction, repair, and inspection of existing and proposed dams in the state. In 1981, the law



was amended and became the Safe Dam Act, N.J.S.A. 58:4. Eventually in 1985, the Dam Safety Standards, N.J.A.C. 7:20 regulations were passed leading to the Dam Safety Section.

The primary goal of the dam safety program is to ensure the safety and integrity of dams in New Jersey and, thereby, protect people and property from the consequences of dam failures. The section also coordinates with the Division of State Police, local and county emergency management officials in the preparations and approval of emergency action plans.

The Dam Safety Section reviews plans and specifications for the construction of new dams or for the alteration, repair, or removal of existing dams. The section must grant approval before the owner can proceed with construction. Engineers from the Dam Safety Section evaluate each project, investigate site conditions, and check recommended construction materials. During construction, engineers identify conditions that may require design changes, check for compliance with approved plans and specifications, and approve foundations before material is placed.

Existing dams are periodically inspected to assure that they are adequately maintained and owners are directed to correct any deficiencies found. The regulations require the owner to obtain a professional engineer to inspect their dams on a regular basis. These investigations include a comprehensive review of all pertinent material contained in the Section's files, a visual inspection, technical studies when necessary, and the preparation of a comprehensive report (NJDEP 2012a).

The owners or operators of all dams which raise the waters of any stream more than 70 feet above its usual mean low-water height or which impound more than 10,000 acre-feet of water shall have a regular inspection performed annually and formal inspections performed every three years by a New Jersey licensed professional engineer obtained by the owner. In addition, these inspections must be attended by a professional engineer assigned from the NJDEP.

Division of Water Supply and Geoscience

The Division of Water Supply and Geoscience (Water Supply) works to ensure adequate, reliable and safe water supply is available for the future. This goal is accomplished through the regulation of ground and surface water diversions, permitting of wells, permitting of drinking water infrastructure, monitoring of drinking water quality and technical support for water systems to achieve compliance with all federal and state standards. In addition, Water Supply staff act in a support role during an emergency situation to provide technical assistance, as needed to re-establish safe and adequate public water supplies.

Water Supply staff provides technical assistance to assist water systems during water supply emergencies and to address routine non-compliance from significant deficiencies or poor water quality test results. The Drinking Water State Revolving Fund (DWSRF) program assists water systems in financing the cost of infrastructure through the use of federal and New Jersey Infrastructure Trust funds. Additionally, Water Supply provides operator licensing and training support as well as financial assistance through the DWSRF program.

Water Resource Management

The Water Pollution Management Element is responsible for protecting New Jersey's surface and ground waters from pollution caused by improperly treated wastewater and its residuals. This is accomplished primarily through the implementation of the New Jersey Pollutant Discharge Elimination System (NJPDES) permit program. This includes publicly owned treatment facilities (e.g. sanitary sewerage plants) and privately owned facilities (e.g. industrial facilities) as well as facilities that discharge stormwater (e.g. municipalities and highway agencies) and stormwater related to development. The NJPDES program also regulates discharges to ground water (e.g. septic systems) and the proper management of any residuals that are generated as part of the treatment process.



The varied ownership of infrastructure components is often a complicating factor in the regulation of these entities (e.g. ownership of a treatment facility by a public entity and sewer mains by a different municipal entity). The total universe of NJPDES permits includes over 7,500 permits. The Water Pollution Management Element engineering and environmental specialist staff provide technical assistance in the development, interpretation and implementation of permit conditions.

New Jersey Department of the State - Office for Planning Advocacy (OPA) – Business Action Center

The New Jersey Office for Planning Advocacy (OPA) supports and coordinates planning throughout the state to protect the environment, mitigate development hazards and guide future growth into compact, mixed use development and redevelopment while fostering a robust long-term economy. The OPA implements the goals of the State Development and Redevelopment Plan to achieve comprehensive, long-term planning; and integrates that planning with programmatic and regulatory land use decisions at all levels of government and the private sector.

New Jersey Geological and Water Survey

The New Jersey Geological and Water Survey evaluates geologic, hydrogeologic and water quality data to manage and protect water resources, to identify natural hazards and contaminants, and to provide mineral resources including offshore sands for beach nourishment. Information provided by the survey includes GIS data and maps of geology, topography, groundwater and aquifer recharge. In addition the data tracks wellhead protection areas, aquifer thicknesses, properties and depths, groundwater quality, drought, geologic resources, and hazards such as earthquakes, abandoned mines, karst-influenced sinkholes and landslides.

Rutgers University

Office of the New Jersey's State Climatologist

The Office of the New Jersey's State Climatologist (ONJSC) generates and archives climate data. Generated data are from the New Jersey Weather and Climate Network (NJWxNet), which is an assemblage of 55 automated weather stations situated throughout the state. A decade or more of hourly observations are available from some of the stations, while others have shorter records. Since fall 2012 observations are available on a five-minute basis.

Along with these records, ONJSC archives or has ready access to National Weather Service (NWS) Cooperative Weather Station data. These are daily observations from several dozen stations at any given time over the past century. Individual stations have as many as 120 years of data while other stations have started or ceased operating since the late 1800s. Another source of generated data is the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS), which includes daily observations of rain and snow from as many as several hundred volunteers throughout the state.

New Jersey Climate Adaptation Alliance

The New Jersey Climate Adaptation Alliance (NJADAPT) was formed in response to a diverse group of stakeholders who came together on November 29, 2011, at Rutgers University to participate in the conference "Preparing New Jersey for Climate Change: A Workshop for Decision-Makers".

The Alliance focuses on climate change preparedness for New Jersey in key impact sectors (public health; watersheds, rivers and coastal communities; built infrastructure; agriculture; and natural resources) through:

- Conducting outreach and education of the general public and targeted sectoral leaders



- Developing recommendations for state and local actions through collaboration with policymakers at the state, federal and local levels
- Undertaking demonstration and pilot projects in partnership with the private sector, local governments, non-governmental organizations, and others
- Identifying science, research and data needs
- Developing capacity for implementation of preparedness measures and documentation of best practices (Rutgers University 2014)

NJADAPT is a collaborative effort of scientists and data managers in academia, government, the private sector and non-governmental organization community who have developed a strategic plan for a New Jersey platform to host and apply climate science impacts and data. The NJADAPT website includes a flood exposure profile for community discussions about hazard impacts; NJ Flood Mapper (which is a tool for flooding hazards and sea level rise); and Getting to Resilience (a tool used to help communities reduce vulnerability and increase preparedness). NJADAPT can be accessed at <http://www.njadapt.org/>

6.4.2.2 Administrative and Technical Capabilities – County and Local

Sussex County Sheriff's Office, Division of Emergency Management (DEM)

The Sussex County Sheriff's Office has the responsibility for a wide range of law enforcement services: Bureau of Corrections; Bureau of Law Enforcement; and Security of the County Court Complex.

The Sussex County DEM is a division of the Sheriff's Office. The Sussex County DEM is a county-level emergency service required by statute that coordinates resources to serve the needs of Sussex County during times of emergency events and disasters.

In carrying out its responsibilities, the DEM oversees the emergency management activities of all county agencies and Sussex County's 24 municipalities. Each municipality has an emergency management coordinator with whom this division interacts and the coordinators, in turn, interact at the local level with police, fire, EMS, public works, public health, schools, etc.

In addition to the foregoing, the DEM presents training and educational programs including personal emergency preparedness, access and functional needs and incident command for responders. The division also oversees two community alert programs, Swift911™ and Register Ready, that are of tremendous service to the public.

The Sussex County DEM is leading the HMP update. As mitigation grant funding becomes available, the Sussex County DEM distributes information to the municipal coordinators at quarterly meetings. The Sussex County DEM is leading the HMGP-Energy Allocation Initiative for the county.

Sussex County Planning Division

The Sussex County Division of Planning is responsible for providing staff and technical assistance to the County Planning Board, Agricultural Development Board, Solid Waste Advisory Committee, 208 Water Quality Policy Advisory Committee, Strategic Growth Advisory Committee and Board of Chosen Freeholders on all matters related to land use, development and conservation. The Division manages the following programs:

- Census data for the county
- Housing Market
- Cross Acceptance
- Development Review



- Economic Development
- Farmland Preservation
- Open Space Preservation
- Regional Planning
- Solid Waste Planning
- Transportation Planning
- Water Quality Management Planning
- Conferences and Presentations

Sussex County Planning Board

The Sussex County Planning Board is responsible for approving site plan and subdivision applications within their jurisdiction in accordance with the New Jersey Municipal Land Use Law. A Development Review Committee reviews all applications and acts on behalf of the full Board. Applications for waiver from County development standards are heard by the full Board with input from county engineering and planning staff.

Sussex County Department of Health and Environmental Services

The Sussex County Department of Health and Environmental Services' mission is to protect, promote, maintain and improve the health and quality of life for Sussex County citizens and visitors through a responsive, well managed and organized community effort. The Department has information on who to contact in times of emergency on their website (local radio stations, state and federal resources). The following are under the Department; some of which are described more fully below:

- Environmental Health
- Public Health Nursing
- Emergency Preparedness
- HAZ-MAT
- Special Child Health Services
- Weights and Measures
- Mosquito Control
- Health Education Topics
- Sussex-Warren Chronic Disease Coalition

Sussex County Public Health Emergency Preparedness Program

The Public Health Emergency Preparedness Program is dedicated to ensuring a coordinated, timely, and effective response to a bioterrorist event, natural disaster, or other public health emergency in Sussex County. On their website, there are numerous links and guides, in English and Spanish, to inform the public on emergencies and public health topics.

Sussex County HAZ-MAT Team

The Sussex county HAZ-MAT team, consists of 20+/- full time county employees trained to the technician level, available to respond to environmental and public health emergencies 24 hours a day, seven days a week.

A collaborative effort between the Sussex County Sheriff's Office, the Sussex County Office of the Prosecutor, the Sussex County Division of Public Works, and the Sussex County Sussex County Department of Environmental and Public Health Services, the team was recognized by the State of New Jersey, Department of Environmental Protection as a Model Program for Hazardous Material Response. With the assistance of the



County Office of Emergency Management and the Sussex County Public Safety Training Academy, the program has matured into a valuable asset and tool for the municipalities of Sussex County.

State of the art haz-mat equipment including response vehicles, air monitoring instruments, personal protective equipment, and decon units were all paid for through Homeland Security Grants received from the State and Federal Government with very little impact from county tax dollars.

Sussex County Community Health Partnership

The Sussex County Community Health Partnership (SCCHP) is committed to making a positive difference regarding the health concerns of the residents of Sussex County. The SCCHP is engaged in a community-wide strategic planning process to improve community health by prioritizing public health issues and identifying resource capacity to address health and quality of life issues using the Mobilizing for Action through Planning and Partnerships (MAPP) model.

Sussex County Division of Engineering

The Sussex County Division of Engineering is charged with overseeing the numerous facets associated with maintaining, improving, and monitoring the county's transportation network. The Division works closely with the Division of Facilities Management providing project support and civil/survey design services for a variety of facility related capital improvement projects. Additionally, the Division of Engineering provides technical support to the Division of Planning.

Included within the department's responsibilities are tasks such as in-house design of road and bridge improvement projects, management of multimillion dollar design projects, monitoring the condition of bridges; signals; signs; traffic markings and other similar infrastructure items, developing long term capital budgets, construction stakeout, ROW surveys, management of county road and bridge construction projects, track traffic trends, and monitor work within the county right of way through road opening and driveway permits.

Sussex County Office of Geographic Information System (GIS) Management

The Sussex County Office of Geographic Information Systems is within the Department of Central and Shared Services which provides mapping and GIS services to meet the business needs of county divisions, constitutional offices, local government and not-for-profit organizations within Sussex County. This includes providing support and maintenance in the areas of data conversion, cartography, computer graphics and visualization, Global Positioning Systems (GPS), database design and software development. As part of the 2016 HMP update, a county-wide critical facility inventory was developed and used to assess risk. The Office of GIS will maintain this dataset for the county.

Sussex County Economic Development Partnership

The Sussex County Economic Development Partnership, Inc. (SCEDP) is dedicated to the creation of sustainable economic opportunity and prosperity to improve the quality of life in Sussex County, NJ. The SCEDP will proactively facilitate the recruitment, retention and expansion of business that will complement, and be consistent with, the character and environment of Sussex County.

Rutgers Cooperative Extension of Sussex County

Rutgers Cooperative Extension is part of the Federal Land Grant University system serving as the educational outreach arm of the United States Department of Agriculture. Rutgers Cooperative Extension of Sussex County was established in 1912 and was the first Cooperative Extension program in New Jersey. The office provides



research-based information to help Sussex County residents acquire knowledge to make informed decisions to maintain or improve their quality of life.

Educational programs are provided without regard to race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, or marital or family status. Program delivery methods include: classes and conferences, telephone and in-person consultations, replies to emailed questions, newspaper columns, radio and television programs, bus trips, fairs and clubs, field meetings and demonstrations, computerized diet and financial analyses, videos, newsletters, fact sheets, speaking engagements for organizations and work sites, exhibits and displays, and web sites.

6.4.3 Fiscal Capabilities

Mitigation projects and initiatives are largely or entirely dependent on available funding. Sussex County and its municipalities are able to fund mitigation projects through existing local budgets, local appropriations (including referendums and bonding), and through a myriad of federal and state loan and grant programs. Additional information on funding sources may be found in the 2014 State of New Jersey HMP. The county currently accesses funding from the following sources for mitigation work:

- Federal and state funding programs
- Capital improvements project funding
- Authority to levy taxes for specific purposes
- Incur debt through general obligation funds and special tax bonds
- Open Space Trust Fund
- Capital improvement plans/municipal budgets

Farmland Preservation, Recreation, and Open Space Trust Fund

The Farmland Preservation, Recreation, and Open Space Trust Fund is divided into two separate categories, each having its own distinct goals and objectives. The Farmland Preservation Program uses Trust Fund dollars to purchase development easements on farm land, forever protecting the agriculture use. The Open Space program uses Trust Fund dollars to acquire land and/or water areas for the protection of ecologically sensitive areas; preservation of areas of scenic, cultural or historic value; public outdoor recreational facilities (active or passive); preservation of lands of exceptional flora or fauna; and for the protection of critical water supplies.

Projects are selected through an open and competitive process, governed by state and local statutes. Funds can only be used to purchase land in Sussex County from willing sellers on a voluntary basis. The County does not condemn property if the owner is unwilling to sell.

In 2015, the residents of the county passed a ballot to renew the Trust Fund. The Trust Fund will continue to be funded through a property tax assessment determined annually by the Board of Chosen Freeholders.

Capital Improvement Plans

Capital improvement plans outline capital spending and investments necessary for public improvements. Many municipalities in Sussex County have capital improvement plans. These plans and budgets have been and may continue to be used to fund mitigation projects and demonstrate integration into daily operations. Refer to Section 9 for further details.

Federal Hazard Mitigation Funding Opportunities

Federal mitigation grant funding is available to all communities with a current HMP (this plan); however most of these grants require a "local share". In general, HMA funds may be used to pay up to 75 percent of the eligible



activity costs. The remaining 25 percent of eligible activity costs are derived from non-federal sources. Exceptions to the 75 percent federal and 25 percent non-federal share are described below under the specific FEMA HMA grant programs.

Hazard Mitigation Grant Program (HMGP)

The HMGP is a post-disaster mitigation program. It is made available to states by FEMA after each federal disaster declaration. The HMGP can provide up to 75 percent funding for hazard mitigation measures. The HMGP can be used to fund cost-effective projects that will protect public or private property in an area covered by a federal disaster declaration or that will reduce the likely damage from future disasters. Examples of projects include acquisition and demolition of structures in hazard-prone areas, flood-proofing or elevation to reduce future damage, minor structural improvements, and development of state or local standards. Projects must fit into an overall mitigation strategy for the area identified as part of a local planning effort. All applicants must have a FEMA-approved HMP (this plan).

Applicants who are eligible for the HMGP are state and local governments, certain nonprofit organizations or institutions that perform essential government services, and Native American tribes and authorized tribal organizations. Individuals or homeowners cannot apply directly for the HMGP; a local government must apply on their behalf. Applications are submitted to NJOEM and placed in rank order for available funding and submitted to FEMA for final approval. Eligible projects not selected for funding are placed in an inactive status and may be considered as additional HMGP funding becomes available.

Flood Mitigation Assistance (FMA) Program

The FMA combines the previous Repetitive Flood Claims and Severe Repetitive Loss Grants into one grant program. FMA provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP. The FMA is funded annually; no federal disaster declaration is required. Only NFIP-insured homes and businesses are eligible for mitigation under this program. Funding for FMA is limited and, as with the HMGP, individuals cannot apply directly for the program. FEMA may contribute up to 100 percent federal cost share for SRL properties. FEMA may contribute up to 90 percent federal cost share for repetitive loss (RL) properties. Applications must come from local governments or other eligible organizations. FMA funds are distributed from FEMA to the state. NJOEM serves as the grantee and program administrator for FMA.

Pre-Disaster Mitigation (PDM) Program

The Pre-Disaster Mitigation (PDM) program is an annually funded, nationwide, competitive grant program. No disaster declaration is required. Federal funds will cover up to 75 percent of a project's cost. Small impoverished communities may be eligible for up to a 90 percent federal cost share. As with the HMGP and FMA, a FEMA-approved local HMP is required to be approved for funding under the PDM program.

Federal and State Disaster and Recovery Assistance Programs

Following a disaster, various types of assistance may be made available by local, state, and federal governments. The types and levels of disaster assistance depend on the severity of the damage and the declarations that result from the disaster event. The following subsections describe the general types of assistance that may be provided should the President of the United States declare the event a major disaster.

Individual Assistance (IA)

Individual Assistance (IA) provides help for homeowners, renters, businesses, and some non-profit entities after disasters occur. This program is largely funded by the U.S. Small Business Administration. For homeowners



and renters, those who suffered uninsured or underinsured losses may be eligible for a Home Disaster Loan to repair or replace damaged real estate or personal property. Renters are eligible for loans to cover personal property losses. Individuals may borrow up to \$200,000 to repair or replace real estate, \$40,000 to cover losses to personal property and an additional 20% for mitigation. For businesses, loans may be made to repair or replace disaster damages to property owned by the business, including real estate, machinery and equipment, inventory and supplies. Businesses of any size are eligible. Non-profit organizations such as charities, churches, private and universities are also eligible. An Economic Injury Disaster Loan provides necessary working capital until normal operations resume after a physical disaster. These loans are restricted, by law, to small businesses only.

Public Assistance (PA)

Public Assistance (PA) provides cost reimbursement aid to local governments (state, county, local, municipal authorities, and school districts) and certain non-profit agencies that were involved in disaster response and recovery programs or that suffered loss or damage to facilities or property used to deliver government-like services. This program is largely funded by FEMA with both local and state matching contributions required.

Small-Business Administration (SBA) Loans

Small Business Administration (SBA) loans provides low-interest disaster loans to homeowners, renters, business of all sizes, and most private nonprofit organizations. SBA disaster loans can be used to repair or replace the following items damaged or destroyed in a declared disaster: real estate, personal property, machinery and equipment, and inventory and business assets.

Homeowners may apply for up to \$200,000 to replace or repair their primary residence. Renters and homeowners may borrow up to \$40,000 to replace or repair personal property-such as clothing, furniture, cars, and appliances that have been damaged or destroyed in a disaster. Physical disaster loans of up to \$2 million are available to qualified businesses or most private nonprofit organizations.

Department of Homeland Security

The Homeland Security Grant Program (HSGP) plays an important role in the implementation of the National Preparedness System by supporting the building, sustainment, and delivery of core capabilities essential to achieving the National Preparedness Goal of a secure and resilient nation. The HSGP supports core capabilities across the five mission area of Prevention, Protection, Mitigation, Response, and Recovery based on allowable cost. The HSGP is comprised of three interconnected grant programs including the State Homeland Security Program (SHSP), Urban Areas Security Initiative (UASI), and the Operation Stonegarden (OPSG). Together, these grant programs fund a range of preparedness activities, including planning, organization, equipment purchase, training, exercises, and management and administration.

Community Development Block Grants (CDBG)

Community Development Block Grants (CDBG) are federal funds intended to provide low- and moderate-income households with viable communities, including decent housing, as suitable living environment, and expanded economic opportunities. Eligible activities include community facilities and improvements, roads and infrastructure, housing rehabilitation and preservation, development activities, public services, economic development, planning, and administration. Public improvements may include flood and drainage improvements. In limited instances, and during the times of "urgent need" (e.g., post disaster) as defined by the CDBG National Objectives, CDBG funding may be used to acquire a property located in a floodplain that was severely damaged by a recent flood, demolish a structure severely damaged by an earthquake, or repair a public facility severely damaged by a hazard event.



Community Development Block Grants-Disaster Recovery (CDBG-DR)

The National Disaster Resilience Competition will make \$1 billion available to communities that have been struck by natural disasters in recent years. The competition will promote risk assessment and planning and will fund the implementation of innovative resilience projects to better prepare communities for future storms and other extreme events. Funding for the competition is from the Community Development Block Grants-Disaster Recovery (CDBG-DR) appropriation provided by the 2013 Disaster Relief Appropriations Act (PL 113-2).

Federal Highway Administration - Emergency Relief

The Federal Highway Administration Emergency Relief is a grant program that may be used for repair or reconstruction of federal-aid highways and roads on federal lands which have suffered serious damage as a result of a disaster.

Federal Transit Administration - Emergency Relief

The Federal Transit Authority Emergency Relief is a grant program that funds capital projects to protect, repair, reconstruct, or replace equipment and facilities of public transportation systems. Administered by the Federal Transit Authority at the U.S. Department of Transportation and directly allocated to MTA and Port Authority, this transportation-specific fund was created as an alternative to FEMA PA.

Homeownership Repair and Rebuilding Fund

The Homeownership Repair and Rebuilding Fund provides grants up to an additional \$10,000 to eligible homeowners who have already qualified for FEMA housing assistance's maximum grant (\$31,900) and will not receive other assistance from private insurance or government agencies that would duplicate the grant's funding.

U.S. Economic Development Administration (USEDA)

The U.S. Economic Development Administration (USEDA) is an agency of the U.S. Department of Commerce that supports regional economic development in communities around the country. It provides funding to support comprehensive planning and makes strategic investments that foster employment creation and attract private investment in economically distressed areas of the United States. Through its Public Works Program, USEDPA invests in key public infrastructure, such as in traditional public works projects, including water and sewer systems improvements, expansion of port and harbor facilities, brownfields, multitenant manufacturing and other facilities, business and industrial parks, business incubator facilities, redevelopment technology-based facilities, telecommunications and development facilities. Through its Economic Adjustment Program, USEDPA administers its Revolving Loan Fund (RLF) Program, which supplies small businesses and entrepreneurs with the gap financing needed to start or expand their business in areas that have experienced or are under threat of serious structural damage to the underlying economic base.

New Jersey Environmental Infrastructure Trust (NJEIT)

The New Jersey Environmental Infrastructure Trust (NJEIT) is an independent state financing authority that provides low-interest rate loans to qualified borrowers in New Jersey for water quality and infrastructure projects. The NJEIT, partnering with NJDEP, offers short-term financing (bridge loans) and long-term disaster-recovery loan assistance.

New Jersey Economic Development Authority (NJEDA)

The New Jersey Economic Development Authority (NJEDA) is an independent state agency that provides tax incentives to foster development and employment growth and retention, financing for small and mid-sized businesses, revitalizes communities through redevelopment initiatives, and supports entrepreneurial



development by providing access to training and mentoring programs. With its large portfolio of some 30 varied programs and services, NJEDA can assist businesses, non-profits and developers to access capital, including tax-exempt and taxable bond financing, loans, loan guarantees, and business and tax incentives.

New Jersey Redevelopment Authority (NJRA)

The New Jersey Redevelopment Authority (NJRA) is an independent state financing authority committed exclusively to the redevelopment of New Jersey's urban areas. NJRA offers several financing resources including site acquisition funding, predevelopment assistance, several development assistance resources, and technical assistance.

New Jersey Housing and Mortgage Finance Agency (NJHMFA)

The New Jersey Housing and Mortgage Finance Agency (NJHMFA) is an independent state financing authority that provides affordable home ownership and housing opportunities for New Jersey residents by funding affordable home mortgages for first-time home buyers, promoting construction and rehabilitation of rental housing, and encouraging mixed-income owner-occupied housing growth. NJHMFA provides low-interest financing and administers low-income housing tax credits for the State of New Jersey's low and moderate income communities.

New Jersey Department of Community Affairs (NJDCa)

The New Jersey Department of Community Affairs (NJDCa) is a state agency created to provide administrative guidance, financial support, and technical assistance to local governments, community development organizations, businesses, and individuals to improve the quality of life in New Jersey. NJDCa offers a wide range of programs, funding, and services that respond to issues of public concern including fire and building safety, housing production, community planning and development, and local government management and finance. Among other funding sources, NJDCa administers CDBG funding and is typically the CDBG-DR funding recipient for the State of New Jersey.

6.5 MITIGATION STRATEGY DEVELOPMENT AND UPDATE

As required by FEMA, the County and participating municipalities completed a comprehensive evaluation of the mitigation strategies and actions from the 2011 HMP and reported on the status of each. Their update may be found in each jurisdictional annex (Section 9). In addition, the county and participating municipalities were provided the opportunity to include new strategies or actions to include in the 2016 HMP Update. New actions were prioritized to ensure they are cost-effective, environmentally sound, and technically feasible using the methodology outlined below.

6.5.1 Strengths, Weaknesses, Opportunities, and Obstacles (SWOO)

In April 2015, a Strengths, Weaknesses, Opportunities, and Obstacles (SWOO) session was held with the Planning Committee. The purpose of this session was to identify strengths, weaknesses, opportunities and obstacles in hazard mitigation within Sussex County through a facilitated brainstorming session on risks, vulnerabilities, and capabilities. All information shared during this session was recorded and used to prepare catalogs of mitigation alternatives to be used by the Planning Committee in preparing their individual jurisdictional annexes. Many of the strategies (such as community outreach) identified in the catalogs could be applied to multiple hazards. This 2016 HMP update identifies strategies for multiple hazards for Sussex County and each jurisdictional annex for participating jurisdictions (Section 9).



Catalog of Mitigation Actions

Based on information gathered during the SWOO session, the Planning Committee and planning consultant generated a mitigation catalog which includes a comprehensive list of mitigation actions that could manipulate the hazard, reduce exposure to the hazard, reduce vulnerability to the hazard, and to increase the ability to respond to or be prepared for a hazard for Sussex County (Appendix B). The catalog was generated to meet the following objectives:

- Use information obtained from the public involvement strategy
- Use information provided in the risk assessment
- Seek mitigation actions consistent with the goals and objectives for the Sussex County Multi-Jurisdictional Plan update
- Create catalogs of mitigation actions to be used as a tool by the Planning Committee in selection of mitigation actions

In addition, the catalog indicates responsibility for implementation (i.e., who would most likely implement the initiative: personal property owners, private sector business, or government). Based on the risk assessment, the hazards included in the catalog are deemed to be those to which the planning area is most vulnerable.

The catalog is not meant to be exhaustive or site-specific but rather to inspire thought and provide members of the Planning Committee a baseline of initiatives backed by a planning process, consistent with the goals and objectives of the planning area, and within the capabilities of the participants. The Planning Committee was not bound to these actions. They had the opportunity to add further actions subsequent to the SWOO workshops. Actions in the catalog that were not selected by the partners to include in their jurisdictional annexes were not selected based on the following:

- Action is currently outside the scope of capabilities (funding)
- The jurisdiction is not vulnerable to the hazard
- Action is already being implemented

All proposed mitigation actions were identified in relation to the goals and objectives presented above. The mitigation actions include a range of options in line with the four types of mitigation actions described in FEMA guidance (FEMA's *Local Mitigation Planning Handbook* March 2013).

6.5.2 Update of Municipal Mitigation Strategies

To evaluate progress on local mitigation actions, each municipality was tasked to review and provide the status of their local mitigation strategy in the 2011 FEMA-approved Sussex County HMP, via a Mitigation Action Plan Review Worksheet. Each worksheet was pre-populated with those actions identified for their jurisdiction in the prior plan. For each action, municipalities that participated in the 2011 HMP were asked to indicate the status of each action ("No Progress/Unknown," "In Progress/Not Yet Complete," "Continuous," "Completed," "Discontinued"), and provide review comments on each. Municipalities were requested to quantify the extent of progress, and provide reasons for the level progress or why actions were discontinued. Each jurisdictional annex provides a table identifying their prior mitigation strategy, the status of those actions and initiatives, and their disposition within their updated strategy.

Local mitigation actions identified as "Complete" and those actions identified as "Discontinued," have been removed from the updated strategies. Those local actions that municipalities identified as "No Progress/Unknown," "In Progress/Not Yet Complete," as well as certain actions/initiatives identified as "Continuous," have been carried forward in their local updated mitigation strategies, if still deemed appropriate



and a priority. Municipalities were asked to provide further details on these projects to help better define the projects, identify benefits and costs, and improve implementation.

Certain continuous or ongoing strategies represent programs that are, or since the 2011 plan have become, fully integrated into the normal operational and administrative framework of the community. Such programs and initiatives have been identified within the Capabilities section of each annex, and removed from the updated mitigation strategy.

The County hosted and participated in a mitigation action workshop in April 2015 and was provided the Sussex County hazard mitigation catalog (Appendix X) as well as the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013).

In addition, the Steering Committee and planning consultant held one-on-one meetings with municipalities, or assisted via conference call to support mitigation strategy development (refer to Table 3-3 in Section 3). The goals of these workshops and meetings were to: (1) evaluate progress on previously identified mitigation actions from the 2011 HMP; (2) review and evaluate a comprehensive range of mitigation strategies for consideration; (3) provide the tools and guide the municipalities on identifying and prioritizing selected mitigation actions; and (4) discuss integration of mitigation activities into daily operations. All municipalities attended these small-scale workshops which began the development of their jurisdictional annexes.

All participating municipalities were provided capture tools (Mitigation Action Worksheets) to further assist in assessing the risk, evaluating potential actions/projects (qualitative alternatives analysis), and identifying new actions for implementation.

The county and municipalities identified projects that have been submitted to NJOEM for grant funding, including projects for which Letters of Intent (LOI) and grant applications have been submitted under the Hurricane Sandy HMGP. In general, LOI/application-based projects submitted directly by the communities are identified within their updated mitigation strategies. Communities may also have included other LOI/application-based projects submitted by special-purpose districts (e.g., fire or school districts), local utilities, and hospitals and health care entities.

From April 2015 to March 2016, members of the Planning Committee and the planning consultant worked directly with each community (phone, email, local support meetings) to assist with the development and update of their annex and include mitigation strategies, focusing on identifying well-defined, implementable projects with a careful consideration of benefits (risk reduction, losses avoided), costs, and possible funding sources (including mitigation grant programs).

As new additional potential mitigation actions, projects, or initiatives became evident during the plan update process, included as part of the risk assessment update and as identified through the public and stakeholder outreach process (see Section 3), communities were made aware of these either through direct communication (local meetings, email, phone) or via their draft municipal annexes.

To help support the selection of an appropriate, risk-based mitigation strategy, each annex provides a summary of hazard vulnerabilities identified during the plan update process, either directly by municipal representatives, through review of available county and local plans and reports, or through the hazard profiling and vulnerability assessment process.



Concerted efforts were made to assure that municipalities develop updated mitigation strategies that included activities and initiatives covering the range of mitigation action types described in recent FEMA planning guidance (FEMA's *Local Mitigation Planning Handbook* March 2013). This specifically includes:

- **Local Plans and Regulations** – These actions include government authorities, policies, or codes that influence the way land and buildings are being developed and built.
- **Structure and Infrastructure Projects** – These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct man-made structures to reduce the impact of hazards.
- **Natural Systems Protection** – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- **Education and Awareness Programs** – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as the NFIP and CRS, StormReady (NOAA) and Firewise (NFPA) Communities.

In consideration of federal and state mitigation guidance, the Planning Committee recognized that all municipalities would benefit from the inclusion of certain mitigation initiatives. These include initiatives to address vulnerable public and private properties, including RL and SRL properties; initiatives to support continued and enhanced participation in the NFIP; improved public education and awareness programs; and initiatives to support county-wide and regional efforts to build greater local mitigation capabilities.

In May 2015, a second mitigation strategy workshop was conducted by the planning consultant; both, FEMA Region II and NJOEM were invited. The purpose of the second workshop was for all participating jurisdictions to support receive additional assistance on the identification, evaluation, and prioritization of local mitigation strategies, as well as how to present and document this process within the plan. The following significant modifications to the mitigation strategy identification, update, and documentation process were made:

- An overarching effort has been made to better focus local mitigation strategies to clearly defined, readily actionable projects and initiatives that meet the definition or characteristics of mitigation.
- Per NJOEM's advice, broadly defined mitigation objectives were maintained if the community felt it were appropriate to ensure eligibility in the future. For example, if a community has numerous RL properties however specific projects/property-owner interest is not solidified at this time, a general action was maintained to ensure future eligibility.
- Certain continuous or ongoing strategies that represent programs that are, or since the 2011 HMP have become, fully integrated into the normal operational and administrative framework of the community have been identified within the Capabilities section of each annex, and removed from the updated mitigation strategy.
- Where applicable, mitigation projects have been documented with an action worksheet, based on FEMA's Action Worksheet templates and within recent guidance documents. These action worksheets and prioritization tables appear at the end of each jurisdiction's annex.

On September 2015, a webinar was held to provide participating jurisdictions an additional opportunity to ask questions and receive assistance on their mitigation strategy. Municipal annex-support meetings were offered and held throughout the planning process to further assist participants (refer to Table 3-3, Section 3).

Overall a comprehensive-range of specific mitigation initiatives were considered by each plan participant to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried



forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected. Table 6-3 lists the common mitigation actions identified across a majority of the communities.

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Table 6-1. Comprehensive Range of Mitigation Actions

Municipality	Acquisitions & Elevations	Drainage / Stormwater	Education & Awareness	Generators	Natural Systems Protection	Structure & Infrastructure	Local Plans & Regulations
Sussex County	X		X	X	X	X	X
Andover Borough			X	X	X	X	
Andover Township		X	X	X	X	X	X
Branchville Borough	X		X		X		X
Byram Township	X	X	X	X		X	X
Frankford Township		X	X	X			X
Franklin Borough	X		X	X		X	X
Fredon Township		X	X	X		X	X
Green Township		X	X	X	X	X	X
Hamburg Borough		X	X	X	X	X	X
Hampton Township		X	X	X			X
Hardyston Township		X	X	X		X	X
Hopatcong Borough		X	X	X	X	X	X
Lafayette Township	X	X	X	X	X	X	
Montague Township	X		X	X	X	X	X
Town of Newton	X	X	X	X		X	X
Ogdensburg Borough	X		X	X	X		X
Sandyston Township			X	X		X	
Sparta Township		X	X	X	X	X	
Stanhope Borough			X	X		X	X
Stillwater Township	X		X	X			
Sussex Borough		X	X	X	X	X	
Vernon Township							X
Walpack Township							
Wantage Township			X	X			X



6.5.3 Update of County Mitigation Strategies

The update of the county-level mitigation strategies was very similar to the municipal update. It included a review of progress on the actions/initiatives identified in the 2011 HMP, using a process similar to that used to review municipal mitigation strategy progress. The county, through their various department representatives, was provided with a Mitigation Action Plan Review Worksheet identifying all of the county-level actions/initiatives from the 2011 HMP. For each action, relevant county representatives were asked to indicate the status of each action (“No Progress/Unknown,” “In Progress/Not Yet Complete,” “Continuous,” “Completed,” or “Discontinued”), and provide review comments on each.

Projects/initiatives identified as “Complete,” as well as though actions identified as “Discontinued,” have been removed from this 2016 HMP update. Those actions the county has identified as “No Progress/Unknown,” “In Progress/Not Yet Complete,” or “Continuous” that are still considered a priority and are relevant, have been carried forward in the county’s updated mitigation strategy.

Throughout the course of the 2016 HMP update process, additional regional and county mitigation actions have been identified. These were identified through:

- Review of the results and findings of the updated risk assessment
- Review of the findings of the SWOO
- Review of available regional and county plans, reports, and studies
- Direct input from county departments, including:
 - Office of Emergency Management
 - Department of Public Works
 - Department of Planning, Economic Development and Land Use
 - Health Services Division
 - County Architect

In November 2015, a Steering Committee was held to provide County departments an additional opportunity to complete the county annex and provide input on the updated mitigation strategy (refer to Table 3-3, Section 3).

6.5.4 Mitigation Strategy Evaluation and Prioritization

Section 201.6(c)(3)(iii) of the 44 CFR requires an action plan describing how the identified actions will be prioritized. Recent FEMA planning guidance (March 2013) identifies a modified Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) mitigation action evaluation methodology that uses a set of 10 evaluation criteria suited to the purposes of hazard mitigation strategy evaluation. This method provides a systematic approach that considers the opportunities and constraints of implementing a particular mitigation action.

Based on this guidance, the Steering and Planning Committees have developed and applied an action evaluation and prioritization methodology which includes an expanded set of 14 criteria to include the consideration of cost-effectiveness, availability of funding, anticipated timeline, and if the action addresses multiple hazards.

The 14 evaluation/prioritization criteria used in the 2016 HMP update process are:

- 1) Life Safety – How effective will the action be at protecting lives and preventing injuries?
- 2) Property Protection – How significant will the action be at eliminating or reducing damage to structures and infrastructure?
- 3) Cost-Effectiveness – Are the costs to implement the project or initiative commensurate with the benefits achieved?



- 4) Technical – Is the mitigation action technically feasible? Is it a long-term solution? Eliminate actions that, from a technical standpoint, will not meet the goals.
- 5) Political – Is there overall public support for the mitigation action? Is there the political will to support it?
- 6) Legal – Does the municipality have the authority to implement the action?
- 7) Fiscal – Can the project be funded under existing program budgets (i.e., is this initiative currently budgeted for)? Or would it require a new budget authorization or funding from another source such as grants?
- 8) Environmental – What are the potential environmental impacts of the action? Will it comply with environmental regulations?
- 9) Social – Will the proposed action adversely affect one segment of the population? Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?
- 10) Administrative – Does the jurisdiction have the personnel and administrative capabilities to implement the action and maintain it or will outside help be necessary?
- 11) Multi-hazard – Does the action reduce the risk to multiple hazards?
- 12) Timeline – Can the action be completed in less than 5 years (within our planning horizon)?
- 13) Local Champion – Is there a strong advocate for the action or project among the jurisdiction’s staff, governing body, or committees that will support the action’s implementation?
- 14) Other Local Objectives – Does the action advance other local objectives, such as capital improvements, economic development, environmental quality, or open space preservation? Does it support the policies of other plans and programs?

Participating jurisdictions were asked to use these criteria to assist them in evaluating and prioritizing all mitigation actions identified in the 2016 HMP update (previously identified actions that were carried forward and new mitigation actions). Specifically, for each mitigation action, the jurisdictions were asked to assign a numeric rank (-1, 0, or 1) for each of the 14 evaluation criteria, defined as follows:

- 1 Highly effective or feasible
- 0 Neutral
- -1 Ineffective or not feasible

Further, jurisdictions were asked to provide a brief summary of the rationale behind the numeric rankings assigned, as applicable. The numerical results of this exercise were then used by each jurisdiction to help prioritize the action or strategy as “Low,” “Medium,” or “High.” While this provided a consistent, systematic methodology to support the evaluation and prioritization of mitigation actions, jurisdictions may have additional considerations that could influence their overall prioritization of mitigation actions.

For the 2016 HMP update there has been an effort to develop more clearly defined and action-oriented mitigation strategies. These local strategies include projects and initiatives that have been well-vetted, and are seen by the community as the most effective approaches to advance their local mitigation goals and objectives within their capabilities. As such, many of the initiatives in the updated mitigation strategy were ranked as “High” or “Medium” priority, as reflective of the community’s clear intent to implement, available resources notwithstanding. In general, initiatives that would have had “Low” priority rankings were appropriately screened out during the local action evaluation process.



6.5.5 Benefit/Cost Review

Section 201.6(c)(3)(iii) of the 44 CFR requires the prioritization of the action plan to emphasize the extent to which benefits are maximized according to a benefit/cost review of the proposed projects and their associated costs. Stated otherwise, cost-effectiveness is one of the criteria that must be applied during the evaluation and prioritization of all actions comprising the overall mitigation strategy.

The benefit/cost review applied for the evaluation and prioritization of projects and initiatives in this 2016 HMP update process was qualitative; that is, it does not include the level of detail required by FEMA for project grant eligibility under the HMGP and PDM grant programs. For all actions identified in the local strategies, jurisdictions have identified both the costs and benefits associated with a project, action, or initiative.

Costs are the total cost for the action or project, and may include administrative costs, construction costs (including engineering, design and permitting), and maintenance costs.

Benefits are the savings from losses avoided attributed to the implementation of the project, and may include life-safety, structure and infrastructure damages, loss of service or function, and economic and environmental damage and losses.

When available, jurisdictions were asked to identify the actual or estimated dollar value for project costs and associated benefits. Having defined costs and benefits allows a direct comparison of benefits versus costs, and a quantitative evaluation of project cost-effectiveness. Often, however, numerical costs and/or benefits have not been identified, or may be impossible to quantitatively assess.

For the purposes of this planning process, jurisdictions were tasked with evaluating project cost-effectiveness with both costs and benefits assigned to “High,” “Medium,” and “Low” ratings. Where quantitative estimates of costs and benefits were available, ratings/ranges were defined as:

- Low < \$10,000
- Medium \$10,000 to \$100,000
- High > \$100,000

Where quantitative estimates of costs and/or benefits were not available, qualitative ratings using the definitions presented in Table 6-4 were used.



Table 6-2. Qualitative Cost and Benefit Ratings

Costs	
High	Existing funding levels are not adequate to cover the costs of the proposed project, and implementation would require an increase in revenue through an alternative source (e.g., bonds, grants, and fee increases).
Medium	The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
Low	The project could be funded under the existing budget. The project is part of or can be part of an existing, ongoing program.
Benefits	
High	Project will have an immediate impact on the reduction of risk exposure to life and property.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property or will provide an immediate reduction in the risk exposure to property.
Low	Long-term benefits of the project are difficult to quantify in the short term.

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial and are prioritized accordingly.

For some of the Sussex County initiatives identified, the Planning Committee may seek financial assistance under FEMA's HMGP or HMA programs. These programs require detailed benefit/cost analysis as part of the application process. These analyses will be performed when funding applications are prepared, using the FEMA benefit/cost analysis model process. The Planning Committee is committed to implementing mitigation strategies with benefits that exceed costs. For projects not seeking financial assistance from grant programs that require this sort of analysis, the Planning Committee reserves the right to define "benefits" according to parameters that meet its needs and the goals and objectives of this HMP.



SECTION 7. PLAN MAINTENANCE PROCEDURES

This section describes the system that Sussex County and all participating jurisdictions have established to monitor, evaluate, and update the mitigation plan; implement the mitigation plan through existing programs; and solicit continued public involvement for plan maintenance.

2016 Plan Update Changes

- For the 2016 HMP update, 'Plan Maintenance Procedures' is maintained as Section 7. This section has been updated.

7.1 Monitoring, Evaluating, and Updating the Plan

The procedures for monitoring, evaluating, and updating the plan are provided below.

The Sussex County Deputy Emergency Management Coordinator, Corporal Mark W. Vogel, will remain Sussex County's Hazard Mitigation Coordinator, to provide leadership and continuity for plan maintenance to ensure the over-arching, long term goals of the plan are addressed.

Each participating jurisdiction will maintain a representative on the Planning Committee who shall fulfill the monitoring, evaluation and updating responsibilities identified in this Section. Table 7-1 identifies the representation of the planning partnership (Steering and Planning Committee members) as of the date of this plan as indicated in each of the annexes in Section 9. It is recognized that individual commitments change over time, and it shall be the responsibility of each jurisdiction and its representatives to inform the HMP Coordinator of any changes in representation. The HMP Coordinator will strive to keep the committee makeup as a uniform representation of planning partners and stakeholders within the planning area.

Table 7-1. Sussex County Hazard Mitigation Planning Partnership

Organization	Name	Title	Municipal POC	
			POC	Alternate POC
Sussex County Sheriff's Office, Division of Emergency Management	Sheriff Michael F. Strada	Sheriff, Emergency Management Coordinator	Steering Committee	
Sussex County Sheriff's Office, Division of Emergency Management	Corporal Mark Vogel	Deputy Emergency Management Coordinator	Steering Committee	
Sussex County Division of Public Works	Scott House	Director	Steering Committee	
Sussex County County Administrator	Ronald Tappan	County Administrator	Steering Committee	
Sussex County Engineering Department	William J. Koppenaal	Assistant County Engineer	Steering Committee	
Sussex County Department of Central and Shared Services	Ronald L. Tappan	Administrator	Steering Committee	
Sussex County Division of Planning	Eric Snyder	Planning Director	Steering Committee	
Sussex County EMS	Rourke Day	EMS Coordinator	Steering Committee	
Andover Borough	John Hoag	Deputy OEM	X	



Organization	Name	Title	Municipal POC	
			POC	Alternate POC
	Beth Brothman	Municipal Clerk/Registrar		X
Andover Township	Chief Eric Danielson	Emergency Management Coordinator	X	
	Ptl. Georgios Laoudis	Deputy Coordinator		X
Branchville Borough	Jeff Lewis	OEM Coordinator	X	
	Christopher Franek	Deputy OEM		X
Byram Township	Joseph Sabatini	Township Manager	X	
	James Oscovitch	Mayor		X
Frankford Township	Patricia Bussow	Municipal Clerk	X	
	TBD			
Franklin Borough	Jim Williams	OEM Coordinator	X	
	Brian VanDenBroek	DPW Supervisor		X
Fredon Township	John A. W. Richardson	Township Committeeman/OEM Coordinator	X	
	Virgil Rome	Deputy OEM		X
Green Township	Linda Peralta	Clerk/Administrator	X	
	Peg Phillips	Mayor		X
Hamburg Borough	Keith Sukennikoff	OEM Coordinator	X	
	Michael Schneider	DPW/Road Supervisor		X
Hampton Township	Eileen Klose	Township Administrator	X	
	Edward Hayes	OEM Coordinator		X
Hardyston Township	William Hickerson	OEM Coordinator	X	
	Marianne Smith	Township Manager		X
Hopatcong Borough	Sylvia Petillo	Mayor/OEM Coordinator	X	
	Robert Elia	Borough Administrator		X
Lafayette Township	Rich Hughes	OEM Coordinator	X	
	Bill Macko	Deputy OEM Coordinator		X
Montague Township	Jesse Brace-Revak	OEM Coordinator	X	
	Eileen DeFabiis	Municipal Clerk		X
Town of Newton	Kenneth Teets	OEM Coordinator	X	
	Debra Millikin	Deputy Town Manager		X
Ogdensburg Borough	Steven Ciasullo	Mayor	X	
	Phyllis Drouin	RMC		X
Sandyston Township	Stanley J. Dukus	Deputy OEM Coordinator	X	



Organization	Name	Title	Municipal POC	
			POC	Alternate POC
	Amanda F. Lobban	Municipal Clerk		X
Sparta Township	Ernest Reigstad	Police Chief	X	
	Eric Powell	Municipal Engineer		X
Stanhope Borough	Brian McNeilly	Borough Administrator	X	
	Eric Keller	Borough Engineer		X
Stillwater Township	George Scott	Mayor	X	
	Lynda Knott	Municipal Clerk		X
Sussex Borough	Floyd Southard	OEM Coordinator	X	
	Mark Zsack	Borough Administrator		X
Vernon Township	Harry Shortway	Mayor	X	
	Ken Clark	OEM Coordinator		X
Walpack Township	Victor Maglio	Mayor	X	
	N/A			
Wantage Township	TBD	Clerk/Administrator	X	
	Joseph Konopinski	OEM Coordinator		X

Notes: POC = Point of Contact

*County HMP Coordinator

7.1.1 Monitoring

The planning partnership (Steering and Planning Committees) shall be responsible for monitoring progress on, and evaluating the effectiveness of, the HMP, and documenting annual progress. Each year, beginning one year after plan development, County and planning partnership representatives will collect and process information from the departments, agencies and organizations involved in implementing mitigation projects or activities identified in their jurisdictional annexes (Volume II, Section 9) of this HMP update. They will be responsible for contacting persons responsible for initiating and/or overseeing the mitigation projects and reporting on project progress.

To standardize and facilitate collection of progress data and information on specific mitigation actions, the Sussex County HMP Coordinator will develop a progress matrix that will be distributed to the Steering and Planning Committee members prior to the scheduled annual Planning Committee meeting. FEMA guidance worksheets and the example progress matrix are provided in Appendix G. This information shall be provided to the HMP Coordinator prior to the annual Planning Committee meeting to be held approximately one year from the date of County adoption of this update, and successively thereafter.

The information that Steering and Planning Committee representatives shall be expected to document, as needed and appropriate include:

- Any grant applications filed on behalf of any of the participating jurisdictions;
- Hazard events and losses occurring in their jurisdiction;
- Progress on the implementation of mitigation actions, including efforts to obtain outside funding;



- Obstacles or impediments to implementation of actions;
- Additional mitigation actions believed to be appropriate and feasible; and
- Public and stakeholder input.

7.1.2 Evaluating

The evaluation of the HMP is an assessment of whether the planning process and actions have been effective, if the HMP goals are being reached, and whether changes are needed. The HMP will be evaluated on an annual basis to determine the effectiveness of the programs, and to reflect changes that may affect mitigation priorities or available funding.

The status of the HMP will be discussed and documented at an annual plan review meeting of the Planning Committee, to be held approximately one year from the date of local adoption of this update, and successively thereafter. This meeting will be held concurrent with municipal OEM Coordinator and County Working Group (CWG) meetings to ensure full representation and participation. At least two weeks before the annual plan review meeting, the HMP Coordinator will advise Planning Committee members of the meeting date, agenda and expectations of the members.

The HMP Coordinator will be responsible for calling and coordinating the annual plan review meeting, and assessing progress toward meeting plan goals and objectives. These evaluations will assess whether:

- Goals and objectives address current and expected conditions.
- The nature or magnitude of the risks has changed.
- Current resources are appropriate for implementing the HMP and if different or additional resources are now available.
- Actions were cost effective.
- Schedules and budgets are feasible.
- Implementation problems, such as technical, political, legal or coordination issues with other agencies are presents.
- Outcomes have occurred as expected.
- Changes in County or municipal resources impacted plan implementation (e.g., funding, personnel, and equipment)
- New agencies/departments/staff should be included, including other local governments as defined under 44 CFR 201.6.

Specifically, the planning partnership will review the mitigation goals, objectives, and activities using performance based indicators, including:

- | | |
|---|----------------------------------|
| • New agencies/departments | • Timeframes |
| • Project completion | • Budgets |
| • Under/over spending | • Lead/support agency commitment |
| • Achievement of the goals and objectives | • Resources |
| • Resource allocation | • Feasibility |

Finally, the planning partnership will evaluate, support and complement how other programs and policies have conflicted or augmented planned or implemented measures, and shall identify policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions (see the “Implementation of Mitigation Plan through Existing Programs” subsection later in this Section). Other plans, programs and policies can include those that address:



- Economic Development
- Environmental Preservation
- Historic Preservation
- Redevelopment
- Health and/or safety
- Parks and Recreation
- Land use/zoning
- Public Education and Outreach
- Transportation
- Redevelopment Plans (e.g., Brownfields)

The planning partnership may refer to the evaluation forms, Worksheets #6.1, 6.2, 7.1, and 7.2 in the FEMA Local Mitigation Planning Handbook (March 2013) guidance document, to assist in the evaluation process (Appendix G).

The HMP Coordinator shall be responsible for preparing an Annual HMP Progress Report, based on the provided local annual progress reports from each participant, information presented at the annual update meeting, and other information as appropriate and relevant. These annual reports will provide data for the 5-year update of this HMP and will assist in pinpointing implementation challenges. By monitoring the implementation of the HMP on an annual basis, the planning partnership will be able to assess which projects are completed, which are no longer feasible, and what projects may require additional funding.

This report shall apply to all planning partners, and as such, shall be developed according to an agreed format and with adequate allowance for input and comment of each planning partner prior to completion and submission to the State Hazard Mitigation Officer. Each planning partner will be responsible for providing this report to its governing body for their review. During the annual update meeting, the planning partners shall establish a schedule for the draft development, review, comment, amendment and submission of the Annual HMP Progress Report to NJOEM.

The Annual HMP Progress Report shall be posted on the Sussex County Hazard Mitigation Plan website (<http://www.sussex.nj.us/Cit-e-Access/webpage.cfm?TID=7&TPID=11091>) to keep the public apprised of the plan's implementation. For communities who may choose to join or recertify themselves in the NFIP Community Rating System (CRS) program, this report will also be provided to each CRS participating community in order to meet annual CRS recertification requirements. To meet this recertification timeline, the planning partnership will strive to complete the review process and prepare an Annual HMP Progress Report by the end of the month in which the plan is approved by FEMA. For example, if the HMP update is approved by FEMA in July 2016, an HMP Progress Report will be prepared and submitted to NJOEM every July for the next five years.

7.1.3 Updating

44 CFR 201.6.d.3 requires that local hazard mitigation plans be reviewed, revised as appropriate, and resubmitted for approval in order to remain eligible for benefits awarded under DMA 2000. It is the intent of the Sussex County HMP Steering and Planning Committees to update this plan on a five-year cycle from the date of initial plan adoption.

To facilitate the update process, the HMP Coordinator, with support of the planning partnership, shall use the second annual update meeting to develop and commence the implementation of a detailed plan update program. The HMP Coordinator shall invite representatives from NJOEM to this meeting to provide guidance on HMP update procedures. This program shall, at a minimum, establish who shall be responsible for managing and completing the HMP update effort, what needs to be included in the updated HMP, and a detailed timeline with milestones to assure that the update is completed according to regulatory requirements.



At this meeting, the planning partnership shall determine what resources will be needed to complete the update including applying for funding to support the update. The HMP Coordinator shall be responsible for assuring that needed resources are secured.

Following each five-year update of the mitigation plan, the updated plan will be distributed for public comment. After all comments are addressed, the HMP will be revised and distributed to all planning group members and the New Jersey State Hazard Mitigation Officer.

7.2 Implementation of Mitigation Plan Through Existing 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 the county there are many existing plans and programs that support hazard risk management, and thus it is critical that this hazard mitigation plan integrate and coordinate with, and complement, those existing plans and programs.

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, the County and each participating jurisdiction have identified how they have 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”).

It is the intention of the planning partnership and all participating jurisdictions to incorporate mitigation planning as an integral component of daily government operations. Planning Committee members will work with local government officials to integrate the newly adopted hazard mitigation goals and actions into the general operations of government and partner organizations. Further, the sample adoption resolution (Section 2) includes a resolution item stating the intent of the local governing body to incorporate mitigation planning as an integral component of government and partner operations. By doing so, the Planning Committee anticipates that:

1. Hazard mitigation planning will be formally recognized as an integral part of overall emergency management efforts;
2. The Hazard Mitigation Plan, Emergency Operation Plans, and other planning documents (as appropriate) will become mutually supportive documents that work in concert to meet the goals and needs of county residents.

The information on hazard, risk, vulnerability and mitigation contained in this HMP is based on the best science and technology available at the time of the HMP’s preparation. It is recognized by all participating jurisdictions that this information can be invaluable in making decisions under other planning programs, such as comprehensive, capital improvement, and emergency management plans. Each jurisdictional annex (Section 9) provides a summary of where participating jurisdictions have incorporated hazard mitigation into their existing processes and programs. The proposed mitigation strategy tables include the new mitigation actions selected to further integrate mitigation into daily operations.

During the annual plan evaluation process, the Planning Committee will identify additional policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions, and include these findings and recommendations in the Annual HMP Progress Report.



7.3 Continued Public Involvement

Sussex County and participating jurisdictions are committed to the continued involvement of the public in the hazard mitigation process. Therefore, this HMP update will be posted on-line (<http://www.sussex.nj.us/Cit-e-Access/webpage.cfm?TID=7&TPID=11090>) for review.

In addition, public outreach and dissemination of the HMP update will/may include :

- Links to the plan on municipal websites of each jurisdiction with capability.
- Utilization of existing social media outlets (Facebook, Twitter) to inform the public of flood hazards and severe storm events. Educate the public via the jurisdictional websites on how these applications can be used in an emergency situation.
- Development of annual articles or workshops on natural hazards to educate the public and keep them aware of their dangers.

Planning Committee representatives and the Sussex County HMP Coordinator will be responsible for receiving, tracking, and filing public comments regarding this HMP. Contact information for the County is included in the Point of Contact information at the end of the Executive Summary and Section 3 of this document.

The public will have an opportunity to comment on the HMP via the hazard mitigation website at any time. The HMP Coordinator will maintain this website, posting new information and maintaining an active link to collect public comments.

The public can also provide input at the annual review meeting for the HMP and during the next 5-year plan update. The HMP Coordinator is responsible for coordinating the HMP evaluation portion of the meeting, soliciting feedback, collecting and reviewing the comments, and ensuring their incorporation in the five-year plan update as appropriate. Additional meetings may also be held as deemed necessary by the planning group. The purpose of these meetings would be to provide the public an opportunity to express concerns, opinions, and ideas about the mitigation plan.

The Planning Committee representatives shall be responsible to assure that their jurisdiction assists with the following:

- Public comment and input on the plan, and hazard mitigation in general, are recorded and addressed, as appropriate.
- Appropriate links to the Hazard Mitigation Plan website (<http://www.sussex.nj.us/Cit-e-Access/webpage.cfm?TID=7&TPID=11091>) are included on municipal websites.
- Public notices are made as appropriate to inform the public of the availability of the HMP, particularly during HMP update cycles.

The HMP County Coordinator shall be responsible to assure that:

- Public and stakeholder comment and input on the HMP, and hazard mitigation in general, are recorded and addressed, as appropriate.
- The HMP website is maintained and updated as appropriate.
- Public notices, including media releases, are made as appropriate to inform the public of the availability of the HMP particularly during plan update cycles.
- Information collected will be efficiently incorporated in the HMP update.



SECTION 8. PLANNING PARTNERSHIP

2016 Plan Update Changes

- This is a new section to Sussex County's HMP.

8.1 BACKGROUND

Section 201.6.a (4) of Chapter 44 of the CFR states: “*Multi-jurisdictional plans (e.g. watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan.*” FEMA and NJOEM both encourage multi-jurisdictional planning. Therefore, in the preparation of the Sussex County HMP update, a planning partnership was formed to pursue grant funding for the plan and to meet DMA 2000 requirements for as many eligible local governments in Sussex County as possible.

DMA 2000 defines a local government as follows: “*Any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under state law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity.*”

8.1.1 Initial Solicitation and Letters of Intent

Sussex County solicited the participation of all cities, towns, townships, and boroughs in the county at the commencement of this project. All municipalities interested signed a “Letter of Intent” and/or a resolution committing their participation and resources to the development of the Sussex County HMP update. Table 8-1 lists those jurisdictions that elected to participate in the update process, and have met the minimum requirements of participation as established by the county and Steering Committee.

Table 8-1. Participating Sussex County Jurisdictions

Jurisdictions		
Andover Borough	Hamburg Borough	Sandyston Township
Andover Township	Hampton Township	Sparta Township
Branchville Borough	Hardyston Township	Stanhope Borough
Byram Township	Hopatcong Borough	Stillwater Township
Frankford Township	Lafayette Township	Sussex Borough
Franklin Borough	Montague Township	Vernon Township
Fredon Township	Town of Newton	Walpack Township
Green Township	Ogdensburg Borough	Wantage Township
Sussex County		



8.1.2 Planning Partner Expectations

The Planning Committee agreed to the following list of expectations:

- Review 2011 HMP goals and re-establish HMP update goals and objectives;
- Establish a timeline for completion of the HMP update;
- Ensure the HMP meets the requirements of DMA 2000, and FEMA and NJOEM guidance;
- Solicit and encourage the participation of regional agencies, a range of stakeholders, and citizens in the HMP development process;
- Assist in gathering information for inclusion in the HMP, including the use of previously developed reports and data;
- Organize and oversee the public involvement process and support outreach efforts in the community;
- Develop, revise, adopt, and maintain Volume I of the HMP in its entirety and the local jurisdictional annex in Volume II.

8.1.3 Jurisdiction Annex Templates

New to the Sussex County HMP update is a two-volume format, including jurisdictional annexes for each participating jurisdiction. While the local annex format is designed to document and assure local compliance with the DMA 2000 regulations, its greater purpose and function includes:

- Providing a locally relevant synthesis of the overall HMP that can be readily presented, distributed, and maintained;
- Facilitating local understanding of the community's risk to natural hazards;
- Facilitating local understanding of the community's capabilities to manage natural hazard risk, including opportunities to improve those capabilities;
- Facilitating local understanding of the efforts the community has taken, and plans to take, to reduce their natural hazard risk;
- Facilitating the implementation of mitigation strategies, including the development of grant applications;
- Providing a framework by which the community can continue to capture relevant data and information for future plan updates.

It is recognized that each jurisdiction's annex is a "living" document, and will continue to be improved as resources permit. As such, its design is intended to promote and accommodate continued efforts to maintain the currency and improve the effectiveness of the annex as the key tool, reference, and guiding document by which the jurisdiction will implement hazard mitigation locally. The following provides a description of the various elements of the jurisdictional annex.

Section 9.X.1: HMP Points of Contact: Identifies the hazard mitigation planning primary and alternate contacts, identified by the jurisdiction as of April 2015.

Section 9.X.2: Jurisdictional Profile: Provides an overview and profile of the jurisdiction, including an identification of areas of known and anticipated future development and the vulnerability of those areas to the hazards of concern.

Section 9.X.3: Natural Hazard Event History Specific to the Jurisdiction: Identifies hazard events that have caused significant impacts within the jurisdiction, including a summary characterization of those impacts as identified by the jurisdiction since the 2011 Sussex County HMP. The documentation of events and losses is critical to supporting the identification and justification of appropriate mitigation actions, including



providing critical data for benefit-cost analysis. It is recognized that this “inventory” of events and losses is a work-in-progress, and may continue to be improved as resources permit. As such, the lack of data or information for a specific event does not necessarily mean that the jurisdiction did not suffer significant losses during that event.

Section 9.X.4: Hazard Vulnerabilities and Ranking: This HMP update identifies and characterizes the broad range of hazards that pose risk to the entire planning area; however each jurisdiction has differing degrees of risk exposure and vulnerability aside from the whole. The local risk ranking serves to identify each jurisdiction’s degree of risk to each hazard as it pertains to them, supporting the appropriate selection and prioritization of initiatives that will reduce the highest levels of risk for each community.

Full data and information on the hazards of concern, the methodology used to develop the vulnerability assessments, and the results of those assessments that serve as the basis of these local risk rankings may be found in Section 5.

- **National Flood Insurance Program (NFIP) Summary:** Provides NFIP summary statistics for the jurisdiction.
- **Critical Facilities:** Identifies the number of critical facilities by type located in the FEMA-designated flood zones, based on the flood vulnerability assessment process presented in Section 5.
- **Other Vulnerabilities Identified by the Jurisdiction:** Presents other specific hazard vulnerabilities as identified by the jurisdiction.

Section 9.X.5: Capability Assessment: This subsection provides an inventory and evaluation of the jurisdiction’s tools, mechanisms, and resources available to support hazard mitigation and natural hazard risk reduction. Within the municipal annexes, the jurisdiction’s planning and regulatory, administrative and technical, and fiscal capabilities are presented, respectively. Further, within the municipal annexes, the municipality’s level of participation in state and federal programs is designed to promote and incentivize local risk reduction efforts.

NFIP: This subsection within the Capability Assessment documents the NFIP as implemented within the jurisdiction. This summary was based on surveys prepared by, and/or interviews conducted with, the NFIP Floodplain Administrators for each NFIP-participating community in the county. This subsection also identifies actions to enhance implementation and enforcement of the NFIP within the community.

Integration of Hazard Mitigation into Existing Planning Mechanisms: This subsection within the Capability Assessment identifies how the jurisdiction has integrated hazard risk management into their existing planning, regulatory and operational/administrative framework (“integration capabilities”), and/or how they intend to promote this integration (“integration actions”). Further information regarding federal, state, and local capabilities may be found in the Capability Assessment portion of Section 6.

Section 9.X.6: Mitigation Strategy and Prioritization

Past Mitigation Initiative Status: Where applicable, a review of progress on the jurisdiction’s prior mitigation strategy is presented, identifying the disposition of each prior action, project, or initiative in the jurisdiction’s updated mitigation strategy. Other completed or on-going mitigation activities that were not specifically part of a prior local mitigation strategy may be included in this sub-section as well.

Proposed Mitigation Strategy: A summary table is presented of the jurisdiction’s updated mitigation strategy. As indicated, applicable mitigation actions (or sturcutre/infrastructure actions), projects, and initiatives are further documented on an Action Worksheet which provides details on the project identification,



evaluation, prioritization and implementation process. These Action Worksheets are included at the end of the annex. In addition, a summary of the local mitigation strategy prioritization process discussed in Section 6 is presented in tabular format as well as an expanded version following the Action Worksheets.

Section 9.X.7: Future Needs to Better Understand Risk/Vulnerability: This subsection provides each jurisdiction the opportunity to identify any further needs to more fully understand their risk and/or vulnerability to the hazards of concern identified.

Section 9.X.8: Hazard Area Extent and Location: Each annex includes two maps illustrating identified hazard zones, critical facilities, and areas of NFIP RL and SRL properties. Further, these maps show areas of known or anticipated future development, as available and provided by the jurisdiction.

Workshops and additional meetings (via in person, email and/or teleconference) to complete the jurisdictional annexes were held with the Steering and Planning Committees throughout the planning process. In summary, all participating communities and the county completed the planning partner expectations and annex-preparation process. Details regarding these meetings are described further in Sections 3 (Planning Process) and 6 (Mitigation Strategy). Completed jurisdictional annexes are presented in Section 9.



9.1 SUSSEX COUNTY

This section presents the jurisdictional annex for the Sussex County.

9.1.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Michael F. Strada, Sheriff/DEM Coordinator Sussex County Sheriff's Office Bureau of Emergency Management 135 Morris Turnpike, Newton, NJ 07860 (973) 579-0380 E-Mail: mstrada@sussexcountysheriff.com	Corporal Mark W. Vogel, Deputy DEM Coordinator Sussex County Sheriff's Office Bureau of Emergency Management 135 Morris Turnpike, Newton, NJ 07860 (973) 579-0380 E-Mail: mvogel@sussexcountysheriff.com

9.1.2 County Profile

Please refer to Section 4, Volume I of this Plan for details on Sussex County's population, location, climate, history, growth and development.

9.1.3 Natural Hazard Event History Specific to Passaic County

Sussex County has a history of natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities.

9.1.4 Natural Hazard Risk/Vulnerability Risk Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, the County had the opportunity to adjust the final ranking based on feedback. The following summarizes the hazard vulnerabilities and their ranking in Sussex County. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.



Table 9.1-1. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	Medium
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$14,923,812 2,500-Year GBS: \$235,483,840	Occasional	28	Medium
Flood	1% Annual Chance: \$400,937,352	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$9,575,514,146	Frequent	39	High
Hurricane	100-year MRP: \$6,432,989 500-year MRP: \$46,529,142 Annualized: \$378,623	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$6,432,989 500-year MRP: \$46,529,142 Annualized: \$378,623	Frequent	48	High
Severe Winter Weather	1% GBS: \$201,574,696 5% GBS: \$1,007,873,480	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$1,327,559,728	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

GBS = General building stock; MRP = Mean return period.

- The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
- Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.



9.1.5 Capability Assessment

This section summarizes the following capabilities of the County. Refer to Section 6 (Mitigation Strategy – Capability Assessment) for additional details on County programs and capabilities.

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and community classification
- National Flood Insurance Program
- Integration of mitigation planning into existing and future planning mechanisms

Planning and Regulatory Capability

The table below summarizes the planning and regulatory tools that are available to Sussex County.

Table 9.1-1. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Division of Planning	Master Plan Study Report 2005 Strategic Growth Plan, updated 2014
Capital Improvements Plan	Yes (Partial), 2015	Local		Annual Capital Project Requests (Both in Summary and Detailed Forms)
Floodplain Management/Basin Plan	No			
Stormwater Management Plan	No			
Open Space Plan	Yes, 2003	Local	Sussex County Agriculture Development Board	Open Space and Recreation Plan
Stream Corridor Management Plan				
Watershed Management or Protection Plan	Yes, n.d.	Local	Division of Planning	Groundwater Manual
Economic Development Plan	Yes, 2009 and 2014	Local	Division of Planning, Vision 2020 Economic Strategy Committee	Target Business and Industry Analysis (2009), Sussex County Economic Base Assessment and Strategic Growth Plan Update (2014)
Comprehensive Emergency Management Plan	No			
Emergency Response Plan	Yes	Local	Office of Emergency Management	Emergency Operations Plan
Post-Disaster Recovery Plan	No			
Transportation Plan	Yes, n.d. (after 2000, before 2010), 2016		Division of Planning	Ten-Year Mobility Study (n.d.), Master Circulation Plan for Transportation (draft, 2016)
Strategic Recovery Planning Report	No			



Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Other Plans:	Yes, 2008	Local	Sussex County Agriculture Development Board	Comprehensive Farmland Plan
	Yes, 2009	Local	Division of Planning	Land Development Standards
	Yes, n.d.	Local	Division of Planning	Natural Resources Inventory
	Yes, 2013	Local	Division of Planning	Solid Waste Management
Regulatory Capability				
Growth Management Ordinances	N/A	County, Local	N/A	Section 12.1 (2009) establishes the Strategic Growth Advisory Committee; Section 6.4b (2009) directs the Office of Environmental Resource Planning to balanced growth.
Site Plan Review Requirements	Yes, 2009	County, Local	Planning Division	NJSA 40:55D-1 et seq., Section 6.4
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes, 2009	County	Division of Emergency Management	Section 11.1b

Note: n.d. = No date

Administrative and Technical Capabilities

The table below summarizes potential staff and personnel resources available to Sussex County.

Table 9.1-2. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Planning Board, Board of Freeholders
Mitigation Planning Committee	Yes	Sussex County Pre-Disaster Mitigation Steering Committee (alternately, Working Group)
Environmental Board/Commission	Yes	Water Quality Policy Advisory Committee, Solid Waste Advisory Committee, Department of Environmental and Health Services
Open Space Board/Committee	Yes (Focused)	Agriculture Development Board
Economic Development Commission/Committee	No	Sussex County Economic Development Partnership (SCEDP)
Maintenance Programs to Reduce Risk	Yes	Sussex County DPW installs snow fencing; annually cleans storm drains and inspects storm drains pre- and post-storm events
Mutual Aid Agreements	Yes	Intra-County Agreements County Fire Box Alarms



		Norwest Region (Hunterdon, Somerset, Sussex, Warren) Statewide HazMat
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Planning Division, Engineering
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Division of Public Works—Office of Roads, Engineering
Planners or engineers with an understanding of natural hazards	Yes	Planning Division
NFIP Floodplain Administrator	No	
Surveyor(s)	No	
Personnel skilled or trained in GIS and/or Hazus-MH applications	Yes	Office of GIS Management
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	Sherriff's Office—Office of Emergency Management
Grant Writer(s)	Yes	Planning Division
Staff with expertise or training in benefit/cost analysis	Yes	Sussex County Department of Finance
Professionals trained in conducting damage assessments	Yes	Sussex County Engineering and Division of Public Works, Sheriff Office of Emergency Management

Fiscal Capability

Mitigation projects and initiatives are largely or entirely dependent on available funding. The table below summarizes financial resources available to Sussex County.

Table 9.1-3. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No)
Community Development Block Grants (CDBG, CDBG-DR)	Yes
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	No
Impact Fees for homebuyers or developers of new development/homes	No
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	Yes
Open Space Acquisition Funding Programs	Yes
Corridor Enhancement Funds	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to Sussex County.

**Table 9.1-4. Education/Outreach and Community Classifications**

Program	Do you have this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	NP	N/A	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	N/A		
Public Protection (ISO Fire Protection Classes 1 to 10)	N/A		
Storm Ready	NP	N/A	N/A
Firewise	NP	N/A	N/A
Disaster/Safety Programs in/for Schools	Yes	L.E.A.D. (Sheriff's Office), Juvenile Fire Watch Program (Fire Marshal)	N/A
Organizations with Mitigation Focus (advocacy group, non-government)	No	N/A	N/A
Public Education Program/Outreach (through website, social media)	Yes	Social Media, Website (Prevention/ Preparedness, Notification, Mitigation, Public Health)	N/A
Public and Private Partnerships	Yes	Sussex/Warren COAD, and Sussex County Chamber of Commerce	

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc-program.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the County's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.



Table 9.1-5. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability	X – due to staffing and funding restrictions		
Administrative and Technical Capability	X – due to staffing and funding restrictions		
Fiscal Capability	X – due to staffing and funding restrictions		
Political Capability	X – due to staffing and funding restrictions		
Resiliency Capability	X – due to staffing and funding restrictions		
Capability to Integrate Mitigation into Processes and Activities.	X – due to staffing and funding restrictions		

Additional Capabilities

Please refer to following subsection (Integration of Hazard Mitigation Into Existing and Future Planning Mechanisms) and Section 6 for details on County capabilities.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

It is the intention of this County to incorporate hazard mitigation planning and natural hazard risk reduction as an integral component of the County's administrative, regulatory and operational framework. A summary of how the County currently integrates hazard mitigation into daily operations is presented below. In addition, the County identified specific integration activities that will be incorporated into procedures and are included in their updated mitigation strategy.

Planning

- Planning Department has a County Master Plan – working on a Master Circulation Plan (in draft) for transportation
- New action: The County will consider reviewing the HMP when updating the County Master Plan

The County has developed or participated in the development of a Master Plan, Annual Capital Project Requests, Open Space and Recreation Plan, Groundwater Manual, Target Business and Industry Analysis, Economic Base Assessment and Strategic Growth Plan, Emergency Operations Plan, Ten-Year Mobility Study, Comprehensive Farmland Plan, Land Development Standards, Natural Resources Inventory, and Solid Waste Management Plan. The County is currently working on a Master Circulation Plan (in draft) for transportation as well. Many of these plans consider floodplains, steep slopes, and other environmentally constrained areas; the County will also consider reviewing the HMP when updating the County Master Plan. Additionally, several of the plans consider smart or strategic growth practices.

The Board of Chosen Freeholders serves as the top governing body in Sussex County. They approve major initiatives, capital improvement spending, and other high level decisions for the County. Additionally, the Board sets policies for five major departments in the County—Department of Central and Shared Services, Department of Engineering and Planning, Department of Environmental and Public Health Services, Department of Finance and Library Services, and Department of Human Services—as well as the 12 Divisions and other boards, commissions, authorities, and committees in the County. The Freeholders are supported in their duties by the County Administrator.



The County participates in New Jersey's Radiological Program, per NJOEM's Radiological Program Guidelines, and shared appropriate informational pamphlets with residents on the Sheriff's Office website. Sussex County OEM is privy to hazardous materials (HazMat) and capabilities for response if needed.

Regulatory and Enforcement (Ordinances)

Many hazard mitigation and disaster preparedness regulations are enacted at the local level in Sussex County; however, the County supports its local jurisdictions in preparing and enforcing ordinance updates, as appropriate. The County also assists in Site Plan Reviews and provides other resources to ensure municipalities can meet State and Federal regulations.

Additionally, per the NJDEP requirements, the County DPW cleans catch basins each year and cleans in-let and outlets as needed or requested. If fall rains are forecasted, DPW makes sure the catch basins are clear and open; the County also marks the catch basins in the fall to identify their locations for the winter months. These activities are coordinated between DPW and Engineering on a daily basis, facilitated by both departments having the same administrator.

The County Right to Know Coordinator maintains effective coordination and information sharing related to hazardous material sites with NJOEM and the Right to Know Network. The Sussex County HAZMAT team integrates data about hazardous materials with most current available information about other risk factors, e.g. population, climate, other site-specific characteristics.

Operational and Administration

Sussex County DEM, Planning Division, and other relevant departments maintain relationships with the U.S. Army Corps of Engineers (USACE) and Rutgers University, along with other important regional stakeholders. These relationships help provide the county with technical information and/or assistance in the identification of hazard areas and risk assessments.

Sussex County DEM and the Planning Division encourage compliance with floodplain management as it relates to new and existing construction by integrating hazard mitigation practices with zoning, subdivision ordinances, comprehensive planning, and other land use tools at the municipal level.

The Board of Chosen Freeholders reviews information from county Engineering, DPW, and Planning Division to determine project priorities and release capital improvement funding. These projects include addressing roads that experience frequent flooding (i.e., roadway design and drainage improvements) or are otherwise vulnerable to disasters and hazards.

Funding

Operating Budget: The County's operating budget contains provisions for necessary capital and infrastructure projects, as well as public safety and mitigation initiatives. In the 2015 budget, the County identified \$315,116 to be allocated to emergency management (about \$8,000 more than was allocated in the 2014 budget). The County also funds other departments involved in mitigation, such as public health, planning, and public works.

Outside Funding: While much of the county's revenue comes from taxes and other fees, part of its revenue is grant-related or received through State Aid. This includes funding from the State Homeland Security Grant Program, Emergency Management Agency Assistance, funding from the NJ Department of Law and Public Safety for the County HMP Update, and other relevant programs. The County also participates in regional or multi-County grant funding opportunities, as needs dictate and opportunities arise.

Capital Projects: The County Capital Budget Request is the vehicle that County Departments use to undertake various projects, including mitigation, stormwater management, and drainage enhancements. The 2015 County budget provides detailed and summary versions of its Capital Budget Request; the detailed version groups



projects by relevant departments and categories. Projects of interest include road and bridge enhancements, stormwater improvements, fire security systems upgrades, and security upgrades.

Education and Outreach

Sussex County conducts public outreach regarding hazard mitigation through collaboration with local schools, colleges, and community groups. For instance, the County supports the American Society of Civil Engineers Future Cities Competition by way of Engineering Department mentoring a competing team. The competition will educate middle school students on planning and responding to storm events.

The county utilizes a wide variety of tools and forums to disseminate preparedness and alert information to as many residents as possible. The most widely used include the Sussex County DEM and Public Health websites and the Sussex County and DEM Facebook page. Sussex County DEM has a booth at the NJ State Fair with information on FEMA programs and mitigation. The County DPW also maintains a list of road closures on the County website (used during Irene and Sandy), and it sends out construction notices to local jurisdictions, which, in turn, distribute the information where needed. The figure below is of the Sussex County DEM webpage and provides an indication of the comprehensiveness of county resources.

The Sussex County DEM also oversees two community alert programs—Swift911 and Register Ready. Swift 911 enables the County to provide residents with critical information during hazard events. Residents can select to be notified by phone, e-mail, text message, hearing impaired devices, and more. Register Ready is a statewide program to ensure individuals with disabilities or who may need extra assistance can receive help or advance notification of an impending hazard event.

The Sussex County DEM conducts outreach to municipal Emergency Management Coordinators; Floodplain Administrators; departments of planning, public works, engineering, etc.; and other local officials regarding the importance of hazard mitigation planning and provision of municipal plans and data for planning purposes during related meetings (such as the Emergency Management Coordinator meetings). Sussex County DEM staff also attend New Jersey and other preparedness conferences as appropriate and as funding allows.

Sussex County maintains an Office of GIS Management, which provides multiple helpful links to residents, including the map applications for bridge and road closures, government services, and West Nile Virus surveillance. It also has prebuilt maps on property parcels, polling locations, watershed boundary (HUC 11), active storm paths, bedrock geology, wetlands, aerial photography, floodplains, and sewer service areas.

9.1.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

For the 2016 plan update, all previous county actions and their status are listed in the table below. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Figure 9.1-1. Sussex County DEM Webpage



Source: http://www.sussexcountysheriff.com/about/emergency_management/



Table 9.1-6. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2016 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
County Engineering 1	Hydrology study for flow impact at Vernon Crossing Bridge in support of potential new bridge.	County Engineer	Complete	This project was funded by FEMA and County funding		
County Engineering 2	Hydrology study of Neldon's Brook located at County Road 622 and Bridge S-25	County Engineer	No Progress	This is no longer a county priority	Discontinue	No longer a County priority.
County Facilities 1	Retrofit roof to meet current standards for snow load on County Department of Public Works building located on Route 206.	Director of Public Works	No Progress	No progress due to lack of funding	Include in 2016 HMP	Change Responsible Party to County Facilities.
County Facilities 2	Retrofit roof to meet current standards for snow load of original section of County Public Safety Training Academy located on Morris Turnpike.	County Facilities Director	No Progress	This is not a County-owned building	Discontinue	Cannot be completed by County as building is not owned by County.
County Facilities 3	Retrofit roof to meet current standards for snow load of the original Homestead Healthcare Facility building located on Morris Turnpike.	County Facilities Director	No Progress	This is not a County-owned building	Discontinue	Cannot be completed by County as building is not owned by County.
1.A.1	Develop All Hazards public education and outreach program for hazard mitigation and preparedness.	SCDEM and municipal OEM	Complete	This is a capability that is on-going (Facebook, at the NJ State Fair Sussex DEM has a booth on FEMA programs and mitigation).	Discontinue	Capability of the County - see Integration subsection.



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1.A.2	Initiate a public awareness program on local cable TV for hazard safety.	SCDEM and municipal OEM	No Progress	A very small audience watches local cable TV. The County will reach a bigger audience on FM radio – see new action to generate public awareness on the Sussex County College radio station.	Include in 2016 HMP	Refer to new action to conduct preparedness outreach on the new Sussex County College radio station.
1.A.3	Conduct yearly workshops related to the Federal Emergency Management Agency (FEMA) hazard mitigation grant programs, including Flood Mitigation Assistance (FMA) program, Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program, Severe Repetitive Loss (SRL) program, and Repetitive Flood Claim (RFC) program, with a focus on those aspects available to private firms and property owners.	SCDEM and NJOEM	In Progress	The County receives information from the State. NJOEM gave a presentation at the kick-off meeting at the start of the HMP planning process and at the mitigation strategy meeting. See more targeted revised action.	Include in 2016 HMP	Agency Lead: SCDEM and Engineering Revised action: Conduct annual workshop related to the FEMA HMA grant programs (HMGP, PDM, FMA). This may be done at quarterly OEM coordinator meetings and invite other County departments.



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1.A.4	Educate the public through NJOEM and New Jersey Forest Fire Service outreach programs and hazard mitigation workshops.	SCDEM, NJOEM, New Jersey Forest Fire Service	No Progress	Project will be revised for current County needs and capabilities.	Include in 2016 HMP	Agency Lead: SCDEM Coordinate a yearly program for public information on wildfire with NJ Forest Fire Service (Division A Liaison); and post this information on the County website regarding the wildfire hazard (including current information about fuel loads and conditions that may affect potential for fires).
1.B.1	Conduct yearly workshops related to FEMA hazard mitigation grant programs, including FMA, HMGP, PDM, SRL, and RFC (coordinated with Action 1.A.4, above).	SCDEM, NJOEM	In Progress	This is a duplicate of 1.A.3	Discontinue	Duplicate project
1.C.1	Reach out to municipal floodplain Administrators, departments of planning, public works, engineering, etc. regarding the importance of hazard mitigation planning and provision of municipal plans and data for planning purposes.	SCDEM and municipal OEM	In Progress	This is included as plan maintenance (see Section 7 of this HMP update)	Discontinue – incorporated as part of plan maintenance	This action is incorporated as part of the plan maintenance.



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2.A.1	Develop and maintain relationships with organizations that can provide technical information and/or assistance in the areas of hazard identification and risk assessment.	SCDEM, Rutgers University, NJGS, NOAA, and USACE	In Progress	This is the role of the SC OEM and they currently do this as part of their mission; current capability.	Discontinue	This is an ongoing, operational capability.
2.A.2	Undertake site-specific studies to better characterize flood risks to areas with extensive flood loss histories (see also municipal actions)	SCDEM and municipal OEM	No Progress	SCDEM and municipal OEM do not have this responsibility.	Discontinue	This is a Department of Engineering responsibility on a project-specific basis as needed.
2.A.3	Use best possible flood data, including Digital Flood Insurance Rate Map and Map Mod data, if available, in next plan update. Track implementation of Risk MAP initiative to ensure Sussex County and municipalities gain full advantage of opportunities under this program.	SCDEM and municipal OEM	Complete	The HMP update used best available flood data to update the risk assessment. This action is complete.		



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2.A.4	Bi-annually update and verify status of repetitive loss and severe repetitive loss lists from the National Flood Insurance Program (NFIP).	SCDEM and municipal OEM	No Progress	No progress.	Include in 2016 HMP	Combine with 1.A.3 above – request and distribute NFIP statistics to OEM coordinators at the County OEM Coordinator meetings; SCDEM will email the State for updated stats prior to meeting.
2.A.5	Inventory critical facilities to identify those in geographic areas that may be prone to high ground motion during earthquakes (due to proximity to faults or to soil characteristics), and those with structures that may be at risk during an earthquake.	SCDEM with support from NJGS	No Progress	There has been no progress due to the lack of funding. Engineering does not have the staff – need to contract out.	Include in 2016 HMP	Engineering Department has ASCE Publication 7 New lead: County Facilities and Engineering Inventory the critical facilities to identify those in geographic areas that may be prone to high ground motion during earthquakes (due to proximity to faults or to soil characteristics), and those with structures that may be at risk during an earthquake. Study will include determine soil and shake characteristics



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2.A.6	Coordinate with state efforts to prioritize critical facilities and conduct more detailed earthquake risk assessments, taking into account the relative importance of the facility and the level of seismic hazard.	SCDEM, FEMA, NJGS	No Program	This action has been incorporated into 2.A.5 and 2.A.7.	Discontinue	See 2.A.5 and 2.A.7-combined action for the update.
2.A.7	Work with New Jersey Geological Survey (NJGS) to determine soil and shake characteristics at specific sites that the county has identified as priority critical facilities with potential vulnerabilities to earthquake forces, and then work with engineers to develop appropriate projects.	SCDEM and municipal OEM	No Progress	No progress – see revised action and new agency lead	Include in 2016 HMP	Work to determine soil and shake characteristics at specific sites that the county has identified as priority critical facilities with potential vulnerabilities to earthquake forces. Based on these results, analyze the critical structures to determine if the structures are sound and next steps to further mitigate. New Leads: County Facilities and Engineering



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2.A.8	Coordinate with NJGS and other county, state and federal agencies to better identify specific sites in Sussex County that may be exposed to the effects of geo-hazards such as landslides, sinkholes, and subsidence.	SCDEM, municipal OEMs, NJDEP, NJGS	Complete	This has been mapped and information is at the Sussex County Soil Conservation District (book by Sylvester Fletcher). HMP update will conduct this evaluation based on critical facilities identified in the planning process.		
2.A.9	Using a prioritized list of state, county, and local facilities, coordinate with state effort to survey wind vulnerabilities, based on criteria such as age of the facility, value of operations, proximity to the coast, etc.	SCDEM, NJOEM, with cooperation of other agencies that own and/or operate the facilities, New Jersey State Climatologist	In Progress	Many buildings in the County were designed to 70 mph; now the code is 90 mph. NJDCA has a wind map – can be downloaded from their website	Include in 2016 HMP	Identify wind vulnerabilities at County critical facilities because buildings were designed to 70 mph; new updated code is 90 mph. New lead: County Facilities
2.A.10	Conduct wind risk assessments on a limited number of high-priority facilities that appear to be vulnerable to high winds. Assessments will use standard FEMA guidelines, procedures, and software, including the wind hazard database.	SCDEM and municipal OEMs	In Progress	See updated 2.A.9	Discontinue	Combined with action above. See updated action for 2.A.9



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2.A.11	Coordinate with state efforts to inventory or survey of prioritized areas to determine if there is a need for additional study or data collection related to wildfire and/or urban-interface fires. Focus of inventory/study will be on identifying areas where there exist vulnerable populations or built environment and/or areas where fuel loads and other conditions suggest potential wildfire risk.	SCDEM, municipal OEMs, NJFFS, NJOEM	No Progress	NJFFS is the lead for updating WUI areas in the state; not Sussex County.	Discontinue	County would not be the initiator of this project. Not appropriate as a County-led action.
2.A.12	Coordinate with state efforts to maintain current information about fuel loads and conditions that may affect potential for fires.	SCDEM, municipal OEMs, NJFFS	No Progress	NJFFS is the lead for updating WUI areas in the state, not Sussex County.	Discontinue	County would not be the initiator of this project. Not appropriate as a County-led action.
2.A.13	For areas with significant risk from wildfires or urban interface fires, perform detailed studies to objectively determine (a) potential for wildfires, including likely magnitude, & (b) vulnerabilities of surrounding populations, built environment, and functions.	SCDEM, municipal OEMs, NJFFS, NJOEM	No Progress	NJFFS will provide County with updated information. Interface is responsibility of municipalities.	Discontinue	County would not be the initiator of this project. Not appropriate as a County-led action.



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2.A.14	Coordinate with state efforts to conduct wildfire risk assessments for areas and assets that are determined to have the most hazard (fuel load, etc.) potential, and the most vulnerable structures, populations, or operations.	SCDEM, NJFFS, outside engineering consultants	Complete	HMP update utilized most current NJFFS mapping for risk assessment.		
2.A.15	Maintain effective coordination and information sharing related to hazardous material sites with NJOEM and the Right to Know Network.	SCDEM, RTK Network, NJOEM	In Progress	The County RTK Coordinator maintains this information and is currently a capability.	Discontinue	This is a County capability. Refer to the integration subsection presented earlier in this annex.
2.A.16	Complete data collection for Geographic Information System (GIS) analysis and mapping of potential areas of impact related to hazardous material sites.	SCDEM, county agencies	Complete	Complete – County has critical infrastructure layer that includes hazardous material sites.		
2.A.17	Integrate data about hazardous materials with most current available information about other risk factors, e.g. population, climate, other site-specific characteristics.	SCDEM, Sussex County HazMat, RTK Network, NJDEP, U.S. EPA	Complete	Complete – SC has a HazMat Team and this is their responsibility; this is currently a capability.		



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2.A.18	Complete a detailed analysis of past losses related to winter storms to determine if additional study is indicated.	Sussex County and local agencies with critical facilities	No Progress	This is no longer a priority of the County	Discontinue	
2.A.19	Undertake a survey of critical facilities to identify and prioritize those that may have structural characteristics that make them vulnerable to excessive snow and ice loads.	Sussex County and local agencies with critical facilities	No Progress	See revised action and new agency lead.	Include in 2016 HMP	Undertake a survey of critical facilities to identify and prioritize those that may have structural characteristics that make them vulnerable to excessive snow and ice loads such as the Sherriff's Office: New Lead: County Facilities
2.A.20	Work with appropriate agencies to identify specific areas that are vulnerable to storm effects, then inventory assets and populations in these areas as the basis for a risk calculation.	SCDEM, NOAA, USACE, local officials, NJDEP	Complete	The HMP update risk assessment addresses this.		
2.A.21	Work with New Jersey Department of Environmental Protection to more fully understand the dam hazard rankings and methodology behind them, particularly regarding high-hazard sites.	SCDEM, NJDEP	Complete	NJDEP provided Municipal Coordinators and OEM information on all high hazard damages and an Excel spreadsheet was provided to Coordinators with a list of dams in their jurisdiction		



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2.A.22	Undertake more detailed engineering studies of dams that may pose risks to the county, based on additional data collected from state or federal agencies.	SCDEM, NJDEP, NJOEM	No Progress	Limited resources and funding	Discontinue	Not a current priority due to lack of funding.
2.A.23	Conduct detailed risk assessments for dams that appear to have vulnerabilities, and where there is potential for significant damage or loss of life.	SCDEM, NJDEP, engineering consultants	Complete	This is part of the high-hazard damage analysis (NJDEP lead).		
2.A.24	Consolidate and incorporate relevant local data related to hazards, extent, probability, exposure, risk, history, etc.	SCDEM and municipal OEMs	Complete	OEM (County and municipal level) – part of their responsibilities and information is in the County Emergency Operations Plan and relevant information is included HMP update		
2.A.25	Work with ongoing county, state, and federal efforts to develop and maintain hazard-specific geospatial data necessary to perform full risk assessments for all relevant hazards in Sussex County.	SCDEM	Complete	HMP update will provide risk assessment results to the County GIS office.		



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2.A.26	Conduct detailed risk assessments for levees which appear to have vulnerabilities, and where there is potential for significant damage or loss of life.	SCDEM, DELO, NJDEP, engineering consultants	No Progress	The County does not have any levees.	Discontinue	Not applicable to County.
2.A.27	Work with NJDEP and other agencies to compile better information about levees in the State, including inventories, engineering data, and any other studies (in particular those that may discuss or catalog past levee failures).	SCDEM, DELO, NJDEP, engineering consultants	No Progress	The County does not have any levees.	Discontinue	Not applicable to County.
2.A.28	Conduct a detailed study to identify and map erosion hazard zones.	SCDEM, NJDEP and USACE	No Progress	Erosion studies are conducted on a project-specific basis as needed.	Discontinue	Not needed as an individual action, based on current County processes.
2.A.29	Undertake more detailed engineering studies of levees that may pose risks to the county, based on additional data collected from local, state or federal agencies.	SCDEM, NJDEP, NJOEM	No Progress	The County does not have any levees.	Discontinue	Not applicable to County.
2.A.30	Coordinate with state efforts to undertake detailed vulnerability assessments and develop mitigation options for critical facilities in A and AE zones.	Sussex County and municipal OEMS	Complete	As per the 2016 HMP update, flood-vulnerable facilities identified in the risk assessment.		



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2.B.1	Participate in the Emergency Preparedness Conference and workshops	SCDEM and municipal OEMs, NJOEM, NJFFS	In Progress	County DEM attends annually	Include in 2016 HMP	
2.C.1	Develop a database inventory of critical facilities countywide (county-, local-, and privately-owned), including fire and police stations, medical facilities, and major public buildings important for emergency response and recovery, and critical lifeline transportation and utility nodes such as bridges, water treatment plants, wastewater treatment plants, high voltage electric substations, and hazardous materials facilities.	SCDEM and municipal OEM	Complete	As per the 2016 HMP update, a critical facility inventory was generated and provided to the County for future updates.		
2.C.2	Prioritize critical facilities and complete Phase 1 site surveys to identify vulnerabilities.	SCDEM and municipal OEM	Complete	Vulnerability of critical facilities were identified as part of the HMP update; remove. Phase 1s are conducted on an as-needed basis.		



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3.A.1	Continue working with the state, as well as local jurisdictions, to encourage local cooperation in making Repetitive Loss (RL) (and SRL) property mitigation a high priority, and offering municipalities technical support in carrying out the requirements of FEMA mitigation programs as well as current information related to RL and SRL properties. This represents a basic requirement to initiate and sustain program momentum for RL and SRL mitigation.	SCDEM	In Progress	Support the mitigation of flood-vulnerable properties in the County. Use standard language action for this one.	Include in 2016 HMP	Revised phrasing: "Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect them from future damage; repetitive loss and severe repetitive loss properties should be a priority, when applicable. Phase 1: Identify appropriate candidates and determine most cost-effective mitigation option (in progress). Phase 2: Work with the property owners to implement selected action based on available funding from FEMA and local match availability."
3.A.2	Provide grants information, planning tools, training and technical assistance to increase the number of public and private sector hazard mitigation projects.	SCDEM, NJOEM, FEMA Region II	In Progress	Refer to updated action 1.A.3 above. Remove this action.	Discontinue	Refer to updated action 1.A.3 above.



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3.A.3	Conduct direct outreach and education to municipal OEMs and other potential participants in Plan maintenance and future plan updates.	SCDEM	Complete	This is part of HMP plan maintenance. This conducted annually at the quarterly OEM meeting. Refer to 1.A.3.		
3.A.4	Work with NJOEM and FEMA to incorporate “recommended revisions” per NJOEM and FEMA Region II review of this Plan into future Plan updates.	SCDEM	Complete	This has been completed as part of the HMP update planning process.		
3.B.1	Conduct community outreach, workshops, and training to increase NFIP participation (coordinate with outreach actions listed under Objectives 1.A and 1.B).	SCDEM, NJOEM	No Progress	This is a municipal-level action. Every community in the County participates in the NFIP.	Discontinue	Not applicable to County.
3.B.2	Encourage municipalities to participate in the Community Rating Survey (CRS) program, including potentially setting up CRS site visits and/or workshops for interested municipalities.	SCDEM, NJOEM	Complete	The County supports participation in the CRS. This is a municipal-led action.		
3.B.3	Encourage municipalities to include identification and prioritization of actions related to future participation in and compliance with the NFIP.	SCDEM and municipal OEM	Complete	The County supports NFIP compliance. This is a municipal-led action.		



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3.C.1	Encourage enforcement of floodplain management as it relates to new and existing construction by integrating hazard mitigation practices with zoning, subdivision ordinances, comprehensive planning, and other land use tools at the municipal level.	SCDEM, NJDEP, municipal officials	Complete	The County supports this action. This is a municipal-led action.		
3.C.2	Coordinate with state efforts to encourage the New Jersey League of Municipalities to become more involved in mitigation activities, and in particular to support the activities described in Action 3.C.1 and 3.D.1.	SCDEM, NJOEM, New Jersey League of Municipalities	No Progress	As a County entity Sussex is not part of the NJ League of Municipalities. This is a municipal-led action.	Discontinue	Not applicable to County.



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3.D.1	Encourage enforcement of floodplain management as it relates to new and existing construction by integrating hazard mitigation practices with zoning, subdivision ordinances, comprehensive planning, other land use tools, and environmental and other regulatory mechanisms via state requirements, reviews, and regulations. Coordinate with the State Planning Commission to integrate the State Development and Redevelopment Plan and the State Hazard Mitigation Plan Update.	SCDEM, NJDCA, State Planning Commission, municipal building inspectors, zoning boards	Complete	The County supports this action. This is a municipal-led action.		
3.E.1	Develop a simple GIS platform, or build upon an existing platform, to maintain and analyze critical facilities inventories and information about hazards.	SCDEM working with neighboring counties	Complete	County has a GIS consultant that completed this action.		
3.F.1	Explore potential for possible regionalization or consolidation of hazard mitigation planning, administration, and/or implementation at the county level.	SCDEM	Complete	Original plan was done on a regional level. The outcome was that it is preferable to do at the HMP update at the County-level.	Discontinue	The County has considered this potential and decided it is not an appropriate strategy for Sussex County needs.



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2016 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
3.F.2	Increase understanding of the capabilities of municipal mitigation programs by continuing to encourage local coordinators to participate in the Municipal Capabilities Assessment Survey.	SCDEM	Complete	All municipalities are participating in the 2016 HMP update and an updated capability assessment was completed.		
3.G.1	Provide regular summaries to neighboring communities re: plan monitoring and update procedures (as outlined in Section 7) and post updates on Sussex County's website for public access to the plan update process.	SCDEM	Complete	Part of HMP update planning process		
4.A.1	Coordinate with state efforts to develop and implement a detailed severe repetitive loss mitigation strategy that will qualify the county and municipalities for 90:10 cost share under the FEMA SRL program.	SCDEM, NJOEM	In Progress	See previous actions regarding mitigation grant programs (SRL now FMA).	Discontinue	See previous actions regarding mitigation grant programs (SRL now FMA).



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2016 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
4.A.2	Continue working with local and regional jurisdictions to encourage and support their efforts to mitigate RL (and SRL) properties, either individually through the use of cluster solutions and/or basin projects, as appropriate, and offer technical support in carrying out the requirements of FEMA mitigation programs. (see	SCDEM, NJOEM	In Progress	Support the mitigation of flood-vulnerable properties – refer to 3.A.1 Default mitigation action.	Discontinue	This action is being combined with the revised wording for flood mitigation indicated above.
4.A.3	Implement mitigation projects and programs intended to reduce risk to critical facilities	SCDEM and municipal OEM coordinators	Complete	All mitigation projects are prioritized and implemented at the County level.		
4.A.4	Implement other mitigation projects and programs as appropriate at the municipal level.	SCDEM and municipal OEM coordinators	No Progress	The County supports this action. This is a municipal-led action.	Discontinue	Not applicable to County.
4.A.5	Promote acquisition and elevation of repetitive loss and severe repetitive loss structures	SCDEM, NJOEM	In Progress	Refer to 3.A.1 - Support the mitigation of flood-vulnerable properties – refer to 3.A.1 Default mitigation action	Discontinue	This action is being combined with the revised wording for flood mitigation indicated above.



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2016 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
4.A.6	Work with NJGS and other county, state and federal agencies to better identify specific sites in the County that may be exposed to the effects of geo-hazards such as landslides, sinkholes, and subsidence.	SCDEM, NJDEP, NJGS	Complete	Refer to 2.A.8: This has been mapped and information is at the Sussex County Soil Conservation District (book by Sylvester Fletcher). HMP update will conduct this evaluation based on critical facilities identified in the planning process	Discontinue	Refer to 2.A.8.
4.B.1	Ensure full and effective enforcement of building codes, floodplain management, zoning, and other risk-reducing regulations.	SCDEM, municipal OEMs and local permitting and planning offices	No Progress	County does not have the authority to enforce municipal codes. County does enforce floodplain management if on properties fronting County roads (part of site-plan review).	Discontinue	
4.B.2	Integrate hazard mitigation Plan and priorities into Capital Improvement Plans, transportation planning and other capital planning.	SCDEM, municipal OEMs and local permitting and planning offices	In Progress	In progress	Include in 2016 HMP	NEW LEAD: County Planning Office in conjunction with local planning offices



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The County has identified the following mitigation projects/activities that have also been completed but were not identified in the previous mitigation strategy in the 2010 Plan:

- County Engineering armored slopes by bridges with FEMA-funding post-disaster (approximately 70 locations).

Proposed Hazard Mitigation Initiatives for the Plan Update

The County hosted a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013). In May 2015, the County hosted a second workshop and was provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.2-11 summarizes the comprehensive-range of specific mitigation initiatives the County would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.1-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.1-6. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures *	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Sussex County-1	Ensure continuity of operations and critical facilities. The following project was identified at this time: • Secure a generator for the Sheriff's Office.	Existing	All	1, 2, 3, 5, 6	Sheriff's Office, SCDEM	High	Medium	FEMA HMA funding, Other Federal or State Grants, Local Cost Share	Short, DOF	High	SIP	ES, PP
Sussex County-2	Incorporate hazard mitigation considerations and priorities into various County Plan updates, and integrate the County Master Plan with the County HMP during the Master Plan Update.	N/A	All	3, 4, 5, 6	SCDEM, Planning Division	Medium	Low	Staff Time, County Budget	Ongoing	High	LPR	PR
Sussex County-3	Design and implement a mitigation awareness campaign through County Planning or Rutgers Extension to Farms/Tree Farms regarding the ingestion pathway response for the radiological hazard.	Existing	Hazardous Materials, Nuclear Incident	1, 3, 4, 6	SCDEM, Planning Division, Rutgers Extension	Medium	Low/Medium	FEMA HMA funding, Other Federal or State Grants, Local Cost Share	Ongoing	High	EAP	PI
Sussex County-4	Coordinate with the Sussex County College FM Radio Station to disseminate preparedness information.	Existing	All	All	SCDEM, Sussex County College	Medium	Low	Staff Time, County Budget	Short, then Ongoing	High	EAP	PI
Sussex County-5	Increase County capabilities to address tree and roadway maintenance, response and removal, and continuity of operations and purchase a new tree truck (70-feet, chipper box), updated stump grinder, and excavator.	New and Existing	All	1, 2, 6	DPW	High	High	FEMA HMA funding, Other Federal or State Grants, EMPG, Local Cost Share	Short, DOF	High	SIP	PR, ES, PP
Sussex County-6	Support continuity of operations at County buildings including the	New and Existing	All	1, 2, 6	Facilities Department	High	High	FEMA HMA funding,	Short, DOF	High	SIP	PR, ES, PP



Table 9.1-6. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures *	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
	purchase and installation of generators including the Office of Bridges and Traffic, replace a generator at the Andover Garage/OEM warehouse, new generators new warming locations (libraries), shelters (Vo Tech)							Other Federal or State Grants, County Budget				
Sussex County-7	Retrofit roof to meet current standards for snow load on County Department of Public Works building located on Route 206.	Existing	Winter Weather	1, 2, 5, 6	Facilities Department	High	High	FEMA HMA funding, Other Federal or State Grants, Local Cost Share	DOF	Medium	SIP	PP, ES
Sussex County-8	Conduct annual workshop related to the FEMA HMA grant programs (HMGP, PDM, FMA). This may be done at quarterly OEM coordinator meetings and invite other County departments.	N/A	All	All	SCDEM and Engineering	High	Medium	FEMA HMA funding, Other Federal or State Grants, Local Cost Share	Ongoing	Medium	EAP	PI
Sussex County-9	Coordinate a yearly program for public information on wildfire with NJ Forest Fire Service (Division A Liaison); and post this information on the County website regarding the wildfire hazard (including current information about fuel loads and conditions that may affect potential for fires).	N/A	Wildfire	All	SCDEM	High	Medium	FEMA HMA funding, Other Federal or State Grants, Local Cost Share	Ongoing	High	EAP	PI
Sussex County-10	Inventory the critical facilities to identify those in geographic areas that may be prone to high ground motion	Existing	Earthquake	1, 2, 4, 5	Facilities Department and Engineering	Medium	Medium	FEMA HMA funding, Other	Short	Medium	LPR	PR, PP



Table 9.1-6. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures *	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
	during earthquakes (due to proximity to faults or to soil characteristics), and those with structures that may be at risk during an earthquake. Study will include determine soil and shake characteristics.							Federal or State Grants, Local Cost Share				
Sussex County-11	Work to determine soil and shake characteristics at specific sites that the county has identified as priority critical facilities with potential vulnerabilities to earthquake forces. Based on these results, analyze the critical structures to determine if the structures are sound and next steps to further mitigate.	Existing	Earthquake	1, 2, 4, 5	Facilities Department and Engineering	Medium	Medium	FEMA HMA funding, Other Federal or State Grants, Local Cost Share	Short	Medium	LPR	PR, PP
Sussex County-12	Identify wind vulnerabilities at County critical facilities because buildings were designed to 70 mph; new updated code is 90 mph.	Existing	Severe Weather	1, 2, 4, 5	County Facilities	Medium	Medium	FEMA HMA funding, Other Federal or State Grants, Local Cost Share	Short, DOF	Medium	LPR	PP, PR
Sussex County-13	Undertake a survey of critical facilities to identify and prioritize those that may have structural characteristics that make them vulnerable to excessive snow and ice loads such as the Sheriff's Office.	Existing	Winter Weather	All	County Facilities	High	Medium	FEMA HMA funding, Other Federal or State Grants, Local Cost Share	Short, DOF	Medium	LPR	PR, PP



Table 9.1-6. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures *	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Sussex County-14	Participate in the Emergency Preparedness Conference and workshops	N/A	All	3, 4	SCDEM and municipal OEMs, NJOEM, NJFFS	Medium	Low	Staff Time, County Budget	Ongoing	Medium	EAP	PI
Sussex County-15	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect them from future damage; repetitive loss and severe repetitive loss properties should be a priority, when applicable. Phase 1: Identify appropriate candidates and determine most cost-effective mitigation option Phase 2: Work with the property owners to implement selected action based on available funding from FEMA and local match availability.											
	See above.	New and Existing	Flood, Severe Weather	1, 2, 5	SCDEM	High	High	FEMA HMA funding, Other Federal or State Grants, Local Cost Share	Long	Medium	SIP	PR, SP, PP

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CAV	Community Assistance Visit
CRS	Community Rating System
DEM	Division of Emergency Management
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000



Costs:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- *Local Plans and Regulations (LPR)* – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- *Structure and Infrastructure Project (SIP)*- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- *Natural Systems Protection (NSP)* – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- *Education and Awareness Programs (EAP)* – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- *Preventative Measures (PR)*-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- *Property Protection (PP)*-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- *Public Information (PI)*-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- *Natural Resource Protection (NR)*-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- *Structural Flood Control Projects (SP)*-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- *Emergency Services (ES)*-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.1-12. Summary of Prioritization of Actions

Mitigation Action/Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community	Total	High/Medium/Low
Sussex County-1	Ensure continuity of operations: Secure a generator for the Sheriff's Office.	1	1	1	1	1	1	-1	0	1	1	1	1	0	0	9	High
Sussex County-2	Incorporate hazard mitigation considerations and priorities into various County Plan updates, and integrate the County Master Plan with the County HMP during the Master Plan Update.	1	1	1	1	1	1	1	1	1	-1	1	0	0	1	10	High
Sussex County-3	Design and implement a mitigation awareness campaign through County Planning or Rutgers Extension to Farms/Tree Farms regarding the ingestion pathway response for the radiological hazard.	1	1	1	1	1	1	0	0	1	0	0	1	1	0	9	High
Sussex County-4	Coordinate with the Sussex County College FM Radio Station to disseminate preparedness information.	1	1	1	1	1	1	1	0	1	0	1	1	1	1	12	High
Sussex County-5	Increase County capabilities to address tree and roadway maintenance, response and removal, and continuity of operations and purchase a new tree truck (70-feet, chipper	1	1	1	1	1	1	-1	0	1	1	1	1	1	0	10	High



Table 9.1-12. Summary of Prioritization of Actions

Mitigation Action/Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community	Total	High/Medium/Low
	box), updated stump grinder, and excavator.																
Sussex County-6	Support continuity of operations at County buildings including the purchase and installation of generators including the Office of Bridges and Traffic, replace a generator at the Andover Garage/OEM warehouse, new generators new warming locations (libraries), shelters (Vo Tech)	1	1	1	1	1	1	-1	0	1	1	1	1	0	0	9	High
Sussex County-7	Retrofit roof to meet current standards for snow load on County Department of Public Works building located on Route 206.	1	1	1	0	1	1	-1	0	1	1	0	1	0	0	7	Medium
Sussex County-8	Conduct annual workshop related to the FEMA HMA grant programs (HMGP, PDM, FMA). This may be done at quarterly OEM coordinator meetings and invite other County departments.	1	1	1	0	1	1	0	0	1	-1	1	1	0	1	8	Medium
Sussex County-9	Coordinate a yearly program for public information on wildfire with NJ	1	1	1	1	1	1	0	1	1	1	-1	0	1	0	9	High



Table 9.1-12. Summary of Prioritization of Actions

Mitigation Action/Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community	Total	High/Medium/Low
	Forest Fire Service (Division A Liaison); and post this information on the County website regarding the wildfire hazard (including current information about fuel loads and conditions that may affect potential for fires).																
Sussex County-10	Inventory the critical facilities to identify those in geographic areas that may be prone to high ground motion during earthquakes (due to proximity to faults or to soil characteristics), and those with structures that may be at risk during an earthquake. Study will include determine soil and shake characteristics.	1	1	1	-1	1	1	-1	1	1	0	0	1	0	1	7	Medium
Sussex County-11	Work to determine soil and shake characteristics at specific sites that the county has identified as priority critical facilities with potential vulnerabilities to earthquake forces. Based on these results, analyze the critical structures to	1	1	1	-1	1	1	0	1	1	0	0	1	0	1	8	Medium



Table 9.1-12. Summary of Prioritization of Actions

Mitigation Action/Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community	Total	High/Medium/Low
	determine if the structures are sound and next steps to further mitigate.																
Sussex County-12	Identify wind vulnerabilities at County critical facilities because buildings were designed to 70 mph; new updated code is 90 mph.	1	1	1	-1	1	1	-1	0	1	1	1	1	0	1	8	Medium
Sussex County-13	Undertake a survey of critical facilities to identify and prioritize those that may have structural characteristics that make them vulnerable to excessive snow and ice loads such as the Sherriff's Office.	1	1	1	0	1	1	0	0	1	-1	0	1	0	1	7	Medium
Sussex County-14	Participate in the Emergency Preparedness Conference and workshops.	0	0	0	1	1	1	0	0	1	0	1	1	1	1	8	Medium
Sussex County-15	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect them from future damage;	1	1	1	0	1	1	-1	1	0	1	1	0	0	1	8	Medium



Table 9.1-12. Summary of Prioritization of Actions

Mitigation Action/Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community	Total	High/Medium/Low
	repetitive loss and severe repetitive loss properties should be a priority, when applicable.																

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.

9.1.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.1.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Sussex County that illustrate the probable areas impacted within the County. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which Sussex County has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.1.9 Additional Comments

None at this time.

DRAFT

Action Number: Sussex County-1
Mitigation Action/Initiative: Sussex County Sheriff's Office Generator

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Power outages in the County; continuity of operations for Sheriff's Office
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Do nothing – vulnerability continues or worsens 2. Secure a generator for the Sheriff's Office – selected action 3.
Action/Project Intended for Implementation	
Description of Selected Action/Project	Secure a generator for the Sheriff's Office.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 3, 5, 6
Applies to existing, future, or not applicable	Existing
Benefits (losses avoided)	Reduced loss of life and property damage (High)
Estimated Cost	Medium
Priority*	
Plan for Implementation	
Responsible Organization	Sheriff's Office/Office of Emergency Management
Local Planning Mechanism	
Potential Funding Sources	FEMA HMA funding, Other Federal or State Grants, Local Cost Share
Timeline for Completion	Short, DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

Action Number:

Sussex County-1

Mitigation Action/Initiative:

Sussex County Sheriff's Office Generator

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Enhances ability for continued operation of Sheriff's Office during hazard events.
Property Protection	1	Enhances ability for continued operation of Sheriff's Office during hazard events.
Cost-Effectiveness	1	Most cost-efficient project option.
Technical	1	Technically feasible.
Political	1	Supported by County.
Legal	1	
Fiscal	-1	Requires external funding.
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	Short, DOF
Agency Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	

Action Number:

Sussex County-5

Mitigation Action/Initiative:

Increase County capabilities to address tree maintenance, response and removal, and continuity of operations

Assessing the Risk	
Hazard(s) addressed:	All – debris removal
Specific problem being mitigated:	The County currently has limited capabilities to respond to tree and roadway maintenance; equipment is aging and is costly to rent and repair. Updated equipment is needed to maintain roadway access for emergency and evacuation purposes.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Do nothing – vulnerability continues or worsens
	2. Increase County capabilities for road and tree maintenance – selected action
	3.
Action/Project Intended for Implementation	
Description of Selected Action/Project	Increase County capabilities to address tree and roadway maintenance, response and removal, and continuity of operations and purchase a new tree truck (70-foot, chipper box), updated stump grinder, and excavator.
Action/Project Category	SIP
Goals Met	1, 2, 6
Applies to existing and or new development, or not applicable	New and Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority*	High
Plan for Implementation	
Responsible Organization	County DPW
Local Planning Mechanism	
Potential Funding Sources	FEMA HMA funding, Other Federal or State Grants, EMPG, Local Cost Share
Timeline for Completion	Short, DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

Action Number: Sussex County-5

Mitigation Action/Initiative: Increase County capabilities to address tree maintenance, response and removal, and continuity of operations

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Reduce risk of accidents on roadways
Property Protection	1	Reduce property and infrastructure damage from debris
Cost-Effectiveness	1	Most cost-effective project option
Technical	1	
Political	1	Supported by County
Legal	1	
Fiscal	-1	Requires external funding
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All hazards resulting in debris
Timeline	1	Short, DOF
Agency Champion	1	
Other Community Objectives	0	
Total	10	
Priority (High/Med/Low)	High	

Action Number:	Sussex County-6
Mitigation Action/Initiative:	Support continuity of operations at County buildings including the purchase and installation of generators including the Office of Bridges and Traffic and Andover Garage/OEM Garage

Assessing the Risk	
Hazard(s) addressed:	All hazards
Specific problem being mitigated:	Lack of backup power at County facilities to support continuity of operations
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install generators – propane/diesel/natural gas
	2. Co-Gen facility
	3. Do nothing
Action/Project Intended for Implementation	
Description of Selected Action/Project	Support continuity of operations at County buildings including the purchase and installation of generators including the Office of Bridges and Traffic, replace a generator at the Andover Garage/OEM warehouse, new generators new warming locations (libraries), shelters (Vo Tech)
Action/Project Category	SIP
Goals Met	1, 2, 6
Applies to existing and or new development, or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority*	High
Plan for Implementation	
Responsible Organization	County Facilities Department
Local Planning Mechanism	
Potential Funding Sources	FEMA HMA funding, Other Federal or State Grants, County Budget
Timeline for Completion	Short, DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

Action Number: Sussex County-6

Mitigation Action/Initiative: Support continuity of operations at County buildings including the purchase and installation of generators including the Office of Bridges and Traffic and Andover Garage/OEM Garage

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Enhances ability for continued operations of County critical facilities, increasing efficiency of emergency responders.
Property Protection	1	Enhances ability for continued operations of County critical facilities, increasing response and repair time for damage.
Cost-Effectiveness	1	Most cost-efficient project option.
Technical	1	Technically feasible.
Political	1	Supported by County.
Legal	1	
Fiscal	-1	Requires external funding.
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	Short, DOF
Agency Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	

Name of Jurisdiction:	Sussex County
Action Number:	Sussex County-7
Mitigation Action/Initiative:	Retrofit roof to meet current standards for snow load on County Department of Public Works building located on Route 206.

Assessing the Risk	
Hazard(s) addressed:	Winter Weather
Specific problem being mitigated:	County DPW Building does not currently meet standards for snow load, leading to vulnerability during operations and winter weather.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	3. Do nothing – vulnerability continues or worsen
	4. Retrofit roof to current standards – selected action
	5. Build new DPW building – not as cost-effective as selected action
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit roof to meet current standards for snow load on County Department of Public Works building located on Route 206.
Action/Project Category	SIP
Goals Met	1, 2, 5, 6
Applies to existing and or new development, or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority*	Medium
Plan for Implementation	
Responsible Organization	Facilities Department
Local Planning Mechanism	-
Potential Funding Sources	FEMA HMA funding, Other Federal or State Grants, Local Cost Share
Timeline for Completion	DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

Action Number:

Sussex County-7

Mitigation Action/Initiative:

Retrofit roof to meet current standards for snow load on County Department of Public Works building located on Route 206.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Reduce risk of accidents and continuing injuries by ensuring continuity of DPW operations during hazard events.
Property Protection	1	Reduce risk of property damage and infrastructure damage by ensuring continuity of DPW operations during hazard events.
Cost-Effectiveness	1	Most cost-efficient project option.
Technical	0	
Political	1	
Legal	1	
Fiscal	-1	Requires external funding
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	0	Winter Weather
Timeline	1	Short, DOF (project has been delayed due to lack of funding)
Agency Champion	0	
Other Community Objectives	0	
Total	7	
Priority (High/Med/Low)	Medium	

Name of Jurisdiction:	Sussex County
Action Number:	Sussex County-15
Mitigation Action/Initiative:	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect them from future damage; repetitive loss and severe repetitive loss properties should be a priority, when applicable.

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	Vulnerable structures, especially repetitive loss and severe repetitive loss properties in Sussex County.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Do nothing – vulnerability continues or worsens
	2. Support mitigation efforts – selected action
	3.
Action/Project Intended for Implementation	
Description of Selected Action/Project	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect them from future damage; repetitive loss and severe repetitive loss properties should be a priority, when applicable. Phase 1: Identify appropriate candidates and determine most cost-effective mitigation option. Phase 2: Work with the property owners to implement selected action based on available funding from FEMA and local match availability.
Action/Project Category	SIP
Goals Met	1, 2, 5
Applies to existing and or new development, or not applicable	New and Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority*	Medium
Plan for Implementation	
Responsible Organization	SCDEM
Local Planning Mechanism	
Potential Funding Sources	FEMA HMA funding, Other Federal or State Grants, Local Cost Share
Timeline for Completion	Long
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

Action Number: Sussex County-15

Mitigation Action/Initiative: Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect them from future damage; repetitive loss and severe repetitive loss properties should be a priority, when applicable.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Reduce risk of injury or loss of life by eliminating flood risk to highly vulnerable properties.
Property Protection	1	Reduce risk of property damage to residences and structures in floodplain.
Cost-Effectiveness	1	Most cost effective project option.
Technical	0	
Political	1	
Legal	1	
Fiscal	-1	Requires external funding sources.
Environmental	1	
Social	0	
Administrative	1	
Multi-Hazard	1	Flood, Severe Weather
Timeline	0	
Agency Champion	0	
Other Community Objectives	1	Reduce number of repetitive loss properties in County
Total	8	
Priority (High/Med/Low)	Medium	



9.2 Borough of Andover

This section presents the jurisdictional annex for the Borough of Andover.

9.2.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan’s primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
John Hoag, Deputy OEM 137 Main Street, Andover, NJ 07821 Phone: (862) 268-3508; (973) 786-6688 Email: Firedog2269@myway.com	Beth Brothman, Municipal Clerk/Registrar 137 Main Street, Andover, NJ 07821 Phone: (973) 786-6688 Email: bethandover@gmail.com

9.2.2 Municipal Profile

The Borough of Andover is located in southern Sussex County and bordered to the north, east and west by Andover Township and to the south by Green Township. Andover Junction Brook and Kymer Brook are two bodies of water that flow through the Borough. The Borough has a total area of 1.47 square miles and contains one unincorporated community, Andover Junction. According to the U.S. Census, the 2010 population for the Borough of Andover was 606.

Growth/Development Trends

The Borough of Andover did not note any recent residential/commercial development since 2010 or any major residential or commercial development, or major infrastructure development planned for the next five years in the municipality.

9.2.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.2-1. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
October 29, 2011	Severe Storm	DR-4048	Yes	Downed trees and power lines within the Borough. Approximately \$5,000 in debris cleanup costs.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	Power outages up to eight days which impacted the water supply for the Borough. The Borough had to purchase and install a generator to power the water supply station. No other costs to the Borough.



9.2.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Borough of Andover. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Borough of Andover.

Table 9.2-1. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	Medium
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$385,540 2,500-Year GBS: \$6,195,143	Occasional	28	Medium
Flood	1% Annual Chance: \$7,833,353	Frequent	18	Medium
Geologic	RCV Exposed to Carbonate Rock Areas: \$57,441,735	Occasional	36	Medium*
Hurricane	100-year MRP: \$35,567 500-year MRP: \$277,684 Annualized: \$2,167	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$35,567 500-year MRP: \$277,684 Annualized: \$2,167	Frequent	48	High
Severe Winter Weather	1% GBS: \$1,107,203 5% GBS: \$5,536,015	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$1,345,767	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed for this hazard based on input from the municipality, population exposed, and/or event history.

GBS = General building stock; MRP = Mean return period.

a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.

b. High = Total hazard priority risk ranking score of 31 and above

Medium = Total hazard priority risk ranking of 15-30+

Low = Total hazard risk ranking below 15

c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.



National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Borough of Andover.

Table 9.2-3. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Borough of Andover	5	1	\$4,314	0	0	3

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file. Number in the floodplain was determined using the 2007 Effective DFIRM 1% annual chance flood boundary.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Note (5) A zero percentage denotes less than 1/100th percentage and not zero damages or vulnerability as may be the case.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance boundary.

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.

9.2.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Borough of Andover.



Table 9.2-4. Planning and Regulatory Tools

Tool / Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept. /Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Planning Board	Andover Borough Master Plan NJSA 40:55D-89
Capital Improvements Plan	No			
Floodplain Management / Basin Plan	No			
Stormwater Management Plan	Yes	Local	Engineer	Andover Borough Stormwater Management Plan NJSA 12:5-3 NJAC 7:8
Open Space Plan	Yes	Local	Open Space	Andover Borough Open Space Plan
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	No			
Comprehensive Emergency Management Plan	Yes	Local	Emergency Management	2014
Emergency Response Plan	Yes	Local	Emergency Management	2014
Post-Disaster Recovery Plan	Yes	Local	Emergency Management	2014
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State and Local	Construction Official	State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Zoning	Chapter 134 – Zoning
Subdivision Ordinance	Yes	Local	Zoning	Chapter 121 – Subdivision of Land
NFIP Flood Damage Prevention Ordinance	Yes	Local	Engineer	Chapter 74 – Flood Damage Prevention
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State and Local	Engineer	N.J.A.C 7:13 – Flood Hazard Area Control Act
Growth Management Ordinances	No			
Site Plan Review Requirements	Yes	Local	Planning & Zoning Board	Andover Borough Code Chapter 109
Stormwater Management Ordinance	Yes	Local	Engineer	Chapter 115 – Stormwater Control
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			



Table 9.2-4. Planning and Regulatory Tools

Tool / Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept. /Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes	Local	Engineer	Chapter 74, Article 15 – Steep Slope Area Regulations

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Borough of Andover.

Table 9.2-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Planning/Zoning Board
Mitigation Planning Committee	No	
Environmental Board/Commission	No	
Open Space Board/Committee	Yes	Open Space
Economic Development Commission/Committee	No	
Maintenance Programs to Reduce Risk	No	
Mutual Aid Agreements	Yes	
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Professional contract
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Professional contract
Planners or engineers with an understanding of natural hazards	Yes	Professional contract
NFIP Floodplain Administrator	Yes	Borough Engineer
Surveyor(s)	Yes	Engineering services
Personnel skilled or trained in GIS and/or Hazus-MH applications	Yes	Borough Engineer
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	Scott Danielson
Grant Writer(s)	No	
Staff with expertise or training in benefit/cost analysis	Yes	Engineer
Professionals trained in conducting damage assessments	Yes	Engineer

Fiscal Capability

The table below summarizes financial resources available to the Borough of Andover.



Table 9.2-6. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	No
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	Yes
Impact Fees for homebuyers or developers of new development/homes	Yes – COAH fees
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	No
Open Space Acquisition Funding Programs	Yes
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Borough of Andover.

Table 9.2-7. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		
Building Code Effectiveness Grading Schedule (BCEGS)	No		
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	7/9	1997
Storm Ready	No		
Firewise	No		
Disaster/Safety Programs in/for Schools	Yes	N/A	
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	Yes	N/A	
Public-Private Partnerships	No		

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no



classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Borough of Andover's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.2-8. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability			X
Administrative and Technical Capability		X	
Fiscal Capability	X – staff; municipal budget		
Community Political Capability			X
Community Resiliency Capability			X
Capability to Integrate Mitigation into Municipal Processes and Activities.	X - funding		

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Harold Pellow, Engineer

Flood Vulnerability Summary

The Borough does not maintain lists/inventories of properties that have been damaged by floods. There were two residential properties damaged during recent storm events. During Irene, Lee, and Sandy, substantial damage estimates were not made. There is currently no interest in mitigation within the Borough.

Resources

Responsibilities of floodplain administration is contracted by the Borough. NFIP administration services and functions the FPA provides includes permit review, inspections, education and outreach. The Borough currently does not provide any education or outreach to the community regarding flood hazards/risk or flood risk reduction. The FPA indicated that there are no barriers to running an effective floodplain management program in the community. The FPA also stated that he feels adequately trained and supported to fulfill the



responsibilities as the Borough FPA and that he would consider attending continuing education and/or certification training on floodplain management.

Compliance History

The Borough is currently in good standing with the NFIP; however, it is unknown as to when the most recent compliance audit was conducted.

Regulatory

The Borough's floodplain management ordinance exceeds the FEMA and State minimum requirements and there are other ordinances, plans and programs in place that support floodplain management.

Community Rating System

The Borough of Andover does not participate in the Community Rating System (CRS) program. However, the Borough has considered joining CRS and would consider attending a seminar if offered.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Borough has a Planning Board/ Zoning Board which reviews all applications for development and consider natural hazard risk areas in their review.

Regulatory and Enforcement (Ordinances)

The Borough has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Management Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter. The Borough also has a chapter specific to the hazards associated with area that may be underlain with carbonate.

Chapter 46: Carbonate Area District <http://www.ecode360.com/8924723>

- A. Areas within Andover Borough are underlain by carbonate bedrock such as limestone and dolomite. The solution of this bedrock causes surface depressions, open drainage passages, and the development of irregular, subsurface rock topography known as "karst." These conditions make such areas unstable and susceptible to subsidence and surface collapse. As a result, the alteration of drainage patterns in these areas by the placement of impervious coverage, grade changes, or increased loads from site improvements can lead to land subsidence and sinkholes.
- B. Fractures or solution openings and fissures in the limestone rock may lead to public or private water supplies, making those sources especially susceptible to groundwater contamination. Contamination of water sources can occur from solid and liquid wastes, contaminated surface water, septic tank effluent, or other hazardous substances moving through fractures or solution openings and fissures within the rock.
- C. The Borough relies on a clean supply of subsurface water to foster and promote human health, welfare and economic and social development. Therefore, the purposes of enacting this chapter are to protect,



preserve and enhance a sensitive and valuable potable groundwater resource and to reduce the frequency of structural damage to public and private improvements by sinkhole collapse or subsidence in areas of limestone geology, thus protecting the public health, safety and welfare and insuring orderly development within the Borough.

Chapter 74: Flood Damage Prevention <http://www.ecode360.com/8925181>

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 150: Stormwater Control <http://www.ecode360.com/8925828>

The purposed of the Stormwater Control chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare the citizens.

Chapter 131-10: Environmental Impact Statement

<http://www.ecode360.com/8925614?highlight=environmentally,environmental#8925614>

The purpose of this section of the Chapter is to allow the Borough to assess the impact of a proposed development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding and waste disposal.

Operational and Administration

The Borough has established a Land Use Board (Planning and Zoning), Environmental Commission, and an Open Space Committee, that aid in planning decisions to support the conservation and preservation of the Township's critical environmental features.

Funding

Operating Budget: The Borough's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Education and Outreach

The Borough's website's home page posts information regarding upcoming community events and important municipal decisions.



9.2.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.

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Table 9.2-9. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2015 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Andover Borough 1	Retrofit roof to meet current standards for snow load on Andover Borough Fire Department building located on Route 206.	Station Commander	No Progress	Due to funding, this project has not been completed.	Include in 2015 HMP	The Borough will include this action in the 2015 HMP update.
Andover Borough 2	Install 300 yards of berm on Kymer Brooke to protect Andover Borough Fire Department located on Route 206.	DPW Supervisor	No Progress	Due to funding, this project has not been completed.	Include in 2015 HMP	The Borough will include this action in the 2015 HMP update.
Andover Borough 3	Install retention basin on Washer Farm.	OEM Coordinator	No progress	No longer an issue for the Borough	Discontinue	
Andover Borough 4	Stormwater runoff management to re-direct runoff from Route 206 near Whitehall Road to a retention basin.	OEM Coordinator	Complete	Borough redirected the stormwater into an area that can accept the water. Funded through a state highway grant.	Discontinue	
Andover Borough 5	Emergency generator for municipal water system facility located on Lenape Road.	OEM Coordinator	In Progress	The Borough submitted grant application for this project; awaiting award	Include in 2015 HMP	The Borough will include this action in the 2015 HMP update.
Andover Borough 6	Retrofit roof to meet current standards for snow load on municipal building located on Main Street.	Station Commander	No Progress	No funding	Include	When the roof is ready to be replaced, the Borough will incorporate the current standards
Andover Borough 7	Implement Fire Wise Program throughout the Borough.	OEM Coordinator	No Progress		Discontinue	Very low risk to wildfires; the Borough will not include this in the 2015 HMP Update
Andover Borough	Conduct all-hazards public education and	OEM Coordinator, in	In Progress	In newsletter	Include in 2015 HMP	Part of day-to-day operations



Table 9.2-9. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2015 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
8	outreach program for hazard mitigation and preparedness.	coordination with SCDEM				



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Borough has identified the following mitigation projects/activities that have also been completed but were not identified in the previous mitigation strategy in the 2011 Plan:

- Upgrade and/or replace culverts and basins

Proposed Hazard Mitigation Initiatives for the Plan Update

The Borough participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013). In May 2015, a second workshop was led by FEMA Region 2 and NJOEM and provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.2-9 summarizes the comprehensive-range of specific mitigation initiatives the Borough would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.2-10 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.2-10. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Andover Boro-1	To ensure continuity of operations, purchase and install generators within the Borough: <ul style="list-style-type: none"> Municipal water system Municipal building Shelter 	Existing	All	1, 3, 6	Mayor, Water Department, OEM	High	High	HMGP with local cost share	Short Term	High	SIP	PP
Andover Boro-2	Provide information on all types of hazards, preparedness and mitigation, and responses in the Borough newsletter.	N/A	All	All	Borough	High	Low	Municipal Budget	Ongoing	High	EAP	PI
Andover Boro-3	Retrofit roof to meet current standards for snow load on Andover Borough Fire Department building located on Route 206.	Existing	Severe Winter Weather	1, 2	Station Commander	Medium	High	HMGP with local cost share	Short Term / DOF	Medium	SIP	PP
Andover Boro-4	Install 300 yards of berm on Kymer Brooke to protect Andover Borough Fire Department located on Route 206.	Existing	Flood, Severe Weather	1, 2, 3	DPW Supervisor	Medium	Medium	Municipal Budget	Short Term / DOF	Medium	SIP	PP
Andover Boro-5	When the roof is ready to be replaced on the municipal building, the Borough will incorporate the current snow load standards	Existing	Severe Winter Weather	1, 2	Borough	Medium	Medium to High	Municipal Budget	Short Term / DOF	Medium	SIP	PP

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
HMA	Hazard Mitigation Assistance Program

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding



Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Mitigation Category:

- **Local Plans and Regulations (LPR)** – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- **Structure and Infrastructure Project (SIP)**- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- **Natural Systems Protection (NSP)** – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- **Education and Awareness Programs (EAP)** – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- **Preventative Measures (PR)** - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- **Property Protection (PP)** - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- **Public Information (PI)** - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- **Natural Resource Protection (NR)** - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- **Structural Flood Control Projects (SP)** - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- **Emergency Services (ES)** - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.



Table 9.2-11. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Andover Boro-1	Purchase and install generators within the Borough: <ul style="list-style-type: none"> Municipal water system Municipal building Shelter 	1	1	1	1	1	1	1	0	1	1	1	1	1	0	12	High
Andover Boro-2	Provide information on all types of hazards, preparedness and mitigation, and responses in the Borough newsletter.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Andover Boro-3	Retrofit roof to meet current standards for snow load on Andover Borough Fire Department building located on Route 206.	1	1	1	0	0	0	1	0	0	1	0	1	1	0	7	Medium
Andover Boro-4	Install 300 yards of berm on Kymer Brooke to protect Andover Borough Fire Department located on Route 206.	1	1	1	0	0	0	1	0	0	1	0	1	1	0	7	Medium
Andover Boro-5	When the roof is ready to be replaced on the municipal building, the Borough will incorporate the current snow load standards	1	1	1	0	0	0	1	0	0	1	0	1	1	0	7	Medium

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.2.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.2.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Borough of Andover that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Borough of Andover has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.2.9 Additional Comments

None at this time.

DRAFT



Figure 9.2-1. Borough of Andover Hazard Area Extent and Location Map 1

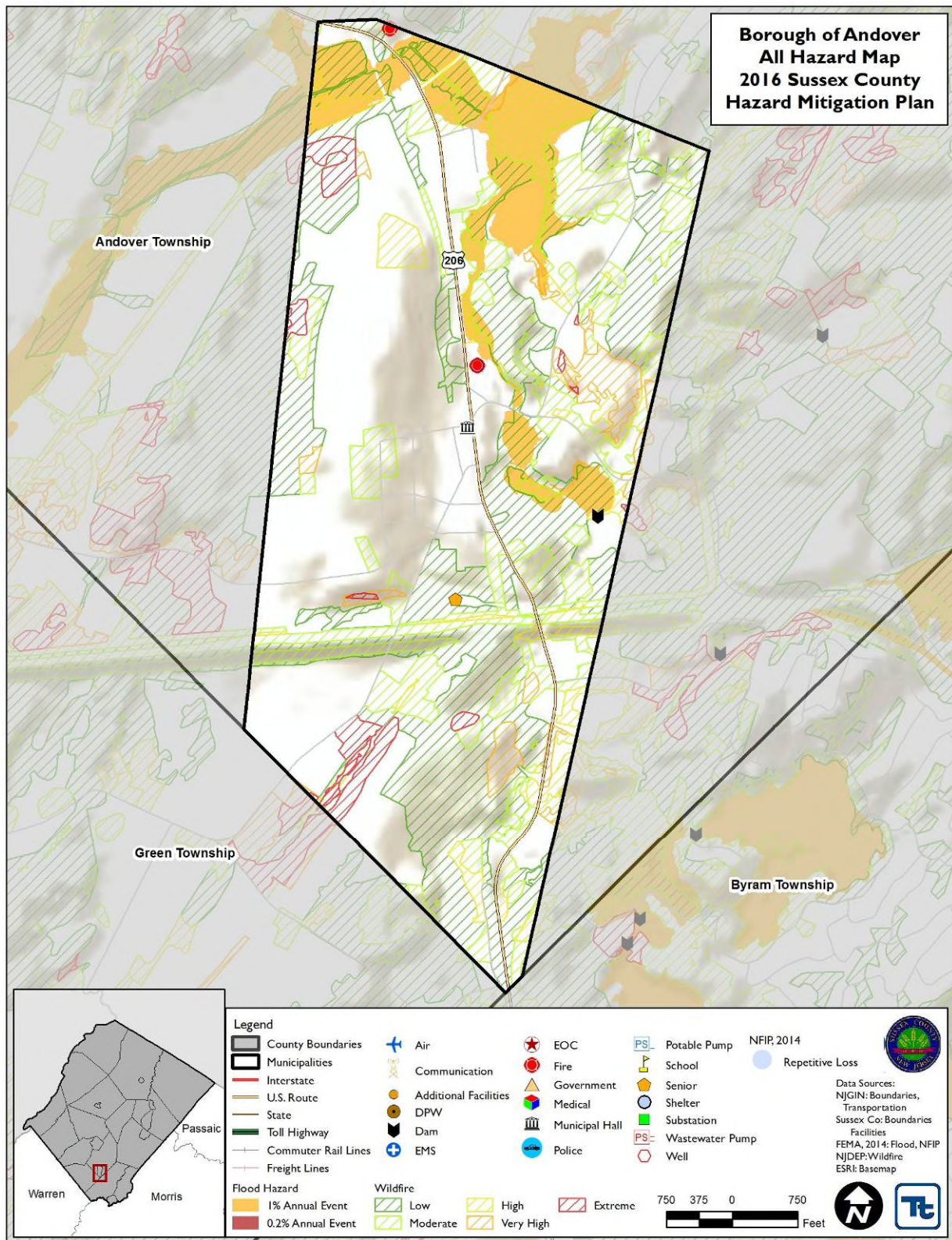
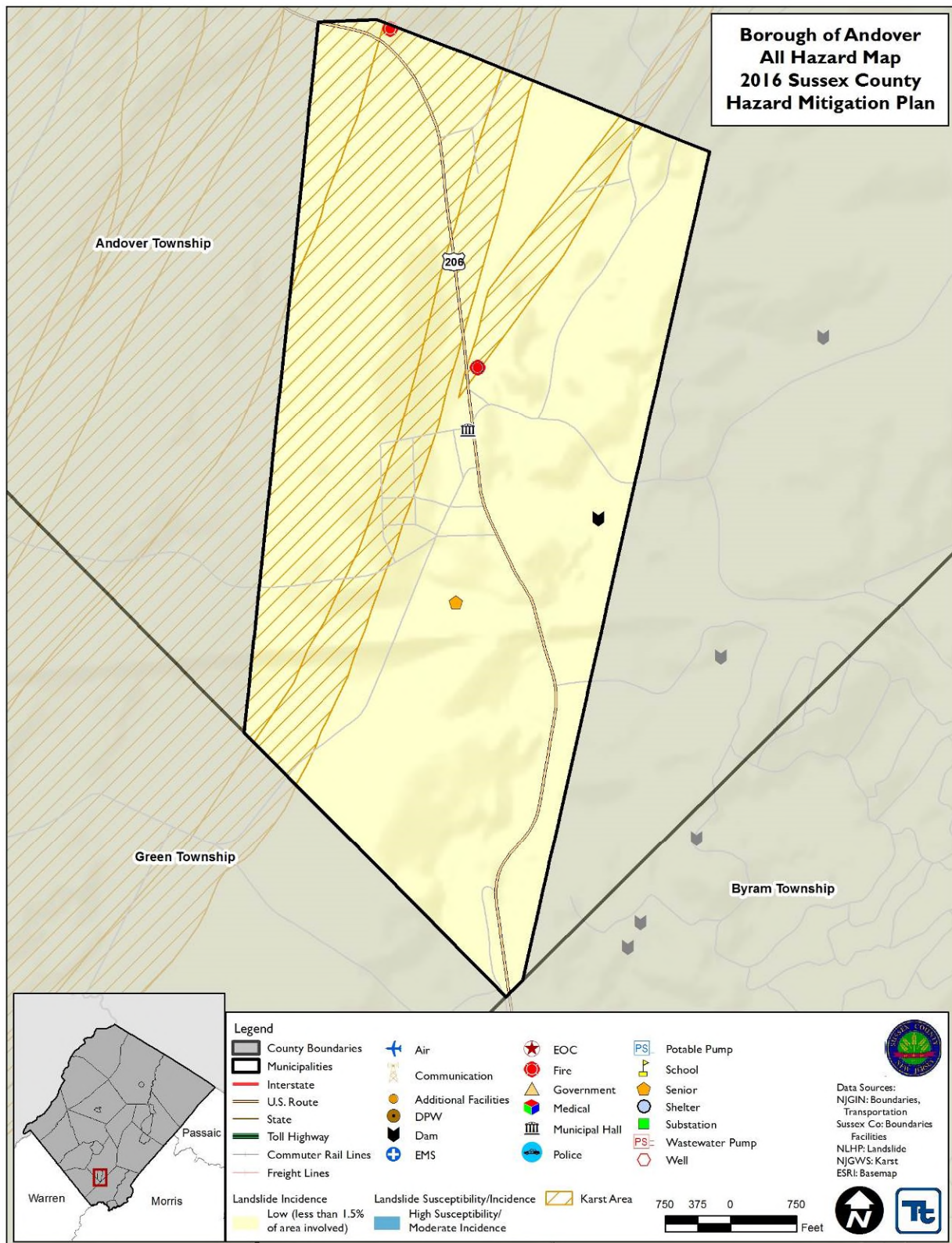




Figure 9.2-2. Borough of Andover Hazard Area Extent and Location Map 2



**Action Number:**

Andover Boro-1

Mitigation Action/Initiative:

Purchase and install generators at critical facilities in the Borough – municipal water system

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Lack of water for residential and businesses; lack of water for fire fighting
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install generator for water system
	2. Purchase portable generator – not feasible for longer power outages
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install 45 kW diesel fuel generator for municipal water system
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 5, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High – Borough water supply unavailable at times of power outages
Estimated Cost	Medium (\$31,000)
Priority*	High
Plan for Implementation	
Responsible/Lead Agency/Department	Mayor, Water Department, OEM
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Andover Boro-1

Mitigation Action/Initiative: Purchase and install generators at critical facilities in the Borough – municipal water system

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Potable water, fire fighting
Property Protection	1	Fire fighting
Cost-Effectiveness	1	
Technical	1	Engineer supports the project
Political	1	Public demands
Legal	1	No issue with installation at site
Fiscal	1	Need grant funding; municipal budget insufficient
Environmental	0	
Social	1	Public supports
Administrative	1	Governing body supports
Multi-Hazard	1	All
Timeline	1	Project will be completed in the next five years
Local Champion	1	
Other Community Objectives	0	
Total	12	
Priority (High/Med/Low)	High	

**Action Number:**

Andover Boro-1

Mitigation Action/Initiative:

Purchase and install generators at critical facilities in the Borough – community center

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Inability to operate shelter / warming center
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install generator and HVAC for community center
	2. Purchase portable generator – not feasible for longer power outages
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install 30 kW diesel fuel generator at community center; upgrade HVAC to natural gas
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 5, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High – currently there is a lack of a community facility to aid residents
Estimated Cost	Medium (\$23,500)
Priority*	High
Plan for Implementation	
Responsible/Lead Agency/Department	Mayor
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Andover Boro-1

Mitigation Action/Initiative:

Purchase and install generators at critical facilities in the Borough – community center

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Capability to shelter residents
Property Protection	1	Maintain operation of community center
Cost-Effectiveness	1	
Technical	1	Engineer supports the project
Political	1	Public demands
Legal	1	No issue with installation at site
Fiscal	1	Need grant funding; municipal budget insufficient
Environmental	0	
Social	1	Public supports
Administrative	1	Governing body supports
Multi-Hazard	1	All
Timeline	1	Project will be completed in the next five years
Local Champion	1	
Other Community Objectives	0	
Total	12	
Priority (High/Med/Low)	High	



Action Number:

Andover Boro-1

Mitigation Action/Initiative:

Purchase and install generators at critical facilities in the Borough – municipal building

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Lack of capability to continue operation of municipal offices
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install generator at the municipal building
	2. Purchase portable generator – not feasible for longer power outages
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install 20 kW generator at municipal building
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 5, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High – support the needs of the community
Estimated Cost	Medium (\$13,500)
Priority*	High
Plan for Implementation	
Responsible/Lead Agency/Department	Mayor, OEM
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Andover Boro-1

Mitigation Action/Initiative:

Purchase and install generators at critical facilities in the Borough – municipal building

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Response to community needs
Property Protection	1	Response to community needs
Cost-Effectiveness	1	
Technical	1	Engineer supports the project
Political	1	Public demands
Legal	1	No issue with installation at site
Fiscal	1	Need grant funding; municipal budget insufficient
Environmental	0	
Social	1	Public supports
Administrative	1	Governing body supports
Multi-Hazard	1	All
Timeline	1	Project will be completed in the next five years
Local Champion	1	
Other Community Objectives	0	
Total	12	
Priority (High/Med/Low)	High	



Action Number:

Andover Boro-3

Mitigation Action/Initiative:

Retrofit fire department roof to meet current standards for snow load

Assessing the Risk	
Hazard(s) addressed:	Severe Winter Weather
Specific problem being mitigated:	The current roof of the Borough Fire Department does meet the current snow load standards
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit fire department roof to meet current standards for snow load
	2. Do nothing – current problem continues
	3. No other feasible options were identified for this project
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit fire department roof to meet current standards for snow load
Action/Project Category	SIP
Goals/Objectives Met	1, 2
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	High
Priority*	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Fire Department, Borough Administration
Local Planning Mechanism	TBD
Potential Funding Sources	HMPG with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Andover Boro-3

Mitigation Action/Initiative: Retrofit fire department roof to meet current standards for snow load

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect roof of fire department from damage due to large amounts of snow
Cost-Effectiveness	1	Reduce costs of repairs
Technical	0	
Political	0	
Legal	0	
Fiscal	1	Borough will seek grant funding for this project
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	0	Severe Winter Weather
Timeline	1	
Local Champion	1	
Other Community Objectives	0	
Total	7	
Priority (High/Med/Low)	Medium	



Action Number:

Andover Boro-4

Mitigation Action/Initiative:

Install berm to protect Fire Department

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Flood
Specific problem being mitigated:	When Kymer Brook overflows its banks, the fire department is prone to flooding and subsequent damages.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Install berm on Kymer Brooke
	2. Do nothing – current problem continues
	3. No other feasible options were identified for this project
Action/Project Intended for Implementation	
Description of Selected Action/Project	Install 300 yards of berm on Kymer Brooke to protect Andover Borough Fire Department located on Route 206.
Action/Project Category	SIP, NSP
Goals/Objectives Met	1, 2, 3
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium
Priority*	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	DPW
Local Planning Mechanism	Emergency Management
Potential Funding Sources	Municipal Budget
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Andover Boro-4

Mitigation Action/Initiative: Install berm to protect Fire Department

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect fire department from flooding
Cost-Effectiveness	1	
Technical	0	
Political	0	
Legal	0	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	Flood, Severe Weather
Timeline	1	
Local Champion	1	
Other Community Objectives	0	
Total	7	
Priority (High/Med/Low)	Medium	



9.3 Township of Andover

This section presents the jurisdictional annex for the Township of Andover.

9.3.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Lt. Eric Danielson, Emergency Management Coordinator 134 Newton-Sparta Road, Newton, NJ 07860 Phone: (973) 383-5544; (973) 383-4280 Email: edanielson@atpd.org	Ptl. Georgios Laoudis, Deputy Coordinator 134 Newton-Sparta Road, Newton, NJ 07860 Phone: (973) 383-5544; (973) 383-4280 Email: glaoudis@atpd.org

9.3.2 Municipal Profile

Andover Township is located in southern Sussex County and bordered to the north by the Townships of Hampton and Lafayette, to the south by the Townships of Green and Byram, to the east by the Township of Sparta and to the west by the Town of Newton and Fredon Township. Brighton, Clearwater, Pinkeyville, Springdale, Whitehall and Wawayanda are unincorporated communities in the Township. It has a total area of 20.7 square miles. Paulins Kill, Kymer Brook, Tar Hill Brook, Pequest River, and Andover Junction Brook are the bodies of water that flow through Andover Township. According to the U.S. Census, the 2010 population for the Township of Andover was 6,319.

Growth/Development Trends

The Township of Andover did not note any recent residential/commercial development since 2010 or any major residential or commercial development, or major infrastructure development planned for the next five years in the municipality.

9.3.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.3-1. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	Hurricane Irene led to flooding of homes and road closures in the Township. The Township provided basement pump outs and the fire department responded to mutual aid with their boat to surrounding municipalities. Limecrest Road and Route 206 were closed. Springdale Gardens Road was damaged due to drainage under the roadway. The Township requested



Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
				public assistance. The DPW conducted basin clean outs, road closures, and debris removal.
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	In the Township, Limecrest Road and Route 206 were both closed. There were flooded basements which required pump outs. The drainage from the culver on Hemlock Avenue eroded the roadway. The Goodale Road ball fields flooded. The DPW cleaned basins, road closures, and removed debris. Public Assistance was requested.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	The entire Township was without power as a result of Hurricane Sandy. Once power was restored, a shelter was established (shelter does not have a backup generator). In addition to power loss, there was no phone service (Century Link) due to their backup power running out. Several roads were closed due to downed trees and utility lines. The fire house, DPW building and Town Hall were all without power. Fire, police, EMS, and DPW were all assigned various tasks that included basin clean outs, road closures, debris removal, and security measures. The Township requested Public Assistance.

9.3.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Andover. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Andover.

Table 9.3-1. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	High*
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$679,675 2,500-Year GBS: \$10,838,367	Occasional	28	Medium
Flood	1% Annual Chance: \$4,689,338	Frequent	18	Medium
Geologic	RCV Exposed to Carbonate Rock Areas: \$389,977,595	Occasional	36	Medium**
Hurricane	100-year MRP: \$288,961	Frequent	48	High



Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
	500-year MRP: \$2,282,736 Annualized: \$16,846			
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$288,961 500-year MRP: \$2,282,736 Annualized: \$16,846	Frequent	48	High
Severe Winter Weather	1% GBS: \$7,974,329 5% GBS: \$39,871,647	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$85,352,230	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed due to the location of high hazard dams in the municipality

** The hazard ranking was changed for this hazard based on input from the municipality, population exposed, and/or event history.

GBS = General building stock; MRP = Mean return period.

a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.

b. High = Total hazard priority risk ranking score of 31 and above

Medium = Total hazard priority risk ranking of 15-30+

Low = Total hazard risk ranking below 15

c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Andover.

Table 9.3-3. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Andover	7	1	\$304	0	0	0

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance flood boundaries.



Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.

9.3.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Community Rating System
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Andover.

Table 9.3-4. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Andover Twp	Resolution
Capital Improvements Plan	Yes	Local	Andover Twp	Resolution
Floodplain Management/Basin Plan	Yes	Local	Andover Twp DPW	Ch 148 Storm Sewer Management
Stormwater Management Plan	Yes	Local	Andover Twp DPW	Ch 150 Stormwater Management
Open Space Plan	Yes	Local	Andover Twp	Resolution
Stream Corridor Management Plan	No	State	DEP	
Watershed Management or Protection Plan	No	State	DEP	
Economic Development Plan	Yes	Local	Andover Twp	Ch 3-70
Comprehensive Emergency Management Plan	Yes	Local	OEM	
Emergency Response Plan	Yes	Local	OEM	
Post-Disaster Recovery Plan	No			
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				



Table 9.3-4. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Building Code	Yes	State, Local		State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Land Use Bd	Ch 190
Subdivision Ordinance	Yes	Local	Land Use Bd	Ch 159
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State, Local		Chapter 55 – Flood Damage Prevention
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State, Local		
Growth Management Ordinances	Yes	Local	Andover Twp	Part of master plan
Site Plan Review Requirements	Yes	Local	Land Use Bd	Ch 131
Stormwater Management Ordinance	Yes	Local	DPW	Ch 150
Municipal Separate Storm Sewer System (MS4)	N/A			
Natural Hazard Ordinance	N/A			
Post-Disaster Recovery Ordinance	N/A			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes	Local	Land Use Bd	Ch 150-11

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Andover.

Table 9.3-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Land use board
Mitigation Planning Committee	No	
Environmental Board/Commission	Yes	Environmental commission
Open Space Board/Committee	Yes	Open space committee
Economic Development Commission/Committee	Yes	Economic advisory committee
Maintenance Programs to Reduce Risk	Yes	AT DPW
Mutual Aid Agreements	Yes	Police/Fire/EMS/DPW
Technical/Staffing Capability		



Table 9.3-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Both Twp planner and Twp engineer
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	DCA is Twp construction officials
Planners or engineers with an understanding of natural hazards	Yes	DCA
NFIP Floodplain Administrator	Yes	Construction Official (as per Township Code)
Surveyor(s)	No	Subcontracted as necessary by engineer
Personnel skilled or trained in GIS and/or Hazus-MH applications	No	Refer to Sussex County GIS Dept
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	AT OEM
Grant Writer(s)	No	
Staff with expertise or training in benefit/cost analysis	No	
Professionals trained in conducting damage assessments	No	

Fiscal Capability

The table below summarizes financial resources available to the Township of Andover.

Table 9.3-6. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	No
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	No
Impact Fees for homebuyers or developers of new development/homes	Yes
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	Yes
Open Space Acquisition Funding Programs	Yes
Other	

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Andover.

**Table 9.3-7. Education/Outreach and Community Classifications**

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	N/A	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	Yes	Zoning/code enforcement	
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	5	2014
Storm Ready	No	N/A	N/A
Firewise	No	N/A	N/A
Disaster/Safety Programs in/for Schools	Yes		
Organizations with Mitigation Focus (advocacy group, non-government)	Yes	DPW/OEM	
Public Education Program/Outreach (through website, social media)	Yes		
Public-Private Partnerships	Yes		

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Township of Andover's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.3-8. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability	X budget restrictions		



Table 9.3-8. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Administrative and Technical Capability	X budget restrictions		
Fiscal Capability	X (money)		
Community Political Capability	X budget restrictions		
Community Resiliency Capability	X budget restrictions		
Capability to Integrate Mitigation into Municipal Processes and Activities.	X budget restrictions		

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Corey Stoner, Township Engineer

Flood Vulnerability Summary

Lists/inventories of properties that have been damaged by floods are maintained through the Township fire department responses and CAD entries. The Township was recently involved in litigation for a floodprone residence and private residences were removed from current lists. During Irene and Lee, there was a basement collapse of a private residence. Other damages during these events included basement pump outs, which were performed by the fire department, where mitigation was possible. Additionally, during Irene and Lee, damage assessments were performed by FEMA representatives who accompanied the Township after the events. During Sandy, damage was mostly caused by wind and there was no flooding in the Township. There is currently no interest in mitigation. The one home that had the basement collapse during Irene and Lee was self-mitigated by the homeowner who received assistance from FEMA.

Resources

As the Andover Township Engineer, the municipal FPA is responsible for reviewing applications for construction that will require zoning permit approval. In coordination with the Township Zoning Officer, reviews are made to determine if the construction will impact floodways in any manner. Education regarding flood risk is done on a one on one basis with homeowners who are planning to perform any work activities in close proximity to flood risk areas. The FPA indicated that there are currently no barriers to running an effective floodplain administration program and that he feels adequately supported and trained to fulfill his responsibilities as the municipal FPA. The FPA also stated that he would consider attending continuing education and/or certification training on floodplain management if it were offered in the County.

Compliance History

The Township is currently in good standing with the NFIP; however, it is unknown as to when the last compliance audit was conducted.

Regulatory

The Township's floodplain ordinances meet the FEMA and State minimum requirements. Additionally, the Planning Board considers efforts to reduce risk when an applicant is proposing to disturb land on a property and/or increases the impervious surface on a property.



Community Rating System

The Township of Andover does not participate in the Community Rating System (CRS) program. Joining CRS has not been considered by the Township.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Andover Township has been quite active in looking at opportunities to proactively plan for development that suits the character of the community while protecting environmental sensitive/hazard prone properties. As such, the Township has prepared a number of Master Plan Reexaminations and Master plan Amendments to coordinate the Townships land use polies with changes in zoning while ensuring the protection of the health, safety and welfare of citizens in the Township. Most recently the Township underwent a Master Plan Reexamination process in 2011 to support a determination of need for an underutilized and vacant property. In 2010 the Township completed a Master Plan Reexamination to evaluate the existing zoning for opportunities for the rezoning of properties to "Public Use" or "Conservation" enhancing the opportunity for the creation of greenways and reducing risk to natural hazards like flooding. The 2008 Open Space and Recreation Plan included a number of mitigation related policy guiding goals:

- Expand trail systems linking neighborhoods, schools, parks, and natural areas to promote community connectivity
- Work with the State of New Jersey to preserve land adjacent to publicly owned parkland
- Protect water resources including aquifer recharge areas, surface waters, and groundwater
- Protect wildlife corridors and wildlife habitat to preserve the diversity of flora and fauna

The plan also identified numerous open space acquisition and preservation funding opportunities as well as preservation tools. The 2007 Master Plan Amendment enacted a number of policy guiding objectives and recommendations applicable to mitigation including the following:

- To provide a future land use pattern that serves the needs of the community for housing, community services and a safe and healthful environment.
- To retain to the greatest extent practicable attractive vistas from public rights-of- way, including views of hills, valleys, ridgelines, woodlands, farmlands, hedgerows, stream corridors, flood plains and other natural areas.
- To protect sensitive environmental resources from destruction or degradation, including but not limited to steep slopes, ridgelines, trout streams, wetlands, stream corridors, potable water supplies, watersheds, aquifers, rivers, view sheds, forests and other vegetation, soils, habitats of threatened and endangered species and unique natural systems.
- To preserve and maintain the interrelationships between land and water resources which contribute to their functioning as an ecological system.
- To relate the intensity of development, in areas relying on groundwater supplies and on-site sewage disposal, to conservative estimates of available water resources and the ability of the soil and ground water to sustain on-lot disposal systems without degrading or impairing the water quality.



- To identify and manage stream corridor buffer areas by maintaining undisturbed vegetation in order to protect and improve water quality, and provide wildlife corridors and opportunities for passive and active recreation.
- To plan for the expansion of necessary public services, including but not limited to utilities, community, emergency service, and recreation facilities, consistent with the future vision plan for Andover Township.

Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Management Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter.

Chapter 55: Flood Damage Prevention <http://www.ecode360.com/7154384>

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 150: Stormwater Management <http://www.ecode360.com/7156337>

The purposed of the Stormwater Management chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of its citizenry.

Chapter 131-11 Article IV Environmental Impact Statement <http://www.ecode360.com/7155777>

The purpose of this section of the Chapter is to allow the Township to assess the impact of a proposed development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding and waste disposal.

Operational and Administration

The Township has established a Land Use Board, Environmental Commission, and an Open Space Committee, that aid in planning decisions to support the conservation and preservation of the Township's critical environmental features. Beyond that the Township employs a Land Use Administrator and contracts out for professional legal, planning, and engineering services for development review. The Township also employs several part time employees for the enforcement of zoning, construction, and fire codes.



Funding

The Township has received funding from the NJDOT, Sustainable Jersey, The Garden State Preservation Trust Fund, and Clean Communities grant programs for the completion of mitigation and emergency response related projects including roadway and drainage improvements.

The Township identified a new mitigation initiative to include in their budget for future mitigation projects in both the Township budget and Capital Improvement Budget. Refer to Table 9.3-10 for further information.

Education and Outreach

The Township's website posts information regarding upcoming community events and important municipal decisions. The website also has a 'Storm Information' web page that provides a great deal of information on emergency information, mitigation project assistance, grant funding, and storm preparedness information. Residents can link to disaster assistance resources and emergency response contact information.

Figure 9.3-1. Screenshot of Township Website with Examples of their Posted Mitigation/Emergency Information





9.3.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.

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Table 9.3-9. Past Mitigation Initiative Status

Initiative Number	2011 Mitigation Action	Responsible Party	Status (In progress, No progress, Complete)	Describe Status 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	Next Step (Include in 2016 HMP? or Discontinue)	Describe Next Step 1. If including action in the 2016 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Andover Township 1	Elevation of flood prone property located on Stickle Pond Road.	OEM Coordinator	No Progress	1. House to be destroyed by new owner 2. Will have to comply with new zoning regulations	Discontinue	This property is going to be demolished by the new owner; new construction will comply with new zoning regulations. This action will not be included in the 2016 HMP.
Andover Township 2	Elevation of flood prone property located on Limecrest Road.	OEM Coordinator	Complete	House was moved to higher elevation by owner following basement collapse 9/8/2011	Discontinue	After a basement collapse of home, the structure was moved to a higher elevation in 2011. This action will not be included in the 2016 HMP.
Andover Township 3	Implementation of Fire Wise community program.	OEM Coordinator	No Progress	Fire Prevention program handled by County; therefore, there has been no progress on this action.	Include in 2016 HMP	The Township will included this action in the 2015 HMP.
Andover Township 4	Upgrade of roof to current snow load and high wind standards of Long Pond School located on Limecrest Road.	School Board Administrator	No Progress	This project has not been completed due to lack of grants/funding	Include in 2016 HMP	The Township will included this action in the 2016 HMP.
Andover Township 5	Upgrade of roof to current snow load and high wind standards of Florence Burd School located on Newton-Sparta Road.	School Board Administrator	No Progress	This project has not been completed due to lack of grants/funding	Include in the 2016 HMP	The Township will included this action in the 2016 HMP.
Andover Township 6	Inundation study for Hidden Valley Lake Dam located on Bonnie Glen Court.	Township Engineer	No Progress	This project has not been completed due to lack of grants/funding	Include in the 2016 HMP	The Township will included this action in the 2016 HMP.
Andover Township 7	Inundation study for Lake Lenape Dam located on Old Creamery Road.	Township Engineer	No Progress	This project has not been completed due to lack of grants/funding	Include in the 2016 HMP	The Township will included this action in the 2016 HMP.
Andover Township 8	Stormwater water retention basin addition to Hemlock Avenue and Old Creamery Road.	Township Engineer	No Progress	1. Mitigation by DPW to lessen impact 2. Funding for project is obstacle	Include in 2016 HMP	The Township will included this action in the 2016 HMP.
Andover Township 9	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	In Progress	This is an ongoing action	Include in 2016 HMP	The Township will included this action in the 2016 HMP.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Township has not identified any additional mitigation projects/activities that have been completed since approval of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Township participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013). In May 2015, the Township participated in a second workshop led by FEMA Region 2 and NJOEM and was provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.3-10 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.3-11 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.3-10. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Andover Twp-1 (LOI)	Install backup generator for critical infrastructure that includes the Township firehouse (shelter), town hall and DPW.	Existing	All	1, 2, 6	Township and OEM	High	High	Grant Funding with local cost share	Short Term / DOF	High	SIP	PP
Andover Twp-2	Pierce Road – stormwater retention basin	Existing	Flood	1, 2, 6	Township and Engineer	Avoid loss of life and damage to infrastructure	High	Grant funding with local cost share	Short Term / DOF	High	SIP	PP
Andover Twp-3	Pinkeyville Road – stormwater retention basin	Existing	Flood	1, 2, 6	Township and Engineer	Avoid loss of life and damage to infrastructure	High	Grant funding with local cost share	Short Term / DOF	High	SIP	PP
Andover Twp-4	Budget for future mitigation projects in both the Township budget and Capital Improvement Budget.	N/A	All	All	OEM Director and Township Administrator	Medium	Low	Municipal Budget	Short Term / DOF	Medium	LPR	PR
Andover Twp-5	Identify critical and essential Township facilities for location in hazard areas; identify mitigation actions to protect these structures from future damage.	N/A	All	All	OEM Director and Township Administrator	Medium	Low	Municipal Budget	Short Term / DOF	Medium	LPR	PR
Andover Twp-6	The Township will establish a community resilience committee and advisor.	N/A	All	All	OEM Director and Township Administrator	Medium	Low	Municipal Budget	Short Term / DOF	Medium	LPR	PR
Andover Twp-7	Improve outreach to local schools, colleges and universities; establish relationships; assist with community service and hazard mitigation activities.	N/A	All	All	OEM Director and Township Administrator	Medium	Low	Municipal Budget	Short Term / DOF	Medium	EAP	PR
Andover Twp-8	The Township will develop a COOP and it will integrate mitigation.	N/A	All	All	OEM Director and Township Administrator	Medium	Low	Municipal Budget	Short Term / DOF	Medium	LPR	PR
Andover Twp-9 (old)	Implementation of Fire Wise community program	N/A	Wildfire	1, 2, 3	Township Fire and OEM	Medium	Low	Municipal Budget	Short Term / DOF	Low	LPR	PR



Table 9.3-10. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Andover Twp-10 (old)	Upgrade roof of Long Pond School to current snow load and high wind standards	Existing	Severe Winter Weather, Severe Weather	1, 2, 6	Andover Regional Board of Education / OEM	High	High	Grant Funding with local school board cost share	Short Term / DOF	Medium	SIP	PP
Andover Twp-11 (old)	Upgrade roof of FMB School to current snow load and high wind standards	Existing	Severe Winter Weather, Severe Weather	1, 2, 6	Andover Regional Board of Education / OEM	High	High	Grant Funding with local school board cost share	Short Term / DOF	Medium	SIP	PP
Andover Twp-12 (old)	Inundation study for Hidden Valley Lake Dam / Bonnie Glen Court	N/A	Dam Failure	1, 2, 6	Hidden Valley Lake Association	Avoid loss of life and damage to infrastructure	Medium	Grant funding / local community specific cost share	Short Term / DOF	Low	LPR	PR
Andover Twp-13 (old)	Inundation study for Lake Lenape Dam / Old Creamery Road	N/A	Dam Failure	1, 2, 6	Hidden Valley Lake Association	Avoid loss of life and damage to infrastructure	Medium	Grant funding / local community specific cost share	Short Term / DOF	Low	LPR	PR
Andover Twp-14 (old)	Stormwater retention basin – Old Creamery Rd & Hemlock Ave	Existing	Flood	1, 2, 6	Township and Engineer	Avoid loss of life and damage to infrastructure	High	Grant funding / local community specific cost share	Short Term / DOF	High	SIP	PP
Andover Twp-15 (old)	Expand mitigation education and outreach efforts through handouts, newsletters, social media, and Township website.	N/A	All	All	OEM	High	Low	Municipal Budget	Ongoing	Medium	EAP	PI

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS Community Rating System
DPW Department of Public Works

FEMA Federal Emergency Management Agency
FPA Floodplain Administrator
HMA Hazard Mitigation Assistance





N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP)-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES)-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities

PDM	Pre-Disaster Mitigation Grant Program
HMA	Hazard Mitigation Assistance Program

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.



Table 9.3-11. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High/Medium/Low
Andover Twp-1 (LOI)	Install backup generator for critical infrastructure that includes the Township firehouse (shelter), town hall and DPW to ensure continuity of operations	1	1	1	1	1	1	-1	1	0	1	1	1	1	1	11	High
Andover Twp-2	Pierce Road – stormwater retention basin	1	1	1	1	1	1	-1	1	1	1	1	0	1	1	11	High
Andover Twp-3	Pinkeyville Road – stormwater retention basin	1	1	1	1	1	1	-1	1	1	1	1	0	1	1	11	High
Andover Twp-4	Budget for future mitigation projects in both the Township budget and Capital Improvement Budget.	1	1	1	1	1	1	0	0	0	1	1	0	0	0	8	Medium
Andover Twp-5	Identify critical and essential Township facilities for location in hazard areas; identify mitigation actions to protect these structures from future damage.	1	1	1	1	1	1	0	0	0	1	1	0	0	0	8	Medium
Andover Twp-6	The Township will establish a community resilience committee and advisor.	1	1	1	1	1	1	0	0	0	1	1	0	0	0	8	Medium
Andover Twp-7	Improve outreach to local schools, colleges and universities; establish relationships; assist with community service and hazard mitigation activities.	1	1	1	1	1	1	0	0	0	1	1	0	0	0	8	Medium
Andover Twp-8	The Township will develop a COOP and it will integrate mitigation.	1	1	1	1	1	1	0	0	0	1	1	0	0	0	8	Medium
Andover Twp-9 (old)	Implementation of Fire Wise community program	1	1	0	0	0	0	0	1	0	0	1	1	0	0	5	Low
Andover Twp-10 (old)	Upgrade roof of Long Pond School to current snow load and high wind standards	1	1	1	1	0	1	-1	0	0	0	1	0	1	1	7	Medium



Table 9.3-11. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High/Medium/Low
Andover Twp-11 (old)	Upgrade roof of FMB School to current snow load and high wind standards	1	1	1	1	0	1	-1	0	0	0	1	0	1	1	7	Medium
Andover Twp-12 (old)	Inundation study for Hidden Valley Lake Dam / Bonnie Glen Court	1	1	1	1	0	1	-1	0	1	0	1	0	1	1	8	Low
Andover Twp-13 (old)	Inundation study for Lake Lenape Dam / Old Creamery Road	1	1	1	1	0	1	-1	0	1	0	1	0	1	1	8	Low
Andover Twp-14 (old)	Stormwater retention basin – Old Creamery Rd & Hemlock Ave	1	1	1	1	1	1	-1	1	1	1	1	0	1	1	11	High
Andover Twp-15 (old)	Conduct all hazards public education and outreach program / preparedness	1	1	0	0	0	0	0	1	0	0	1	1	0	0	5	Medium

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.3.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.3.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Andover that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Andover has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.3.9 Additional Comments

None at this time.



Figure 9.3-2. Township of Andover Hazard Area Extent and Location Map 1

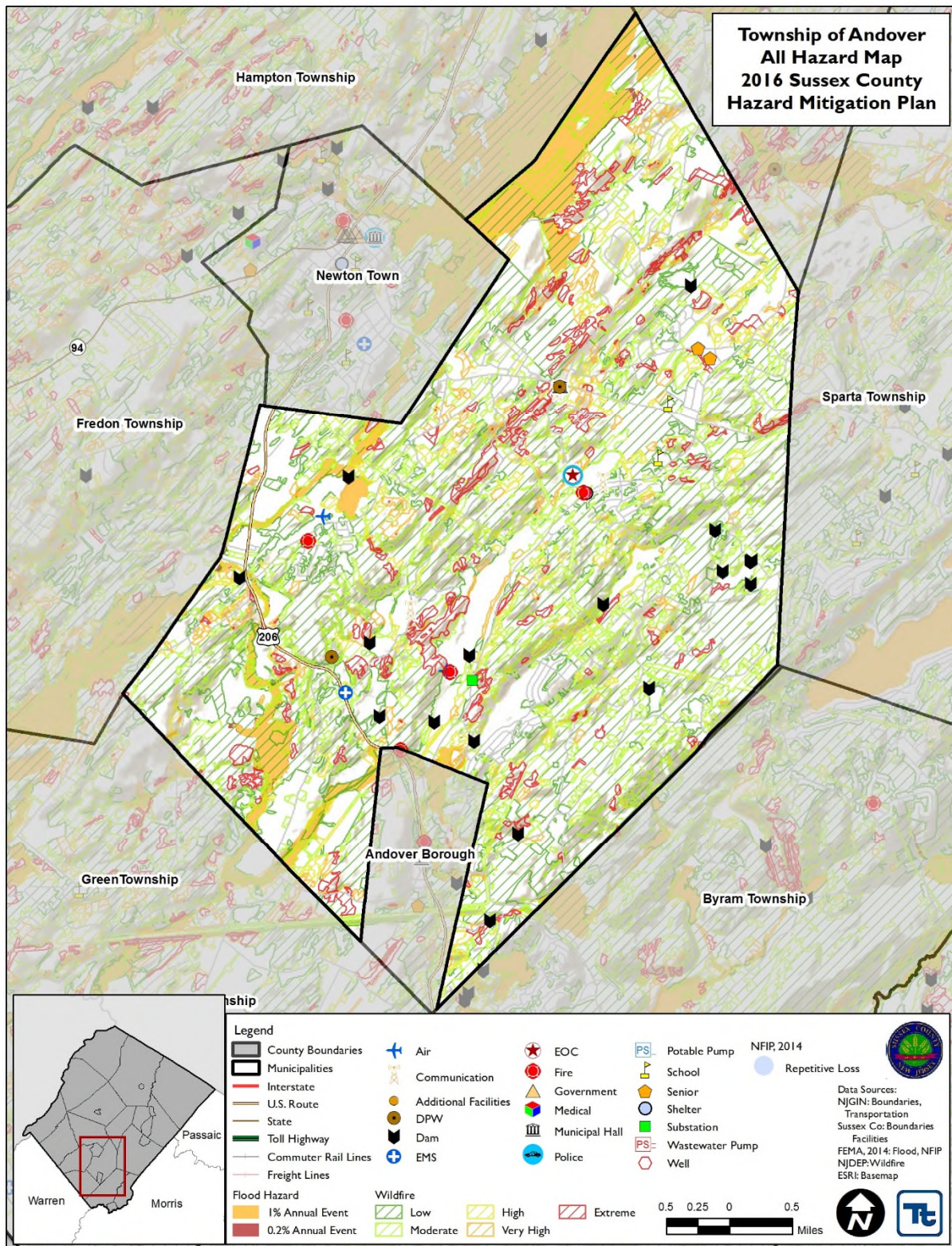
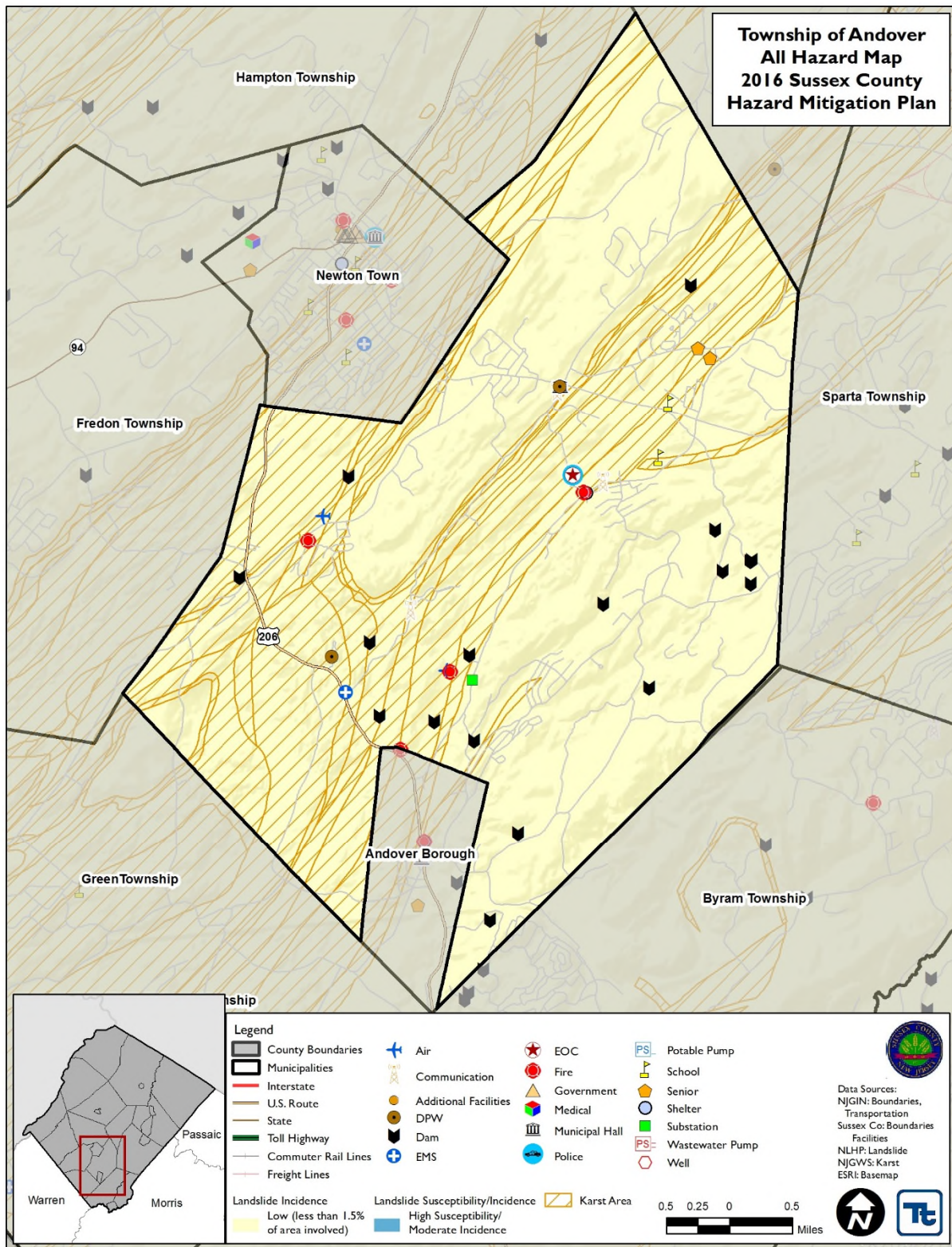




Figure 9.3-3. Township of Andover Hazard Area Extent and Location Map 2





Action Number:

Andover Township-1

Mitigation Action/Initiative:

Install backup generator for critical infrastructure / emergency shelter Andover
Twp Firehouse / Town Hall / DPW

Assessing the Risk	
Hazard(s) addressed:	All hazards that may lead to a power outage
Specific problem being mitigated:	Loss of power restricts Township critical infrastructure from functioning during times of need
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install backup generators for critical infrastructure in the Township
	2. Build new facilities
	3. Update existing facilities
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install backup generators for critical infrastructure in the Township
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Protect life and property / provide emergency shelter and con't services
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township and OEM
Local Planning Mechanism	Emergency Management
Potential Funding Sources	Grant funding with local cost share
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: 05/20/2015 Progress on Action/Project: grant submitted to FEMA via NJEMGrants



Action Number: Andover Township-1

Mitigation Action/Initiative: Install backup generator for critical infrastructure / emergency shelter Andover Twp Firehouse / Town Hall / DPW

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide shelter for Township residents; allow for continuity of operations
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	-1	Will need to seek grant funding for this project
Environmental	1	
Social	0	
Administrative	1	
Multi-Hazard	1	All
Timeline	1	Short Term
Local Champion	1	
Other Community Objectives	1	
Total	11	
Priority (High/Med/Low)	High	



Action Number:

Andover Twp-2

Mitigation Action/Initiative:

Pierce Road – stormwater retention basin

Assessing the Risk	
Hazard(s) addressed:	Flood
Specific problem being mitigated:	Ponding of water and freezing of water due to improper drainage
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Install drainage / stormwater drains
	2. Create large area retention basin
	3. Mitigate erosion
Action/Project Intended for Implementation	
Description of Selected Action/Project	Install drainage and retention basins
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Avoid loss of life and damage to infrastructure
Estimated Cost	\$ 500,000
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township of Andover / Engineer
Local Planning Mechanism	Stormwater Management
Potential Funding Sources	Grant funding / local community specific cost share
Timeline for Completion	5 years
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Andover Twp-2

Mitigation Action/Initiative: Pierce Road – stormwater retention basin

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	-1	
Environmental	1	
Social	1	
Administrative	1	
Multi-Hazard	1	Flood, Severe Weather
Timeline	0	>5 years
Local Champion	1	
Other Community Objectives	1	
Total	11	
Priority (High/Med/Low)	High	



Action Number:

Andover Twp-3

Mitigation Action/Initiative:

Pinkeyville Road – stormwater retention basin

Assessing the Risk	
Hazard(s) addressed:	Flood
Specific problem being mitigated:	Ponding of water and freezing of water due to improper drainage
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Install drainage / stormwater drains
	2. Create large area retention basin
	3. Mitigate erosion
Action/Project Intended for Implementation	
Description of Selected Action/Project	Install drainage and retention basins
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Avoid loss of life and damage to infrastructure
Estimated Cost	\$ 500,000
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township of Andover / Engineer
Local Planning Mechanism	Stormwater Management
Potential Funding Sources	Grant funding / local community specific cost share
Timeline for Completion	5 years
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Andover Twp-3

Mitigation Action/Initiative: Pinkeyville Road – stormwater retention basin

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect residents from flooding in this area
Property Protection	1	Protect structures from damage in this area
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	-1	
Environmental	1	
Social	1	
Administrative	1	
Multi-Hazard	1	Flood, Severe Weather
Timeline	0	>5 years
Local Champion	1	
Other Community Objectives	1	
Total	11	
Priority (High/Med/Low)	High	



Action Number:

Andover Twp-10

Mitigation Action/Initiative:

Upgrade roof of Long Pond School to current snow load and high wind standards

Assessing the Risk	
Hazard(s) addressed:	Severe Winter Weather, Severe Weather
Specific problem being mitigated:	Potential for roof collapse and/or damage due to snow and wind
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Replace roof of school
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Replace roof of Long Pond School to current snow loads and high wind standards.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Avoid loss of life and damage to infrastructure
Estimated Cost	High
Priority*	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Andover Regional Board of Education / OEM
Local Planning Mechanism	School Budget
Potential Funding Sources	Grant funding / local school board share
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Andover Twp-10

Mitigation Action/Initiative: Upgrade roof of Long Pond School to current snow load and high wind standards

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect students from any damages that could occur if roof is not upgraded
Property Protection	1	Protect school from damages
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	1	
Fiscal	-1	
Environmental	0	
Social	0	
Administrative	0	
Multi-Hazard	1	Severe Weather, Severe Winter Weather
Timeline	0	
Local Champion	1	
Other Community Objectives	1	
Total	7	
Priority (High/Med/Low)	Med	

**Action Number:** Andover Twp-11**Mitigation Action/Initiative:** Upgrade roof of FMB School to current snow load and high wind standards

Assessing the Risk	
Hazard(s) addressed:	Severe Winter Weather, Severe Weather
Specific problem being mitigated:	Potential for roof collapse and/or damage due to snow and wind
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Replace roof of school
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Replace roof of FMB School to current snow loads and high wind standards.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Avoid loss of life and damage to infrastructure
Estimated Cost	High
Priority	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Andover Regional Board of Education / OEM
Local Planning Mechanism	School Budget
Potential Funding Sources	Grant funding / local school board share
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Andover Twp-11

Mitigation Action/Initiative: Upgrade roof of FMB School to current snow load and high wind standards

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect students from any damages that could occur if roof is not upgraded
Property Protection	1	Protect school from damages
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	1	
Fiscal	-1	
Environmental	0	
Social	0	
Administrative	0	
Multi-Hazard	1	Severe Weather, Severe Winter Weather
Timeline	0	
Local Champion	1	
Other Community Objectives	1	
Total	7	
Priority (High/Med/Low)	Med	

**Action Number:**

Andover Twp-14

Mitigation Action/Initiative:

Stormwater retention basin – Old Creamery Rd & Hemlock Ave

Assessing the Risk	
Hazard(s) addressed:	Flood
Specific problem being mitigated:	Ponding of water and freezing of water due to improper drainage
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Install drainage / stormwater drains
	2. Create large area retention basin
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Install drainage and retention basins
Action/Project Category	Structure and Infrastructure Project
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Avoid loss of life and damage to infrastructure
Estimated Cost	\$500,000
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township of Andover / Engineer
Local Planning Mechanism	Stormwater Management
Potential Funding Sources	Grant funding / local community specific cost share
Timeline for Completion	5 years
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Andover Twp-14

Mitigation Action/Initiative: Stormwater retention basin – Old Creamery Rd & Hemlock Ave

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect residents from flooding in this area
Property Protection	1	Protect structures from damage in this area
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	-1	
Environmental	1	
Social	1	
Administrative	1	
Multi-Hazard	1	Flood, Severe Weather
Timeline	0	>5 years
Local Champion	1	
Other Community Objectives	1	
Total	11	
Priority (High/Med/Low)	High	



9.4 Borough of Branchville

This section presents the jurisdictional annex for the Borough of Branchville.

9.4.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Jeff Lewis, OEM Coordinator 5 Main Street, P.O. Box 840, Branchville, NJ 07826 Phone: (973) 479-7203 Email: jlewis310@embarqmail.com	Christopher Franek, Deputy OEM 5 Main Street, P.O. Box 840, Branchville, NJ 07826 Phone: (973) 670-7037 Email: Christopher.Franek@gmail.com

9.4.2 Municipal Profile

The Borough of Branchville is located in northwestern Sussex County and surrounded entirely by the Township of Frankford. Culvers Creek and Dry Brook both flow through the Borough. The Borough has a total area of 0.6 square miles. According to the U.S. Census, the 2010 population for the Borough of Branchville was 841.

Growth/Development Trends

The Borough of Branchville did not note any recent residential/commercial development since 2010 or any major residential or commercial development, or major infrastructure development planned for the next five years in the municipality.

9.4.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.4-1. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	Local residents were evacuated and sheltered. Mill Street and Broad Street were closed for two days and there were residential power outages. The borough park and baseball field were damaged.
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	Local residents were evacuated and sheltered. Broad Street was closed for two days and Mill Street was closed for three weeks. There were residential power outages as well. Infrastructure damage included the county bridge and roadway at Mill Street. Additionally, one home was deemed uninhabitable due to flood damage. Public assistance was requested. Other costs to



Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
				the Borough included DPW cleanup and fire department pumping detail.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	The Borough was without power for one week and many local businesses had to close. Roads were also closed in the Borough. Other costs to the Borough included DPW clean up and fire department road closures.

9.4.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Borough of Branchville. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Borough of Branchville.

Table 9.4-2. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	Medium
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$531,175 2,500-Year GBS: \$8,027,019	Occasional	28	Medium
Flood	1% Annual Chance: \$3,813,930	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$48,198,523	Frequent	54	Medium*
Hurricane	100-year MRP: \$25,242 500-year MRP: \$256,819 Annualized: \$1,665	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$25,242 500-year MRP: \$256,819 Annualized: \$1,665	Frequent	48	High
Severe Winter Weather	1% GBS: \$1,057,879 5% GBS: \$5,289,397	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$1,035,772	Frequent	18	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High



Notes: GBS = General building stock; MRP = Mean return period.

* The hazard ranking was changed for this hazard based on input from the municipality, population exposed, and/or event history.

- a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- b. High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
- c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Borough of Branchville.

Table 9.4-3. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Borough of Branchville	9	6	\$57,589	2	0	2

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Note (5) A zero percentage denotes less than 1/100th percentage and not zero damages or vulnerability as may be the case.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance boundary.

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.



9.4.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Borough of Branchville.

Table 9.4-4. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Mayor & Council	Code chapters: Chapter 97-19
Capital Improvements Plan	Yes	Local	Mayor & Council	Code chapters: Chapter 104-B
Floodplain Management/Basin Plan	Yes	Local	Mayor & Council	N/A
Stormwater Management Plan	Yes	Local	Mayor & Council	Chapter 121 Storm Water Management
Open Space Plan	No			
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	No			
Comprehensive Emergency Management Plan	Yes	Local	Mayor & Council	N/A
Emergency Response Plan	Yes	Local	Mayor & Council OEM	N/A
Post-Disaster Recovery Plan	No			
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	Yes	Local	Mayor Council	121-16 requirements for a site Storm water Plan
Regulatory Capability				
Building Code	Yes	State, Local	Mayor & Council	State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)



Table 9.4-4. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Zoning Ordinance	Yes	Local	Mayor Council	Chapter 123 - Zoning
Subdivision Ordinance	No	State	Mayor & Council	Chapter 104 – Subdivision of Land
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State, Local	Mayor & Council	Chapter 64 – Flood Damage Prevention
NFIP: Cumulative Substantial Damages	Yes	State	Mayor & Council	Chapter 64-5(25)
NFIP: Freeboard	Yes	State, Local	Mayor & Council	N/A
Growth Management Ordinances	No			
Site Plan Review Requirements	Yes	Local	Mayor & Council	Chapter 97-3
Stormwater Management Ordinance	Yes	Local	Mayor & Council	Chapter 121-6
Municipal Separate Storm Sewer System (MS4)	Yes	Local	Mayor & Council	Chapter 144 – Sewage Disposal Systems, Individual
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes	Local	Borough	Chapter 111 – Trees and Shrubbery Chapter 131 – Flooding and Standing Water

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Borough of Branchville.

Table 9.4-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Planning Board
Mitigation Planning Committee	No	Mayor & Council
Environmental Board/Commission	No	Mayor & Council
Open Space Board/Committee	No	Mayor & Council
Economic Development Commission/Committee	No	Mayor & Council
Maintenance Programs to Reduce Risk	No	Mayor & Council
Mutual Aid Agreements	Yes	Mayor Council OEM Fire Chief
Technical/Staffing Capability		



Table 9.4-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Mayor & Council
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Mayor & Council
Planners or engineers with an understanding of natural hazards	Yes	Mayor & Council
NFIP Floodplain Administrator	Yes	Construction Official
Surveyor(s)	Yes	Mayor & Council
Personnel skilled or trained in GIS and/or Hazus-MH applications	No	State
Scientist familiar with natural hazards	No	State
Emergency Manager	Yes	OEM
Grant Writer(s)	No	
Staff with expertise or training in benefit/cost analysis	No	
Professionals trained in conducting damage assessments	Yes	Mayor & Council

Fiscal Capability

The table below summarizes financial resources available to the Borough of Branchville.

Table 9.4-6. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	Yes
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	Yes
Impact Fees for homebuyers or developers of new development/homes	Yes
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	N/A
Other Federal or State Funding Programs	Yes
Open Space Acquisition Funding Programs	No
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Borough of Branchville.



Table 9.4-7. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		
Building Code Effectiveness Grading Schedule (BCEGS)	No		
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	6/10	
Storm Ready	No		
Firewise	No		
Disaster/Safety Programs in/for Schools	No		
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	No		
Public-Private Partnerships	No		

N/A = Not Applicable. NP = Not Participating. - = Unavailable. TBD = To Be Determined.

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>



Self-Assessment of Capability

The table below provides an approximate measure of the Borough of Branchville's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.4-8. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability	Limited Staff		
Administrative and Technical Capability	Limited Staff		
Fiscal Capability	Limited Staff		
Community Political Capability	Limited Staff		
Community Resiliency Capability	Limited Staff		
Capability to Integrate Mitigation into Municipal Processes and Activities.	Limited Staff		

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Wesley Powers, Construction Official

Flood Vulnerability Summary

The Borough does not maintain lists or inventories of properties that have been damaged by floods. During Irene and Lee, seven residential structures were damaged and the Methodist Church was damaged. The FPA makes Substantial Damage estimates; however, none were declared for the recent events that impacted the Borough. There is currently no interest in mitigation (acquisition or elevation).

Resources

The FPA is the sole person assuming the responsibilities of floodplain administration within the Borough. NFIP administration services and functions provided by the FPA include permit review, inspections and damage assessments. The FPA indicated that the Borough does not provide any education or outreach to the community regarding flood hazards/risk or flood risk reduction. He stated that there are barriers to running an effective floodplain management program. The FPA does feel adequately supported and trained to fulfill his responsibilities as the Borough floodplain administrator and would consider attending training and/or continuing education training if offered in the County.

Compliance History

The Borough is currently in good standing with the NFIP and the most recent compliance audit was conducted in 2012.

Regulatory

The Borough's floodplain management regulations meet the minimum set forth by FEMA and the state. The Borough does have other local ordinances, plans, and programs that support floodplain management.



Community Rating System

The Borough of Branchville does not participate in the Community Rating System (CRS) program. However, the Borough would attend a CRS seminar if offered locally.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Borough has a Planning Board/Zoning Board which reviews all applications for development and consider natural hazard risk areas in their review. Additionally, the hazard mitigation plan is reviewed prior to land use, zoning changes or development permitting, to ensure consistent and compatible land use within the Borough.

The Borough limits development in high hazard areas and their permit review process includes addressing hazards. The Borough also incorporates hazard resistant construction standards into the design and location of projects. The Borough's rezoning procedures recognize hazard areas as limits on zoning changes.

Regulatory and Enforcement (Ordinances)

The Borough has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Management Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter. The Borough also has a chapter specific to the hazards associated with area that may be underlain with carbonate.

Chapter 64: Flood Damage Prevention <http://www.ecode360.com/8955484>

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 121: Stormwater Management <http://www.ecode360.com/8956544>

The purposed of the Stormwater Control chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare the citizens.



Chapter 97-10: Environmental Impact Statement

<http://www.ecode360.com/8955953?highlight=environmentally,environmental#8955953>

The purpose of this section of the Chapter is to allow the Borough to assess the impact of a proposed development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding and waste disposal.

The Borough has identified two new mitigation initiatives: 1) Future rezoning procedures will recognize natural hazard areas; and 2) Establish a community resilience committee and advisor. Refer to Table 9.4-10 below for further information.

Operational and Administration

The Borough has established a Land Use Board (Planning and Zoning), Environmental Commission, and an Open Space Committee, that aid in planning decisions to support the conservation and preservation of the Township's critical environmental features.

Funding

Operating Budget: The Borough's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Education and Outreach

The Borough's website posts information regarding upcoming community events and important municipal decisions. <http://branchvilleborough.com/>.

The Borough has identified a new mitigation initiative to provide information on all types of hazards, preparedness and mitigation measures, and responses on the Borough website. Refer to action 'Branchville – 6' in Table 9.4-10 below.



Figure 9.4-1. Screenshot of Borough Website with Examples of Their Emergency Information Notification



9.4.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.4-9. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Branchville Borough 1	Implementation of Fire Wise community program.	OEM Coordinator	Complete	This project has been completed and was funded locally.	Discontinue	This projects has been completed and will not be included in the 2016 HMP Update.
Branchville Borough 2	Raise embankments along 40 feet of the Culver Brook near Milk Street.	Borough Engineer	Complete	Project has been completed.	Discontinue	This projects has been completed and will not be included in the 2016 HMP Update.
Branchville Borough 3	Raise embankments along 70 feet of the Dry Brook near Borough baseball field.	Borough Engineer	No Progress	Funding has not been secured for this project; therefore, there has been no progress.	Include in 2016 HMP	The Borough will include this action in the 2016 HMP Update.
Branchville Borough 4	Armoring and bank stabilization for Small Pond Dam located on Wantage Avenue.	Borough Engineer	No Progress	This is on private property.	Discontinue	The location of this proposed action is on private property; therefore, the Borough will not include this action in the 2016 HMP Update.
Branchville Borough 5	Flood proofing of the Little Children's World school building.	Facility Administrator	No Progress	There has been no progress on this action.	Discontinue	The Borough will not include this action in the 2016 HMP Update.
Branchville Borough 6	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	Complete	This project has been completed and was funded locally.	Discontinue	This projects has been completed and will not be included in the 2016 HMP Update.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

There are no additional completed mitigation projects/activities identified since the adoption of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Borough participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013). In May 2015, a second workshop was led by FEMA Region 2 and NJOEM and provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.4-10 summarizes the comprehensive-range of specific mitigation initiatives the Borough would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High', 'Medium', or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.4-11 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.4-10. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Branchville-1	Raise embankments along 70 feet of the Dry Brook near Borough baseball field.	Existing	Flood	1, 2, 6	Borough Engineer	High	High	HMGP with local cost share	Short Term / DOF	Low	SIP	PP
Branchville-2	Future rezoning procedures will recognize natural hazard areas that will allow greater intensity or density of use.	New and Existing	All	All	Borough Administration	High	Low	Municipal Budget	Ongoing	Medium	LPR	PR
Branchville-3	Establish a community resilience committee and advisor.	N/A	All	All	Borough Administration	High	Low	Municipal Budget	Ongoing	Medium	LPR	PR
Branchville-4	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect structures from future damage, with repetitive loss and severe repetitive loss properties as a priority when applicable. Phase 1: Identify appropriate candidates and determine most cost-effective mitigation option. Phase 2: Work with the property owners to implement selected action based on available funding and local match availability.											
	See above.	Existing	All	All	Engineering via NFIP FPA with NJOEM, FEMA support	High	High	FEMA Mitigation Grant Programs and local budget (or property owner) for cost share	Ongoing (outreach and specific project identification); Long term DOF (specific project application and implementation)	High	SIP	PP
Branchville-5	Provide information on all types of hazards, preparedness and mitigation measures, and responses on the Borough website.	N/A	All	All	Borough	High	Low	Municipal Budget	On Going	High	LPR, EAP	PR, PI

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS Community Rating System
 DPW Department of Public Works
 FEMA Federal Emergency Management Agency
 FPA Floodplain Administrator
 HMA Hazard Mitigation Assistance
 N/A Not applicable

NFIP National Flood Insurance Program
 NJDEP New Jersey Department of Environmental Protection
 NJOEM New Jersey Office of Emergency Management
 OEM Office of Emergency Management

Potential FEMA HMA Funding Sources:





FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
HMA	Hazard Mitigation Assistance Program

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP)-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES)-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.4-11. Summary of Prioritization of Actions

Mitigation Action/Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Branchville-1	Raise embankments along 70 feet of the Dry Brook near Borough baseball field.	1	1	0	0	0	0	1	1	1	0	0	0	0	0	5	Low
Branchville-2	Future rezoning procedures will recognize natural hazard areas that will allow greater intensity or density of use.	1	1	1	1	0	1	1	0	0	1	1	1	0	0	9	Medium
Branchville-3	Establish a community resilience committee and advisor.	1	1	1	1	0	1	1	0	0	1	1	1	0	0	9	Medium
Branchville-4	Support the mitigation of vulnerable structures via retrofit or acquisition / relocation	1	1	1	1	0	0	0	1	1	1	1	1	0	0	9	High
Branchville-5	Provide information on all types of hazards, preparedness and mitigation measures, and responses on the Borough website.	1	1	1	1	0	1	1	0	0	1	1	1	0	0	9	Medium

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.4.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.4.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Borough of Branchville that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Borough of Branchville has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.4.9 Additional Comments

None at this time.



Figure 9.4-2. Borough of Branchville Hazard Area Extent and Location Map 1

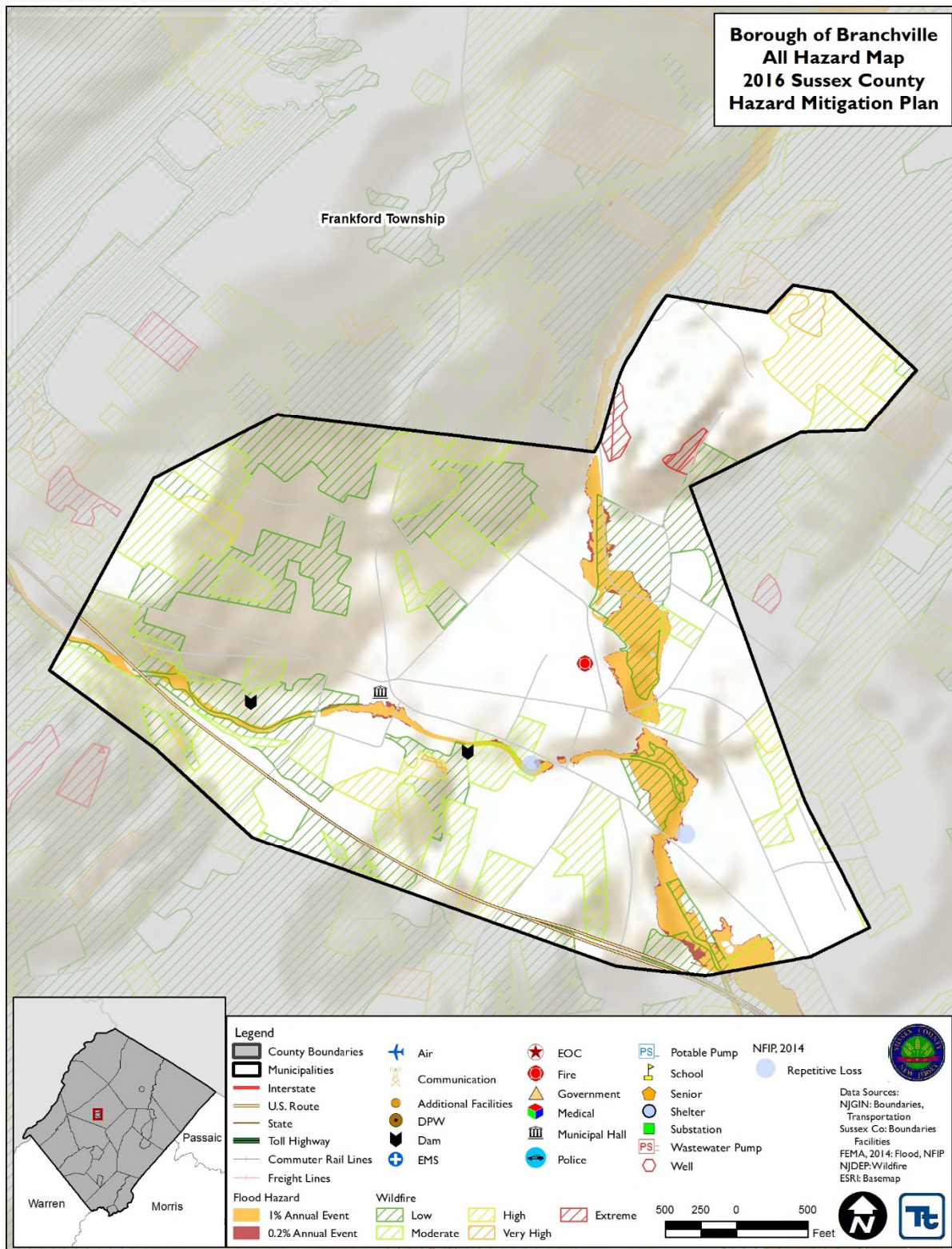
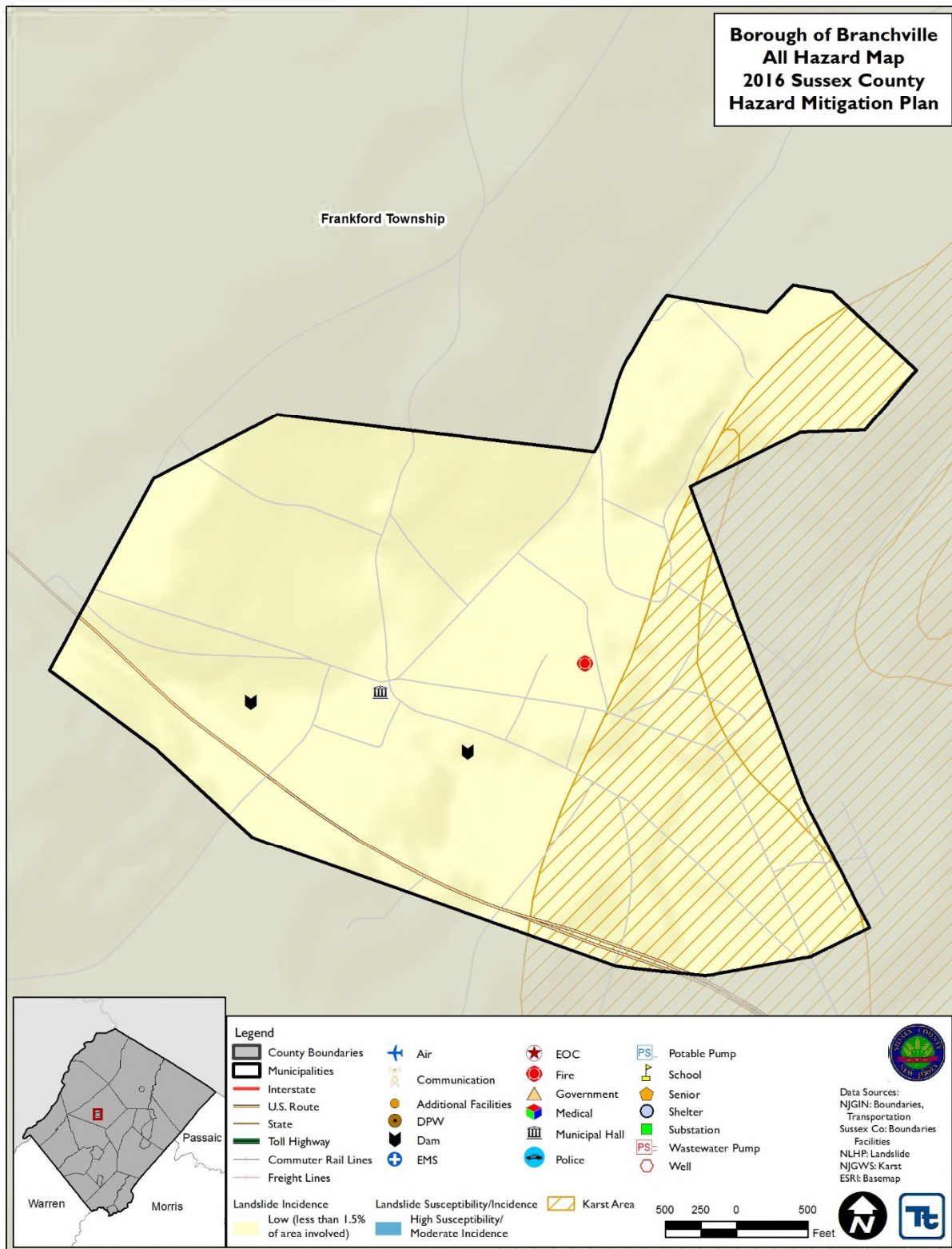




Figure 9.4-3. Borough of Branchville Hazard Area Extent and Location Map 2





Action Number:

Branchville-1

Mitigation Action/Initiative:

Raise embankments along 70 feet of the Dry Brook near Boro baseball field.

Assessing the Risk	
Hazard(s) addressed:	Flood
Specific problem being mitigated:	During periods of heavy precipitation, Dry Brook tends to overflow its banks and floods the baseball fields in the Borough.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Raise embankments along 70 feet of the Dry Brook near Boro baseball field.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Raise embankments along 70 feet of the Dry Brook near Boro baseball field.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority*	Low
Plan for Implementation	
Responsible/Lead Agency/Department	Borough
Local Planning Mechanism	Stormwater Management
Potential Funding Sources	Grant funding with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Branchville-1

Mitigation Action/Initiative: Raise embankments along 70 feet of the Dry Brook near Boro baseball field.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Boro well is located along stream
Property Protection	1	Ball field damaged from previous flooding
Cost-Effectiveness	0	
Technical	0	
Political	0	
Legal	0	
Fiscal	1	Cut out cleanup cost
Environmental	1	Impact on wildlife
Social	1	Impact on community
Administrative	0	
Multi-Hazard	0	
Timeline	0	
Local Champion	0	
Other Community Objectives	0	
Total	5	
Priority (High/Med/Low)	Low	



9.5 Township of Byram

This section presents the jurisdictional annex for the Township of Byram.

9.5.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Joseph Sabatini, Township Manager 10 Mansfield Drive, Stanhope, NJ 07874 Phone: (973) 347-2500 x129 Email: jsabatini@byramtwp.org	James Oscovitch, Mayor 10 Mansfield Drive, Stanhope, NJ 07874 Phone: (973) 347-2500 x127 Email: joscovitch@byramtwp.org

9.5.2 Municipal Profile

Byram Township is located in southern Sussex County. The Township is bordered to the north by the Townships of Andover and Sparta, to the east by the Borough of Hopatcong, to the west by Green and Andover Townships and to the south by Stanhope and Warren County. Numerous unincorporated communities are found within the Township and include: Roseville, Whitehall, Cranberry Lake, Waterloo, and Lockwood. Andover Junction Brook, Musconetcong River, and Lubbers Run all flow through the Township. The Township is known as "The Township of Lakes" because of the two dozen lakes and ponds located throughout. Byram covers more than 22.48 square miles and according to the U.S. Census, the 2010 population for the Township of Byram was 8,350. Additionally, the Township is located within the New Jersey Highlands Region.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the map in Section 9.5.8 of this annex which illustrates the hazard areas along with the location of potential new development.

Table 9.5-1. Growth and Development

Property or Development Name	Type (e.g. Res., Comm.)	# of Units / Structures	Location (address and/or Block & Lot)	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to present					
CVS Pharmacy (redevelopment)	Comm.	One	77 Route 206	None at this time	CVS Pharmacy, demolition of old bldg. underway in prep. to build new CVS underway
JTK Construction	Comm.	One + outside equipment storage	9 Lackawanna Drive	Flood: 1% Chance; Carbonate Hazard	No date for construction of new building; heavy equip. stored on site
Venture II (redevelopment)	Comm.	Small strip mall	9 Route 206	None at this time	Site work begun; project to be revised.
Known or Anticipated Development in the Next Five (5) Years					
Village Center Zone	Mixed use	c. 130 homes; c.90,000sf comm.	Corner of Route 206 and Lackawanna Dr.	None at this time	In Master Plan and governed by Village Center and Smart Growth ordinances; no developer yet.



Property or Development Name	Type (e.g. Res., Comm.)	# of Units / Structures	Location (address and/or Block & Lot)	Known Hazard Zone(s)	Description/Status of Development
Jones Lane Recreational Fields within Tamarack Park	On Twp. open space.	Ballfields; parking.	12 Jones Lane	Flood: 1% Chance	Planning complete; construction planned for fall 2015.

* Only location-specific hazard zones or vulnerabilities identified.

9.5.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.5-2. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
February 12-13, 2008	Winter Storm	N/A	N/A	Plowing/salting both days; 15.5 hours DPW overtime.
February 1-2, 2011	Winter Storm	N/A	N/A	Plowing/salting both days; 16.5 hours DPW overtime.
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	Roadways flooded and were closed in the Township. Stag Pond Road washed out and needed repairs. The Township conducted tree and debris removal and had police, fire and DPW overtime. Costs and damages to the Township were over \$29,000.
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	Several roads were closed in the Township and there was downstream flooding below the Lake Lackawanna dam which caused private property damage. Other damages in the Township included: flooding from Big to Little Johnson Lake and over the road at Tamarack/Indian Springs; severe stream bank erosion at drainage pipe under Indian Springs; Little Paint Way flooded and closed; Culvert washout at Roger Trail; washouts of sides of roadways at Amity, Roseville, Woodland. Washout of Mansfield Bike Trail; flooding of roads at Glenside South, East Shore Trail and Birch Parkway including flooding into or around 6 homes. There were also complaints of flooding from 37 homes in Forest Lakes, Cranberry Lake and Brookwoods. The DPW had to conduct road repairs.
October 29, 2011	Severe Storm	DR-4048	Yes	The storm caused road closures of several roads in the Township and there were power outages for nearly a week in certain areas. The Township plowed and salted roads, removed debris, and conducted curbside debris cleanup throughout the Township. The Township had costs and damages totaling over \$51,000.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	The Township had over \$150,000 in costs and damages from Hurricane Sandy.



Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
September 12, 2013	Heavy Rain and Flash Flooding	N/A	N/A	Loss of service: Road closures on North Crescent, Old Stage Coach, Harbor View. 30 hours total OT for six employees to clear trees and open roads.

9.5.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Byram. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Byram.

Table 9.5-1. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	High*
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$697,588 2,500-Year GBS: \$11,494,316	Occasional	28	Medium
Flood	1% Annual Chance: \$36,586,230	Frequent	18	Flood**
Geologic	Exposed to Carbonate Rock Areas: \$99,500,701	Occasional	12	Low
Hurricane	100-year MRP: \$291,015 500-year MRP: \$2,056,285 Annualized: \$17,303	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$291,015 500-year MRP: \$2,056,285 Annualized: \$17,303	Frequent	48	High
Severe Winter Weather	1% GBS: \$10,011,399 5% GBS: \$50,056,993	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$10,536,361	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed due to the location of high hazard dams in the municipality



** The municipality identified that flood is a significant concern for the Township; therefore, the hazard ranking was changed from medium to high.

GBS = General building stock; MRP = Mean return period.

- The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
- Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Byram.

Table 9.5-4. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Byram	34	10	\$129,878	1	0	3

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

The table below presents the number of critical facilities, by type, in the community located in the effective FEMA flood zones (1% and 0.2% annual chance boundaries).

Table 9.5-4. Number of Critical Facilities in the DFIRM 1% and 0.2% Annual Chance Flood Boundaries

Municipality	1% Annual Chance		0.2% Annual Chance	
	Shelter	Wastewater Pump	Shelter	Wastewater Pump
Byram, Township of	2	2	2	2

Source: Sussex County; FEMA, 2011

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.



9.5.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Byram.

Table 9.5-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	12/16/04; re-exam Mar.2012	Local	Planning Board	Byram Twp. Master Plan 2004; Master Plan Re-examination Report 2012
Capital Improvements Plan	Yes	Local	Township Council	2015 Municipal Budget—3-yr. Plan
Floodplain Management/Basin Plan	No			
Stormwater Management Plan	Municipal Ord. 211 (4/3/06)	Local	Township Council	Municipal Stormwater Mgt. Plan (Sept.2005); Ordinance Chapter 211, Stormwater Control
Open Space Plan	Oct. 2000; update Nov. 2010	Local	Township Open Space Committee	Open Space and Recreation Plan (2000); OS and Recreation Plan Update (2010)
Stream Corridor Management Plan	June 1997; update 12/18/2000	Local	Township Environmental Commission	Lubbers Run Greenway Project: A Stream Corridor Study (1997 and 2000)
Watershed Management or Protection Plan	Yes	State, Local	Planning Board/Council	Lakefront Development Plan 2003; Highlands Conformance Process (underway)
Economic Development Plan	No			
Comprehensive Emergency Management Plan	Municipal Ord. Chapter 32 (10/2/74); amended 11/19/90	Local	Township Council	Municipal Ordinance Chapter 32: Emergency Management
Emergency Response Plan	2011-2014	Local	Township Council/Emergency Mgt. Coord.	2015 EOP update underway
Post-Disaster Recovery Plan	Yes	State/Regional		Delaware River Water Basin



Table 9.5-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
				Disaster Recovery Plan
Transportation Plan	Master Plan Circulation Element 2004	Local	Planning Board	Master Plan Circulation Element
Strategic Recovery Planning Report	No			
Other Plans:	Smart Growth Plan 2002	Local	Planning Board	Byram Township Smart Growth Plan (2002)
Regulatory Capability				
Building Code	Yes	State, Local		State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Municipal Ord. Chapter 240 (4/5/79) and various amendments	Local	Planning Board and Township Council	Chapter 240: Zoning
Subdivision Ordinance	Municipal Ord. Chapter 215 (4/5/79) and various amendments	Local	Planning Board and Township Council	Chapter 215: Subdivision and Site Plan
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State, Local		Township Ord. Chapt.135: Flood Damage Prevention
NFIP: Cumulative Substantial Damages	no			
NFIP: Freeboard	Yes	State, Local		
Growth Management Ordinances	2002 to present	Local, State	Planning Board/Township Council/Highlands Council	2002 Township Smart Growth Plan; 2004 Township Master Plan; 2006 zoning ordinances based on 2004 Township Master Plan; Master Plan Highlands Element 10/12/14; full Highlands Conformance now underway
Site Plan Review Requirements	Municipal Ord. Chapt.215 (4/5/79) and various amendments	Local	Planning Board and Township Council	Chapter 215: Subdivision and Site Plan
Stormwater Management Ordinance	Municipal Ord. Chapt. 211 (4/3/06); annual NJDEP Tier 1 Stormwater Permit	Local, State	Township Council/NJDEP	Chapter 211: Stormwater Control; Tier 1 Stormwater Permit (annual)
Municipal Separate Storm Sewer System (MS4)	Municipal Ord. Chapter	Local	Township Council	Chapter 203: Separate Storm Sewer System



Table 9.5-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
	203 (12/19/05)			
Natural Hazard Ordinance	no			
Post-Disaster Recovery Ordinance	no			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Municipal Ord. 240-29.2 amended 11/15/04	Local	Planning Board and Township Council	Ord. 240-29.2: Tract Disturbance; also Master Plan Highlands Element (10/2/14) and full Highlands Conformance (now underway)

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Byram.

Table 9.5-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Municipal Ord. Chapt. 45: 1/19/77, 11/19/90; Amendment 5/4/95
Mitigation Planning Committee	Yes	Hazard Mitigation Planning Team: Township Council And Municipal Department Heads
Environmental Board/Commission	Yes	Municipal Ord. Chapt. 19 (10/2/74)
Open Space Board/Committee	Yes	Municipal Ord. Chapt. 42 (1/20/2000)
Economic Development Commission/Committee	Yes	Municipal Ord. Chapt. 16 (10/21/85)
Maintenance Programs to Reduce Risk	Yes	Superintendent Of Dept. Of Public Works
Mutual Aid Agreements	Yes	Lakeland Emergency Squad & Byram Twp. Fire Dept.
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Municipal And Planning Board Engineer; Consulting Land Use Planner
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Construction Official And Sub-Code Officials
Planners or engineers with an understanding of natural hazards	Yes	Construction Official And Sub-Code Officials
NFIP Floodplain Administrator	Yes	Construction Official
Surveyor(s)	Yes	Within Office Of Township Engineer.
Personnel skilled or trained in GIS and/or HAZUS-MH applications	Yes	Municipal/Planning Board Engineer
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	Emergency Management Coordinator



Table 9.5-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Grant Writer(s)	Yes	Municipal Staff
Staff with expertise or training in benefit/cost analysis	Yes	Township Manager; Township Engineer, Township Risk Manager
Professionals trained in conducting damage assessments	Yes	Construction Official; Municipal Engineer

Fiscal Capability

The table below summarizes financial resources available to the Township of Byram.

Table 9.5-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	Don't Know
Capital Improvements Project Funding	Yes—Township Council
Authority to levy taxes for specific purposes	Yes—Township Council
User fees for water, sewer, gas, or electric service	Yes (sewer fees); Township Council
Impact Fees for homebuyers or developers of new development/homes	No?
Stormwater Utility Fee	No?
Incur debt through general obligation bonds	Yes; Township Council
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	Yes; Township Planning Board and Council.
Other Federal or State Funding Programs	Yes; Township Council.
Open Space Acquisition Funding Programs	Yes; Township Council and Open Space Committee
Other	

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Byram.

Table 9.5-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	N/A	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	Yes	3 – 1 and 2 family residential properties 3 – commercial and industrial properties	2009
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	Class 06/6X	June 2014
Storm Ready	No	N/A	N/A



Table 9.5-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Firewise	No	N/A	N/A
Disaster/Safety Programs in/for Schools	Yes	Fire Prevention, Safety Drill/Lock Downs, District Website for Public Outreach	N/A
Organizations with Mitigation Focus (advocacy group, non-government)	Yes	Private communities with dams that have worked with dams; water companies working in the community to install generators at the pump stations (since Sandy)	N/A
Public Education Program/Outreach (through website, social media)	Yes	Through municipal website and social media; E-Gov is used for residents to sign up for notifications	N/A
Public-Private Partnerships	Yes	Private communities working to reduce risk within their established area	N/A

N/A = Not applicable; NP = Not participating

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Township of Byram's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.



Table 9.5-9. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability		X	
Administrative and Technical Capability		X	
Fiscal Capability	X Limited funding/staff		
Community Political Capability	X Limited funding/staff		
Community Resiliency Capability	X Limited funding/staff		
Capability to Integrate Mitigation into Municipal Processes and Activities.	X Limited funding/staff		

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Richard O'Connor, Construction Official

Flood Vulnerability Summary

The Township does not currently maintain lists/inventories of properties that have been damaged by floods. The Township has not been notified by property owners; the Township will keep this list in the future, based on notifications by homeowners through the Construction Office permitting process. During recent storm events, several homes were damaged by falling trees; several homes subject to flooding, particularly along Lubbers Run, south of Lake Lackawanna dam. No reports of commercial/industrial buildings damaged. The Township does not conduct substantial damage estimates and they have not received this information from homeowners. There is currently one home, identified in the current hazard mitigation plan, which is interested in mitigation; however, there has been no mitigation conducted to date. Sources of potential mitigation funding for this home include private funding, private home/flood insurance, grant funding, but no municipal funding.

Resources

In accordance with Township ordinance Chapter 136 (Flood Damage Prevention), the Construction Official is the local administrator; also involved are the Land Use Board, Zoning Officer, Township Engineer, and Township Consulting Planner. As described in Township ordinance Chapter 136 and also as addressed under various other local ordinances (required distances to water bodies, prohibitions against disturbing sensitive natural features that may affect flooding) and as reflected in information required on site plan/subdivision checklists for the Land Use board (wetlands or riparian features/regulations). Although Byram has numerous lakes/streams, flood prone areas are typically found in only isolated areas of the Township.

The only education/outreach to the community regarding flood hazards and risk in the Township is only through the permit/development application process. There is no general education/outreach program. Other than the lack of a general education/outreach program regarding flood hazards and risk, the Township lacks funding and resources to conduct a broader floodplain management program. The Township would welcome any opportunities to improve training and support for the FPA and Township staff to identify and mitigate floodprone areas.



Compliance History

To the best of the Township's knowledge, the Township is currently in good standing with the NFIP.

Regulatory

The Township's floodplain management regulations and ordinances meet the FEMA and State minimum requirements. Additionally, the Township's local ordinances include Chapter 136 (Flood Damage Prevention), site-plan/subdivision checklists requiring information about wetlands/riparian features, various local ordinances (requiring certain distances from water bodies or non-disturbance of sensitive environmental features that could affect flooding). The Township has considered joining CRS and would attend a CRS seminar if offered locally.

Community Rating System

The Township of Byram does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Byram Township has proactively undertaken a number of planning initiatives geared towards developing planning documents that both guide policy and work towards aligning regional and county planning goals, objectives, and recommendations. Byram is located in the New Jersey Highlands Region and is part of both the Highlands Planning and Preservation Areas. As such, the Township is one of 88 municipalities protected by and subject to the provisions of the Highlands Water Protection and Planning Act that protects, enhances and restores Highland's natural resources. The Highlands Act requires that future land use in the Highlands Region be guided by the Regional Master Plan's Land Use Capability Map (LUCM) Series which includes tools to identify and protect the natural, scenic and other resources of the region. In supporting and complying with the Highlands Act, the Township enacted amendments and updates to local zoning and development ordinances that ensure the protection of important resources and areas. The Highland Act creates three primary zones: a Protection Zone, a Conservation Zone and an Existing community Zone. Protection Zones are areas with the highest quality resources with extreme limitations on allowable development while Conservation Zones have significant agricultural lands and associated woodlands and environmental features with allowable development consisting primarily of agricultural uses. Existing Community Zones consist of areas of concentrated development with limited environmental constraints. These zones are overlayed with existing local zoning maps to identify and address issues of public interest including watershed management, open space preservation, historic preservation, flood protection among others.

Byram Township recently complete the Highlands Master Plan Element in 2014 that consolidated a number of the planning documents goals objective, and recommendations into a single document. This included the following goals applicable to mitigation:

- To locate and maintain community facilities and services that support compact development patterns and shared services, and provide a high level of service.



- To identify existing and planned community facilities and to encourage shared service opportunities, whether at intra- or inter-municipal levels.
- To identify for all such facilities, realistic options to enhance energy efficiencies, incorporate “green” building materials and technologies, reduce pollutant emissions, and minimize “carbon footprints;” and to develop a community strategy for implementing them.
- To consider and incorporate all feasible Low Impact Development techniques in the design, development, operation and management of existing and proposed community facilities. (For description and discussion of LID techniques, see Conservation Plan Element.)
- To implement Riparian Area restoration practices on Preserved Lands that give priority to ecological and watershed protection measures.
- To identify and preserve opportunities for outdoor recreation, including a variety of active and passive recreation options, in such locations and in such manner as to ensure environmental resource protections, while addressing the needs of the local population for physical activity, social interaction, connection with nature and the natural environment, and enjoyment of the outdoors.
- To require that development supported by new or expanded public water supply systems and/or wastewater collection and treatment systems occur at a density and intensity that ensures efficiency and cost-effectiveness of the public infrastructure.
- To ensure that Carbonate Rock Areas and Wellhead Protection Areas are considered and appropriately protected in the design and construction of any new or expanded wastewater collection/treatment system.
- To ensure that on-site wastewater system discharges do not exceed the natural capacity of ground water to attenuate loadings, exacerbate existing nitrate impairment, or contribute to potential nitrate impairment for subwatersheds of the Highlands Area.
- To ensure that all development in areas not served by public water supply or wastewater collection and treatment systems is at a density that can be supported by on-site wells and subsurface septic systems, respectively. With respect to septic systems, to determine such densities on the basis of median nitrate concentrations in ground water and nitrate dilution modeling.
- To continuously update and improve maps and delineations of karst features within Carbonate Rock Areas as better information becomes available (i.e., through enhanced mapping technologies) and/or as new areas are identified through project reviews pertaining to individual sites and properties.
- To develop maps identifying all lands that drain into Carbonate Rock Areas determined to contain karst features, for easy reference by applicants, reviewing officials, and Land Use Boards. This will ensure that consideration is given to the protection of affected Carbonate Rock Areas (whether on- or off-site) during the course of development reviews.
- To carefully examine land development applications for potential impacts to Carbonate Rock Areas containing karst features, whether by direct disturbance, or by indirect means such as introduction of additional stormwater runoff.
- Maps and delineations of Steep Slope Protection Areas should continue to be updated and improved as better information becomes available and/or as new areas are identified through project reviews pertaining to individual sites and properties.
- Land disturbance within all Steep Slope Protection Areas should incorporate Low Impact Development (see Section K) techniques to minimize the extent of such disturbance and the potential negative impacts resulting from it.
- Land disturbance within areas of Severely and Moderately Constrained Slopes should be prohibited altogether, with exceptions only for linear development meeting the requirements of NJDEP Preservation Area Rules.
- To develop a Stream Corridor Protection and Restoration Management Plan.



The Highlands Master Plan Element included a section of Low Impact Development [LID]. LID encompasses a broad array of development and management techniques that can minimize or mitigate the potential adverse impacts of land use and development on the natural environment. LID is used in stormwater management, resource management, “green” building, and sustainable site design. In stormwater management for example, LID techniques can be employed to capture rainfall, filter it through existing vegetation, and maximize its absorption by on-site soils in order to recharge ground water supplies. In site design, LID would incorporate strategies to reduce site disturbance, limit impervious coverage, and integrate existing natural features affecting the site and/or its immediate surroundings into the proposed layout and design.

Numerous additional geographic areas of importance and related objectives were identified through an Environmental Resource Inventory completed in 2011. Specific areas of importance were delineated to protect specific forest resources, open water and riparian areas, steep slopes, critical habitats, agricultural areas, water resources and prime groundwater recharge areas. The Township’s Master Plan Element also recommends the utilization of development practices that limit or prevent negative impacts to the environment including an inventory of contaminated sites to identify areas with potential negative impacts on important resources, promotion of cluster development to protect open spaces and natural areas, and utility and infrastructure planning among others. The Environmental Resource Inventory and Highlands Master Plan Element together help the Township to guide land use and development to protect critical resources and ensure they continue to provide services to the community. These services include potential hazard mitigation improvements through water filtration, flood protection, shade and cooling, clean drinking water among many others.

Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter.

Chapter 136: Flood Damage Prevention <http://ecode360.com/6651595>

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 150: Stormwater Control <http://www.ecode360.com/7156337>

The purposed of the Stormwater Control Chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of the Townships’ citizens and businesses.



Chapter 215-45 Environmental Impact Statement <http://www.ecode360.com/7155777>

The purpose of this section of the Chapter is to allow the Township to assess the impact of a proposed development upon the natural environment. Before approving any major subdivision or any site plan that involves a nonresidential use in which there is proposed a new structure, an addition or alteration to an existing structure, a change of use or an expansion of an existing use, the Planning Board shall take into consideration the effect of the proposal for development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding, waste disposal, soil erosion and the preservation of trees and other vegetation. The Planning Board, as a part of its administrative review of environmental factors, shall give careful consideration to the review and recommendations of the New Jersey Department of Environmental Protection and Energy and the Sussex County Soil Conservation District, when applicable, as well as the Byram Township Board of Health, the Byram Township Environmental Commission and all other reports that may be prepared on behalf of the Township.

In addition, the Highlands Water Protection and Planning Act provides additional regulatory control over development within the Township. While Major Highlands Development projects, as defined by the Highlands Act, still require local approvals, they must first receive a Highlands Resource Applicability Determination and be evaluated for consistency with the provisions of the Highlands Act. Major Highlands Development projects include a variety of projects such as any non-residential development, any residential development that disturbs one or more acres of land, any development that disturbs ¼ acres or more of forest among others. This process identifies any potential Highlands Resources on the site and if found requires adherence to relevant development standards and restrictions.

Operational and Administration

The Township has established a Planning Board, Architectural Review Committee, Environmental Commission, and an Open Space Committee, that aid in planning decisions to support the conservation and preservation of the Township's critical environmental features. Beyond that the Township employs and Planning Board Secretary and contracts out for professional legal, planning, and engineering services for development review. The Township also employs several part time employees for the enforcement of zoning, construction, and environmental commission liaison employee.

Funding

The Township has received funding from the NJDOT, New Jersey State Forestry Grant, Sustainable Jersey, The Garden State Preservation Trust Fund, and Clean Communities grant programs for the completion of mitigation and emergency response. The Township's 2015 Capital Budget includes line items for the purchase of a standby generator, as well as a number of drainage and roadway improvements.

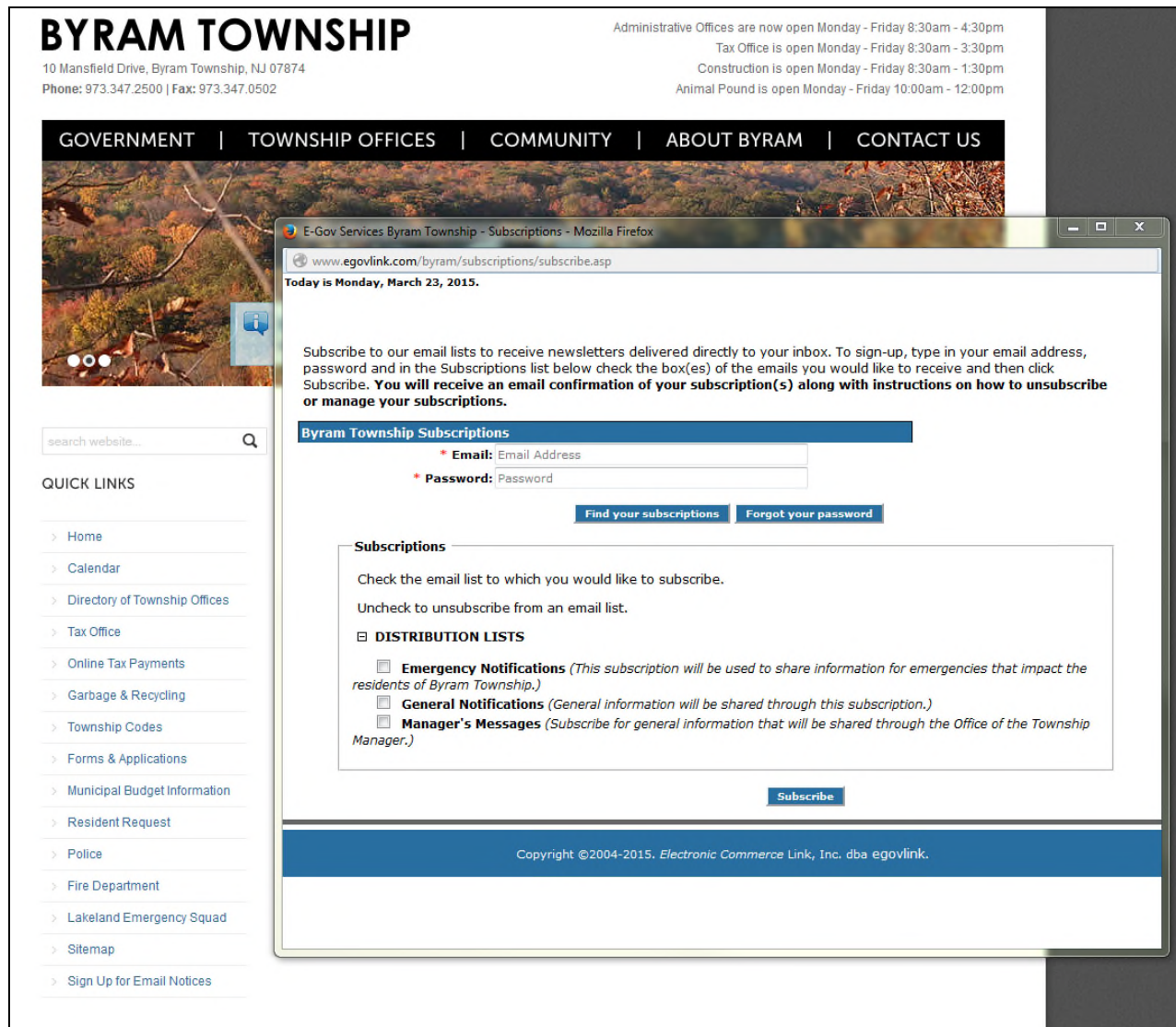
Education and Outreach

The Township's website posts information regarding upcoming community events and important municipal decisions. Byram's website includes the option to sign up for emergency notifications under "Quick Links" The website also has all the local contacts for emergencies and critical facilities including police, fire, EMS and hospitals. The Environmental Commission web page includes a link to a document on the assessment of tree hazards which could help residents understand, identify and reduce their risk of storm caused tree hazards.

The Township identified a new mitigation initiative to have several Township staff obtain their Certified Floodplain Manager certification. In addition, the Township would like to conduct an all-hazards public outreach and education program for hazard mitigation and preparedness. Refer to Table 9.5-11 for further information.



Figure 9.5-1. Screenshot of Township Website with Examples of their Emergency Information Notification



9.5.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.5-10. Past Mitigation Initiative Status

Initiative Number	2011 Mitigation Action	Responsible Party	Status (In progress, No progress, Complete)	Describe Status 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	Next Step (Include in 2016 HMP? or Discontinue)	Describe Next Step 1. If including action in the 2016 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Byram Township 1	Acquisition/Elevation, of one Repetitive Loss property on Lackawanna Drive.	OEM Coordinator	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Include in 2016 HMP	1. Expand to include areas throughout town with flood-prone homes, including below Lackawanna dam, Birch/Glenside/East Shore, Brookwood Dr. etc. Educate homeowners about mitigation to help prevent/lessen future problems. 2. Obtain information from FEMA about homeowner policies/claims.
Byram Township 2	Retrofit roof to meet current high wind standards on Byram Township Lackawanna Fire Department building located on Lackawanna Drive.	Station Commander	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Discontinue	Not a priority and not part of Township immediate or long-term planning.
Byram Township 3	Retrofit roof to meet current snow load standards on Byram Township Fire Department Cranberry Lake building located on Route 206.	Station Commander	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Discontinue	Not a priority and not part of Township immediate or long-term planning.
Byram Township 4	Backup generator for shelter at Byram Township Fire Department Cranberry Lake located on Route 206.	Station Commander	Complete	A generator has been purchased for this building.	Discontinue	A generator has been purchased for this building; therefore, this action will not be included in the 2015 HMP Update.
Byram Township 5	Retrofit roof to meet current snow load and high wind standards on Byram Civic Center located on Mansfield Drive.	N/A	No Progress	The Township no longer owns this building or property.	Discontinue	The Township no longer owns the building identified; therefore, this action will not be included in the 2016 HMP.
Byram Township 6	Retrofit roof to meet current snow load standards on Byram Municipal Building located on Mansfield Drive.	Township Manager	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Discontinue	Not a priority and not part of Township immediate or long-term planning.
Byram Township 7	Flood proofing two pump stations located on Mansfield Drive.	Township Manager	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Discontinue	Not a priority and not part of Township immediate or long-term planning.



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2016 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Byram Township 8	Harden Lee Hill Road EMS station located on Lee Hill Road to FEMA 361 standards.	Station Commander	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Discontinue	Not a priority and not part of Township immediate or long-term planning.
Byram Township 9	Retrofit roof to meet current snow load standards on Intermediate School located on Mansfield Drive.	School Board Administrator	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Discontinue	Not a priority and not part of Township immediate or long-term planning.
Byram Township 10	Upgrade and improve culverts on Little Paint Way.	DPW Supervisor	In Progress	Township has grant application pending with FEMA. Township has provided responses to requests for more information on the FEMA grant application and has allocated its 10% funding requirement (\$12,500 of the total estimated \$125,000 cost).	Include in 2016 HMP	Continue process of seeking FEMA grant; this project will be included in the 2016 HMP.
Byram Township 11	Lackawanna Dam inundation study.	Byram Township, Lake Lackawanna Investment Corp.	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Discontinue	Not a priority and not part of Township immediate or long-term planning.
Byram Township 12	Forrest Lakes Dam analysis and inundation study.	Forest Lakes Community Club	Complete	1. 100%--Tier 1 dam; FLCC completed repairs 2013.	Discontinue	Not a priority and not part of Township immediate or long-term planning.
Byram Township 13	Implement Fire Wise Program in the Township.	Township Engineer	No Progress	1. No program at this point.	Include in 2016 HMP	The Township currently does not participate in Firewise; this action will be included in the 2016 HMP.
Byram Township 14	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	No Progress	1. No program at this point.	Include in 2016 HMP	There is currently no program at this point; this action will be included in the 2016 HMP.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

There are no additional completed mitigation projects/activities identified since the adoption of the 2011 HMP.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Township participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013). In May 2015, the Township participated in a second workshop led by FEMA Region 2 and NJOEM and was provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.5-11 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High', 'Medium', or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.5-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.5-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Byram-1	Engineering study of East Brookwood Estates drainage issues.	Existing	Flood	1, 2, 5, 6	Township Engineer, DPW, Planning Board	Medium to High	Low	Capital Improvement	Short Term	High	SIP	PP
Byram-2	Have designated NFIP Floodplain Administrator (FPA), and the Town's Emergency Management Council, become a Certified Floodplain Manager (CFM) through the Association of State Floodplain Managers (ASFPM) and New Jersey Association for Floodplain Management (NJAFM), and pursue relevant continuing education training such as FEMA Benefit-Cost Analysis (BCA) and Substantial Damage Estimation (SDE).	N/A	Flood	1, 2, 3, 4	NFIP FPA, Emergency Management Coordinator, Emergency Management Council	Medium	Low	Municipal Budget	Short Term / DOF	High	LPR, EAP	PR, PI
Byram-3	Ensure continuity of operations at critical facilities: Purchase and install a generator for critical facility (radio communications for police/fire/emergency departments).	Existing	All	1, 2, 5, 6	Township, Engineer, DPW	High	Medium	FEMA grant with local cost share	Short Term	High	SIP	PP
Byram-4	Upgrade and improve culverts on Little Paint Way.	Existing	Flood	1, 2, 5	DPW Supervisor	High	High	FEMA grant with local cost share	Short Term	High	SIP, NSP	PP, NR
Byram-5	Implement Fire Wise Program in the Township.	New and Existing	Wildfire	All	Township Engineer	High Avoid potential damage/loss to property and homes.	Low	Funding from NJDEP Forest Fire Service, with in-kind from Byram	Long Term then ongoing	Low	EAP	PI
Byram-6	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	New and Existing	All	All	Township	Medium	Low	Seeking outside funding or grants	Long Term and Ongoing	Medium	EAP	PI
Byram-7	Educate floodprone property	Existing	Flood	All	Township	High	Medium to	Grant	Short Term	High	EAP,	PI,



Table 9.5-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
	owners; pursue acquisition/elevation of one repetitive loss property						High	funding; no local funding available			NSP, SIP	PP, NR
Byram-8	Review status of all 17 dams in Township and identify if inundation studies for these dams needs to be conducted.	Existing	Dam Failure	All	Township of Byram; NJDEP Dam Safety	High Physical property damage, possible risk to life	High	NJDEP Dam Safety	Long Term	Medium	LPR, EAP	PR, NR
Byram-9	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect structures from future damage, with repetitive loss and severe repetitive loss properties as a priority when applicable. Phase 1: Identify appropriate candidates and determine most cost-effective mitigation option. Phase 2: Work with the property owners to implement selected action based on available funding and local match availability.											
	See above.	Existing	Flood, Severe Weather Wildfire, Severe Winter Weather		Engineering via NFIP FPA with NJOEM, FEMA support	High	High	FEMA Mitigation Grant Programs and local budget (or property owner) for cost share	Ongoing (outreach and specific project identification); Long term DOF (specific project application and implementation)	High	SIP	PP

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
HMA	Hazard Mitigation Assistance Program

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low < \$10,000

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:



Costs:

Medium \$10,000 to \$100,000
High > \$100,000

Where actual project costs cannot reasonably be established at this time:

Low Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Low= < \$10,000
Medium \$10,000 to \$100,000
High > \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low Long-term benefits of the project are difficult to quantify in the short term.
Medium Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP)-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES)-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.5-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Byram-1	Engineering study of East Brookwood Estates Drainage issues.	1	1	1	0	1	0	0	0	1	1	1	0	1	1	9	High
Byram-2	Have designated NFIP Floodplain Administrator (FPA), and the Town's Emergency Management Council, become a Certified Floodplain Manager (CFM).	1	1	1	1	1	1	1	0	0	1	0	1	1	0	10	High
Byram-3	Generator for critical facility (radio communications for police/fire/emergency departments).	1	1	1	1	1	0	0	1	1	1	1	1	1	1	12	High
Byram-4	Upgrade and improve culverts on Little Paint Way.	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
Byram-5	Implement Fire Wise Program in the Township.	1	1	1	0	1	0	0	1	1	1	1	-1	0	1	9	Low
Byram-6	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	1	1	1	0	1	0	0	1	1	0	1	-1	0	1	8	Medium
Byram-7	Educate floodprone property owners; pursue acquisition/elevation of one repetitive loss property	1	1	1	1	0	0	0	1	1	0	-1	1	1	1	8	High
Byram-8	Review status of all 17 dams in Township and identify if inundation studies for these dams needs to be conducted.	1	1	0	0	0	0	-1	1	1	0	0	0	0	1	4	Medium
Byram-9	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect structures from future damage, with repetitive loss and severe repetitive loss properties as a priority when applicable.	1	1	1	1	1	1	0	0	0	1	1	1	1	0	10	High

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.5.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.5.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Byram that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Byram has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.5.9 Additional Comments

None at this time.

DRAFT



Figure 9.5-2. Township of Byram Hazard Area Extent and Location Map 1

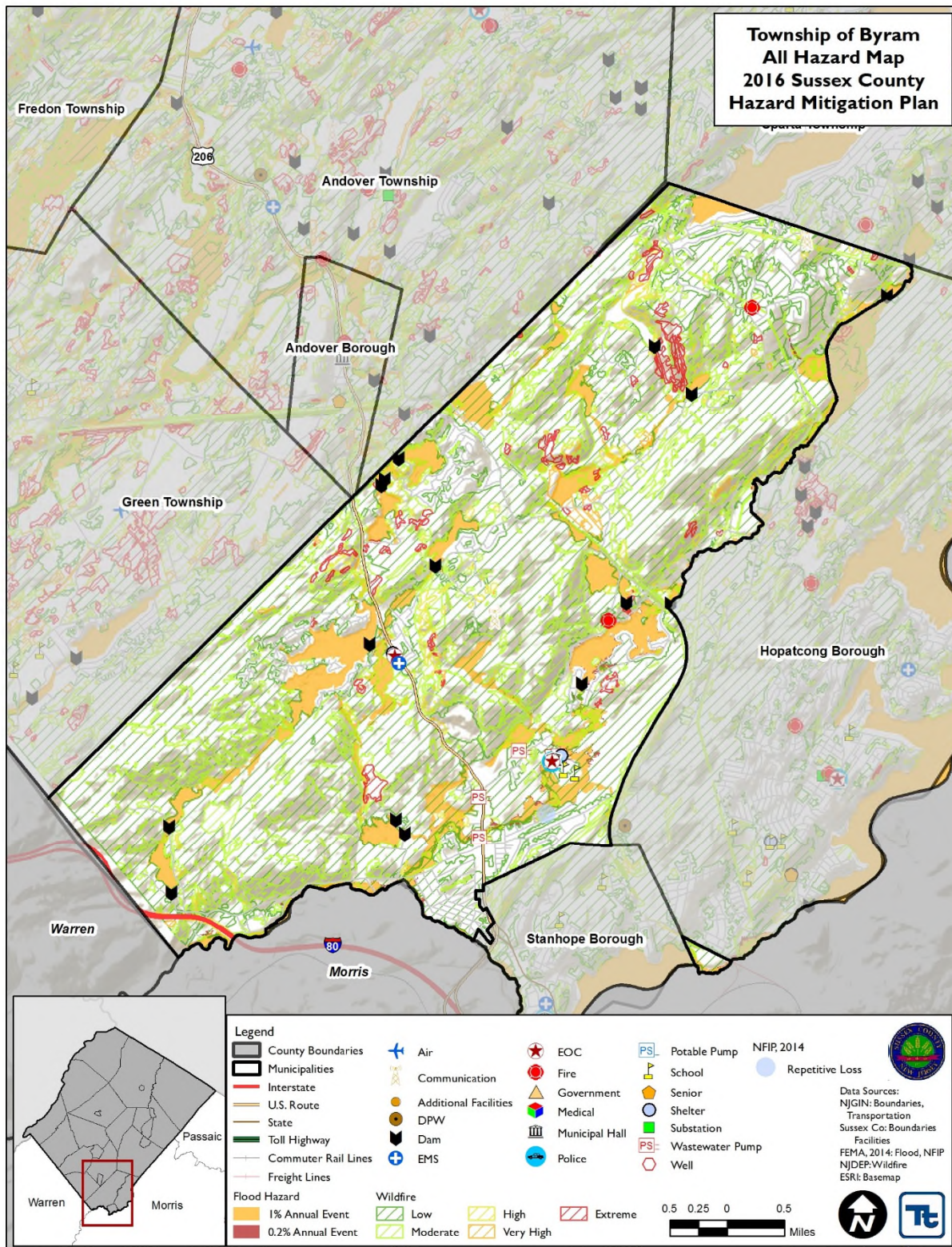
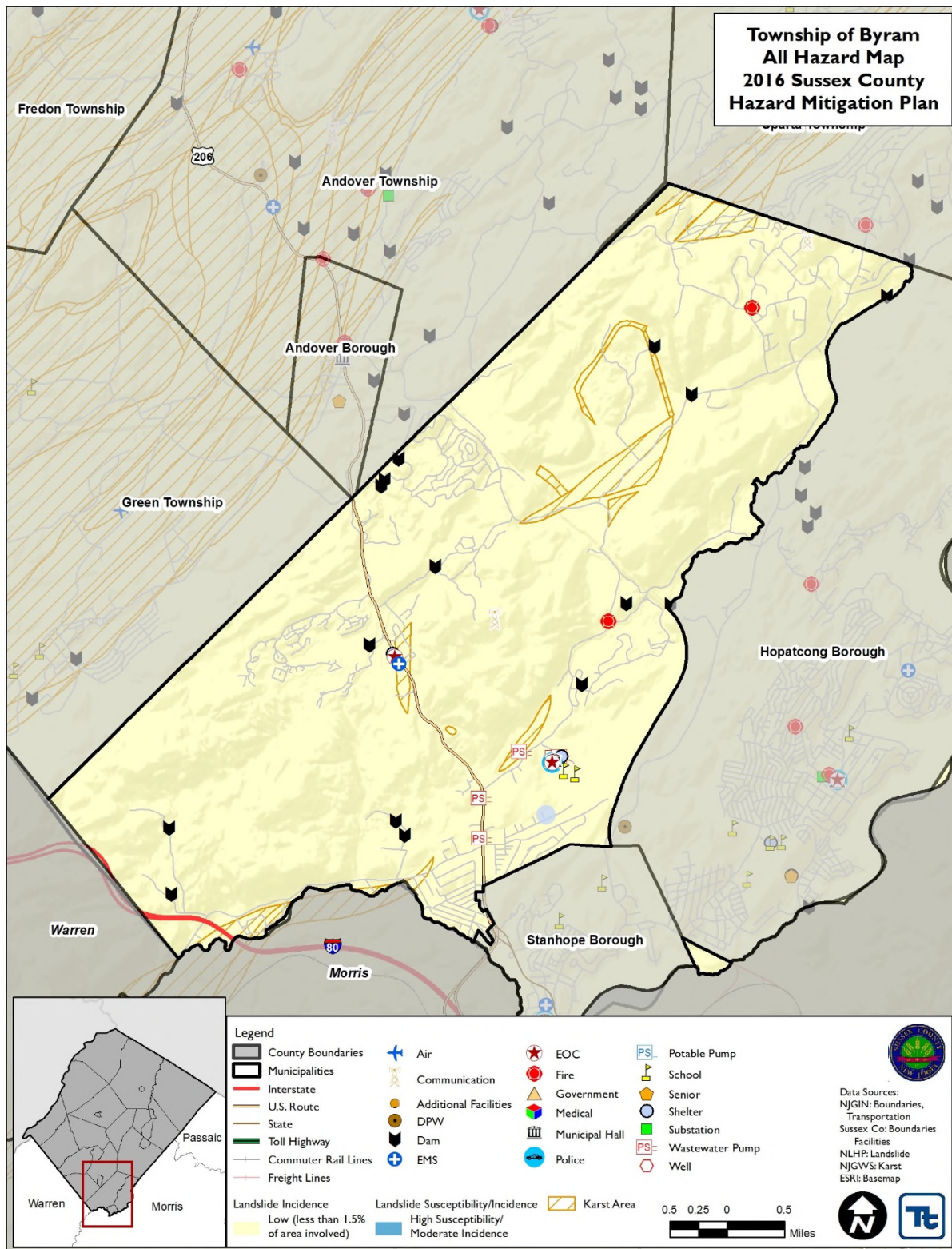




Figure 9.5-3. Township of Byram Hazard Area Extent and Location Map 2



**Action Number:** Byram-2**Mitigation Action/Initiative:** Generator for critical facility (radio communications for police/fire/emergency departments).

Assessing the Risk	
Hazard(s) addressed:	All hazards that have the potential to cause power outages
Specific problem being mitigated:	Interrupted radio communications for police/fire/emergency services.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Install permanent generator at radio tower
	2. Continue using a portable generator
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Reliable, uninterrupted radio communications are an absolute necessity. Currently a portable generator is trucked to this site if necessary, which needs constant re-fueling and also needs constant oversight. The Township is proposing to install permanent new generator at radio tower. Generator for critical facility (radio communications for police/fire/emergency departments).
Action/Project Category	SIP
Goals Met	1, 2, 5, 6
Applies to existing and or new development, or not applicable	All development in Byram (and parts of some surrounding towns) and all future development
Benefits (losses avoided)	Difficult to estimate, as secure radio communications are essential to rapid emergency response.
Estimated Cost	\$36,000
Priority	High
Plan for Implementation	
Responsible Organization	Township of Byram
Local Planning Mechanism	Township Engineer and DPW Superintendent
Potential Funding Sources	FEMA grant, plus \$11,000 set aside in Township capital planning budget
Timeline for Completion	Short
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: 5/26/2015 Progress on Action/Project: The Township has applied for a FEMA grant S#338, under DR 4086 NJ, and has supplied additional information on this grant application in 2015.

**Action Number:**

Byram-2

Mitigation Action/Initiative:

Generator for critical facility (radio communications for police/fire/emergency departments).

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	
Cost-Effectiveness	1	There were substantial costs involved in trucking a generator to this site when necessary, re-fueling and overseeing it, as well as the potential costs from poor response times to emergencies.
Technical	1	The Township Engineer and Fire/Police Departments have already provided expertise on this project.
Political	1	
Legal	0	No legal issues are expected.
Fiscal	0	The Township has set aside \$11,000 for this project but needs the FEMA grant to fully fund the work.
Environmental	1	No environmental permits required.
Social	1	
Administrative	1	The Township has already dedicated the hours to prepare the FEMA grant application; obtaining the grant and installing the generator are manageable aspects of this project.
Multi-Hazard	1	Reliable radio communications are key to all hazard management planning and implementation in the Township.
Timeline	1	Short
Agency Champion	1	This problem has the full support of the Township Council, Fire/Police/Emergency Services departments.
Other Community Objectives	1	Helps protect lives, property, and also natural resources in the Township.
Total	12	
Priority (High/Med/Low)	High	



Action Number: Byram-3

Mitigation Action/Initiative: Upgrade and improve culverts on Little Paint Way

Assessing the Risk	
Hazard(s) addressed:	Repetitive roadway flooding, which blocks access to 26-home neighborhood.
Specific problem being mitigated:	Insufficient capacity in drainage culverts under Little Paint Way, which is the sole access to this neighborhood; road must be elevated to provide room for larger pipes.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Take no action---not acceptable because flooding blocks access to 26-home neighborhood.
	2. Try to improve existing drainage conditions—not feasible as culverts cannot handle moderate-major precipitation events.
	3. Elevate roadway and install larger drainage culverts
Action/Project Intended for Implementation	
Description of Selected Action/Project	Elevate roadway and install larger drainage culverts.
Action/Project Category	SIP and NRP
Goals Met	Goals 1, 2, 5
Applies to existing and or new development, or not applicable	Existing development
Benefits (losses avoided)	Repetitive emergency situation, calling upon Township DPW / police / emergency services; homeowners stranded in the neighborhood or unable to get back home; no access for potential emergency service needs.
Estimated Cost	\$125,000
Priority	High
Plan for Implementation	
Responsible Organization	Township of Byram
Local Planning Mechanism	Byram Township engineering/administrative staff, as well as Department of Public Works.
Potential Funding Sources	\$112,500 FEMA grant applied for; \$12,500 (10%) set aside in Township budgets.
Timeline for Completion	Short
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: 5/26/2015 Progress on Action/Project: Township applied for FEMA grant S#337, under HR-4086-NJ and has responded to two request for additional information this year.



Action Number: Byram-3

Mitigation Action/Initiative: Upgrade and improve culverts on Little Paint Way

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	Township has applied for FEMA grant and has budgeted for 10% local share.
Environmental	1	
Social	1	
Administrative	1	
Multi-Hazard	1	
Timeline	1	
Agency Champion	1	
Other Community Objectives	1	In line with Township Capital Funding Plan; supports protection of natural/environmental resources, a key element in the Township Master Plan.
Total	13	
Priority (High/Med/Low)	High	



9.6 Township of Frankford

This section presents the jurisdictional annex for the Township of Frankford.

9.6.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Patricia Bussow, RMC/CMR, Municipal Clerk Frankford Township Municipal Building 151 US Highway 206, Augusta NJ 07822 973-948-5566 clerk@frankfortwp-nj.com	Kenny French, Fire Chief 973-903-9616

9.6.2 Municipal Profile

Frankford Township is geographically located in the center of Sussex County. It encompasses 34.8 square miles and contains two natural lakes, Culver Lake and Lake Owassa, and the Kittatinny Mountains. According to the U.S. Census, the 2010 population for the Township of Frankford was 5,565. The Township is bordered to the north by Montague Township, to the northeast by the Township of Wantage, to the east by Lafayette Township, to the south by Hampton Township and to the west by the Townships of Sandyston and Walpack. Papakating Creek, Dry Brook, Paulins Kill, and Culvers Creek all flow throughout the Township. The following unincorporated communities are located within the Township: Culvers Inlet, Mount Pisgah, Augusta, Ross' Corner, Northrup, Plains, Armstrong, Pelletown, and Wykertown.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the map in Section 9.6.8 of this annex which illustrates the hazard areas along with the location of potential new development.

Table 9.6-1. Growth and Development

Property or Development Name	Type (e.g. Res., Comm.)	# of Units / Structures	Location (address and/or Block & Lot)	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to present					
North Plains Holding / Wingles	Commercial (strip mall)	1	749 Route 565	Wildfire: High	Constructed and Occupied
Known or Anticipated Development in the Next Five (5) Years					
Sussex Commons	Commercial	TBD	Ross' Corner (Route 206 / Route 565)	None at this time	Site Plans Approved; State approved
Township Fire House	Emergency Response	1	390 Route 206 North B: 82 L: 7	None at this time	Approved; In Progress – clearing land
Waste Water Treatment Plant for Branchville	WWTP	Multiple	Route 206	Could not locate	Site located in Township but actually owned/operated by Branchville and County



Property or Development Name	Type (e.g. Res., Comm.)	# of Units / Structures	Location (address and/or Block & Lot)	Known Hazard Zone(s)	Description/Status of Development
Bentley Assisted Living	Residential	20 units	3 Phillips Road	None at this time	Approved; not started

* Only location-specific hazard zones or vulnerabilities identified.

9.6.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.6-2. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	The Township had limited storm damage from this event. They had costs associated with debris cleanup and overtime for Township employees.
October 29, 2011	Severe Storm	DR-4048	Yes	This event resulted in down trees and power outages to the Township. The Township had costs associated with cleanup and overtime for employees.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	Hurricane Sandy caused widespread power outages to the Township. Most areas experienced power loss for five to seven days with some areas being without power for up to two weeks. Numerous roads were closed due to downed wires and trees. The Township had over \$32,000 in damages and overtime costs.

9.6.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Frankford. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Frankford.



Table 9.6-1. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	Medium*
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$780,590 2,500-Year GBS: \$11,794,736	Occasional	28	Medium
Flood	1% Annual Chance: \$63,805,758	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$84,219,174	Frequent	18	Medium*
Hurricane	100-year MRP: \$235,422 500-year MRP: \$2,755,493 Annualized: \$17,486	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$235,422 500-year MRP: \$2,755,493 Annualized: \$17,486	Frequent	48	High
Severe Winter Weather	1% GBS: \$10,285,668 5% GBS: \$51,428,340	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$106,366,352	Frequent	33	High
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

- * The hazard ranking was changed due to the location of high hazard dams in the municipality
 - * The hazard ranking was changed for this hazard based on input from the municipality, population exposed, and/or event history.
- GBS = General building stock; MRP = Mean return period.
- a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
 - b. High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
 - c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.



National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Frankford.

Table 9.6-4. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Frankford	24	5	\$61,459	0	0	7

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

The table below presents the number of critical facilities, by type, in the community located in the effective FEMA flood zones (1% and 0.2% annual chance boundaries).

Table 9.6-4. Number of Critical Facilities in the DFIRM 1% and 0.2% Annual Chance Flood Boundaries

Municipality	1% Annual Chance Shelter	0.2% Annual Chance Shelter
Frankford, Township of	1	1

Source: Sussex County; FEMA, 2014

Other Vulnerabilities Identified by Municipality

The Township identified the following vulnerable areas in the municipality:

- Union Turnpike – several homes in this area are prone to basement flooding during periods of heavy rain. The Township fire department responds to these homes to provide pumpouts of the basements.
- Culvers Lake – homes around the lake are prone to basement flooding during periods of heavy rain. The Township fire department responds to these homes to provide pumpouts of the basements.
- West Owassa Turnpike – during severe weather events (wind, rain, etc.), this area of the Township is prone to downed trees and power lines which lead to power outages. This requires debris cleanup after these events.

9.6.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program



- Community Rating System
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Frankford.

Table 9.6-5. Planning and Regulatory Tools

Tool / Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept. /Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Land Use Board	2004; updates along the way
Capital Improvements Plan	Yes	Local	Engineer	annually
Floodplain Management / Basin Plan	Yes	Local	Engineer	ASK HAROLD
Stormwater Management Plan	Yes	Local	Engineer	ASK HAROLD
Open Space Plan	Yes	Local	Open Space Commission	Updated in 2016 (part of Master Plan)
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	Yes	County	Economic Development Partnership	
Comprehensive Emergency Management Plan	No			
Emergency Response Plan	Yes	Local	OEM	PATTY WILL CHECK
Post-Disaster Recovery Plan	No			
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State and Local	Building Department	State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.) Chapter 7 – Building and Housing
Zoning Ordinance	Yes	Local	Land Use Board / Zoning	Chapter 30, Article 10 – Land Use/Zoning
Subdivision Ordinance	Yes	Local	Land Use Board	Chapter 15 – Land Subdivision
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State and Local	Engineer	Chapter 27 – Flood Damage Prevention
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State and Local	Engineer	N.J.A.C 7:13 – Flood Hazard Area Control Act
Growth Management Ordinances	No			



Table 9.6-5. Planning and Regulatory Tools

Tool / Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept. /Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Site Plan Review Requirements	Yes			
Stormwater Management Ordinance	Yes	Local		Chapter 32 of municipal code
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes	Local		Chapter 20 – Environmental Protection Chapter 30, Article 6 – Land Use / Design and Development Principles and Standards

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Frankford.

Table 9.6-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/ Agency/Position
Administrative Capability		
Planning Board	Yes	
Mitigation Planning Committee	No	
Environmental Board/Commission	No	
Open Space Board/Committee	Yes	Open Space Board; Parks Commission
Economic Development Commission/Committee	Yes	Economic Development Committee
Maintenance Programs to Reduce Risk	Yes	
Mutual Aid Agreements	Yes	
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Professional services agreement with Engineer
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Professional services agreement with Engineer
Planners or engineers with an understanding of natural hazards	Yes	Professional services agreement with Engineer
NFIP Floodplain Administrator	Yes	Township Engineer per municipal code
Surveyor(s)	No	
Personnel skilled or trained in GIS and/or Hazus-MH applications	No	



Table 9.6-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/ Agency/Position
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	Chuck Konecke – appointed
Grant Writer(s)	No	
Staff with expertise or training in benefit/cost analysis	No	
Professionals trained in conducting damage assessments	Yes	

Fiscal Capability

The table below summarizes financial resources available to the Township of Frankford.

Table 9.6-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community development Block Grants (CDBG, CDBG-DR)	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	No
Impact Fees for homebuyers or developers of new development/ homes	No
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	No
Open Space Acquisition Funding Programs	Yes
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Frankford.

Table 9.6-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	NP	
Building Code Effectiveness Grading Schedule (BCEGS)	No		
Public Protection (ISO Fire Protection Classes 1 to 10)	No		
Storm Ready	No	NP	
Firewise	No	NP	
Disaster/Safety Programs in/for Schools			



Table 9.6-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	Yes		
Public-Private Partnerships	No		

NP = Not participating

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Township of Frankford's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.6-9. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability		X	
Administrative and Technical Capability		X	
Fiscal Capability		X	
Community Political Capability		X	
Community Resiliency Capability		X	
Capability to Integrate Mitigation into Municipal Processes and Activities.		X	



National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Harold Pellow, Engineer

Flood Vulnerability Summary

ADD INFO FROM FPA HERE

Resources

ADD INFO FROM FPA HERE

Compliance History

ADD INFO FROM FPA HERE

Regulatory

ADD INFO FROM FPA HERE

Community Rating System

The Township of Frankford does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Township has a Joint Land Use Board which reviews all applications for development and consider natural hazard risk areas in their review.

The Township began updating its Master Plan in 2000 and several elements have been drafted since then including a Recreation and Open Space Master Plan (2001), a Center Plan (April 2006), a draft Farmland Preservation Plan and Transfer of Development Rights Plan. The Township has begun a Natural Resources Inventory for the Township and will be completing a Capital Improvement Program and Utility Services Plan for the Center.

Frankford Master Plan 2000: An update to the Township's Master Plan was adopted by the Land Use Board on November 29, 2000 and included a land use element, housing element, conservation element, open space and recreation element and circulation element. The Master Plan process included two public hearings and a public workshop to go over the planning process and get input. The Plan included the following applicable goals:

- A. Preserve the Township's natural resources and ecological balance within the context of permitting appropriate development based on sound planning and engineering principles. (2000 Master Plan)
- B. Encourage resource recovery and recycling of materials consistent with the State laws. (2000 Master Plan)



- C. Provide a comprehensive system of integrated and interconnected open space areas, parks and public plazas to meet the needs of residents, employees and visitors. (Center Plan)
- D. Protect and preserve identified exceptional valued land for surface and ground water recharge, threatened and endangered species habitats, high valued wetlands, steep sloped areas and large forested land areas. (Open Space and Recreation Master Plan).

The plan also included the following recommendations:

- 1. Cluster subdivisions are encouraged on tracts greater than 40 acres to minimize construction costs and future municipal maintenance costs, preserve environmentally sensitive land, woodlands and scenic or historic places. The clustering and lot averaging should provide minimum and maximum lot acres with an overall average of 2 acres with environmental and sensitive areas area calculations included. A minimum open space requirement of 45% is dedicated as public or private with an option for farmland preservation. The average lot area shall be 2 acres of non-critical land as defined in the ordinance. The bulk requirements will be as defined in the ordinance.
- 2. The Land Use Board should monitor the proposed State regulations on Watershed Management and the Wastewater Management Rules and respond as needed to protect the local planning process and the natural environment.

Open Space and recreation Plan 2001: The Frankford Township Committee created by ordinance in April of 1999, an Open Space, Recreation, Farmland Preservation and Historic Preservation Committee. This committee developed an Open Space and Recreation Master Plan according to the recommendations from the 2000 Master Plan Open Space and Recreation Element. The purpose of the Open Space and Recreation Plan, which was adopted in September 2001, was to identify and prioritize open space land, develop acquisition strategies and cultivate funding resources to preserve land for open space, resource protection, farming and recreation. The plan process included one public hearing in front of the Land Use Board. The Plan includes the following goals and objectives.

- 1. Preserve the natural mountain ridgelines to protect the scenic views and vistas in Frankford Township.
- 2. Protect and preserve identified exceptional valued land for surface and ground water recharge, threatened and endangered species habitats, high valued wetlands, steep sloped areas and large forested land areas.
- 3. Establish and maintain natural greenways to link animal and bird migratory routes.
- 4. Encourage the preservation of farmland through the State and County easement purchase programs to compliment the Land Use Plan Element of the Municipal Master Plan.
- 5. Ensure adequate open space and recreational for the Frankford citizens based on National and State standards and recommendations and identify potential land for purchase.
- 6. Establish greenways for walking and bicycle riding to create linkages throughout the community and to adjacent communities. Utilize existing trails, railroad easements and natural stream corridors to interconnect the uses.
- 7. Enhance the existing park and recreational areas in the Township by identifying adjacent properties for purchase as active or passive parkland.
- 8. Identify environmentally sensitive and prime agricultural land under development pressure.
- 9. Identify Federal, State and County funding programs to implement the recommendations of the Open Space Master Plan.

Frankford Transfer of Development Rights Plan 2007: This plan included the identification of natural hazard risk areas like floodplains, wetlands, and steep slopes. The plan prioritizes development right transfers to areas that would be less prone to these risk.



Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter.

Chapter XXVII: Flood Damage Prevention

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter XXXII: Stormwater Control

The purposed of the Stormwater Control Chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of the Townships' citizens and businesses.

Article 6 Section 30-613 Environmental Impact Statement

Frankford's natural environment is its most important physical resource. Appreciation of the environment's natural features is a matter of vital interest and attraction to the Township's citizenry and visitors, and the impact of development on the environment must therefore be accorded close scrutiny. Moreover, since Frankford's economic base is heavily dependent upon outdoor recreation and related tourism, environmental impact analysis is intrinsic to broad community impact, including fiscal impact. The 2000 Master Plan, particularly in its Conservation Plan Element, contemplates improved standards for analysis of environmental impact. It is the purpose of this section to implement the same.

The Township has identified a new mitigation initiative to incorporate risk assessment and hazard mitigation principles into comprehensive planning efforts. Refer to Table 9.6-10 for further information.

Operational and Administration

The Township has established a Joint Land Use Board and an Open Space Committee, that aid in planning decisions to support the conservation and preservation of the Township's critical environmental features. Beyond that the Township employs and Planning Board Secretary and contracts out for professional legal, planning, and engineering services for development review. The Township also employees several part time employees for the enforcement of zoning, construction, and environmental commission liaison employee.



Funding

Operating Budget: The Township’s operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster. The Township has received funding from the NJDOT and The Garden State Preservation Trust Fund grant programs. The Township’s 2014 Capital Budget includes line items for improvements to the Municipal Building, as well as a number of drainage and roadway improvements.

Education and Outreach

The Township’s website posts information regarding upcoming community events and important municipal decisions on the home page. The Township identified a new mitigation initiative to continue to develop and enhance their public outreach and education program on mitigation-related issues. Refer to Table 9.6-10 for further information.

9.6.6 Mitigation Strategy and Prioritization

This section discusses past mitigation actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community’s mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under ‘Capability Assessment’ presented previously in this annex.



Table 9.6-10. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Frankford Township 1	Backup generator for Frankford Township Volunteer Fire Department 1 located on US Highway 206. Facility is used as a shelter and backup EOC.	Station Commander	In Progress	The Township has applied for a grant to obtain the generator. The grant has been submitted and the Township is awaiting approval.	Included in the 2016 HMP	Purchase and install a backup generator for the Township fire department located on Route 206.
Frankford Township 2	Upgrade and improvement of culverts on access road to Culver Lake fire tower located on the top of Sunrise Mountain.	DPW Supervisor	No Progress	The Township has no jurisdiction over this land; owned by the State of New Jersey (state land).	Discontinue	The Township has no jurisdiction over this land; owned by the State of New Jersey (state land). This action will not be included in the 2016 HMP.
Frankford Township 3	Backup generator for Culver Lake Fire Tower located on top of Sunrise Mountain.	Station Commander	No Progress	The Township has no jurisdiction over this land; owned by the State of New Jersey (state land).	Discontinue	The Township has no jurisdiction over this land; owned by the State of New Jersey (state land). This action will not be included in the 2016 HMP.
Frankford Township 4	Backup generator for municipal offices and court located on U.S. Hwy 206. Facility is primary EOC.	DPW Supervisor	In Progress	The Township has applied for a grant to obtain the generator. The grant has been submitted and the Township is awaiting approval.	Included in the 2016 HMP	Purchase and install a backup generator for the Township municipal building located on Route 206.
Frankford Township 5	Provide backup generator for the Administration Building at the Sussex County Fair site located on Plains Road. This facility also serves as an EMS site and Primary Point of Distribution for both medical and commodities supplies.	DPW Administrator	No Progress	The Sussex County Fairgrounds is not owned by the Township; therefore, the Township has no jurisdiction over this property.	Discontinue	The Sussex County Fairgrounds is not owned by the Township; therefore, the Township has no jurisdiction over this property. This action will not be included in the 2016 HMP.
Frankford Township 6	Provide an all-hazards public education outreach program on mitigation related issues	OEM Coordinator	In Progress	This is an ongoing action; the Township provides public outreach to its residents regarding hazard mitigation.	Include in 2015 HMP	This is an ongoing action; the Township will continue to develop and enhance their public outreach and education programs.



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Frankford Township 7	Mountain snowmelt and rain runoff analysis for the area of Upper North Shore to Lower North Shore at the water edge of Culver Lake, from Sunkin Road to New Street.	Township Engineer	Complete	The Township Engineer conducted the study which involved state and county participation.	Discontinue	This action has been completed.
Frankford Township 8	Installation of a storm warning system for severe weather affecting the Sussex County Fairgrounds on Plains Road.	OEM Coordinator	No Progress	The Township does not have jurisdiction over the Sussex County Fairgrounds.	Include in 2015 HMP	Install a storm warning system on the new firehouse located on Route 206.
Frankford Township 9	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	In Progress	This is an ongoing action; the Township provides public outreach to its residents regarding hazard mitigation.	Include in 2015 HMP	This is an ongoing action; the Township will continue to develop and enhance their public outreach and education programs.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Township has identified the following mitigation projects/activities that have also been completed but were not identified in the previous mitigation strategy in the 2011 Plan:

- The Township road department repairs or replaces culverts as necessary
- A generator has been installed at the Frankford Township School, which is used as a shelter during an emergency.

Proposed Hazard Mitigation Initiatives for the Plan Update

In April 2015, the County held a mitigation action workshop for the participating municipalities and each municipality was provided with the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013). In May 2015, a second workshop was led by FEMA Region 2 and NJOEM and they provided the results to the risk assessment to further assist the municipalities with the identification of mitigation actions. Additionally, the Township participated in an annex support meeting in October 2015 where they identified and finalized the mitigation actions for the community.

Table 9.6-11 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High', 'Medium', or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.6-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.6-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Frankford-1	Ensure continuity of operations. Purchase and install generators for critical facilities in the Township: • Fire Department – Stations 1 & 2 • Municipal Building	Existing	All	1, 3, 6	Township	High	High	HMPG with local cost share	Short Term / DOF	High	SIP	PP
Frankford-2	Incorporate risk assessment and hazard mitigation principles into comprehensive planning efforts.	N/A	All	All	Township	High	Low	Township Budget	On Going	High	LPR	PR
Frankford-3	Conduct an engineering study to identify the flooding issues on Culvers Lake and Union Turnpike. Once study is completed, identify mitigation strategies to correct this issue.	Existing	Flood, Severe Weather	All	Engineering	High	Low	Grant Funding, Township Budget	Short Term / DOF	Medium	SIP	PP
Frankford-4	Upgrading of culverts on Ridge Road and Plains Road. This area tends to accumulate water during heavy rain events.	Existing	Flood, Severe Weather		DPW, Engineering	Medium to High	Low to Medium	Grant Funding, Township Budget	Short Term / DOF	Medium	SIP	PP
Frankford-5	Continue to develop and enhance the Township's public outreach and education program on mitigation related issues. Provide information on all types of hazards, preparedness and mitigation measures, and responses on the Township website.	N/A	All	All	Township, OEM	Medium	Low	Township Budget	Ongoing	High	EAP	PI
Frankford-6	Install a storm warning system on the firehouse located on Route 206 once it is constructed.	New	All	All	Township OEM, Fire Department	High	Low to Medium	HMGP with local cost share	Short Term / DOF	Medium	SIP, EAP	PP, PI

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS Community Rating System
DPW Department of Public Works

FEMA Federal Emergency Management Agency
FPA Floodplain Administrator
HMA Hazard Mitigation Assistance





N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR) - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP) - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI) - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR) - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP) - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES) - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities

PDM	Pre-Disaster Mitigation Grant Program
HMA	Hazard Mitigation Assistance Program

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.



Table 9.6-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Frankford-1	Generators for critical facilities in the Township: <ul style="list-style-type: none"> Fire Department – Stations 1 & 2 Municipal Building 	1	1	1	1	0	0	0	0	1	1	1	1	1	0	9	High
Frankford-2	Incorporate risk assessment and hazard mitigation principles into comprehensive planning efforts.	1	1	1	1	1	1	1	0	0	1	1	1	0	0	10	High
Frankford-3	Conduct an engineering study to identify the flooding issues on Culvers Lake and Union Turnpike. Once study is completed, identify mitigation strategies to correct this issue.	1	1	1	1	0	0	0	1	0	1	1	1	0	0	8	Medium
Frankford-4	Upgrading of culverts on Ridge Road and Plains Road. This area tends to accumulate water during heavy rain events.	1	1	1	1	0	0	0	1	0	1	1	1	0	0	8	Medium
Frankford-3	Continue to develop and enhance the Township's public outreach and education program on mitigation related issues. Provide information on all types of hazards, preparedness and mitigation measures, and responses on the Township website.	1	1	1	1	1	1	1	0	0	1	1	1	0	0	10	High
Frankford-6	Install a storm warning system on the firehouse located on Route 206 once it is constructed.	1	1	1	1	0	0	0	0	1	1	1	1	1	0	9	Medium

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.6.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.6.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Frankford that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Frankford has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.6.9 Additional Comments

None at this time.



Figure 9.6-1. Township of Frankford Hazard Area Extent and Location Map 1

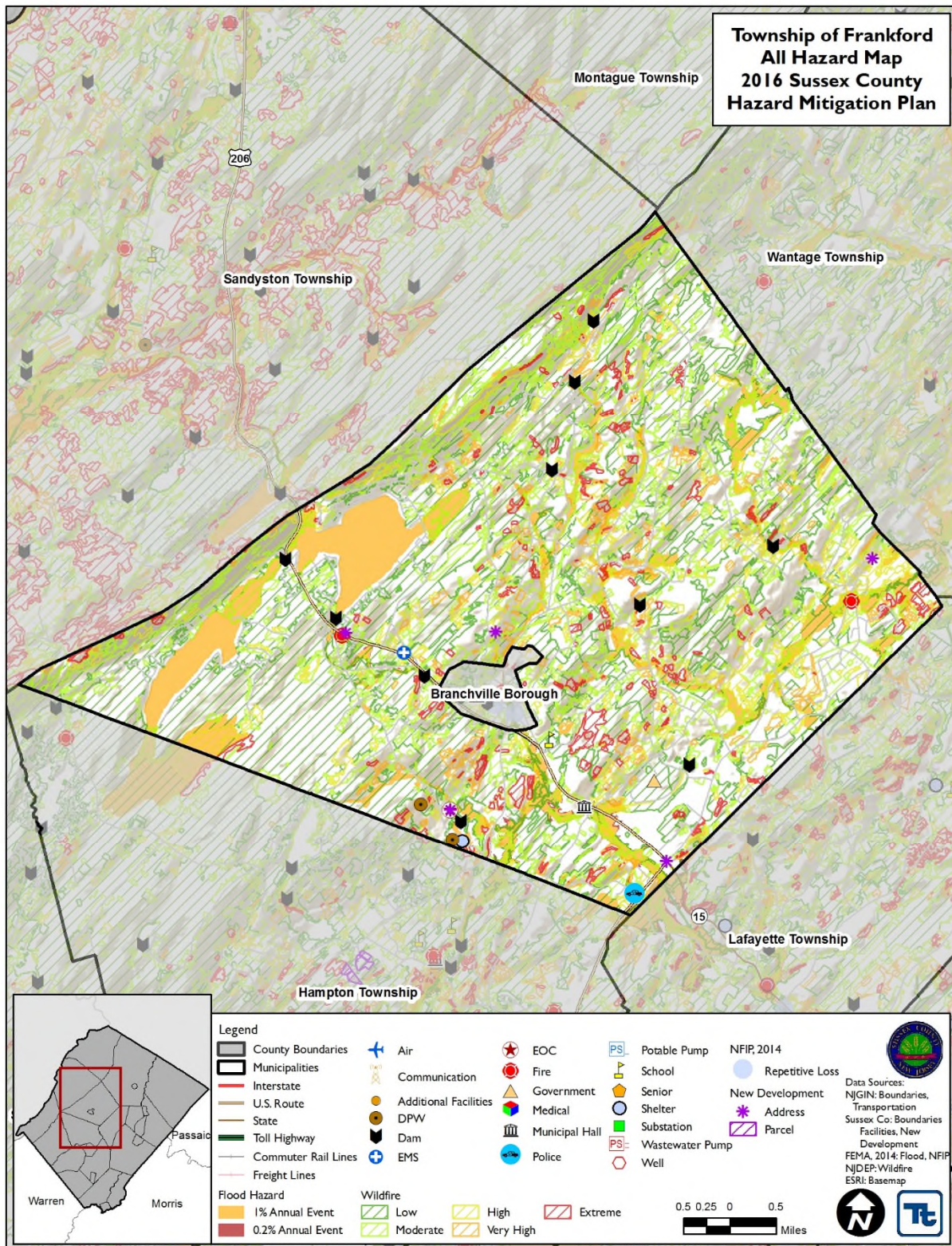
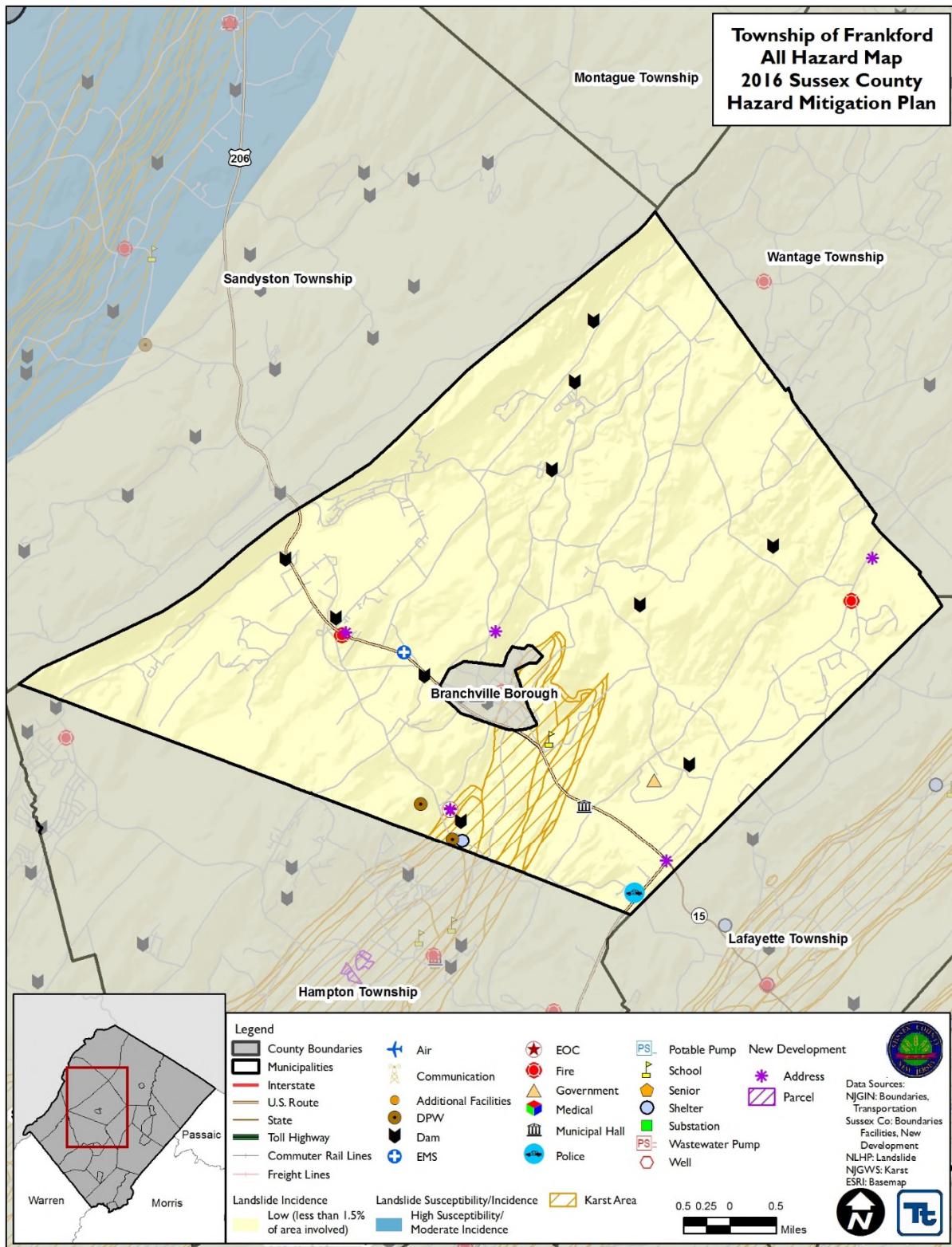




Figure 9.6-2. Township of Frankford Hazard Area Extent and Location Map 2





Action Number:

Frankford-1

Mitigation Action/Initiative:

Generators for critical facilities in the Township

Assessing the Risk	
Hazard(s) addressed:	All that have the potential to cause power outages
Specific problem being mitigated:	Loss of power to critical facilities in the Township prevent them from functioning properly during power outages
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install generators for critical facilities in the Township
	2. Purchase portable generators – not feasible during longer power outages
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Generators for critical facilities in the Township: <ul style="list-style-type: none">• Fire Department – Stations 1 & 2• Municipal Building
Action/Project Category	SIP
Goals/Objectives Met	1, 3, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority*	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Frankford-1

Mitigation Action/Initiative: Generators for critical facilities in the Township

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Allow for continuity of operations for emergency services
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	0	Township will seek grant funding for this project
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	This project will be completed in the next five years
Local Champion	1	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	



Action Number:

Frankford-4

Mitigation Action/Initiative:

Upgrade culverts on Ridge Road and Plains Road

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	There are areas of Ridge and Plains Roads where water ponds during periods of heavy rain.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Upgrade culverts on Ridge Road and Plains Road
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Upgrade culverts on Ridge Road and Plains Road
Action/Project Category	SIP
Goals/Objectives Met	1, 2
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium to High
Estimated Cost	Low to Medium
Priority*	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	DPW, Engineering
Local Planning Mechanism	Master Plan, Capital Improvement
Potential Funding Sources	Grant funding; municipal budget
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Frankford-4

Mitigation Action/Initiative: Upgrade culverts on Ridge Road and Plains Road

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Allow roadways to be functioning during periods of heavy rain; allow emergency personnel to respond
Property Protection	1	Protect structures and properties in the area of concern
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	0	
Environmental	1	
Social	0	
Administrative	1	
Multi-Hazard	1	Flood, Severe Weather
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	8	
Priority (High/Med/Low)	Medium	



Action Number:

Frankford-6

Mitigation Action/Initiative:

Storm warning system on firehouse

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Lack of storm warning system within the Township
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Install a storm warning system on firehouse
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Install a storm warning system on the firehouse located on Route 206 once it is constructed.
Action/Project Category	SIP, EAP
Goals/Objectives Met	All
Applies to existing and/or new development; or not applicable	New
Benefits (losses avoided)	High
Estimated Cost	Low to Medium
Priority*	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Township OEM, Fire Department
Local Planning Mechanism	Emergency Operations, Capital Improvement
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Frankford-6

Mitigation Action/Initiative: Storm warning system on firehouse

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide warning to residents of hazard events
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	
Local Champion	1	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	Medium	



9.7 Borough of Franklin

This section presents the jurisdictional annex for the Borough of Franklin.

9.7.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Jim Williams, OEM Coordinator 46 Main Street, Franklin, NJ 07416 Phone: (973) 600-9081 Email: lauranjenna@gmail.com	Brian VanDenBroek, DPW Supervisor 46 Main Street, Franklin, NJ 07416 Phone: (862) 268-7788 Email: bvandenbroek@franklinborough.org

9.7.2 Municipal Profile

Franklin Borough was incorporated in 1913 and is known as the "Fluorescent Mineral Capital of the World." The Borough has a rich mining history and was widely recognized for its rich ore body containing more than 150 minerals. The Borough is located in eastern Sussex County and bordered to the north by the Borough of Hamburg, to the west by Hardyston Township, to the south by the Borough of Ogdensburg, and to the west by the Township of Hardyston. The Borough is also located within the New Jersey Highlands Region. According to the U.S. Census, the 2010 population for the Borough of Franklin was 5,045. The Wallkill River, Franklin Pond Creek and Wildcat Branch flow through the Borough.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the map in Section 9.7.8 of this annex which illustrates the hazard areas along with the location of potential new development.

Table 9.7-1. Growth and Development

Property or Development Name	Type (e.g. Res., Comm.)	# of Units / Structures	Location (address and/or Block & Lot)	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to present					
Auto-Zone	Comm.	1	RT. 23	Carbonate Hazard	Completed
Walgreens	Comm.	1	Rt. 23	Carbonate Hazard	Completed
S.T.S. Tire store	Comm.	1	Rt. 23	Carbonate Hazard	Completed
Taco Bell	Comm.	1	RT. 23	Carbonate Hazard	95 % complete
Known or Anticipated Development in the Next Five (5) Years					
None identified					

** Only location-specific hazard zones or vulnerabilities identified.*

9.7.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of



events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.7-2. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	Downed trees, debris, shoring up the banks at the Franklin Pond to prevent a break in the beach area and to protect County Route 631 from flooding. The Borough had costs in overtime, protective measures (fire department pumped out basements to approximately 40 homes).
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	Downed trees and debris on roadways. Overtime for DPW, Road Department, etc.
October 29, 2011	Severe Storm	DR-4048	Yes	Downed trees and debris on roadways. Overtime for DPW, Road Department, etc.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	Power outages Borough-wide; fire department had to assist approximately 40 to 50 people to pump out their basements. There were downed trees, wires and debris as well. The Borough had costs related to equipment use, overtime and cleanup.

9.7.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Borough of Franklin. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Borough of Franklin.

Table 9.7-1. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	Medium
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$453,402	Occasional	28	Medium



Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
	2,500-Year GBS: \$7,110,614			
Flood	1% Annual Chance: \$10,492,325	Frequent	18	High*
Geologic	Exposed to Carbonate Rock Areas: \$710,251,061	Occasional	36	Medium*
Hurricane	100-year MRP: \$215,622 500-year MRP: \$1,109,779 Annualized: \$10,253	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$215,622 500-year MRP: \$1,109,779 Annualized: \$10,253	Frequent	48	High
Severe Winter Weather	1% GBS: \$5,550,836 5% GBS: \$27,754,179	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$19,252,499	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed for this hazard based on input from the municipality, population exposed, and/or event history.

GBS = General building stock; MRP = Mean return period.

- The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
- Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Borough of Franklin.

Table 9.7-4. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Borough of Franklin	14	8	\$67,237	1	0	2

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.



Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance flood boundary.

Other Vulnerabilities Identified by Municipality

The Borough identified the following vulnerable areas within the municipality:

- During periods of heavy rain, State Route 23 tends to flood near the Franklin Shopping Center.
- Approximately one-quarter mile north of the Franklin Pond Dam on County Route 631, this area tends to flood during periods of heavy rain and homes experience flooding in their basements.
- The homes on Newton Street experience frequent flooding from the Wallkill River. These homes were constructed prior to the establishment of land use and zoning boards.

9.7.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Borough of Franklin.

Table 9.7-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Planning Bd.	2003 Master Plan with reexamination in 2009
Capital Improvements Plan	Yes	Local	Boro Council	
Floodplain Management/Basin Plan	No			
Stormwater Management Plan	No			
Open Space Plan	No			
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	Yes	Local	In-House Comm.	
Comprehensive Emergency Management Plan	Yes	Local	O.E.M.	



Table 9.7-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Emergency Response Plan	Yes	Local	O.E.M.	
Post-Disaster Recovery Plan	No			
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State & Local		State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Zoning Officer	Chapter 161, Article 5 – Land Development – Zoning
Subdivision Ordinance	Yes	Local	Zoning Officer	Chapter 161 – Land Development
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State, Local	Construction Official	Chapter 128 – Flood Damage Prevention Hardyston Township NFIP FPA is the FPA for the Borough
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State, Local		
Growth Management Ordinances	No			
Site Plan Review Requirements	Yes	Local	Engineer	
Stormwater Management Ordinance	Yes	Local	Town Engineer	Chapter 161, Article 9 – Land Development, Stormwater and Flooding Controls
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division Of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	No			

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Borough of Franklin.



Table 9.7-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	
Mitigation Planning Committee	No	
Environmental Board/Commission	No	
Open Space Board/Committee	Yes	Part of the Planning Board
Economic Development Commission/Committee	Yes	
Maintenance Programs to Reduce Risk	Yes	Franklin Borough Board of Public Works
Mutual Aid Agreements	Yes	Surrounding communities with written and verbal
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Contractors (annually)
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Contractors (annually)
Planners or engineers with an understanding of natural hazards	Yes	Contractors (annually)
NFIP Floodplain Administrator	Yes	Construction Official as per Chapter 128 of Borough Code Hardyston Township NFIP FPA is the FPA for the Borough
Surveyor(s)	Yes	Contractors (annually)
Personnel skilled or trained in GIS and/or Hazus-MH applications	Yes	Contractors (annually)
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	
Grant Writer(s)	Yes	Borough Staff
Staff with expertise or training in benefit/cost analysis	No	
Professionals trained in conducting damage assessments	No	

Fiscal Capability

The table below summarizes financial resources available to the Borough of Franklin.

Table 9.7-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community development Block Grants (CDBG, CDBG-DR)	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	Yes
Impact Fees for homebuyers or developers of new development/homes	No
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	No



Table 9.7-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	Yes
Open Space Acquisition Funding Programs	No
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Borough of Franklin.

Table 9.7-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		
Building Code Effectiveness Grading Schedule (BCEGS)	No		
Public Protection (ISO Fire Protection Classes 1 to 10)	No		
Storm Ready	No		
Firewise	No		
Disaster/Safety Programs in/for Schools	Yes		
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	Yes		
Public-Private Partnerships	No		

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>



- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Borough of Franklin's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.7-9. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability		X	
Administrative and Technical Capability		X	
Fiscal Capability		X	
Community Political Capability		X	
Community Resiliency Capability		X	
Capability to Integrate Mitigation into Municipal Processes and Activities.		X	

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Joseph Butto, Construction Official – Hardyston Township

Flood Vulnerability Summary

The Borough does not maintain lists or inventories of properties that have been damaged by flooding. During Irene/Lee and Sandy, there were no structures damaged within the Borough. The FPA does not make substantial damage estimates and none were declared during Irene/Lee or Sandy. There is currently no interested in mitigation within the community.

Resources

The FPA is the sole person assuming the responsibilities of floodplain administration in the Borough. However, the FPA does not provide any NFIP administration services or education/outreach to the community. The FPA indicated that lack of training, staff and funding are barriers to running an effective floodplain management program in the Borough. The FPA also indicated that he does not feel adequately supported or trained to fulfill his role as the FPA and would consider attending continuing education and/or certification training on floodplain management if it were offered.

Compliance History

The FPA did not indicate if the community was in good standing with the NFIP.

Regulatory

It is unknown if the floodplain ordinance in the Borough exceeds the FEMA and State minimum requirements and there are no other ordinances or programs that support floodplain management.



Community Rating System

The Borough of Franklin does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Borough has a Planning Board and Zoning Board of Adjustments which reviews all applications for development and consider natural hazard risk areas in their review.

The current Franklin Borough Master Plan consists of a series of documents dating from 2003. The Planning Board adopted an all new Franklin Borough Master Plan on March 17th, 2003. This Plan was subsequently amended with the adoption of the Housing Element and Fair Share Plan (August 15, 2005); the Munsonhurst District Amendment (August 20, 2007) and the Quarry Zone Amendment (May 19, 2008).

The 2005 Housing Element and Fair Share Plan have not yet been adopted by COAH for substantive certification as there were objections filed by developers in connection with their properties. These objections have since been withdrawn and an Amended Housing Plan and Fair Share Plan were subsequently adopted in 2010.

The Munsonhurst District Amendment recommended two new zoning districts: The Mixed Active Adult Housing (MAAH) zone and the Neighborhood Commercial (NC) zone. The MAAH zone has been implemented by ordinance: the NC zone has not yet been created by ordinance.

The Quarry (Q) Zone Amendment is an extension of the old quarry zone which permits quarrying activities. The new (Q) zone is over 100 acres in the southern end of the Borough.

2009 Master Plan Reexamination:

Every ten years municipalities are required to review their Master Plans. Commencing in 2009, the Planning Board undertook this review which is reflected in the 2009 Master Plan Reexamination Report and Master Plan Amendments, adopted October 21, 2009. The Reexamination Report includes a review and recommendation for changes to the 2003 Master Plan. The Report Identified a continued objective from that 2003 Master plan that is applicable to hazard mitigation:

1. The protection on environmentally sensitive lands in the Borough using a variety of tools is a continue priority.
2. The protection of the environmentally sensitivity of the well head in the southern part of the Borough should continue to be examined.

Highlands

Franklin Borough is located in the New Jersey Highlands Region and is part of the Highlands Area. As such, the Borough is one of 88 municipalities protected by and subject to the provisions of the Highlands Water Protection and Planning Act that protects, enhances and restores Highland's natural resources. The Highlands Act requires that future land use in the Highlands Region be guided by the Regional Master Plan's Land Use



Capability Map (LUCM) Series which includes tools to identify and protect the natural, scenic and other resources of the region. In supporting and complying with the Highlands Act, the Borough enacted amendments and updates to local zoning and development ordinances that ensure the protection of important resources and areas. The Highland Act creates three primary zones: a Protection Zone, a Conservation Zone and an Existing community Zone. Protection Zones are areas with the highest quality resources with extreme limitations on allowable development while Conservation Zones have significant agricultural lands and associated woodlands and environmental features with allowable development consisting primarily of agricultural uses. Existing Community Zones consist of areas of concentrated development with limited environmental constraints. These zones are overlayed with existing local zoning maps to identify and address issues of public interest including watershed management, open space preservation, historic preservation, flood protection among others.

Regulatory and Enforcement (Ordinances)

The Borough has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement and an Environmentally Sensitive Areas section included in the Land Use Chapter. The Borough also has a chapter specific to the hazards associated with environmentally sensitive areas.

Chapter 128: Flood Damage Prevention <http://www.ecode360.com/9094695>

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 161 Article IX: Stormwater Control <http://www.ecode360.com/9096593>

The purposed of the Stormwater Control chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare the citizens.

Chapter 161-12: Environmental Impact Statement <http://www.ecode360.com/9095494>

The purpose of this section of the Chapter is to allow the Borough to assess the impact of a proposed development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding and waste disposal.

Chapter 161-12: Environmental Sensitive Areas <http://www.ecode360.com/9095982#9095982>

The purpose of this section of the Chapter has specific standards and buffer requirements for wetlands, steep slopes, shallow bedrock areas, carbonate areas.

Highlands:





In addition, the Highlands Water Protection and Planning Act provides additional regulatory control over development within the Borough. While Major Highlands Development projects, as defined by the Highlands Act, still require local approvals, they must first receive a Highlands Resource Applicability Determination and be evaluated for consistency with the provisions of the Highlands Act. Major Highlands Development projects include a variety of projects such as any non-residential development, any residential development that disturbs one or more acres of land, any development that disturbs ¼ acres or more of forest among others. This process identifies any potential Highlands Resources on the site and if found requires adherence to relevant development standards and restrictions.

Operational and Administration

The Borough has established a Planning board and Zoning Board of Adjustments that are responsible for the review of development applications. The Borough has a Zoning officer as well as a planning and zoning board secretary.

Funding

Operating Budget: The Borough's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Borough has received funding from the NJDOT, Sustainable Jersey, The Garden State Preservation Trust Fund, and Clean Communities grant programs for the completion of mitigation and emergency response related projects including roadway and drainage improvements.

Education and Outreach

The Borough's website's home page posts information regarding upcoming community events and important municipal decisions. The OEM Coordinator uses the website to provide information regarding hazard preparedness for weather events. The Borough has identified a new mitigation initiative to enhance their public outreach and education program. Refer to Table 9.7-11 for further information.

9.7.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.7-10. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Franklin Borough 1	Retrofit roof to meet current snow load standards on Franklin Fire Department building located on Buckwheat Road.	Station Commander	No Progress	Budget constraints have restricted this from moving forward	Discontinue	This has been discussed within the Borough and they wish to remove from the mitigation initiatives.
Franklin Borough 2	Backup generator for the municipal building located on Main Street	OEM Coordinator	No Progress	No funding secured	Include in 2016 HMP	Purchase and install a generator for the Borough municipal building.
Franklin Borough 3	Construction of retention pond and culverts to eliminate stormwater runoff flooding on Route 23 between Franklin Avenue and Rutherford Avenue.	Borough Engineer	No Progress	State owned road, no funding available	Discontinue	The Borough does not have jurisdiction over the property and wishes to remove this from the mitigation initiatives.
Franklin Borough 4	Stormwater management system upgrade and improvement along Newton Street off County Route 631. – Walkill River	Borough Engineer	No Progress	The area near Newton Street is governed by NJDEP and Fish and Wildlife. The Borough has no jurisdiction over the River.	Discontinue	The Borough does not have jurisdiction over this area of land.
Franklin Borough 5	Flood proofing of the Immaculate Conception Regional School.	Facility Administrator	No Progress	School is owned by Catholic Church, no funding available	Discontinue	School is not owned and operated by the Borough; therefore, this action will not be included in the 2016 HMP Update.
Franklin Borough 6	Provide an all-hazards public education outreach program on mitigation related issues	OEM Coordinator	In Progress	appeared before the public and the Borough Council	Include in 2016 HMP	Borough is currently doing this and will continue to do so.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Borough has identified the following mitigation projects/activities that have also been completed but were not identified in the previous mitigation strategy in the 2011 Plan:

- Completed the Viaduct bridge over the Railroad and the Wallkill River - Sussex County Engineering Dept. was the lead agency and grants were obtained to fund this project
- Completed the dredging of the small streams along Rt. 23 to allow for less ponding of stormwater - Franklin Borough Road dept. was the lead agency and was funded by the Borough.

Proposed Hazard Mitigation Initiatives for the Plan Update

In April 2015, a mitigation action workshop was held for participating municipalities where each was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013). In May 2015, FEMA Region 2 and NJOEM led a second workshop and provided the results to the risk assessment to further assist with the identification of mitigation actions. In September 2015 and October 2015, the Borough attended annex support meetings where they identified and finalized mitigation actions for their community.

Table 9.7-11 summarizes the comprehensive-range of specific mitigation initiatives the Borough would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High', 'Medium', or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.7-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.7-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Franklin Boro-1	Conduct a study on the redevelopment of Rutherford Avenue. This would allow traffic heading north and south when Route 23 is closed due to an emergency. Once study is complete, identify mitigation actions to complete this project.	Existing	All	All	Borough Engineer with support from NJDOT	High	Low to Medium	Municipal Budget; Grants where available	Short Term / DOF	High	LPR	PR
Franklin Boro-2	Ensure continuity of operations at critical facilities. Purchase and install a generators for critical facilities in Borough: <ul style="list-style-type: none"> First Aid Squad Franklin Elementary School Borough Hall Borough's Board of Public Works Water Division facility Borough's Board of Public Works Road Division facility 	Existing	All	1, 2, 6	Borough OEM	Medium to High	High	HMGP with local budget for cost share	Short Term / DOF	High	SIP	PP
Franklin Boro-3	Provide an all-hazards public education outreach program on mitigation related issues through social media and the Borough website.	N/A	All	All	Borough OEM	High	Low	HMGP with local budget for cost share	Ongoing	High	EAP	PI
Franklin Boro-4	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect structures from future damage, with repetitive loss and severe repetitive loss properties as a priority when applicable. Phase 1: Identify appropriate candidates and determine most cost-effective mitigation option. Phase 2: Work with the property owners to implement selected action based on available funding and local match availability.											
	See above.	Existing	Flood, Severe Weather Wildfire, Severe Winter Weather	All	Engineering via NFIP FPA with NJOEM, FEMA support	High	High	FEMA Mitigation Grant Programs and local budget (or property owner)	Ongoing (outreach and specific project identification); Long term DOF (specific project application and implementation)	High	SIP	PP



Table 9.7-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
								for cost share				
Franklin Boro-5	Identify and establish a reverse 911 system for the Borough to use to alert residents during emergencies. Once set up, create an outreach program to all the residents of the Borough on how to sign up and use the system.	N/A	All	All	Borough OEM	High	Low to Medium	Municipal Budget	Short Term / DOF	High	LPR, EAP	PR, PI
Franklin-6	Conduct a study on the flooding of the Walkkill River and its impacts on the homes along Newton Avenue.	Existing	Flood, Severe Weather	1, 2	Engineering with support from NJDEP and Fish and Wildlife	Medium to High	Low to Medium	Municipal Budget; grants where available	Short Term / DOF	Medium	SIP	PP
Franklin-7	Purchase and install a 3,000 gallon bi-fuel tank at the DPW facility on Corkhill Road. The tank would hold 2,000 gallons of gasoline and 1,000 gallons of diesel fuel. The fuel will be used for municipal vehicles.	New	All	All	Borough OEM and DPW	High	Medium to High	Grant Funding with local cost share	Short Term / DOF	High	SIP	PP

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
HMA	Hazard Mitigation Assistance Program

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low < \$10,000

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:



Costs:

Medium \$10,000 to \$100,000
High > \$100,000

Where actual project costs cannot reasonably be established at this time:

Low Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Low= < \$10,000
Medium \$10,000 to \$100,000
High > \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low Long-term benefits of the project are difficult to quantify in the short term.
Medium Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP)-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES)-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.7-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Franklin Boro-1	Conduct a study on the redevelopment of Rutherford Avenue. This would allow traffic heading north and south when Route 23 is closed due to an emergency. Once study is complete, identify mitigation actions to complete this project.	1	1	1	0	0	0	0	0	1	0	1	1	1	0	6	High
Franklin Boro-2	Purchase and install a generators for critical facilities in Borough: <ul style="list-style-type: none"> • First Aid Squad • Franklin Elementary School • Borough Hall • Borough's Board of Public Works Water Division facility • Borough's Board of Public Works Road Division facility 	1	1	1	1	1	0	0	0	0	1	1	1	1	0	8	High
Franklin Boro-3	Provide an all-hazards public education outreach program on mitigation related issues through social media and the Borough website.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Franklin Boro-4	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition / relocation to protect structures from future damage, with repetitive loss and severe repetitive loss properties as a priority when applicable.	1	1	1	1	1	0	0	0	0	1	1	1	1	0	8	High
Franklin Boro-5	Identify and establish a reverse 911 system for the Borough to use to alert residents during emergencies. Once set up, create an outreach program to all the residents of the Borough on how to sign up and use the system.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Franklin-6	Conduct a study on the flooding of the Wallkill River and its impacts on the homes along Newton Avenue.	1	1	1	1	0	0	1	1	0	1	1	1	0	0	9	Medium
Franklin-7	Purchase and install a 3,000 gallon bi-fuel tank at the DPW facility on Corkhill Road. The tank would hold 2,000 gallons of gasoline and 1,000 gallons of diesel fuel. The fuel will be used for municipal vehicles.	1	1	1	1	1	1	0	0	1	1	1	1	1	0	11	High

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.7.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.7.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Borough of Franklin that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Borough of Franklin has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.7.9 Additional Comments

None at this time.

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Figure 9.7-1. Borough of Franklin Hazard Area Extent and Location Map 1

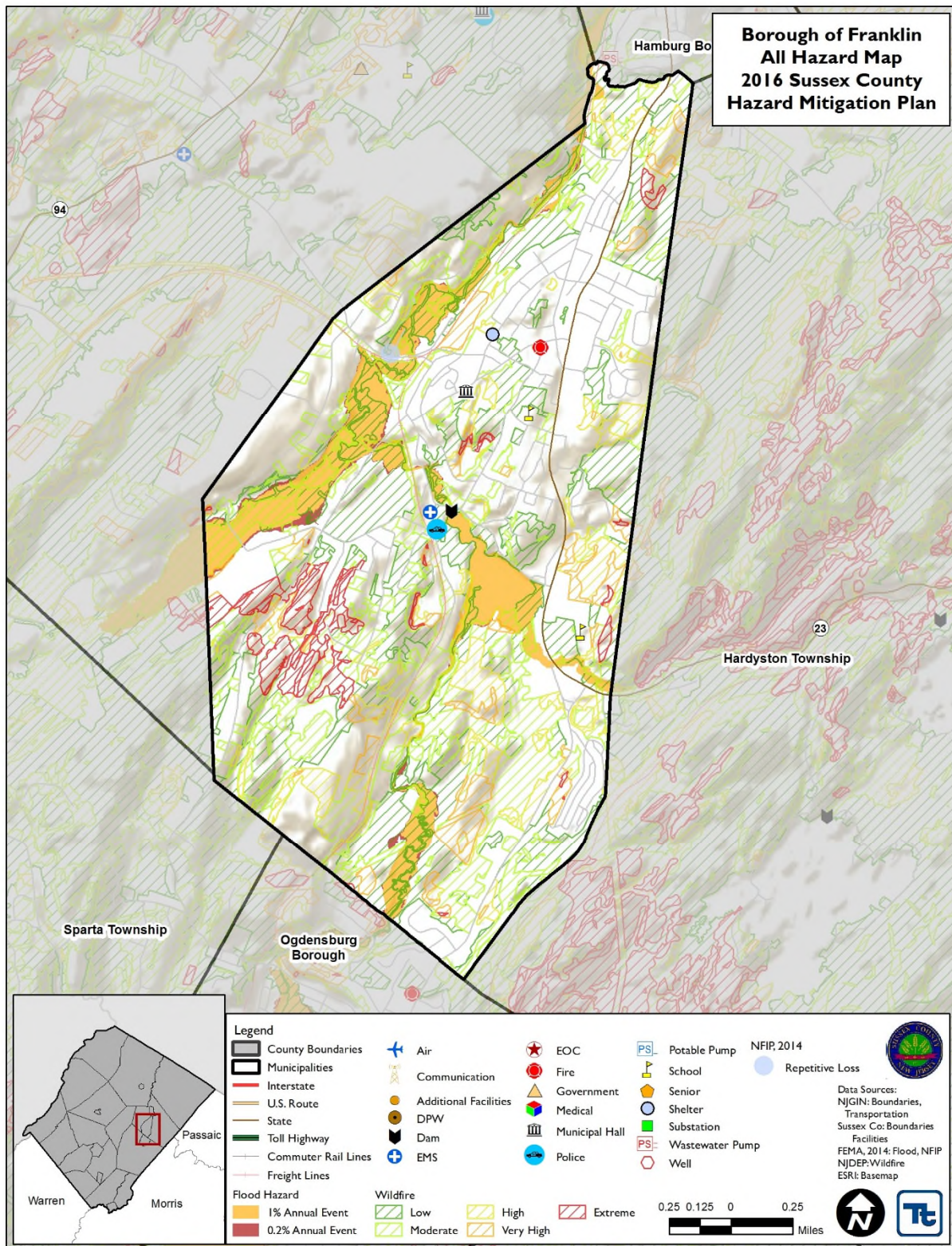
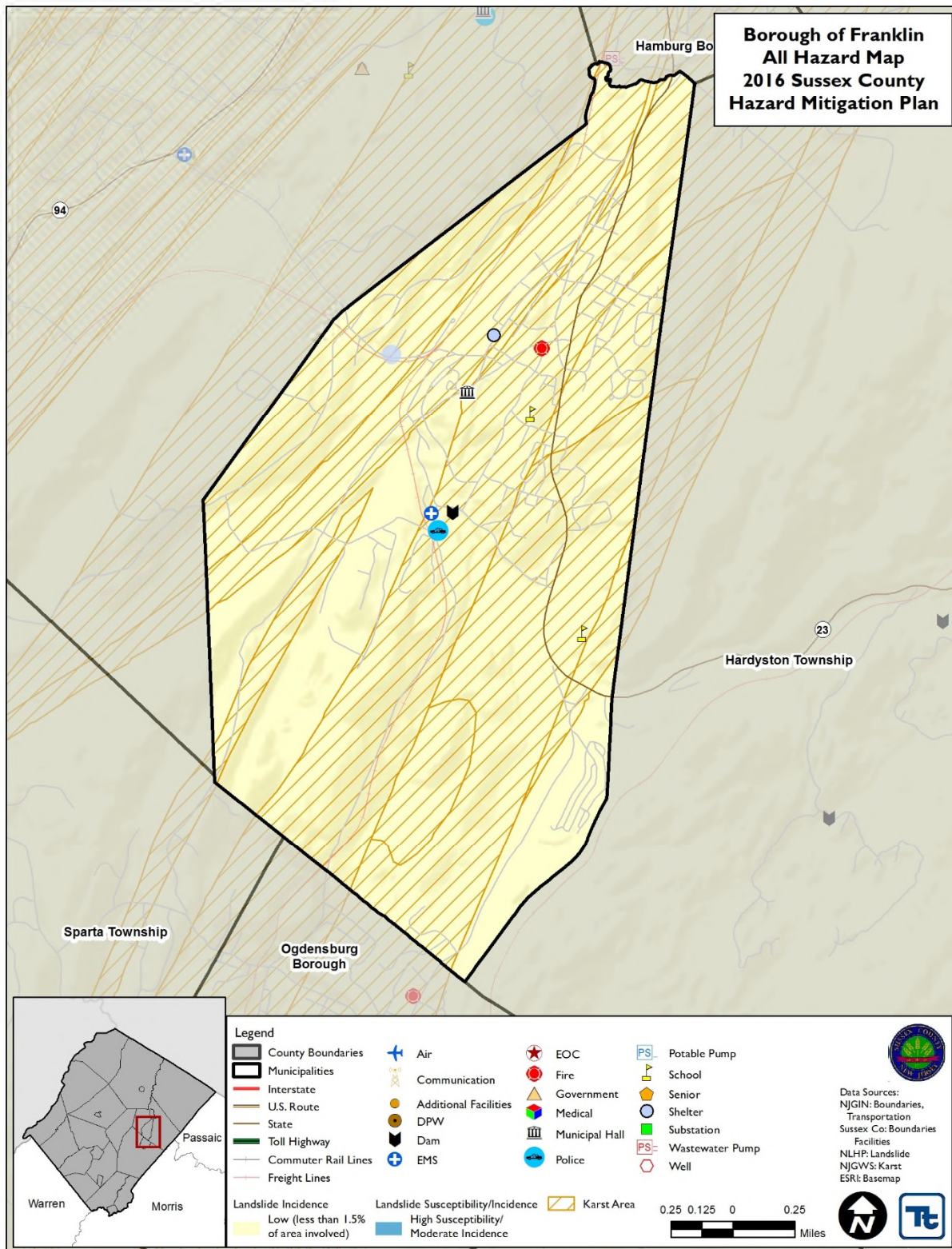




Figure 9.7-2. Borough of Franklin Hazard Area Extent and Location Map 2





Action Number:

Franklin Boro-2

Mitigation Action/Initiative:

Purchase and install a generators for critical facilities in Borough

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Loss of power within the Borough disrupts the continuity of operations
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install a generators for critical facilities in Borough
	2. Purchase portable generators – not feasible if longer power outages
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install a generators for critical facilities in Borough: <ul style="list-style-type: none">• First Aid Squad• Franklin Elementary School• Borough Hall• Borough's Board of Public Works Water Division facility• Borough's Board of Public Works Road Division facility
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium to High
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Borough OEM
Local Planning Mechanism	Emergency Management, Capital Improvement
Potential Funding Sources	HMGP with local budget for cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Franklin Boro-2

Mitigation Action/Initiative: Purchase and install a generators for critical facilities in Borough

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Allow continuity of operations during periods of power outages; provide shelter facilities for residents impacted
Property Protection	1	Allow continuity of operations during periods of power outages
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	0	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	Project will be completed within five years once funding is received
Local Champion	1	
Other Community Objectives	0	
Total	8	
Priority (High/Med/Low)	High	



Action Number:

Franklin Boro-7

Mitigation Action/Initiative:

Purchase and install a 3,000 gallon bi-fuel tank at the DPW facility

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	The Borough currently has an inter-local agreement with Hardyston Township for fuel for municipal vehicles.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install a 3,000 gallon bi-fuel tank at the DPW facility
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install a 3,000 gallon bi-fuel tank at the DPW facility on Corkhill Road. The tank would hold 2,000 gallons of gasoline and 1,000 gallons of diesel fuel. The fuel will be used for municipal vehicles.
Action/Project Category	SIP
Goals/Objectives Met	All
Applies to existing and/or new development; or not applicable	New
Benefits (losses avoided)	High
Estimated Cost	Medium to High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Borough OEM
Local Planning Mechanism	Emergency Management, Capital Improvement
Potential Funding Sources	Grant funding with local budget for cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Franklin Boro-7

Mitigation Action/Initiative: Purchase and install a 3,000 gallon bi-fuel tank at the DPW facility

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All Hazards
Timeline	1	
Local Champion	1	Need for a local fueling station for the Borough
Other Community Objectives	0	
Total	11	
Priority (High/Med/Low)	High	



9.8 Township of Fredon

This section presents the jurisdictional annex for the Township of Fredon.

9.8.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
John A. W. Richardson, Township Committeeman/OEM Coordinator 443 Route 94, Newton, NJ 07860 Phone: (973) 222-8196 Email: jawr3@centurylink.net	Virgil Rome, Deputy OEM 443 Route 94, Newton, NJ 07860 Phone: (973) 951-4196 Email: vrome461@me.com

9.8.2 Municipal Profile

The Township of Fredon was incorporated in 1904. The Township is located in southwestern Sussex County and has a total land area of 17.65 square miles. It is bordered to the north by Hampton Township, to the south by Green Township, to the east by Andover Township and Newton, and to the west by Stillwater Township and Warren County. According to the U.S. Census, the 2010 population for the Township of Fredon was 3,437. The Pequest River, Paulins Kill, and Bear Brook all flow through the Township. In addition, numerous ponds and lakes are located throughout the Township.

Growth/Development Trends

The Township of Fredon did not note any recent residential/commercial development since 2010 or any major residential or commercial development, or major infrastructure development planned for the next five years in the municipality. The Township notes that there was a \$140 million loss in assessed valuation with 3% of the housing stock in foreclosure.

9.8.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.8-1. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	Stillwater Station Road washed out; downed trees and power lines; Township had over \$7,900 in cleanup costs and overtime.
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	The Township had over \$31,000 in losses, cleanup costs, debris removal and overtime. There were also power outages throughout the Township.
October 29, 2011	Severe Storm	DR-4086	Yes	This event brought heavy snow to the Township which led to downed trees and



Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
				power lines. There were power outages in the Township and over \$42,000 in cleanup costs, snow removal and overtime.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	The storm brought down trees and power lines which led to power outages in the Township. Debris removal, cleanup and overtime costs for the Township was over \$44,000.

9.8.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Fredon. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Fredon.

Table 9.8-2. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	Medium
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$377,871 2,500-Year GBS: \$5,941,808	Occasional	28	Medium
Flood	1% Annual Chance: \$554,358	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$67,425,407	Occasional	12	Low
Hurricane	100-year MRP: \$141,647 500-year MRP: \$1,574,454 Annualized: \$10,233	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$141,647 500-year MRP: \$1,574,454 Annualized: \$10,233	Frequent	48	High
Severe Winter Weather	1% GBS: \$5,240,179 5% GBS: \$26,200,896	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$81,432,841	Frequent	33	High
Hazardous Materials	Damage estimate not available	Frequent	36	High



Notes: GBS = General building stock; MRP = Mean return period.

- The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- High = Total hazard priority risk ranking score of 31 and above

Medium = Total hazard priority risk ranking of 15-30+

Low = Total hazard risk ranking below 15
- Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Fredon.

Table 9.8-3. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Fredon	4	1	\$6,937	0	0	0

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Note (5) A zero percentage denotes less than 1/100th percentage and not zero damages or vulnerability as may be the case.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance flood boundary.

Other Vulnerabilities Identified by Municipality

The Township identified the following vulnerable areas in the community:

- Glenn Terrace Pond is a dammed (Paulinskill Water Shed #2 Dam) pond created by the USACE to use as stormwater control in this section of the Township. It is owned by the Town of Newton; however, it is located in Fredon Township. The dam is owned by Green Hills Estate POA and is identified as a significant hazard dam. Moores Brook flows from Glenn Terrace Pond feeds under a commercial area in the Township and in Newton. There is one commercial building and one residential/commercial building where the Brook flows through the basement of these buildings.
- Whittemore Pond is a manmade farm pond that drains the surrounding farmland and feeds into the Glenn Terrace Pond.
- There is major concern of a dam failure at either of these ponds. If a dam failure were to occur, it would impact, and most likely destroy, homes surrounding the ponds. There are EAPs for both dams and are maintained by the Town of Newton.



9.8.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Community Rating System
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Fredon.

Table 9.8-4. Planning and Regulatory Tools

Tool / Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept. /Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Planning Board	2008
Capital Improvements Plan	Yes	Local	Township	2015
Floodplain Management / Basin Plan	No			
Stormwater Management Plan	Yes	Local and Federal	Planning Board	Master Plan
Open Space Plan	Yes	Local, State	Planning Board	2000
Stream Corridor Management Plan	Yes			Master Plan
Watershed Management or Protection Plan	Yes			Master Plan
Economic Development Plan	No			
Comprehensive Emergency Management Plan	Yes	Local	OEM	2014
Emergency Response Plan	Yes	Local	OEM	2014
Post-Disaster Recovery Plan				
Transportation Plan	Yes	Local	OEM	2014
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State	Building Dept.	Chapter 200 – Construction Codes, Uniform
Zoning Ordinance	Yes	Local	Zoning	Chapter 550 - Zoning
Subdivision Ordinance	Yes	Local	Planning and Zoning	Chapter 550 - Zoning



Table 9.8-4. Planning and Regulatory Tools

Tool / Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept. /Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
NFIP Flood Damage Prevention Ordinance	Yes	Local		Chapter 270 – Flood Control
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State		
Growth Management Ordinances	Yes	Local	Planning and Zoning	Ongoing
Site Plan Review Requirements	Yes	Local	Planning and Zoning	Chapter 424 – Site Plan Review
Stormwater Management Ordinance	Yes	Local	Planning and Zoning	Chapter 457 – Stormwater Control
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No			
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes	Local	Planning and Zoning	Chapter 441 – Soil Erosion and Sediment Control

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Fredon.

Table 9.8-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/ Agency/Position
Administrative Capability		
Planning Board	Yes	Planning and Zoning Boards
Mitigation Planning Committee	Yes	
Environmental Board/Commission	Yes	Environmental Commission
Open Space Board/Committee	Yes	Open Space Commission
Economic Development Commission/Committee	No	
Maintenance Programs to Reduce Risk	Yes	
Mutual Aid Agreements	Yes	Verbal agreements
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Pellow Engineering
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	State



Table 9.8-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/ Agency/Position
Planners or engineers with an understanding of natural hazards	Yes	Pellow Engineering and State
NFIP Floodplain Administrator	Yes	Construction Official (as per Township Code)
Surveyor(s)	No	
Personnel skilled or trained in GIS and/or HAZUS-MH applications	No	
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	Appointed by Township Committee
Grant Writer(s)	No	
Staff with expertise or training in benefit/cost analysis	No	
Professionals trained in conducting damage assessments	Yes	State Building Inspector

Fiscal Capability

The table below summarizes financial resources available to the Township of Fredon.

Table 9.8-6. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community development Block Grants (CDBG, CDBG-DR)	No
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	No
Impact Fees for homebuyers or developers of new development/ homes	Yes
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	State Aid
Open Space Acquisition Funding Programs	Yes
Other	No



Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Fredon.

Table 9.8-7. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		
Building Code Effectiveness Grading Schedule (BCEGS)	No		
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	5	2014
Storm Ready	No		
Firewise	No		
Disaster/Safety Programs in/for Schools	Yes	Fire Prevention	Annual
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	Yes		Daily as needed
Public-Private Partnerships	No		

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>



Self-Assessment of Capability

The table below provides an approximate measure of the Township of Fredon's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.8-8. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability			X
Administrative and Technical Capability			X
Fiscal Capability	X		
Community Political Capability		X	
Community Resiliency Capability		X	
Capability to Integrate Mitigation into Municipal Processes and Activities.		X	

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Construction Official according to Chapter 270, Section 13 of the Township Code.

Flood Vulnerability Summary

During the most recent flooding events in the Township, no homes or structures were damaged. However, during Hurricane Irene, the Township had part of a road washout. According to the Township FPA and OEM Coordinator, the Township does not have flooding issues in the municipality.

Resources

None identified

Compliance History

The Township joined the NFIP on March 11, 1983 and is in good standing. As of August 31, 2015, there are four in-force policies and one claim has been paid.

Regulatory

Chapter 270 of Township Code – Flood Control

Community Rating System

The Township of Fredon does not participate in the Community Rating System (CRS) program.



Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Township has a Planning Board and Zoning Board of Adjustments which reviews all applications for development and consider natural hazard risk areas in their review.

2007 Comprehensive Master Plan Reexamination: The Township completed a Comprehensive Plan, which included the identification of natural hazard risk areas like floodplains, wetlands, and steep slopes, as well as land use and zoning recommendations for managing those risks. The Plan included the following applicable goals and objectives: Some of the recommendations included the following:

GOAL 1: To protect areas constrained by steep slopes, wetlands, category one streams, flood prone areas, forested areas, and areas with threatened or endangered habitat by enforcing the township's environmental regulations and establishing new regulations to address unregulated elements.

Objectives:

1. To encourage township actions to guide the appropriate use or development of all lands in Fredon Township which will promote the public health, safety, morals and general welfare.
2. To secure safety from fire, flood, panic and other natural and man-made disasters.
3. To promote the establishment of appropriate densities and concentrations that will contribute to the well-being of persons, neighborhoods, communities and regions and preservation of the environment.

Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Control Chapter, Stormwater Management Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter. The Township also has a chapter specific to the hazards associated with environmentally sensitive areas.

Chapter 270: Flood Control

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;



- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 457: Stormwater Control

The purposed of the Stormwater Control chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare the citizens.

Chapter 424-22 Article V: Environmental Impact Statement

The purpose of this section of the Chapter is to allow the Township to assess the impact of a proposed development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding and waste disposal.

The Township has identified a new mitigation initiative to review the current hazard mitigation plan prior to updating plans, ordinances, etc. within the Township. Refer to Table 9.8-10 below for further information.

Operational and Administration

The Township has established a Planning board and Zoning Board of Adjustments that are responsible for the review of development applications. The Township has a Zoning officer as well as a planning and zoning board secretary.

Funding

Operating Budget: The Township's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Township has received funding from the NJDOT, Sustainable Jersey, The Garden State Preservation Trust Fund, and Clean Communities grant programs for the completion of mitigation and emergency response related projects including roadway and drainage improvements.

Education and Outreach

The Township's website's home page posts information regarding upcoming community events and important municipal decisions. The Township has identified a new mitigation initiative to develop and implement a multi-hazard public outreach program. Refer to Table 9.8-10 below.

9.8.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.8-9. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Fredon Township 1	Harden Fredon Town Hall/DPW located on 94S to FEMA 361 Standards.	OEM Coordinator	No Progress	Due to lack of funding, this initiative has not been completed.	Include in 2016 HMP	Harden Fredon Town Hall/DPW located on 94S to FEMA 361 standards; install a backup generator.
Fredon Township 2	Retrofit roof to meet current high wind standards on school located on Route 94S.	School Board Administrator	No Progress	Due to lack of funding, this initiative has not been completed.	Include in 2016 HMP	The Township will include this initiative in the 2016 HMP Update.
Fredon Township 3	Retrofit impact resistant windows and shutters to school located on Route 94S.	School Board Administrator	No Progress	Due to lack of funding, this initiative has not been completed.	Include in 2016 HMP	The Township will include this initiative in the 2016 HMP Update.
Fredon Township 4	Emergency generator for school shelter located on Route 94S.	School Board Administrator	No Progress	Due to lack of funding, this initiative has not been completed.	Include in 2016 HMP	The Township will include this initiative in the 2016 HMP Update.
Fredon Township 5	Implement Fire Wise prevention program throughout municipality.	OEM Coordinator	No Progress	Due to lack of funding, this initiative has not been completed.	Discontinue	
Fredon Township 6	Inundation Study for twin dams located on Warner Road and Paulinskill Lake Road.	Township Engineer	No Progress	Due to lack of funding, this initiative has not been completed.	Include in 2016 HMP	The Township will include this initiative in the 2016 HMP Update.
Fredon Township 7	Emergency generator for shelter at Civic Center.	OEM Coordinator	No Progress	Due to lack of funding, this initiative has not been completed.	Include in 2016 HMP	Revised – refer to Fredon Township 1
Fredon Township 8	Inundation study for Whittemore Pond Dam.	Township Engineer	No Progress	Due to lack of funding, this initiative has not been completed.	Include in 2016 HMP	The Township will include this initiative in the 2016 HMP Update.
Fredon Township 9	Upgrade and improve stormwater culverts at intersection of Pond Place and Slate Ridge.	Township Engineer	No Progress	Due to lack of funding, this initiative has not been completed.	Include in 2016 HMP	The Township will include this initiative in the 2016 HMP Update.
Fredon Township 10	Install stormwater runoff retention basin located at Newton Memorial Hospital.	Hospital Administrator	No Progress	Due to lack of funding, this initiative has not been completed.	Include in 2016 HMP	The Township will include this initiative in the 2016 HMP Update.



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Fredon Township 11	Retrofit roof to meet current snow-load standards on Civic Center/Emergency Services Center on 94S.	Facility Administrator	No Progress	Due to lack of funding, this initiative has not been completed.	Include in 2016 HMP	The Township will include this initiative in the 2016 HMP Update.
Fredon Township 12	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDM	In Progress	This project is not funded by is part of the email system throughout the Township.	Discontinue	



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Township has not identified any mitigation projects/activities that have been completed since the last hazard mitigation plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Township participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013). In May 2015, FEMA Region 2 and NJOEM led a second workshop and provided the results of the risk assessment to the municipalities to further assist with the identification of mitigation actions. Additionally, the Township attended an annex support meeting in October 2015 to identify and finalize their mitigation actions for the community.

Table 9.8-10 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.8-11 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.8-10. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Fredon-1	Harden the Township's Civic Center and EOC to FEMA 361 standards.	Existing	All	1, 2, 6	Township Administration, OEM	High	High	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Fredon-2	When updating the roof of the Township school, incorporate current high wind standards into the design.	Existing	All	1, 2, 6	School Administration	High	High	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Fredon-3	Conduct inundation studies for the dams located in the Township: twin dams at Warner Road and Paulinskill Lake Road and at Whittemore Pond.	Existing	All	1, 2, 3, 4	Township Engineer	High	Medium	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Fredon-4	Upgrade and improve stormwater culverts at intersection of Pond Place and Slate Ridge.	Existing	All	1, 2, 6	Township Engineer	High	Medium	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Fredon-5	Install stormwater runoff retention basin located at Newton Medical Center	Existing	All	1, 2, 6	Township Engineer, Hospital Administration	High	Medium	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Fredon-6	Review the current hazard mitigation plan prior to updating plans, ordinances, etc. within the Township.	N/A	All	All	Township Administration	High	Low	Municipal Budget / Staff Time	Ongoing	High	LPR	PR
Fredon-7	Develop and implement a multi-hazard public outreach program.	N/A	All	All	Township Administration, OEM	High	Low	Municipal Budget / Staff Time	Ongoing	High	EAP	PI
Fredon-8	Continue with the process of adding additional radio equipment on an existing tower in the Township. Awaiting zoning sign off; then will complete project.	Existing	All	All	Township OEM and County OEM	High	Low	Municipal Budget	Short Term	High	SIP	PP
Fredon-9	Purchase and install backup generators at the following locations: • Town Hall/DPW • Civic Center • Township School	Existing	All	1, 2, 6	Township OEM	High	Medium to High	HMGP with local cost share	Short Term / DOF	High	SIP	PP

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS Community Rating System
DPW Department of Public Works

Potential FEMA HMA Funding Sources:

FMA Flood Mitigation Assistance Grant Program
HMGP Hazard Mitigation Grant Program

Timeline:

Short 1 to 5 years
Long Term 5 years or greater



Acronyms and Abbreviations:

FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

PDM	Pre-Disaster Mitigation Grant Program
HMA	Hazard Mitigation Assistance Program

Timeline:

OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP) - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR) - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP) - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI) - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR) - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP) - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES) - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.8-11. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Fredon-1	Harden the Township's Civic Center and EOC to FEMA 361 standards.	1	1	1	1	0	1	0	0	0	-1	1	0	0	0	5	High
Fredon-2	When updating the roof of the Township school, incorporate current high wind standards into the design.	1	1	1	1	0	-1	0	0	0	-1	1	0	0	0	3	High
Fredon-3	Conduct inundation studies for the dams located in the Township: twin dams at Warner Road and Paulinskill Lake Road and at Whittemore Pond.	1	1	1	1	1	-1	0	1	0	-1	1	0	0	0	5	High
Fredon-4	Upgrade and improve stormwater culverts at intersection of Pond Place and Slate Ridge.	1	1	1	1	0	1	0	1	0	-1	1	0	0	0	6	High
Fredon-5	Install stormwater runoff retention basin located at Newton Medical Center	1	1	1	1	0	-1	0	1	0	-1	1	0	0	0	4	High
Fredon-6	Review the current hazard mitigation plan prior to updating plans, ordinances, etc. within the Township.	1	1	1	1	0	1	1	0	0	-1	1	0	0	0	6	High
Fredon-7	Develop and implement a multi-hazard public outreach program.	1	1	1	1	0	1	1	0	0	-1	1	0	0	0	6	High
Fredon-8	Continue with the process of adding additional radio equipment on an existing tower in the Township. Awaiting zoning sign off; then will complete project.	1	1	1	1	1	0	1	0	0	1	1	1	1	0	10	High
Fredon-9	Purchase and install backup generators at the following locations: <ul style="list-style-type: none"> Town Hall/DPW Civic Center Township School 	1	1	1	1	1	0	0	0	0	1	1	1	0	0	8	High

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.8.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.8.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Fredon that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Fredon has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.8.9 Additional Comments

None at this time.

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Figure 9.8-1. Township of Fredon Hazard Area Extent and Location Map 1

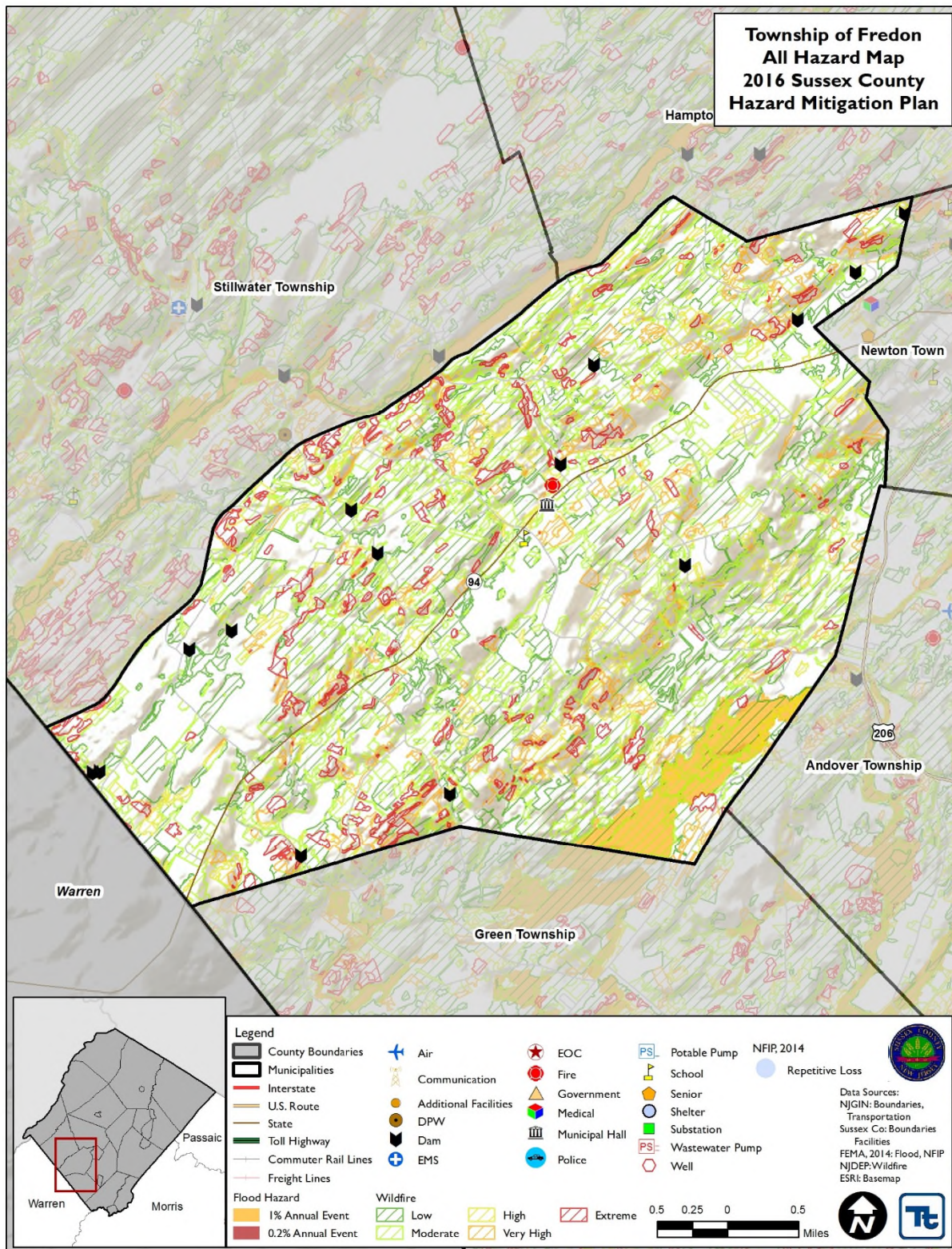
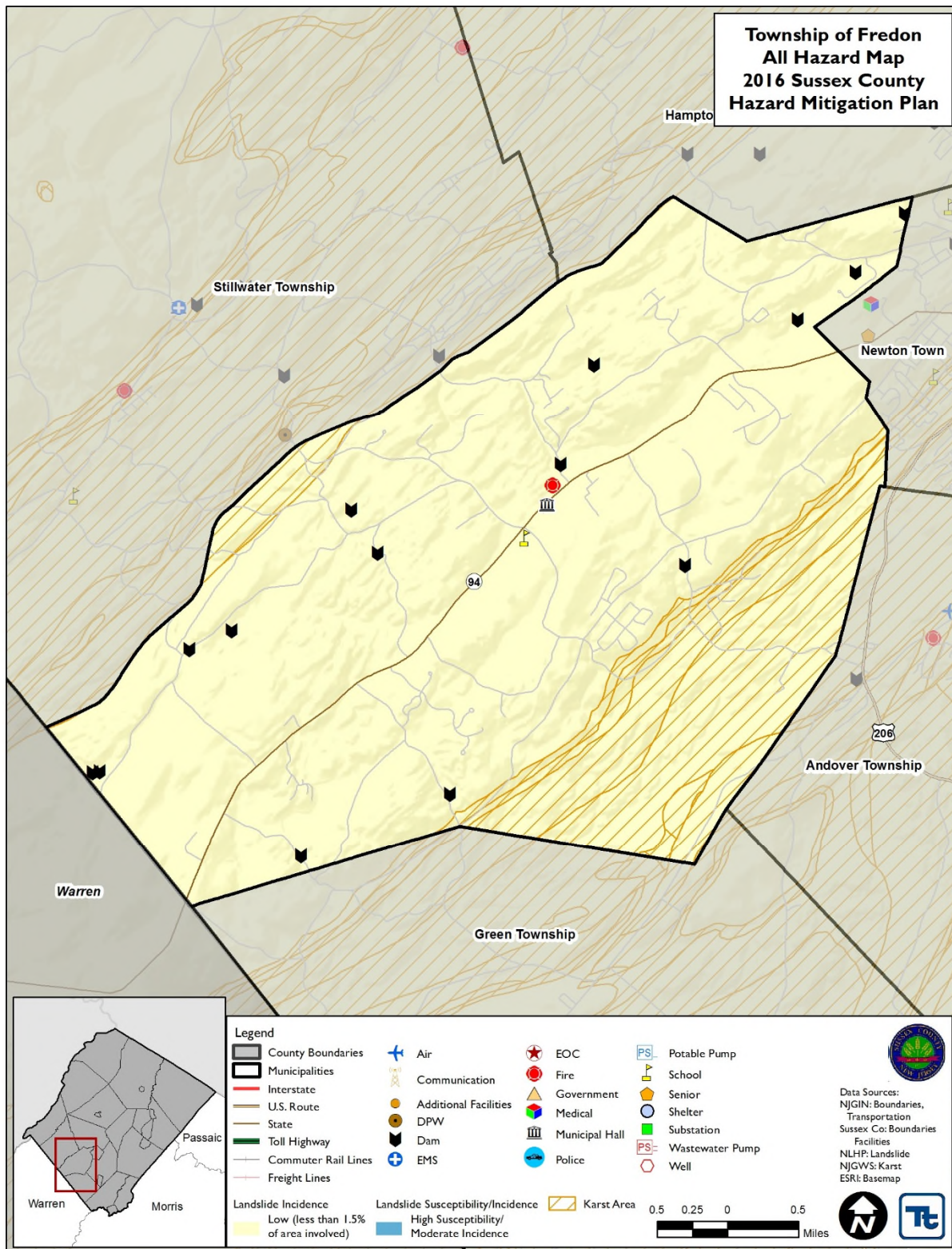




Figure 9.8-2. Township of Fredon Hazard Area Extent and Location Map 2





Action Number:

Fredon-1

Mitigation Action/Initiative:

Harden the Township's Civic Center and EOC to FEMA 361 standards.

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Current building is not protected from tornadoes and hurricanes
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Harden the Township's Civic Center and EOC to FEMA 361 standards.
	2. Construct new facility – too costly
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Harden the Township's Civic Center and EOC to FEMA 361 standards.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority*	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township Administration, OEM
Local Planning Mechanism	Emergency Operations, Capital Improvement
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Fredon-1

Mitigation Action/Initiative: Harden the Township's Civic Center and EOC to FEMA 361 standards.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect building from damages from tornadoes and hurricanes
Cost-Effectiveness	1	Reduce impacts from severe weather events
Technical	1	
Political	0	
Legal	1	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	-1	
Multi-Hazard	1	Severe Weather, Hurricanes/Tropical Storms
Timeline	0	
Local Champion	0	
Other Community Objectives	0	
Total	5	
Priority (High/Med/Low)	High	



Action Number:

Fredon-2

Mitigation Action/Initiative:

When updating the roof of the Township school, incorporate current high wind standards into the design.

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Current roof of school does meet high wind standards
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. When updating the roof of the Township school, incorporate current high wind standards into the design.
	2. Build new school – too costly
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	When updating the roof of the Township school, incorporate current high wind standards into the design.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	School Administration
Local Planning Mechanism	School Budget, Emergency Operations
Potential Funding Sources	HMGP with local (school budget) cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Fredon-2

Mitigation Action/Initiative: When updating the roof of the Township school, incorporate current high wind standards into the design.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect building from damages due to high winds
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	-1	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	-1	
Multi-Hazard	1	All
Timeline	0	
Local Champion	0	
Other Community Objectives	0	
Total	3	
Priority (High/Med/Low)	High	

**Action Number:**

Fredon-4

Mitigation Action/Initiative:

Upgrade and improve stormwater culverts at intersection of Pond Place and Slate Ridge.

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Undersized culverts at intersection of Pond Place and Slate Ridge causes flooding in this area.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Upgrade and improve stormwater culverts at intersection of Pond Place and Slate Ridge.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Upgrade and improve stormwater culverts at intersection of Pond Place and Slate Ridge.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township Engineer
Local Planning Mechanism	Stormwater Management
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Fredon-4

Mitigation Action/Initiative: Upgrade and improve stormwater culverts at intersection of Pond Place and Slate Ridge.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect residents from flooding in this area
Property Protection	1	Protect structures from flood damage
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	1	
Fiscal	0	
Environmental	1	
Social	0	
Administrative	-1	
Multi-Hazard	1	All
Timeline	0	
Local Champion	0	
Other Community Objectives	0	
Total	6	
Priority (High/Med/Low)	High	

**Action Number:**

Fredon-5

Mitigation Action/Initiative:

Install stormwater runoff retention basin located at Newton Medical Center

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Flooding in this area of the Township
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Install stormwater runoff retention basin located at Newton Medical Center
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Install stormwater runoff retention basin located at Newton Medical Center
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township Engineer, Hospital Administration
Local Planning Mechanism	Stormwater Management
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Fredon-5

Mitigation Action/Initiative: Install stormwater runoff retention basin located at Newton Medical Center

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect residents from flooding in this area
Property Protection	1	Protect structures from flood damage
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	-1	
Fiscal	0	
Environmental	1	
Social	0	
Administrative	-1	
Multi-Hazard	1	All
Timeline	0	
Local Champion	0	
Other Community Objectives	0	
Total	4	
Priority (High/Med/Low)	High	



Action Number:

Fredon-9

Mitigation Action/Initiative:

Purchase and install generators at critical facilities in the Township

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Loss of power in the community and lack of emergency generators – Township cannot function properly during emergencies
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install generators at critical facilities in the Township
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install generators at critical facilities in the Township
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium to High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township OEM
Local Planning Mechanism	Emergency Operations, Capital Improvement
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Fredon-9

Mitigation Action/Initiative: Purchase and install generators at critical facilities in the Township

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide shelter facility for residents
Property Protection	1	Allow buildings to function during power outages
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	0	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	All
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	8	
Priority (High/Med/Low)	High	



9.9 Township of Green

This section presents the jurisdictional annex for the Township of Green.

9.9.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Linda Peralta, Clerk/Administrator 150 Kennedy Road, P.O. Box 65, Tranquility, NJ 07879 Phone: (908) 852-9333 Email: clerk_admin@greentwp.com	Peg Phillips, Mayor 150 Kennedy Road, P.O. Box 65, Tranquility, NJ 07879 Phone: (908) 852-9333 Email: pPhillips@greentwp.com

9.9.2 Municipal Profile

Green Township is located in southwestern Sussex County and is bordered to the north by Fredon and Andover Townships, to the south and west by Warren County and to the east by Byram Township. The following unincorporated communities are located within the Township: Huntsburg, Greendell, Tranquility, and Huntsville. According to the U.S. Census, the 2010 population for the Township of Green was 3,601. The Pequest River, Bear Brook, and Trout Brook are named streams that flow through the Township. Lake Tranquility, Buckmire Pond, and Turtle Pond are the larger named lakes located in the Township.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the map in Section 9.9.8 of this annex which illustrates the hazard areas along with the location of potential new development.

Table 9.9-1. Growth and Development

Property or Development Name	Type (e.g. Res., Comm.)	# of Units/Structures	Location (address and/or Block & Lot)	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to present					
Airport Road	Comm.	3	Airport Road Block 31 Lots 1.06, 1.08, 1.09	Wildfire: High; Carbonate Hazard	Lot 1.08 under construction
Hackettstown-Andover 12" Gas Line	Utility	—	Route 517	—	Gas Main
Known or Anticipated Development in the Next Five (5) Years					
Airport Road	Comm.	4	Airport Road Block 31-Lots 1.03, 1.04, 1.05, 1.07	Wildfire: High; Carbonate Hazard	—
Crossed Keys	Comm.	1	289 Pequest Road Block 22 Lots 2 & 2.02	Flood: 1% Chance; Carbonate Hazard	In planning

* Only location-specific hazard zones or vulnerabilities identified.



9.9.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.9-2. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
March 5, 2008	Strong Wind	N/A	N/A	One flooded basement pump out
October 28, 2008	Heavy Snow and Strong Winds	N/A	N/A	Four calls for wires down on Hillside, Dogwood Drive (2), and Highland Ave. One activated alarm.
February 1-2, 2011	Winter Storm	N/A	N/A	Stand by for Allamuchy Fire Department.
March 11-12, 2011	Heavy Rain and Flooding	N/A	N/A	One flooded basement pumped out.
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	The Township had power outages that affected approximately 500 homes for six to 10 days. There were two structure fires, one mutual aid for tanker into Stillwater, 15 flooded basements pumped out, 27 wires down, and two motor vehicle accidents. Additionally, the Township had overtime costs for cleanup and equipment operation.
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	One flooded basement pumped out, two activated alarms, one wires down, one electrical fire, two motor vehicle accidents; Whitehall Road was flooded and closed from September 10 th to December 1 st .
October 29, 2011	Severe Storm	DR-4048	Yes	Eight wires down, five brush fires, one tree on wires, one activated alarm.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	The Township opened a warming shelter at the Green Township Fire Department and the Township municipal building for 14 days. There were multiple road closures and power outages town-wide for three to 14 days. The Township responded to a structure fire in Blairstown. There were 45 wires down, 23 trees down, one tree on a home, a transformer incident and an electrical fire. The Township had overtime for cleanup in the Township.
September 12, 2013	Heavy Rain and Flash Flooding	N/A	N/A	One smoke condition in basement, 23 wires down.

9.9.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Green. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.



Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Green.

Table 9.9-3. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	High*
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$405,042 2,500-Year GBS: \$6,470,904	Occasional	28	Medium
Flood	1% Annual Chance: \$25,076,647	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$743,457,272	Occasional	36	Medium**
Hurricane	100-year MRP: \$227,207 500-year MRP: \$1,955,312 Annualized: \$13,840	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$227,207 500-year MRP: \$1,955,312 Annualized: \$13,840	Frequent	48	High
Severe Winter Weather	1% GBS: \$6,178,929 5% GBS: \$30,894,647	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$85,197,298	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed due to the location of high hazard dams in the municipality

** The hazard ranking was changed for this hazard based on input from the municipality, population exposed, and/or event history.

GBS = General building stock; MRP = Mean return period.

a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.

b. High = Total hazard priority risk ranking score of 31 and above

Medium = Total hazard priority risk ranking of 15-30+

Low = Total hazard risk ranking below 15

c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Green.



Table 9.9-4. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Green	12	1	\$11,652	0	0	2

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance flood boundaries.

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.

9.9.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Green.

Table 9.9-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Planning Bd.	Master Plan Reexamination Report, Green Township, September 2008
Capital Improvements Plan	No			
Floodplain Management/Basin Plan	No			



Table 9.9-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Stormwater Management Plan	Yes	Local	Planning Bd.	
Open Space Plan	Yes	Local	Open Space	Open Space and Recreation Plan Update, 2009
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	No			
Comprehensive Emergency Management Plan	No			
Emergency Response Plan	Yes	Local	OEM	EOP
Post-Disaster Recovery Plan				
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	Yes	Local	Planning Board	Green Township Land Use Plan, December 2005 Housing Element and Fair Share Plan, December 2005
Regulatory Capability				
Building Code	Yes	State & Local	Zoning Official	State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Zoning Official	Chapter 30, Article XII
Subdivision Ordinance	Yes	Local	Zoning Official	Chapter 30, Article IX
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State, Local	Zoning Official	Chapter 25
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State & Local		N.J.A.C 7:13 – Flood Hazard Area Control Act
Growth Management Ordinances	No			
Site Plan Review Requirements	Yes	Local	Planning Bd.	Chapter 30, Article IX
Stormwater Management Ordinance	Yes	Local & County	Township Committee	N.J.A.C. 5:21 – Section 30-17.1A
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1



Table 9.9-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes	Local & County	Township Committee/Engineer	Soil and Soil Removal Chapter 26 – purpose to control soil erosion and sediment damages and related environmental damage by requiring adequate provisions for surface water retention and drainage and for the protection of exposed soil surfaces in order to promote the safety, public health, convenience and general welfare of the community.

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Green.

Table 9.9-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Green Township Planning Board
Mitigation Planning Committee	Yes	
Environmental Board/Commission	Yes	Green Township Environmental Advisory Committee
Open Space Board/Committee	Yes	Open Space Advisory Committee
Economic Development Commission/Committee	No	
Maintenance Programs to Reduce Risk	No	
Mutual Aid Agreements	Yes	Fire, First Aid
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Township Engineer/Township Planner
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Township Engineer
Planners or engineers with an understanding of natural hazards	Yes	Township Engineer/Township Planner
NFIP Floodplain Administrator	Yes	David Deal, Zoning Officer
Surveyor(s)	Yes	Township Engineer
Personnel skilled or trained in GIS and/or Hazus-MH applications	Yes	Township Engineer
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	OEM
Grant Writer(s)	Yes	Township Engineer or Planner
Staff with expertise or training in benefit/cost analysis	Yes	Township Engineer
Professionals trained in conducting damage assessments	No	



Fiscal Capability

The table below summarizes financial resources available to the Township of Green.

Table 9.9-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	N/A
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	No
Impact Fees for homebuyers or developers of new development/homes	Yes
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	Yes
Withhold public expenditures in hazard-prone areas	Yes
Other Federal or State Funding Programs	Yes
Open Space Acquisition Funding Programs	Yes
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Green.

Table 9.9-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	NP	N/A	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	No		
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	05/5Y	July 2014
Storm Ready	NP	N/A	N/A
Firewise	NP	N/A	N/A
Disaster/Safety Programs in/for Schools	No		
Organizations with Mitigation Focus (advocacy group, non-government)	Yes		
Public Education Program/Outreach (through website, social media)	Yes		
Public-Private Partnerships	No		

N/A = Not applicable. NP = Not participating

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule



(BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Township of Green's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.9-9. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability	X		
Administrative and Technical Capability	X		
Fiscal Capability	X		
Community Political Capability	X		
Community Resiliency Capability	X		
Capability to Integrate Mitigation into Municipal Processes and Activities.	X		

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

David Deal, Zoning Officer
Phone: (908) 852-9333
Email: zoning@greentwp.com

Flood Vulnerability Summary

The Township does not maintain lists/inventories of properties that have been damaged by floods. During Irene, Lee and Sandy, no inventories were kept regarding structures damaged. Damages from Irene and Lee was due to flooding particularly in the Lake Tranquility area of the Township where drainage is not good (many basements needed pumping) and where the Pequest River cross Pequest Road. Sandy caused wind damage to structures. The Township FPA does make substantial damage estimates; however, he did not make them during the most recent FEMA disaster declarations. It is unknown if any homes are interested in mitigation currently. There was one home that was approached by Open Space but was declined acquisition.



Resources

The Township FPA is the sole person assuming the responsibilities of floodplain administration. If needed, the Township will contact professionals. If and when the FPA is needed, he conducts permit reviews for the Township. The Township provides a general handout regarding flood hazards and risks. The FPA indicated that there are currently no barriers to running an effective floodplain management program. The FPA feels adequately supported and trained and has is a Certified Floodplain Manager (CFM). He would consider attending continuing education and certification training on floodplain management.

Compliance History

The Township is currently in good standing with the NFIP. It is unknown when the last compliance audit was conducted.

Regulatory

The Township's floodplain management regulations/ordinances are in harmony with the FEMA and State minimum requirements. During site plan review and application review, the Planning and Zoning Boards consider efforts to reduce flood risk when reviewing. The Township has not considered joining CRS.

Community Rating System

The Township of Green does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Township has a Planning Board and Zoning Board of Adjustments which reviews all applications for development and consider natural hazard risk areas in their review.

Highlands: Green Township is located in the New Jersey Highlands Region and is part of both the Highlands Planning and Preservation Areas. As such, the Township is one of 88 municipalities protected by and subject to the provisions of the Highlands Water Protection and Planning Act that protects, enhances and restores Highland's natural resources. The Highlands Act requires that future land use in the Highlands Region be guided by the Regional Master Plan's Land Use Capability Map (LUCM) Series which includes tools to identify and protect the natural, scenic and other resources of the region. In supporting and complying with the Highlands Act, the Township enacted amendments and updates to local zoning and development ordinances that ensure the protection of important resources and areas. The Highland Act creates three primary zones: a Protection Zone, a Conservation Zone and an Existing community Zone. Protection Zones are areas with the highest quality resources with extreme limitations on allowable development while Conservation Zones have significant agricultural lands and associated woodlands and environmental features with allowable development consisting primarily of agricultural uses. Existing Community Zones consist of areas of concentrated development with limited environmental constraints. These zones are overlaid with existing local zoning maps to identify and address issues of public interest including watershed management, open space preservation, historic preservation, flood protection among others.



The Township has identified a new mitigation initiative to review the current hazard mitigation plan and other hazard analyses prior to land use, zoning changes and development permitting. Refer to Table 9.9-11 for further information.

Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Control Chapter, Stormwater Management Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter. The Township also has a chapter specific to the hazards associated with environmentally sensitive areas.

The Township has a soil and removal ordinance (Chapter 26). The purpose is to control soil erosion and sediment damages and related environmental damage by requiring adequate provisions for surface water retention and drainage and for the protection of exposed soil surfaces in order to promote the safety, public health, convenience and general welfare of the community.

Operational and Administration

The Township has established a Planning Board, Zoning Board of Adjustments, Environmental Committee, and Open space Committee that are responsible for the review of development applications. The Township has a zoning officer as well as a planning and zoning board secretary.

Funding

Operating Budget: The Township's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Township has received funding from the NJDOT, Sustainable Jersey, The Garden State Preservation Trust Fund, and Clean Communities grant programs for the completion of mitigation and emergency response related projects including roadway and drainage improvements.

Education and Outreach

The Township's website's home page posts information regarding upcoming community events and important municipal decisions.

9.9.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.9-10. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2016 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Green Township 1	Retrofit roof to meet current high wind standards on Green Hills School located on Mackerly Road.	School Board Administrator	No Progress	1. 0% complete 2. No funding 3.	Include in 2016 HMP	1. Revise action to include in the 2016 HMP: work with school to retrofit roof to meet current high wind standards on Green Hills School located on Mackerley Road as funding permits.
Green Township 2	Implement Fire Wise Program throughout the Township.	OEM Coordinator	In Progress	1. 0% complete 2. Initial meeting scheduled late April 2015	Include in 2016 HMP	1. Initial information meeting 2.
Green Township 3	Stream bank stabilization and augmentation of the Pequest River.	Township Engineer	No Progress	1. 0% complete 2. no funding/mainly private property 3.	Include in 2016 HMP	Revise action to say and include in the 2016 HMP: work with private land owners to stabilize stream bank(s) and augment Pequest River
Green Township 4	Retrofit impact resistant windows and shutters on municipal building located on Kennedy Road.	DPW Administrator	No Progress	1. 0% complete 2. no funding 3. 4.	Include in 2016 HMP	Revise action to say and include in the 2016 HMP: retrofit impact resistant windows and shutters on municipal building located on Kennedy Road as funding permits
Green Township 5	Retrofit an external -frame to mitigate straight line winds to post office building located on Municipal Road	Township Administrator	No Progress	1. 0% complete 2. no funding 3.	Include in 2016 HMP	Revise action to say and include in the 2016 HMP: retrofit an external frame to mitigate straight line winds to PO building located on Municipal Rd as funding permits.
Green Township 6	Retrofit roof to meet current high wind standards for two buildings located on the Trinca Airport located on Airport Road.	Township Administrator	In Progress	1. 75% complete 2. one building removed and ½ of other building removed funded through local budget and insurance 3.	Include in 2016 HMP	Revise action to say and include in the 2016 HMP: retrofit roof on remaining building to meet current high wind standards located at Trinca Airport on Airport Road
Green Township 7	Storm-water runoff management system implemented for 350 homes in the Lake Tranquility development.	DPW Administrator	No Progress	1. 0% complete 2. no funding/largely private property 3.	Include in 2016 HMP	Revise action to say and include in the 2016 HMP: implement a storm water runoff management system for 350 homes in Lake



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2016 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
						Tranquility area as funding and private cooperation permit
Green Township 8	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	No Progress	1. unknown 2. 3.	Include in 2016 HMP	1. SCDEM 2.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Township has not identified any additional mitigation projects/activities that have been completed since approval of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Township participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013). In May 2015, the Township participated in a second workshop led by FEMA Region 2 and NJOEM and was provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.9-11 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High', 'Medium', or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.9-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.9-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Green Twp-1	Add or replace permanent generators at critical facilities (municipal building, Road Dept., Fire Station, Squad Building)	Existing	All	1, 2, 6	OEM Coordinator Fire Department	High	High	HMGP with local budget for cost share	Short Term / DOF	High	SIP	PP
Green Twp-2	Purchase and install repeaters on two existing towers in the Township. This will increase the level of emergency communities both inter and intra-agency.	New and Existing	All	1, 2, 5, 6	OEM Coordinator Fire Department	High	High	HMGP grants with local budget for cost share	Short Term / DOF	High	SIP	PP
Green Twp-3	Ensure continuity of operations: Purchase portable generators (12) to ensure those in need have the life support needed during and after an event.	Existing	All	1, 2	First Aid Captain, Fire Chief, Administrator (Engineer)	High	Medium	HMGP with local budget for cost share	Ongoing / DOF	Medium	SIP	PP
Green Twp-4	Add stand pipes at draft sites – 2 or more throughout Township	New and Existing	All	All	Administrator OEM Coordinator	Medium	Medium	Grant funding with local budget for cost share	Short Term / DOF	Medium	SIP	PP
Green Twp-5	Purchase/replace portable water pumps (12) to ensure those who experience flooding in conjunction with loss of power are adequately protected from loss of structure and/or mold issues.	Existing	Flood	2, 5	Fire Chief, Administrator	High	Medium	HMGP with local budget for cost share	Ongoing / DOF	Medium	SIP	PP
Green Twp-6	Work with private land owners to stabilize stream bank(s) and augment Pequest River	Existing	Flood	1, 2	Township Engineer	Medium to High	High	Grant funding with local cost share	Short Term / DOF	Medium	SIP	PP
Green Twp-7	Retrofit impact resistant windows and shutters on municipal building located on Kennedy Road as funding permits	Existing	Severe Weather, Severe Winter Weather, Hurricanes / Tropical Storms	1, 2	DPW	Medium	Medium	Grant funding with local cost share	Short Term / DOF	High	SIP	PP
Green Twp-8	Retrofit an external frame to mitigate straight line winds to PO building located on Municipal Rd as funding permits	Existing	Severe Weather, Severe Winter Weather, Hurricanes /	1, 2	Township Administrator	Medium	High	Grant funding with local cost share	Short Term / DOF	High	SIP	PP



Table 9.9-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
			Tropical Storms									
Green Twp-9	Retrofit roof on remaining building to meet current high wind standards located at Trinca Airport on Airport Road	Existing	Severe Weather, Severe Winter Weather, Hurricanes / Tropical Storms	1, 2	Township Administrator	Medium	High	Grant funding with local cost share	Short Term / DOF	High	SIP	PP
Green Twp-10	Implement a storm water runoff management system for 350 homes in Lake Tranquility area as funding and private cooperation permit	Existing	Flood	1, 2	DPW	Medium	High	Grant funding with local cost share	Short Term / DOF	High	SIP	PP
Green Twp-11	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	New and Existing	All	All	OEM Coordinator, in coordination with SCDEM	High	Low	Municipal Budget	Short Term / DOF	High	LPR, EAP	PR, PI
Green Twp-12	Review the current hazard mitigation plan and other hazard analysis prior to land use, zoning changes and development permitting.	N/A	All	All	Township Engineer and Planner	High	Low	Municipal Budget	Short Term / DOF	High	LPR	PR
Green Twp-13	Provide protection to buildings/infrastructure in high hazard areas in the Township	New and Existing	All	All	Township Engineer and Planner	High	Medium to High	Grant Funding with local cost share	Short Term / DOF	Medium	SIP	PP
Green Twp - 14	Work with school to retrofit roof to meet current high wind standards on Green Hills School located on Mackerley Road as funding permits.	Existing	Severe Weather, Severe Winter Weather, Hurricanes / Tropical Storms	1, 2	Township Administrator, School Board	Medium	High	Grant funding with local cost share	Short Term / DOF	High	SIP	PP
Green Twp - 15	Implement Fire Wise	New and Existing	Wildfire	All	OEM Coordinator	Medium	Medium/Low	Municipal budget	Short Term/ DOF	Medium	EAP, LPR	PR, PI

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

Potential FEMA HMA Funding Sources:

Timeline:



CRS	Community Rating System	FMA	Flood Mitigation Assistance Grant Program	Short	1 to 5 years
DPW	Department of Public Works	HMGP	Hazard Mitigation Grant Program	Long Term	5 years or greater
FEMA	Federal Emergency Management Agency	PDM	Pre-Disaster Mitigation Grant Program	OG	On-going program
FPA	Floodplain Administrator	RFC	Repetitive Flood Claims Grant Program (discontinued)	DOF	Depending on funding
HMA	Hazard Mitigation Assistance	SRL	Severe Repetitive Loss Grant Program (discontinued)		
N/A	Not applicable				
NFIP	National Flood Insurance Program				
NJDEP	New Jersey Department of Environmental Protection				
NJOEM	New Jersey Office of Emergency Management				
OEM	Office of Emergency Management				

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP)-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES)-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.9-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High/Medium/Low
Green Twp-1	Add or replace permanent generators at critical facilities (municipal building, Road Dept., Fire Station, Squad Building)	1	1	1	1	1	1	1	0	1	1	1	1	1	1	13	High
Green Twp-2	Purchase and install repeaters on two existing towers in the Township. This will increase the level of emergency communities both inter and intra-agency.	1	1	1	1	1	1	1	0	1	1	1	1	1	1	13	High
Green Twp-3	Purchase portable generators (12) to ensure those in need have the life support needed during and after an event.	1	1	1	1	1	1	0	0	1	1	1	1	1	0	11	Medium
Green Twp-4	Add stand pipes at draft sites – 2 or more throughout Township	1	1	1	1	0	0	0	0	1	1	1	0	0	0	7	Medium
Green Twp-5	Purchase/replace portable water pumps (12) to ensure those who experience flooding in conjunction with loss of power are adequately protected from loss of structure and/or mold issues.	1	1	1	1	1	1	0	0	1	1	0	1	1	0	10	Medium
Green Twp-6	Work with private land owners to stabilize stream bank(s) and augment Pequest River	1	1	1	1	0	0	1	1	1	1	0	0	0	0	8	Medium
Green Twp-7	Retrofit impact resistant windows and shutters on municipal building located on Kennedy Road as funding permits	1	1	1	1	1	1	0	0	0	1	1	1	0	0	9	High
Green Twp-8	retrofit an external frame to mitigate straight line winds to PO building located on	1	1	1	1	1	1	0	0	0	1	1	1	0	0	9	High



Table 9.9-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High/Medium/Low
	Municipal Rd as funding permits																
Green Twp-9	retrofit roof on remaining building to meet current high wind standards located at Trinca Airport on Airport Road	1	1	1	1	1	1	0	0	0	1	1	1	0	0	9	High
Green Twp-10	implement a storm water runoff management system for 350 homes in Lake Tranquility area as funding and private cooperation permit	1	1	1	1	1	0	0	1	0	1	1	1	0	0	9	High
Green Twp-11	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Green Twp-12	Review the current hazard mitigation plan and other hazard analysis prior to land use, zoning changes and development permitting.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Green Twp-13	Provide protection to buildings/infrastructure in high hazard areas in the Township	1	1	1	1	1	1	0	0	0	1	1	1	0	0	9	Medium
Green Twp -14	Work with school to retrofit roof to meet current high wind standards on Green Hills School located on Mackerley Road as funding permits.	1	1	1	1	1	1	0	0	0	1	1	1	0	0	9	High
Green Twp – 15	Implement Firewise	1	1	1	1	1	1	0	0	0	1	0	1	1	0	9	Medium

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.9.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.9.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Green that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Green has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.9.9 Additional Comments

None at this time.



Figure 9.9-1. Township of Green Hazard Area Extent and Location Map 1

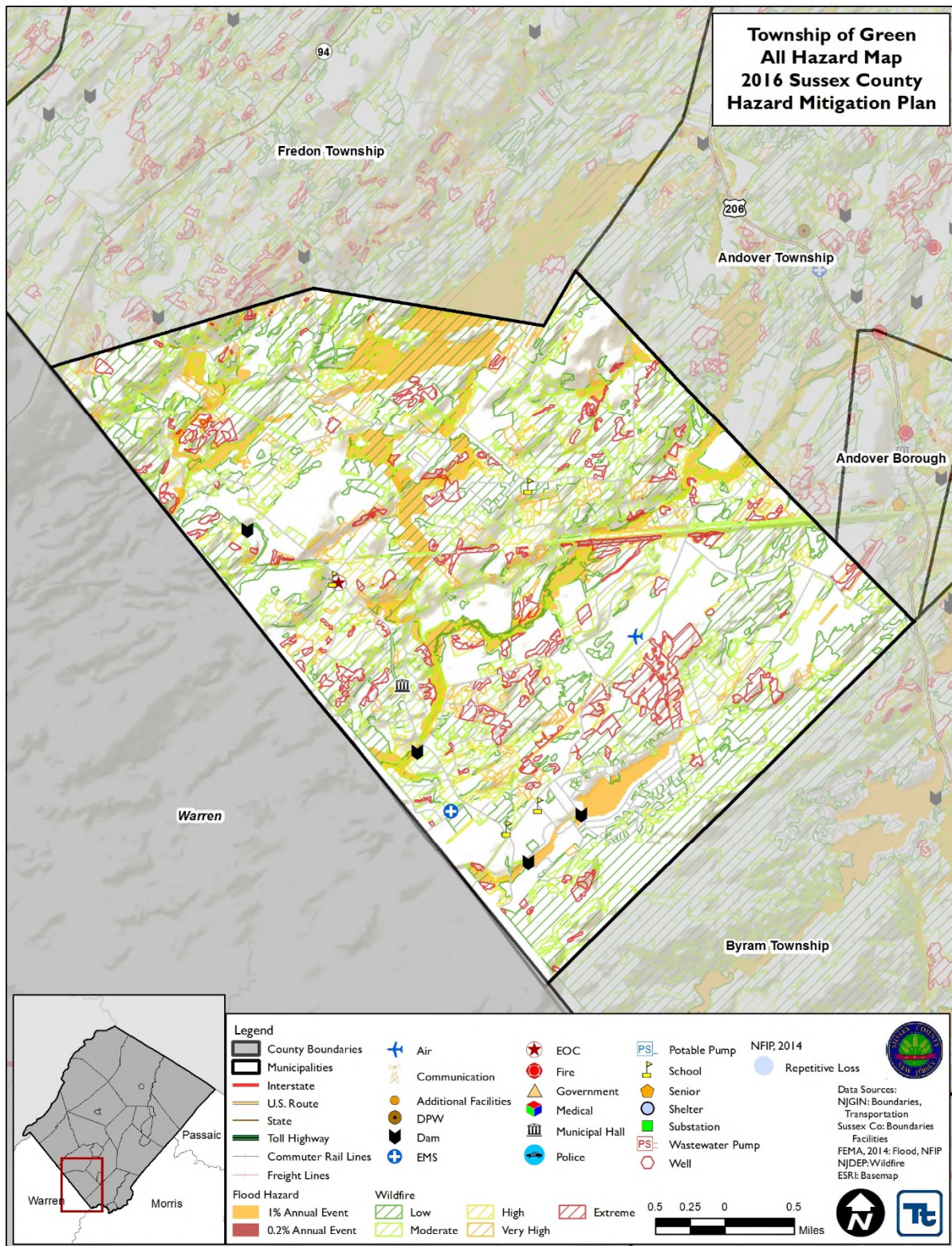
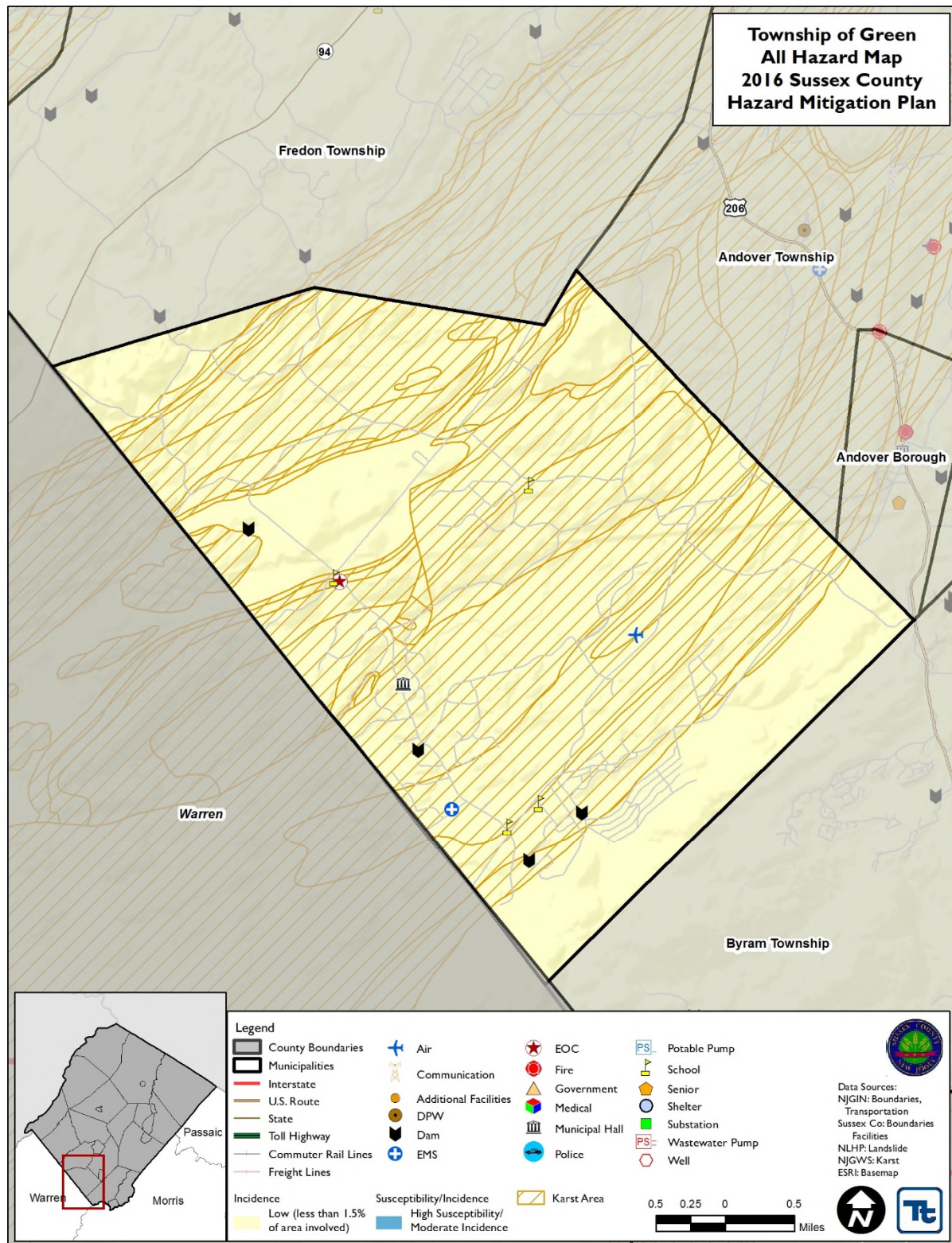




Figure 9.9-2. Township of Green Hazard Area Extent and Location Map 2





Action Number:

Green Twp-1

Mitigation Action/Initiative:

Add or replace permanent generators at critical facilities (municipal building, Road Dept., Fire Station, Squad Building)

Assessing the Risk	
Hazard(s) addressed:	Power loss from high winds/storm events
Specific problem being mitigated:	<p>DPW building does not have back-up power and needs to be operational during natural hazard event.</p> <p>Fire house has very old, malfunctioning back-up power and needs to be replaced so as to be operational during natural hazard event; building also serves as warming station/shelter.</p> <p>First Aide Squad building has very old, malfunctioning back-up power and needs to be replaced so as to be operational during natural hazard event; serves on 24/7 basis emergency personnel.</p> <p>Municipal building does not have back-up power and needs to be operational during natural hazard event; building also serves as warming station.</p>
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase a backup generator
	2. Do nothing
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase generators for critical facilities in Township to ensure continuity of operations during and post-hazard events.
Action/Project Category	SIP
Goals Met	1, 2, 6
Applies to existing and or new development, or not applicable	Existing building
Benefits (losses avoided)	High
Estimated Cost	High
Priority*	High
Plan for Implementation	
Responsible Organization	Administrator (Engineer), OEM Coordinator, Fire Chief, First Aid Squad Captain
Local Planning Mechanism	Capital Plan and Mitigation Plan
Potential Funding Sources	FEMA Mitigation Assistance
Timeline for Completion	Short (1 to 2 years) dependent upon funding
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Green Twp-1

Mitigation Action/Initiative:

Add or replace permanent generators at critical facilities (municipal building, Road Dept., Fire Station, Squad Building)

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	These buildings and their operations are critical during and after disasters – power is necessary to maintenance equipment and pump gas
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	1	Grant funding is being actively pursued for this project – match is already in budget.
Environmental	0	
Social	1	All facilities serve vulnerable populations and areas in the Township
Administrative	1	
Multi-Hazard	1	
Timeline	1	Project expected to be complete within 1 to 2 years
Agency Champion	1	
Other Community Objectives	1	Purchase of generator is also in the Capital Plan
Total	13	
Priority (High/Med/Low)	High	



Action Number:

Green Twp-2

Mitigation Action/Initiative:

Increased levels of emergency communication – inter/intra agency

Assessing the Risk	
Hazard(s) addressed:	Loss due to any and all hazard(s)
Specific problem being mitigated:	Inter and intra agency communications are currently hampered by the terrain and lack of adequate towers in the area
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install repeaters to existing towers in the area.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install repeaters on two existing towers in the area to increase levels of emergency communication.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 5, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority*	High
Plan for Implementation	
Responsible/Lead Agency/Department	Fire Chief – Squad Captain - Administrator – Engineer, SCDEM
Local Planning Mechanism	Mitigation Plan Capital Plan
Potential Funding Sources	FEMA Mitigation Assistance, local budget(s)
Timeline for Completion	Short, some funding in current budget
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Green Twp-2

Mitigation Action/Initiative: Increased levels of emergency communication – inter/intra agency

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Reliable communications both inter and intra agency are critical for the safety of the population
Property Protection	1	Reliable communications both inter and intra agency are critical for the protection of public and private property.
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	1	Local funding and some grant funding
Environmental	0	
Social	1	Communications serve the entire population
Administrative	1	
Multi-Hazard	1	
Timeline	1	1 – 2 years
Local Champion	1	
Other Community Objectives	1	Capital Plan
Total	13	
Priority (High/Med/Low)	High	



Action Number:

Green Twp-3

Mitigation Action/Initiative:

Portable generators for those in need

Assessing the Risk	
Hazard(s) addressed:	All hazards
Specific problem being mitigated:	Loss of power in municipality poses a threat to those residents that rely on equipment, such as oxygen.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase portable generators (12) to ensure those in need have the life support needed during and after an event.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase portable generators (12) to ensure those in need have the life support needed during and after an event.
Action/Project Category	SIP
Goals/Objectives Met	1, 2
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority*	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	First Aid Captain, Fire Chief, Administrator (Engineer)
Local Planning Mechanism	Hazard Mitigation, Emergency Management
Potential Funding Sources	HMGP with local budget for cost share
Timeline for Completion	Ongoing / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Green Twp-3

Mitigation Action/Initiative: Portable generators for those in need

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide a means of power for those that rely on healthcare equipment that requires electricity
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	1	
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	
Local Champion	1	
Other Community Objectives	0	
Total	12	
Priority (High/Med/Low)	Medium	



Action Number:

Green Twp-4

Mitigation Action/Initiative:

Stand pipes at draft sites

Assessing the Risk	
Hazard(s) addressed:	All hazards
Specific problem being mitigated:	Lack of stand pipes at draft stations for emergency equipment
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Add stand pipes at draft sites – 2 or more throughout Township
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Add stand pipes at draft sites – 2 or more throughout Township
Action/Project Category	SIP
Goals/Objectives Met	All
Applies to existing and/or new development; or not applicable	New and Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium
Priority*	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Administrator, OEM Coordinator
Local Planning Mechanism	Emergency Management, Hazard Mitigation
Potential Funding Sources	Grant funding with local budget for cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Green Twp-4

Mitigation Action/Initiative: Stand pipes at draft sites

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	0	Need to obtain grant funding
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	0	
Local Champion	0	
Other Community Objectives	0	
Total	7	
Priority (High/Med/Low)	Medium	



Action Number:

Green Twp-5

Mitigation Action/Initiative:

Purchase/replace portable water pumps

Assessing the Risk	
Hazard(s) addressed:	Flood
Specific problem being mitigated:	Basements of homes in the Township flood during periods of heavy rain and the residents do not have pumps to remove the water.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase/replace portable water pumps (12)
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase/replace portable water pumps (12) to ensure those who experience flooding in conjunction with loss of power are adequately protected from loss of structure and/or mold issues.
Action/Project Category	SIP
Goals/Objectives Met	2, 5
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority*	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Fire Chief, Administrator
Local Planning Mechanism	Emergency Management, Hazard Mitigation
Potential Funding Sources	HMGP with local budget for cost share
Timeline for Completion	Ongoing / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Green Twp-5

Mitigation Action/Initiative: Purchase/replace portable water pumps

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	Need to obtain grant funding
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	0	Flood
Timeline	1	
Local Champion	1	
Other Community Objectives	0	
Total	10	
Priority (High/Med/Low)	Medium	



Action Number:

Green Twp-7

Mitigation Action/Initiative:

Retrofit municipal building

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Severe Winter Weather, Hurricanes / Tropical Storms
Specific problem being mitigated:	The current windows and shutters of the municipal building are not impact resistant and the building is prone to damages during periods of high winds.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit impact resistant windows and shutters on municipal building located on Kennedy Road as funding permits
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit impact resistant windows and shutters on municipal building located on Kennedy Road as funding permits
Action/Project Category	SIP
Goals/Objectives Met	1, 2
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium
Priority*	High
Plan for Implementation	
Responsible/Lead Agency/Department	DPW
Local Planning Mechanism	Hazard Mitigation
Potential Funding Sources	Grant funding with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Green Twp-7

Mitigation Action/Initiative: Retrofit municipal building

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect those using the municipal building during high wind events
Property Protection	1	Protect the building from damages
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	Need to seek grant funding to cover costs
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	



Action Number:

Green Twp-8

Mitigation Action/Initiative:

Retrofit post office building

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Severe Winter Weather, Hurricanes / Tropical Storms
Specific problem being mitigated:	The current frame of the post office building is not mitigated from straight-line winds
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit an external frame to mitigate straight line winds to PO building located on Municipal Rd as funding permits
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit an external frame to mitigate straight line winds to PO building located on Municipal Rd as funding permits
Action/Project Category	SIP
Goals/Objectives Met	1, 2
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	High
Priority*	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township Administrator
Local Planning Mechanism	Hazard Mitigation
Potential Funding Sources	Grant funding with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Green Twp-8

Mitigation Action/Initiative: Retrofit post office building

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect those using the municipal building during high wind events
Property Protection	1	Protect the building from damages
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	Need to seek grant funding to cover costs
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	



Action Number:

Green Twp-9

Mitigation Action/Initiative:

Retrofit roof of Trinca Airport

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Severe Winter Weather, Hurricanes / Tropical Storms
Specific problem being mitigated:	Roof of the building at Trinca Airport does not meet current high wind standards and vulnerable to damages from wind events
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit roof on remaining building to meet current high wind standards located at Trinca Airport on Airport Road
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit roof on remaining building to meet current high wind standards located at Trinca Airport on Airport Road
Action/Project Category	SIP
Goals/Objectives Met	1, 2
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	High
Priority*	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township Administrator
Local Planning Mechanism	Hazard Mitigation
Potential Funding Sources	Grant funding with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Green Twp-9

Mitigation Action/Initiative: Retrofit roof of Trinca Airport

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect those using the municipal building during high wind events
Property Protection	1	Protect the building from damages
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	Need to seek grant funding to cover costs
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	



Action Number:

Green Twp-10

Mitigation Action/Initiative:

Stormwater runoff management system

Assessing the Risk	
Hazard(s) addressed:	Flood
Specific problem being mitigated:	Flooding of homes in the area of Lake Tranquility
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Implement a storm water runoff management system for 350 homes in Lake Tranquility area as funding and private cooperation permit
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Implement a storm water runoff management system for 350 homes in Lake Tranquility area as funding and private cooperation permit
Action/Project Category	SIP
Goals/Objectives Met	1, 2
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	High
Priority*	High
Plan for Implementation	
Responsible/Lead Agency/Department	DPW
Local Planning Mechanism	Hazard Mitigation, Stormwater
Potential Funding Sources	Grant funding with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Green Twp-10

Mitigation Action/Initiative: Stormwater runoff management system

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect homes from damage from flood events
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	0	
Fiscal	0	Need grant funding
Environmental	1	
Social	0	
Administrative	1	
Multi-Hazard	1	
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	

**Action Number:**

Green Twp-13

Mitigation Action/Initiative:

Provide protection to buildings/infrastructure in high hazard areas in the Township

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Buildings and infrastructure located in high hazard areas of the Township are vulnerable to all hazards
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Provide protection to buildings/infrastructure in high hazard areas in the Township
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Provide protection to buildings/infrastructure in high hazard areas in the Township
Action/Project Category	SIP
Goals/Objectives Met	All
Applies to existing and/or new development; or not applicable	New and Existing
Benefits (losses avoided)	High
Estimated Cost	Medium to High
Priority*	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Township Engineering and Planning
Local Planning Mechanism	Hazard Mitigation
Potential Funding Sources	Grant funding with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Green Twp-13

Mitigation Action/Initiative: Provide protection to buildings/infrastructure in high hazard areas in the Township

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect buildings from damage from hazard events
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	Need to seek grant funding
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	Medium	



Action Number:

Green Twp-14

Mitigation Action/Initiative:

Retrofit roof of Green Hills School Building

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Severe Winter Weather, Hurricanes / Tropical Storms
Specific problem being mitigated:	Roof of the school building does not meet current high wind standards and vulnerable to damages from wind events
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit roof on remaining building to meet current high wind standards
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit roof on Green Hills School located on Mackerley Road to meet current high wind standards
Action/Project Category	SIP
Goals/Objectives Met	1, 2
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	High
Priority*	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township Administrator, School Board
Local Planning Mechanism	Hazard Mitigation
Potential Funding Sources	Grant funding with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Green Twp-9

Mitigation Action/Initiative: Retrofit roof of Green Hills School building

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect those using the municipal building during high wind events
Property Protection	1	Protect the building from damages
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	Need to seek grant funding to cover costs
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	



9.10 Borough of Hamburg

This section presents the jurisdictional annex for the Borough of Hamburg.

9.10.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Keith Sukennikoff, OEM Coordinator 16 Wallkill Avenue, Hamburg, NJ 07419 Phone: (973) 670-0105 Email: Hamburg_oem2@hamburgnj.org	Michael Schneider, DPW/Road Supervisor 16 Wallkill Avenue, Hamburg, NJ 07419 Phone: (973) 600-5213 Email: Road_dept@hamburgnj.org

9.10.2 Municipal Profile

The Borough of Hamburg is located in northern Sussex County. It is bordered to the north, east and west by the Township of Hardyston and to the south by the Borough of Franklin. The Borough covers an area of approximately 1.2 square miles. According to the U.S. Census, the 2010 population for the Borough of Hamburg was 3,277. A tributary of the Wallkill River flows through the northern section of the Borough and along the Wallkill River forms the western border between the Borough and Township of Hardyston. Hamburg Creek is located in the southern end of the Borough. Hardistonville is an unincorporated area of the Borough.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the map in Section 9.10.8 of this annex which illustrates the hazard areas along with the location of potential new development.

Table 9.10-1. Growth and Development

Property or Development Name	Type (e.g. Res., Comm.)	# of Units/Structures	Location (address and/or Block & Lot)	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to present					
Fairways at Wallkill	Res.	68	G/B Castle Road Block 11 Lot 30 and Block 11.01 Lot 1	Flood: 1% Chance; Carbonate Hazard	On going
Known or Anticipated Development in the Next Five (5) Years					
None identified at this time.					

** Only location-specific hazard zones or vulnerabilities identified.*

9.10.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material



or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.10-2. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26-September 5, 2011	Hurricane Irene	DR-4021	Yes	Hurricane Irene caused fallen debris and power outages in the Borough. The Borough used generators to power the Borough Hall, Police Department, water system and sewer system. The Borough also used contractors to provide sewage pumping during the outage. Roads were closed in the Borough due to flooding and debris. A water main under Route 23 was undermined by flooding and caused the pipes to separate. Damages to the Borough were over \$161,000.
October 26-November 8, 2012	Hurricane Sandy	DR-4086	Yes	Hurricane Sandy caused debris to fall on property and roadways throughout the Borough. There was also widespread power outages. The Borough provided backup power to essential facilities, barricaded hazardous streets, and provided traffic control. Damages and costs to the Borough were over \$53,000.

9.10.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Borough of Hamburg. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Borough of Hamburg.

Table 9.10-1. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	Medium
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$399,167 2,500-Year GBS: \$6,271,068	Occasional	28	Medium
Flood	1% Annual Chance: \$1,549,875	Frequent	18	Medium
Geologic	RCV Exposed to Carbonate Rock Areas: \$625,285,229	Occasional	36	Medium*
Hurricane	100-year MRP: \$169,219	Frequent	48	High



Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
	500-year MRP: \$908,528 Annualized: \$8,445			
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$169,219 500-year MRP: \$908,528 Annualized: \$8,445	Frequent	48	High
Severe Winter Weather	1% GBS: \$4,787,774 5% GBS: \$23,938,870	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$32,280,095	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed for this hazard based on input from the municipality, population exposed, and/or event history.

GBS = General building stock; MRP = Mean return period.

a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.

b. High = Total hazard priority risk ranking score of 31 and above

Medium = Total hazard priority risk ranking of 15-30+

Low = Total hazard risk ranking below 15

c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Borough of Hamburg.

Table 9.10-4. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Borough of Hamburg	4	0	\$0	0	0	0

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance flood boundary.



Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.

9.10.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Borough of Hamburg.

Table 9.10-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	LUB	1997; re-examination report November 2006
Capital Improvements Plan	No			
Floodplain Management/Basin Plan	No			
Stormwater Management Plan	Yes – 4/20/05	Local	MC	Chapter 182
Open Space Plan	Yes – 6/24/03	Local	MC	Chapter 215
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	No			
Comprehensive Emergency Management Plan	No			
Emergency Response Plan	Yes – 2010	Local	OEM	
Post-Disaster Recovery Plan	No			
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State & Local		State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq)
Zoning Ordinance	Yes	Local	Zoning	Chapter 215



Table 9.10-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Subdivision Ordinance	Yes	Local	LUB	Chapter 186
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State and Local	Construction Official	Chapter 215-20
NFIP: Cumulative Substantial Damages	Yes	Local	Construction Official	Chapter 215-20
NFIP: Freeboard	Yes	State & Local	Construction Official	NJDEP
Growth Management Ordinances	No			
Site Plan Review Requirements	Yes	Local	LUB	Chapter 171
Stormwater Management Ordinance	Yes	Local	LUB	Chapter 182
Municipal Separate Storm Sewer System (MS4)	Yes	Local	DPW	Chapter 182
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	Yes	State	Division of Consumer Affairs	N.J.A.C. 13-:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	No			

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Borough of Hamburg.

Table 9.10-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Lane Use Board
Mitigation Planning Committee	No	
Environmental Board/Commission	No	
Open Space Board/Committee	Yes	Land Use Board, Recreation Commission
Economic Development Commission/Committee	No	
Maintenance Programs to Reduce Risk	No	
Mutual Aid Agreements	Yes	Mayor and Council
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Mayor and Council
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Mayor and Council
Planners or engineers with an understanding of natural hazards	Yes	Mayor and Council
NFIP Floodplain Administrator	Yes	Construction Official
Surveyor(s)	Yes	Mayor and Council



Table 9.10-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Personnel skilled or trained in GIS and/or Hazus-MH applications	Yes	Mayor and Council
Scientist familiar with natural hazards	Yes	Mayor and Council
Emergency Manager	Yes	Mayor and Council
Grant Writer(s)	No	
Staff with expertise or training in benefit/cost analysis	No	
Professionals trained in conducting damage assessments	No	

Fiscal Capability

The table below summarizes financial resources available to the Borough of Hamburg.

Table 9.10-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	Yes
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	Yes
Impact Fees for homebuyers or developers of new development/homes	Don't Know
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	Don't Know
Withhold public expenditures in hazard-prone areas	Don't Know
Other Federal or State Funding Programs	Yes
Open Space Acquisition Funding Programs	Yes
Other	Don't Know

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Borough of Hamburg.

Table 9.10-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		
Building Code Effectiveness Grading Schedule (BCEGS)	Yes		
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes		
Storm Ready	No		
Firewise	No		
Disaster/Safety Programs in/for Schools	No		

**Table 9.10-8. Education/Outreach and Community Classifications**

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	Yes		
Public-Private Partnerships	No		

N/A = Not applicable; NP = Not participating

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Borough of Hamburg's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.10-9. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability		X	
Administrative and Technical Capability		X	
Fiscal Capability	X – limited staff		
Community Political Capability	X – limited staff		
Community Resiliency Capability	X – limited staff		
Capability to Integrate Mitigation into Municipal Processes and Activities	X – limited staff		



National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

John Rushke, Borough Engineer

Flood Vulnerability Summary

The Borough does not maintain lists/inventories of properties damaged by flooding and there were no properties damaged during the most recent flooding events in the Borough. The FPA does make substantial damage estimates; however, none were declared for Irene, Lee or Sandy.

Resources

The FPA is the sole person assuming the responsibilities of floodplain administration in the Borough of Hamburg. The FPA provides permit review, inspections, damage assessments, record keeping, GIS and education and outreach as NFIP administration services to the Borough. The FPA feels adequately supported and trained to fulfill their responsibilities. The FPA would consider attending continuing education and/or certification training on floodplain management if offered.

Compliance History

The Borough is currently in good standing with the NFIP. The date of the most recent compliance audit is unknown.

Regulatory

The Borough's floodplain management regulations/ordinances meet the minimum requirement of FEMA and the State. There are other local ordinances, plans and programs in the Borough that support floodplain management. The Borough has not considered joining CRS.

Community Rating System

The Borough of Hamburg does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning:

The Borough has a Land Use Board which reviews all applications for development and consider natural hazard risk areas in their review.

Highlands:

Hamburg Borough is located in the New Jersey Highlands Region and is part of the Highlands Area. As such, the Borough is one of 88 municipalities protected by and subject to the provisions of the Highlands Water



Protection and Planning Act that protects, enhances and restores Highland's natural resources. The Highlands Act requires that future land use in the Highlands Region be guided by the Regional Master Plan's Land Use Capability Map (LUCM) Series which includes tools to identify and protect the natural, scenic and other resources of the region. In supporting and complying with the Highlands Act, the Borough enacted amendments and updates to local zoning and development ordinances that ensure the protection of important resources and areas. The Highland Act creates three primary zones: a Protection Zone, a Conservation Zone and an Existing community Zone. Protection Zones are areas with the highest quality resources with extreme limitations on allowable development while Conservation Zones have significant agricultural lands and associated woodlands and environmental features with allowable development consisting primarily of agricultural uses. Existing Community Zones consist of areas of concentrated development with limited environmental constraints. These zones are overlaid with existing local zoning maps to identify and address issues of public interest including watershed management, open space preservation, historic preservation, flood protection among others.

The Borough identified a new mitigation initiative to utilize the HMP when updating the Comprehensive Master Plan. Refer to Table 9.10-11 for further details.

Regulatory and Enforcement (Ordinances)

The Borough has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement and an Environmentally Sensitive Areas section included in the Land Use Chapter. The Borough also has a chapter specific to the hazards associated with environmentally sensitive areas.

Chapter 215-20: Floodplains or Flood Hazards <http://www.unicode360.com/10217544>

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 181: Stormwater Management <http://www.unicode360.com/10216322>

The purpose of the Stormwater Control chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare the citizens.

Chapter 171-8: Environmental Impact Statement

<http://www.unicode360.com/10216103?highlight=environmentally,environmental#10216103>

The purpose of this section of the Chapter is to allow the Borough to assess the impact of a proposed development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding and waste disposal.



Highlands: In addition, the Highlands Water Protection and Planning Act provides additional regulatory control over development within the Borough. While Major Highlands Development projects, as defined by the Highlands Act, still require local approvals, they must first receive a Highlands Resource Applicability Determination and be evaluated for consistency with the provisions of the Highlands Act. Major Highlands Development projects include a variety of projects such as any non-residential development, any residential development that disturbs one or more acres of land, any development that disturbs ¼ acres of more of forest among others. This process identifies any potential Highlands Resources on the site and if found requires adherence to relevant development standards and restrictions.

Operational and Administration

The Borough has established a Joint Land Use Board that is responsible for the review of development applications. The Borough has a Zoning officer as well as a planning and zoning board secretary.

Funding

Operating Budget: The Borough's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Borough has received funding from the NJDOT, Sustainable Jersey, The Garden State Preservation Trust Fund, and Clean Communities grant programs for the completion of mitigation and emergency response related projects including roadway and drainage improvements.

Education and Outreach

The Borough's website's home page posts information regarding upcoming community events and important municipal decisions. Additionally, the Borough has a public outreach program that informs its citizens on hazards that may occur in the community.

9.10.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.10-10. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2016 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Hamburg Borough 1	Backup generator for shelter at Hamburg Elementary School located on Linwood Avenue.	OEM Coordinator	No Progress	This project is 0% completed because funding has not been secured.	Include in 2016 HMP	The Hamburg School is utilized as a shelter; therefore, it requires a backup generator. This project will be carried over into the 2016 HMP.
Hamburg Borough 2	Retrofit roof to meet current snow load standards on Hamburg Elementary School located on Linwood Avenue.	School Administrator	In Progress	This project is 50% completed; however, funding has not been secured to complete.	Include in 2016 HMP	The Borough is planning on trying to secure funding to complete this project in the next budget. This project will be carried over into the 2016 HMP.
Hamburg Borough 3	Flood proofing of the Hamburg Fire Company building.	Municipal Fire Chief	No Progress	0% complete	Discontinue	The building identified in this action has not shown sufficient flooding to warrant flood proofing; therefore, this action will be removed from this plan update.
Hamburg Borough 4	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	No Progress	0% complete	Include in 2016 HMP	The Borough will try to obtain funding to facilitate programs. This action will be carried over into the 2016 HMP.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Borough has not identified any additional mitigation projects/activities that have been completed since approval of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Borough participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013). In May 2015, the Borough participated in a second workshop led by FEMA Region 2 and NJOEM and was provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.10-11 summarizes the comprehensive-range of specific mitigation initiatives the Borough would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.10-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.10-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Hamburg-1	Backup generator for shelter at Hamburg Elementary School located on Linwood Avenue.	Existing	All	1, 2, 6	OEM Coordinator	High	High	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Hamburg-2	Retrofit roof to meet current snow load standards on Hamburg Elementary School located on Linwood Avenue.	Existing	Severe Winter Weather	1, 2	School Administrator, Municipal Engineer	High	High	FEMA Mitigation Assistance	Short Term / DOF	High	SIP	PP
Hamburg-3	Develop, implement, and facilitate a multi-hazard public awareness program. Provide information on all types of hazards, preparedness and mitigation measures via the Borough website and social media.	N/A	All	All	OEM Coordinator, in coordination with SCDEM	High	Low	Municipal Budget	Ongoing	High	EAP	PI
Hamburg-4	Multi-purpose emergency vehicle to support highways	N/A	All	1, 2, 3, 6	Borough OEM	High	Medium	FEMA Mitigation Assistance	Short Term / DOF	High	SIP, NSP	PP, NR
Hamburg-5	Purchase Bobcat Skid-Steer to use during debris cleanup operations and post-hazard events.	N/A	All	2, 6	Borough DPW	High	Medium	FEMA Mitigation Assistance	Short Term / DOF	High	SIP, NSP	PP, NR
Hamburg-6	Create and maintain a plan for adequate road and debris clearing capabilities within the Borough.	N/A	All	All	Borough DPW	High	Low	Municipal Budget	Ongoing	Medium	LPR, NSP	PR, NR
Hamburg-7	To ensure continuity of operations, purchase portable generator for critical facilities	New and Existing	All	1, 2, 6	Municipal Engineer, OEM Coordinator	High	Medium	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Hamburg-8	Utilize the Hazard Mitigation Plan (HMP) when updating the Comprehensive Master Plan; consider including hazard identification, hazard zones risk assessment information, and hazard mitigation goals as identified in the HMP. Further, the findings and recommendation	Both	All	All	Planning	High	Low	Municipal Budget	Ongoing	High	LPR	PR



Table 9.10-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
	of the HMP will be considered during any future site plan review processes.											
Hamburg-9	During the Borough's rezoning procedures or update of the zoning ordinance, the Borough will recognize hazard areas as limits on changes to zoning within the municipality.	N/A	All	All	Borough Administration	High	Low	Municipal Budget	Ongoing	High	LPR	PR
Hamburg-10	Prepare and enforce a fire plan for the Borough and recognize the existence of wildfire hazards and identify risk areas based on a vulnerability assessment.	New and Existing	Wildfire	All	OEM Coordinator	High	Low	Municipal Budget	Ongoing	High	LPR, EAP	PR, PI
Hamburg-11	The Borough will work with local school districts and assist with community service projects regarding hazards and mitigation.	N/A	All	All	OEM Coordinator	High	Low	Municipal Budget	Ongoing	High	EAP	PI
Hamburg-12	Catch basin and general stormwater facility maintenance	Existing	Flood, Severe Weather, Severe Winter Weather	2, 4	Borough DPW and Engineer	Loss of Function	Medium	Municipal Budget	Short Term & Ongoing	High	SIP	PP
Hamburg-13	Perform study to analyze where sanitary sewer reinforcement is needed and address where necessary.	New and Existing	Severe Weather, Severe Winter Weather, Earthquake	2	Borough Engineer	Loss of function, road closings / detours	Medium	HMGP with local cost share; municipal budget	Short Term	Medium	SIP	PP
Hamburg-14	Tree removal and maintenance in the Borough	Existing	Severe Weather, Severe Winter Weather	2, 4	Borough DPW	Loss of function, road closings / detours	Medium	Municipal Budget	Short Term & Ongoing	High	SIP	PP

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.



Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
HMA	Hazard Mitigation Assistance Program

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.



- *Structural Flood Control Projects (SP)-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.*
- *Emergency Services (ES)-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities*

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Table 9.10-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action / Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Hamburg-1	Backup generator for shelter at Hamburg Elementary School located on Linwood Avenue.	1	1	1	1	1	1	0	0	1	1	1	1	1	0	11	High
Hamburg-2	Retrofit roof to meet current snow load standards on Hamburg Elementary School located on Linwood Avenue.	1	1	1	1	1	1	0	0	1	1	1	1	1	0	11	High
Hamburg-3	Develop, implement, and facilitate a multi-hazard public awareness program. Provide information on all types of hazards, preparedness and mitigation measures via the Borough website and social media.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Hamburg-4	Multi-purpose emergency vehicle to support highways	1	1	1	1	1	1	0	0	1	1	1	1	1	0	11	High
Hamburg-5	Purchase Bobcat Skid-Steer to use during debris cleanup operations and post-hazard events.	1	1	1	1	1	1	0	0	1	1	1	1	1	0	11	High
Hamburg-6	Create and maintain a plan for adequate road and debris clearing capabilities within the Borough.	1	1	1	1	1	1	0	0	1	1	1	1	1	0	11	Medium
Hamburg-7	Portable generator for critical facilities	1	1	1	1	1	1	0	1	1	1	1	1	1	0	12	High
Hamburg-8	Utilize the Hazard Mitigation Plan (HMP) when updating the Comprehensive Master Plan; consider including hazard identification, hazard zones risk assessment information, and hazard mitigation goals as identified in the HMP. Further, the findings and recommendation of the HMP will be considered during any future site plan review processes.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Hamburg-9	During the Borough's rezoning procedures or update of the zoning ordinance, the Borough will recognize hazard areas as limits on changes to zoning within the municipality.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Hamburg-10	Prepare and enforce a fire plan for the Borough and recognize the existence of wildfire hazards and identify risk areas based on a vulnerability assessment.	1	1	1	1	1	1	1	0	1	1	0	1	0	0	10	High
Hamburg-11	The Borough will work with local school districts and assist with community service projects regarding hazards and mitigation.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Hamburg-12	Catch basin and general stormwater facility maintenance	0	1	1	1	1	1	1	1	0	1	1	1	1	1	12	High
Hamburg-13	Perform study to analyze where sanitary sewer reinforcement is needed and address where necessary.	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	Medium
Hamburg-14	Tree removal and maintenance in the Borough	0	1	1	1	1	1	1	-1	0	1	1	1	1	1	10	High

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.10.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.10.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Borough of Hamburg that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Borough of Hamburg has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.10.9 Additional Comments

None at this time.

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Figure 9.10-1. Borough of Hamburg Hazard Area Extent and Location Map 1

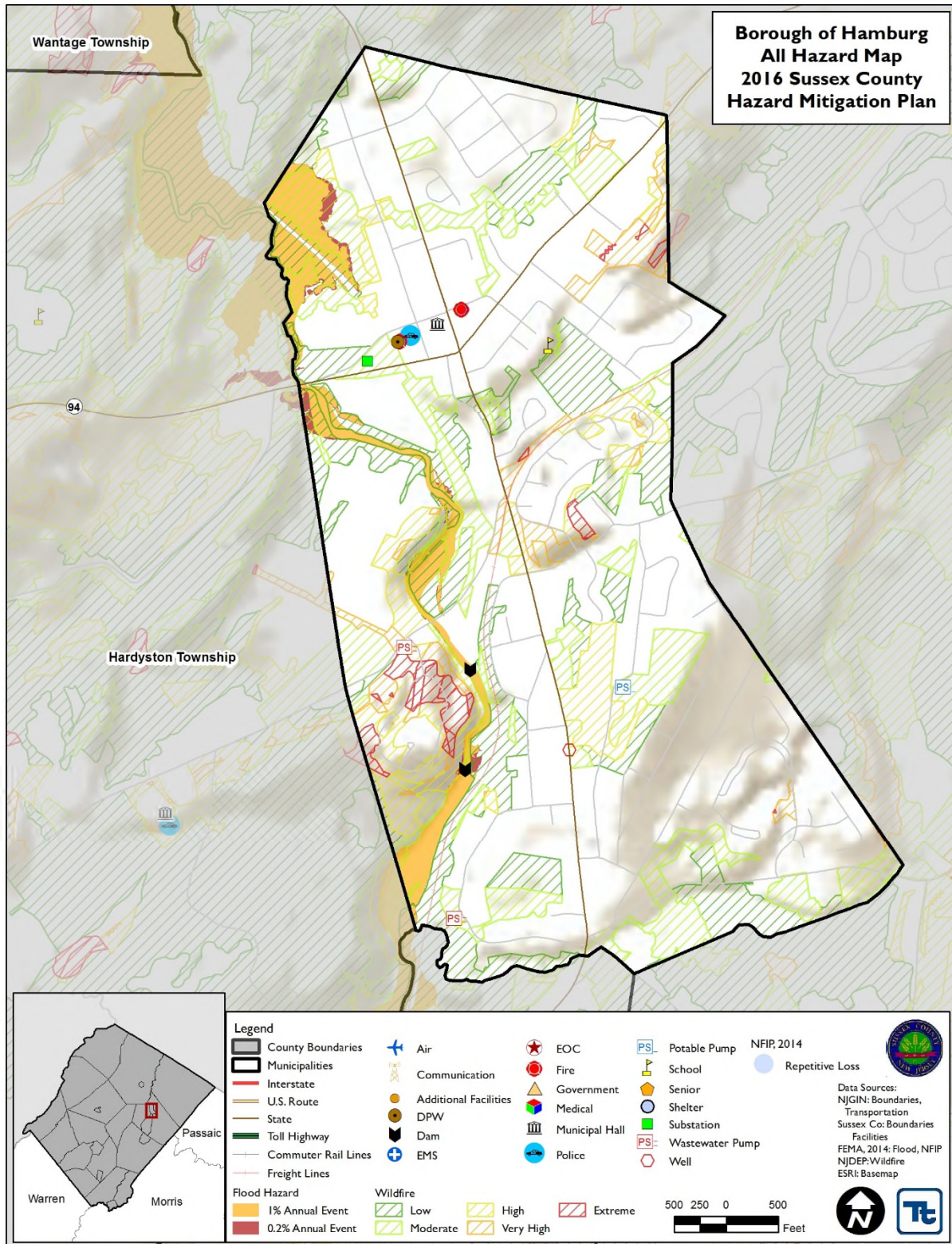
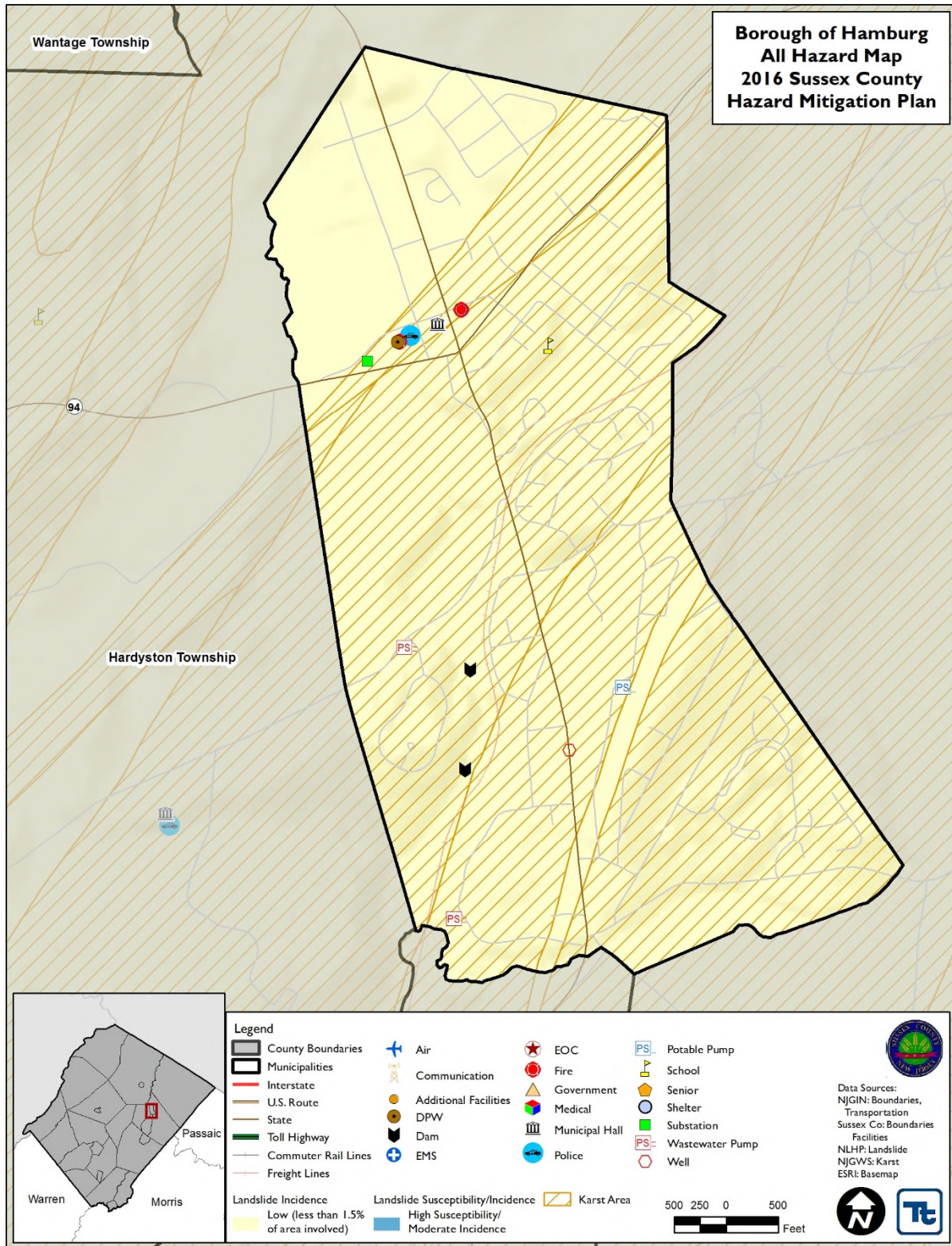




Figure 9.10-2. Borough of Hamburg Hazard Area Extent and Location Map 2





Action Number:

Hamburg-1

Mitigation Action/Initiative:

Obtain back up power to ensure continuity of operations

Assessing the Risk	
Hazard(s) addressed:	Power loss from high winds/storm events
Specific problem being mitigated:	Hamburg School does not have backup power and needs to be in operation during a natural hazard event; building serves as a shelter.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase a backup generator
	2. Co-Gen facility or build a new shelter
	3. Do nothing
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase a generator for the School to ensure continuity of operations during and post-hazard events.
Action/Project Category	SIP
Goals Met	1, 2, 6
Applies to existing and or new development, or not applicable	Existing building
Benefits (losses avoided)	High
Estimated Cost	High (estimated \$750,000.)
Priority	High
Plan for Implementation	
Responsible Organization	Municipal Engineer
Local Planning Mechanism	Capital Plan and Mitigation Plan
Potential Funding Sources	FEMA Mitigation Assistance
Timeline for Completion	Short (5 years but depends on funding) DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project: DOF



Action Number:

Hamburg-1

Mitigation Action/Initiative:

Purchase generator to ensure continuity of operations

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	School serves as a shelter
Property Protection	1	Protects pipes from freezing
Cost-Effectiveness	1	Prevents structural damage
Technical	1	Engineering
Political	1	Mayor and Council
Legal	1	
Fiscal	0	Grant funding is necessary
Environmental	0	
Social	1	School services vulnerable populations
Administrative	1	
Multi-Hazard	1	Yes it is a shelter
Timeline	1	Can implement in 5 years but depends of funding availability
Agency Champion	1	
Other Community Objectives		
Total	11	
Priority (High/Med/Low)	High	



Action Number:

Hamburg-2

Mitigation Action/Initiative:

Retrofit Hamburg School Roof

Assessing the Risk	
Hazard(s) addressed:	Roof Damage incurred by severe winter weather
Specific problem being mitigated:	Hamburg School Roof is only 50% replaced
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Complete the replacement
	2. Repair partial roof
	3. Do nothing
Action/Project Intended for Implementation	
Description of Selected Action/Project	Replace the roof to ensure safety
Action/Project Category	SIP
Goals Met	1, 2
Applies to existing and or new development, or not applicable	Existing Building
Benefits (losses avoided)	High – only school system
Estimated Cost	High – (estimated cost 150,000.)
Priority	High
Plan for Implementation	
Responsible Organization	Municipal Engineer
Local Planning Mechanism	Mitigation Plan
Potential Funding Sources	FEMA Mitigation Assistance
Timeline for Completion	Short (5 years depending on funding)
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project: DOF



Action Number:

Hamburg-2

Mitigation Action/Initiative:

Retrofit Hamburg School Roof

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	School serves as a shelter
Property Protection	1	Protects the school
Cost-Effectiveness	1	Prevents structural damage
Technical	1	Engineering
Political	1	Mayor and Council
Legal	1	
Fiscal	0	Grant funding necessary
Environmental	0	
Social	1	School services valuable populations
Administrative	1	
Multi-Hazard	1	Shelter
Timeline	1	Can implement in 5 years depending on funding
Agency Champion	1	
Other Community Objectives		
Total	11	
Priority (High/Med/Low)	High	



Action Number: Hamburg-4
Mitigation Action/Initiative: Multi-purpose emergency vehicle

Assessing the Risk	
Hazard(s) addressed:	Highway Hazard
Specific problem being mitigated:	Safety on two major highways running through borough
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase Vehicle
	2. Purchase Highway safety equipment
	3. Do nothing
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase vehicle to ensure safety is maintained on the highway during and post hazard events
Action/Project Category	SIP
Goals Met	1, 2, 3, 6
Applies to existing and or new development, or not applicable	Existing Highways and streets
Benefits (losses avoided)	High
Estimated Cost	Medium (estimated \$50,000.00)
Priority	High
Plan for Implementation	
Responsible Organization	Mayor and Council
Local Planning Mechanism	Mitigation Plan
Potential Funding Sources	FEMA Mitigation Assistance
Timeline for Completion	Short (5 years depending on funding)
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project: DOF



Action Number:

Hamburg-4

Mitigation Action/Initiative:

Multipurpose emergency vehicle

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Serves as continuing flow of traffic through municipality
Property Protection	1	Protects from major motor vehicle accidents occurring
Cost-Effectiveness	1	Prevents major motor vehicle accidents from occurring
Technical	1	Engineering
Political	1	Mayor and Council
Legal	1	
Fiscal	0	Grant funding is necessary
Environmental	0	
Social	1	Valuable of keeping the highway open
Administrative	1	
Multi-Hazard	1	Used as a emergency service unit for OEM, police and fire
Timeline	1	5 years depending on funding
Agency Champion	1	
Other Community Objectives		
Total	11	
Priority (High/Med/Low)	High	



Action Number: Hamburg-5
Mitigation Action/Initiative: Purchase Bobcat Skid Steer

Assessing the Risk	
Hazard(s) addressed:	Damage incurred from storm
Specific problem being mitigated:	Small Space Areas
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase Equipment
	2. Do nothing
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase unit for town to ensure debris cleanup operations during and post hazard events
Action/Project Category	SIP, NSP
Goals Met	2, 6
Applies to existing and or new development, or not applicable	Existing infrastructure
Benefits (losses avoided)	High
Estimated Cost	Medium (estimated \$ 40,000.00)
Priority	High
Plan for Implementation	
Responsible Organization	Municipal Engineer
Local Planning Mechanism	Mitigation Plan
Potential Funding Sources	FEMA Mitigation Assistance
Timeline for Completion	Short (5 years but depends on funding)
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project: DOF



Action Number:

Hamburg-5

Mitigation Action/Initiative:

Purchase Bobcat Skid Steer

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Serves as continuous operations in municipality
Property Protection	1	
Cost-Effectiveness	1	Prevents structural damage
Technical	1	Engineer
Political	1	Mayor and Council
Legal	1	
Fiscal	0	Need Grant Funding
Environmental	0	
Social	1	Valuable in confined areas within the municipality
Administrative	1	
Multi-Hazard	1	Easier to use in confined areas within the municipality
Timeline	1	Short (5 years depending on funding)
Agency Champion	11	
Other Community Objectives		
Total	1	
Priority (High/Med/Low)	High	

**Action Number:**

Hamburg-12

Mitigation Action/Initiative:

Catch basin and general stormwater facility maintenance

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather, Severe Winter Weather
Specific problem being mitigated:	Stormwater structures malfunctioning during large storm events due to improper maintenance or no maintenance
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Catch basin and general stormwater facility maintenance
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Debris removal and maintenance in and around catch basins and other stormwater facilities especially before and after large storm events. This will allow them to function properly. A lack of maintenance may clog the systems and propagate local flooding.
Action/Project Category	SIP
Goals Met	2, 4
Applies to existing and or new development, or not applicable	Existing
Benefits (losses avoided)	Loss of function
Estimated Cost	\$15,000 (Medium)
Priority	High
Plan for Implementation	
Responsible Organization	Borough DPW, Borough Engineer
Local Planning Mechanism	Emergency Management Planning
Potential Funding Sources	Hamburg Borough
Timeline for Completion	Short Term (1-year) and continuing in the future
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Hamburg-12

Mitigation Action/Initiative:

Catch basin and general stormwater facility maintenance

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	0	No loss of life threat currently exists
Property Protection	1	Protection of existing stormwater structures from damage, protection from local flooding damage
Cost-Effectiveness	1	Cost of maintenance is minimal in comparison to the potential damages
Technical	1	Maintenance is feasible and undertaken by most municipalities
Political	1	Political and overall public support for the project implementation
Legal	1	Legally feasible
Fiscal	1	Can be carried out by Hamburg staff and volunteers
Environmental	1	No permitting required for maintenance
Social	0	Project will have positive impacts on populations throughout Hamburg
Administrative	1	Hamburg has the capabilities to implement and maintain the project
Multi-Hazard	1	Flood, Severe Weather, Severe Winter Weather
Timeline	1	Project goals I one year and continuously before and after large storm events
Agency Champion	1	Advocated for by the governing body
Other Community Objectives	1	Address local maintenance issues
Total	12	
Priority (High/Med/Low)	High	



Action Number: Hamburg-13
Mitigation Action/Initiative: Sanitary Sewer Reinforcement

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Severe Winter Weather, Earthquake
Specific problem being mitigated:	Reduce the impact of hazards to the municipal sewer system
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Sanitary Sewer Reinforcement
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Perform a study to analyze where sanitary sewer reinforcement is needed due to the most imminent threats of failure or cracking during extreme weather conditions; address where practical
Action/Project Category	SIP
Goals Met	2
Applies to existing and or new development, or not applicable	New and Existing
Benefits (losses avoided)	Loss of function, road closings/detours
Estimated Cost	\$50,000 (Medium)
Priority	Medium
Plan for Implementation	
Responsible Organization	Borough Engineer
Local Planning Mechanism	Floodplain Management
Potential Funding Sources	HMGP with local cost share; Borough
Timeline for Completion	Short Term, 1-3 years
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Hamburg-13

Mitigation Action/Initiative:

Sanitary Sewer Reinforcement

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	0	No loss of life threat currently exists
Property Protection	1	Will minimize damage to existing sanitary infrastructure
Cost-Effectiveness	1	The cost of the study is small in comparison to the potential damages and costs associated with such
Technical	1	Feasible
Political	1	Political and overall public support for the project implementation
Legal	1	Legally feasible
Fiscal	-1	New authorization or funding from another source is needed
Environmental	1	May require standard land use permits from NJDEP for certain areas, but generally no permits required
Social	1	Project will have positive impacts on populations throughout Hamburg
Administrative	1	Hamburg has the capabilities to implement and maintain the project
Multi-Hazard	1	Severe Weather, Severe Winter Weather, Earthquake
Timeline	1	Goal for study is one to three years; additional time depending on maintenance required
Agency Champion	1	Advocated for by the governing body
Other Community Objectives	1	Addresses capital improvements
Total	11	
Priority (High/Med/Low)	Medium	



Action Number: Hamburg-14
Mitigation Action/Initiative: Tree removal and maintenance

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Severe Winter Weather, Hurricanes
Specific problem being mitigated:	Trees that down power lines during storm events
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Tree removal and maintenance
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Tree removal and maintenance in the vicinity of power lines in order to minimize power outages from downed trees/tree limbs during severe storm and severe winter storm events.
Action/Project Category	SIP
Goals Met	2, 4
Applies to existing and or new development, or not applicable	Existing
Benefits (losses avoided)	Loss of function, road closures/detours
Estimated Cost	\$30,000 (medium)
Priority	High
Plan for Implementation	
Responsible Organization	Borough DPW
Local Planning Mechanism	Emergency Management Planning
Potential Funding Sources	Hamburg Borough
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project: DOF



Action Number: Hamburg-14
Mitigation Action/Initiative: Tree removal and maintenance

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	0	No loss of life threat currently exists
Property Protection	1	Protection of existing power lines
Cost-Effectiveness	1	Cost of tree removal is minimal in comparison to the potential losses in power outages from both the point of view of repairing the lines and from the homeowners losses
Technical	1	Tree removal is very feasible
Political	1	Political and overall public support for the project implementation
Legal	1	Legally feasible
Fiscal	1	New authorization or funding from another source is needed
Environmental	-1	Removal of trees
Social	0	May get backlash due to the removal of healthy trees
Administrative	1	Hamburg has the capabilities to implement and maintain the project
Multi-Hazard	1	Severe Weather, Severe Winter Weather, Hurricanes
Timeline	1	Immediately and continuously
Agency Champion	1	Advocated for by the governing body
Other Community Objectives	1	Addresses capital improvements
Total	10	
Priority (High/Med/Low)	High	



9.11 Township of Hampton

This section presents the jurisdictional annex for the Township of Hampton.

9.11.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Eileen Klose, Township Administrator 1 Rumsey Way, Newton, NJ 07860 Phone: (973) 383-5570 Email: administrator@hamptontwp-nj.org	Edward Hayes, OEM Coordinator 1 Rumsey Way, Newton, NJ 07860 Phone: (973) 592-2767 Email: bged5679@yahoo.com

9.11.2 Municipal Profile

The Township of Hampton is located in northwestern Sussex County. It has a total area of approximately 25.3 square miles. The Township is bordered to the north by Frankford Township, to the south by Fredon Township and the Town of Newton, to the east by the Townships of Lafayette and Andover, and to the west by the Township of Stillwater. According to the U.S. Census, the 2010 population for the Township of Hampton was 5,196. The following unincorporated communities are located within the Township: Crandon Lakes, Myrtle Grove, Balesville, Halsey, and Washingtonville. Numerous ponds and lakes are found throughout the Township. The Paulins Kill flows through the center of the Township. Other streams found in Hampton Township include Troys Brook, Clearview Creek, Swartswood Creek, and smaller tributaries of Paulins Kill.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the map in Section 9.11.8 of this annex which illustrates the hazard areas along with the location of potential new development.

Table 9.11-1. Growth and Development

Property or Development Name	Type (e.g. Res., Comm.)	# of Units / Structures	Location (address and/or Block & Lot)	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to present					
McGuire Chevrolet	Comm.	1	63 Hampton House Road	None at this time	Complete
Known or Anticipated Development in the Next Five (5) Years					
Lowe's – Block 3501, Lot 37	Comm.	1 or 2	39 Hampton House Road Lot/Lots in Front of Current Lowe's Store, Block 3501, Lot 37	None at this time	Vacant
Hampton House Realty 3501, Lots 32,34, 35	Comm.	At Least 1	32-35 Hampton House Road	None at this time	DEP Clean-up Almost Complete
Ephemeral Realty	Comm.	1	98 Hampton House Road 3602/5.03	None at this time	Vacant. Approval granted for Commercial Bldg. Unknown
Stone Rows at Halsey Station	Residential	20	Block 2602/ Lots 2.03, 2.04, 2.06, 2.07, 2.08, 2.09, 2.10, 2.13, 2.14, 2.16, 2.17	Carbonate Hazard	Lots Available for Sale

* Only location-specific hazard zones or vulnerabilities identified.



9.11.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.11-2. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
February 12-13, 2008	Winter Storm	N/A	N/A	DPW plowed, sanded, and removed debris. 23 hours, time and a half. Six hours double time. Township granted roadside pick-up. All soft trees, i.e., pines and cedar trees were affected. It took one month to clean up this storms damage.
March 5, 2008	Strong Wind	N/A	N/A	DPW cut and removed debris from road. Four hours overtime
October 28, 2008	Heavy Snow and Strong Winds	N/A	N/A	DPW plowed, sanded, and cleared debris. Three hours overtime, 14 hours double time
February 1-2, 2011	Winter Storm	N/A	N/A	DPW plowed and sanded. day 1 – seven hours overtime; day 2 – 16 hours double time
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	Localized flooding and road closures three to four days. DPW closed roads, removed debris, FD pump outs – volunteer hours 353.5; 6 hours' time and a half, 16 hours double time; open shelter for 1½ days, McKeown School 9 AM Saturday. Estimated Outages in township 843. Loss of Services: road closures; Clearview Lake Dam breached. Flooding on Haggerty Road, Parsons Road, Ike Williams Road. Flooding on Old Stage Coach Road. Infrastructure damage: Ike Williams Road, Mary Jones Road, Haggerty Road, and Old Stage Coach Road. Debris clean up-\$19, 653.23.
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	Power Outages, no eligible damage. Withdrew from Public Assistance
October 29, 2011	Severe Storm	DR-4048	Yes	DPW kept roads open for emergency vehicles. Nine hours overtime; 11 hours double time. Power outages; DPW cleared debris.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	DPW/FD marked downed wires and removed debris overtime. 16 hours' time and a half; 11 hours double time. County Shelter Open. Emergency Operation was open for fourteen (14) days at the Hampton Volunteer Fire House for the purpose of charging communication equipment, warming, and water distribution. Loss of services: Thirty percent of township roads were closed due to lines down for two days. Quick Chek on Route 206 was closed by Emergency Management and Fire Dept and Building Inspector due to possible transmission lines falling on gas station. Power outages for 16 days. Two Residents with trees on their homes.



9.11.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Hampton. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Hampton.

Table 9.11-3. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	Medium
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$634,723 2,500-Year GBS: \$9,774,688	Occasional	28	Medium
Flood	1% Annual Chance: \$3,007,136	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$620,791,042	Occasional	30	Medium
Hurricane	100-year MRP: \$167,978 500-year MRP: \$2,248,401 Annualized: \$13,957	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$167,978 500-year MRP: \$2,248,401 Annualized: \$13,957	Frequent	48	High
Severe Winter Weather	1% GBS: \$8,981,278 5% GBS: \$44,906,389	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$49,421,978	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

GBS = General building stock; MRP = Mean return period.

- The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
- Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.



National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Hampton.

Table 9.11-4. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Hampton	13	1	\$1,023	0	0	3

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance flood boundary.

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.

9.11.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Community Rating System
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms



Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Hampton.

Table 9.11-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Planning Bd.	Township of Hampton Master Plan, 2002
Capital Improvements Plan	Yes	Local	Finance Dept	Township Budget
Floodplain Management/Basin Plan	Yes	Local/State	Twp. Engineer	NEED INFO – NAME AND DATE OF PLAN
Stormwater Management Plan	Yes	Local/State	Local/State	NEED INFO – NAME AND DATE OF PLAN
Open Space Plan	Yes	Local	Planning Bd.	Chapter 17 of Hampton Twp. Code NEED INFO – NAME AND DATE OF PLAN
Stream Corridor Management Plan	Yes	Local/State	Planning Bd.	Chapters 58-5; 109-6 & 11; Chapter 15 NEED INFO – NAME AND DATE OF PLAN
Watershed Management or Protection Plan	Yes	Local/State	Planning Bd.	Chapter 109-9,11&13 NEED INFO – NAME AND DATE OF PLAN
Economic Development Plan	No			
Comprehensive Emergency Management Plan	Yes	Local/County	County	NEED INFO – NAME AND DATE OF PLAN
Emergency Response Plan	Yes	Local/County	Local/County	NEED INFO – NAME AND DATE OF PLAN
Post-Disaster Recovery Plan	No			
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State/Local	Building	State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Planning Bd.	Chapter 108 of Hampton Twp. Code
Subdivision Ordinance	Yes	Local	Planning Bd.	Chapter 85 of Hampton Township Code
NFIP Flood Damage Prevention Ordinance	Yes	Federal/State/Local	Township Engineer	Chapter 62
NFIP: Cumulative Substantial Damages	No			



Table 9.11-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
NFIP: Freeboard	Yes	State, Local	Township Engineer	N.J.A.C 7:13 – Flood Hazard Area Control Act
Growth Management Ordinances	Yes	Local	Planning Bd.	Chapter 108-53 of Hampton Twp. Code
Site Plan Review Requirements	Yes	Local	Planning Bd.	Chapter 85 of Hampton Twp. Code
Stormwater Management Ordinance	Yes	Local/State	Planning Bd.	Chapter 109
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes	Local	Township	Chapter 48 – Carbonate Area Development Chapter 87 – Soil Removal Chapter 95 – Trees

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Hampton.

Table 9.11-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Planning Bd./Governing Body
Mitigation Planning Committee	Yes	Emergency Management Coordinator
Environmental Board/Commission	No	N/A
Open Space Board/Committee	Yes	Open Space Committee
Economic Development Commission/Committee	No	N/A
Maintenance Programs to Reduce Risk	Yes	Risk Management Consultant/Statewide Insurance
Mutual Aid Agreements	Yes	Local/County
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Township Engineer Harold E. Pellow
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Township Engineer Harold E. Pellow
Planners or engineers with an understanding of natural hazards	Yes	Township Engineer Harold E. Pellow
NFIP Floodplain Administrator	Yes	Township Engineer Harold E. Pellow
Surveyor(s)	Yes	Township Engineer Harold E. Pellow



Table 9.11-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Personnel skilled or trained in GIS and/or Hazus-MH applications	Yes	Township Engineer Harold E. Pellow
Scientist familiar with natural hazards	No	N/A
Emergency Manager	Yes	Emergency Management Coordinator Edward Hayes
Grant Writer(s)	Yes	Township Administrator Eileen Klose
Staff with expertise or training in benefit/cost analysis	Yes	Township Administrator Eileen Klose
Professionals trained in conducting damage assessments	Yes	Construction Official and Local Sub-code Officials

Fiscal Capability

The table below summarizes financial resources available to the Township of Hampton.

Table 9.11-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	Yes
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	No
Impact Fees for homebuyers or developers of new development/homes	COAH
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	Yes
Withhold public expenditures in hazard-prone areas	Only in Private Communities
Other Federal or State Funding Programs	Yes
Open Space Acquisition Funding Programs	Yes
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Hampton.



Table 9.11-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		
Building Code Effectiveness Grading Schedule (BCEGS)	TBD		
Public Protection (ISO Fire Protection Classes 1 to 10)	TBD		
Storm Ready	No		
Firewise	No		
Disaster/Safety Programs in/for Schools	TBD		
Organizations with Mitigation Focus (advocacy group, non-government)	TBD		
Public Education Program/Outreach (through website, social media)	Yes	Township Website	
Public-Private Partnerships	Yes	Local Fire Department	

N/A = Not Applicable. NP = Not Participating. - = Unavailable. TBD = To Be Determined.

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>



Self-Assessment of Capability

The table below provides an approximate measure of the Township of Hampton's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.11-9. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability		X	
Administrative and Technical Capability		X	
Fiscal Capability			X
Community Political Capability			X
Community Resiliency Capability			X
Capability to Integrate Mitigation into Municipal Processes and Activities.		X	

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

TOWNSHIP ENGINEER

Flood Vulnerability Summary

ADD INFO FROM FPA HERE (Worksheet #3)

Resources

ADD INFO FROM FPA HERE (Worksheet #3)

Compliance History

ADD INFO FROM FPA HERE (Worksheet #3)

Regulatory

ADD INFO FROM FPA HERE (Worksheet #3)

Community Rating System

The Township of Hampton does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.



Planning

Land Use Planning: The Township has a Planning Board and a Zoning Board which reviews all applications for development and consider natural hazard risk areas in their review.

Hampton Township Master Plan 2000: The Township's Master Plan was adopted by the Planning Board on September 26, 2002 and included a land use element, housing element, natural resources element, historic element and circulation element. This plan includes the identification of natural hazard risk areas like floodplains, wetlands, and steep slopes, as well as land use and zoning recommendations for managing those risks. The Plan included the following applicable goals and objectives:

Goal 7: Support increases of safety and health related activities such as fire, emergency squad, police protection and public health in order to meet and improve service to the community.

Objectives:

1. Evaluate safety and health facilities, and their levels of activity which are located in of serve Hampton Township, and evaluate their effectiveness in relation to the generally recognized norms.
2. Indicate where corrective measures may be needed to better serve the Hampton community.

Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter.

Chapter 62: Flood Damage Prevention

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 109: Stormwater Control

The purposed of the Stormwater Control Chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of the Townships' citizens and businesses.

Chapter 97-7.1: Environmental Impact Statement



The purpose of this section of the Chapter is to allow the Township to assess the impact of a proposed development upon the natural environment. Before approving any major subdivision or any site plan that involves a nonresidential use in which there is proposed a new structure, an addition or alteration to an existing structure, a change of use or an expansion of an existing use, the Planning Board shall take into consideration the effect of the proposal for development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding, waste disposal, soil erosion and the preservation of trees and other vegetation.

Operational and Administration

The Township has established a Planning Board, Zoning Board and an Open Space Committee, that aid in planning decisions to support the conservation and preservation of the Township's critical environmental features. Beyond that the Township employs and Planning Board Secretary and contracts out for professional legal, planning, and engineering services for development review. The Township also employees several part time employees for the enforcement of zoning and construction..

Funding

Operating Budget: The Township's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Township has received funding from the NJDOT and The Garden State Preservation Trust Fund grant programs. The Township's 2014 Capital Budget includes line items for improvements to the Municipal Building, as well as a number or drainage and roadway improvements.

Education and Outreach

The Township's website posts information regarding upcoming community events and important municipal decisions on the home page. The Township also has an emergency management page with community alert and emergency management information.

The Township identified a new mitigation initiative to conduct a hazard mitigation and preparedness public education and outreach program. Refer to Table 9.11-11 for further information.



Figure 9.11-1. Screenshot of Township Website with Examples of their Emergency Information Notification

The screenshot shows the Hampton Township website header with the title "HAMPTON TOWNSHIP" and "SUSSEX COUNTY, NEW JERSEY". It includes contact information for the Hampton Township Municipal Building. A navigation bar lists various links. The main content area is titled "Emergency Management" and features information about the Emergency Management Coordinator, Edward Hayes, and a notice of voluntary interest to all residents. It also includes a "How To Contact" section with a phone number and a "Community Alerting System" section featuring the CodeRED logo. On the right side, there are logos for the Federal Emergency Management Agency, Homeland Security, and the State of NJ Emergency Management.

HAMPTON TOWNSHIP
SUSSEX COUNTY, NEW JERSEY

Hampton Township Municipal Building
1 Rumsey Way Hampton Township Newton, NJ 07860
(973) 383-5570 Fax: (973) 383-8969

Welcome Boards & Committees Agendas & Minutes Offices Township Information Ordinances & Financial
Links Sitemap

Emergency Management

Emergency Management Coordinator - Edward Hayes

Notice of Voluntary Interest to all Residents,

Whenever, in his/her opinion, a disaster has occurred or is imminent in any municipality, the Municipal Emergency Management Coordinator of that municipality shall proclaim a state of local disaster emergency within the municipality.

The municipal Emergency Management Coordinator in accordance with regulations promulgated by the State Director of Emergency Management, shall be empowered to issue and enforce such orders as may be necessary to implement and carry out Emergency Management operations and to protect the health, safety, and resources of the residents of the municipality.

How To Contact:

Phone: (973) 383-8745

Community Alerting System

CODE RED

Sussex County's Division of Emergency Management has the ability to notify all Sussex County residents in the event of an emergency through its CodeRED system. When activated by officials, this automated system calls homes and businesses in the affected area and delivers a recorded message to notify the public about the emergency and what actions they may need to take.

Residents should not assume their information is in the system. [Please click here](#) to visit the CodeRED page to enter unlisted numbers, mobile numbers and TDD/TTY requirements.

Federal Emergency Management

Homeland Security

State of NJ Emergency Management

9.11.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.11-10. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Hampton Township 1	Retrofit roof to meet current snow load standards on Department of Public Works facility located on Rumsey Way.	DPW Supervisor	Choose an item.		Choose an item.	
Hampton Township 2	Implement Fire Wise program throughout Township.	OEM Coordinator	Choose an item.		Choose an item.	
Hampton Township 3	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	In Progress	This project is 10% complete. The Township needs time and advertising to complete this project.	Include in 2016 HMP	



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Township has not identified any additional mitigation projects/activities that have been completed since approval of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Township participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013). In May 2015, the Township participated in a second workshop led by FEMA Region 2 and NJOEM and was provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.11-11 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.11-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.11-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Hampton-1	Ensure continuity of operations by purchasing and installing emergency generators	Existing	All	1, 2, 6	Township Administration	High	High	HMGP with local cost share	Short term	High	SIP	PP
Hampton-2	Develop and implement an enhanced all-hazards, public outreach / education / mitigation information program on natural hazard risks and what they can do in the way of mitigation and preparedness, including flood insurance.	N/A	All	All	Township Administration	Medium	Low	Municipal Budget, HMA programs with local or county match	Short Term	High	EAP	PI
Hampton-3	Purchase emergency vehicles – fire truck and ambulance	N/A	All	All	Township Fire and Rescue	High	High	Grant Funding, Municipal Budget	Short Term / DOF	High	SIP	PP
Hampton-4	Stabilize Ike Williams and Old Swartswood Roads to ensure life safety and passage – roads are deteriorating due to erosion from water.	Existing	All	1, 2, 5	Township and NJDEP	High	High	Capital Improvement	Short Term / DOF	High	SIP	PP

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS Community Rating System
 DPW Department of Public Works
 FEMA Federal Emergency Management Agency
 FPA Floodplain Administrator
 HMA Hazard Mitigation Assistance
 N/A Not applicable
 NFIP National Flood Insurance Program
 NJDEP New Jersey Department of Environmental Protection
 NJOEM New Jersey Office of Emergency Management
 OEM Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA Flood Mitigation Assistance Grant Program
 HMGP Hazard Mitigation Grant Program
 PDM Pre-Disaster Mitigation Grant Program
 HMA Hazard Mitigation Assistance Program

Timeline:

Short 1 to 5 years
 Long Term 5 years or greater
 OG On-going program
 DOF Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low < \$10,000
 Medium \$10,000 to \$100,000

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low= < \$10,000



Costs:

High > \$100,000

Where actual project costs cannot reasonably be established at this time:

- Low Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
- Medium Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
- High Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Medium \$10,000 to \$100,000

High > \$100,000

Where numerical project benefits cannot reasonably be established at this time:

- Low Long-term benefits of the project are difficult to quantify in the short term.
- Medium Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
- High Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP)-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES)-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.11-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High/Medium/Low
Hampton-1	Emergency generators	1	1	1	1	1	1	0	0	0	1	1	1	0	0	9	High
Hampton-2	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	1	1	1	1	1	1	0	0	1	1	1	1	0	0	10	High
Hampton-3	Purchase emergency vehicles – fire truck and ambulance	1	1	1	1	1	1	0	0	0	1	1	1	1	0	10	High
Hampton-4	Stabilize Ike Williams and Old Swartswood Roads to ensure life safety and passage – roads are deteriorating due to erosion from water.	1	1	1	1	1	1	0	1	1	1	1	0	1	1	12	High

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.11.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.11.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Hampton that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Hampton has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.11.9 Additional Comments

None at this time.



Figure 9.11-2. Township of Hampton Hazard Area Extent and Location Map 1

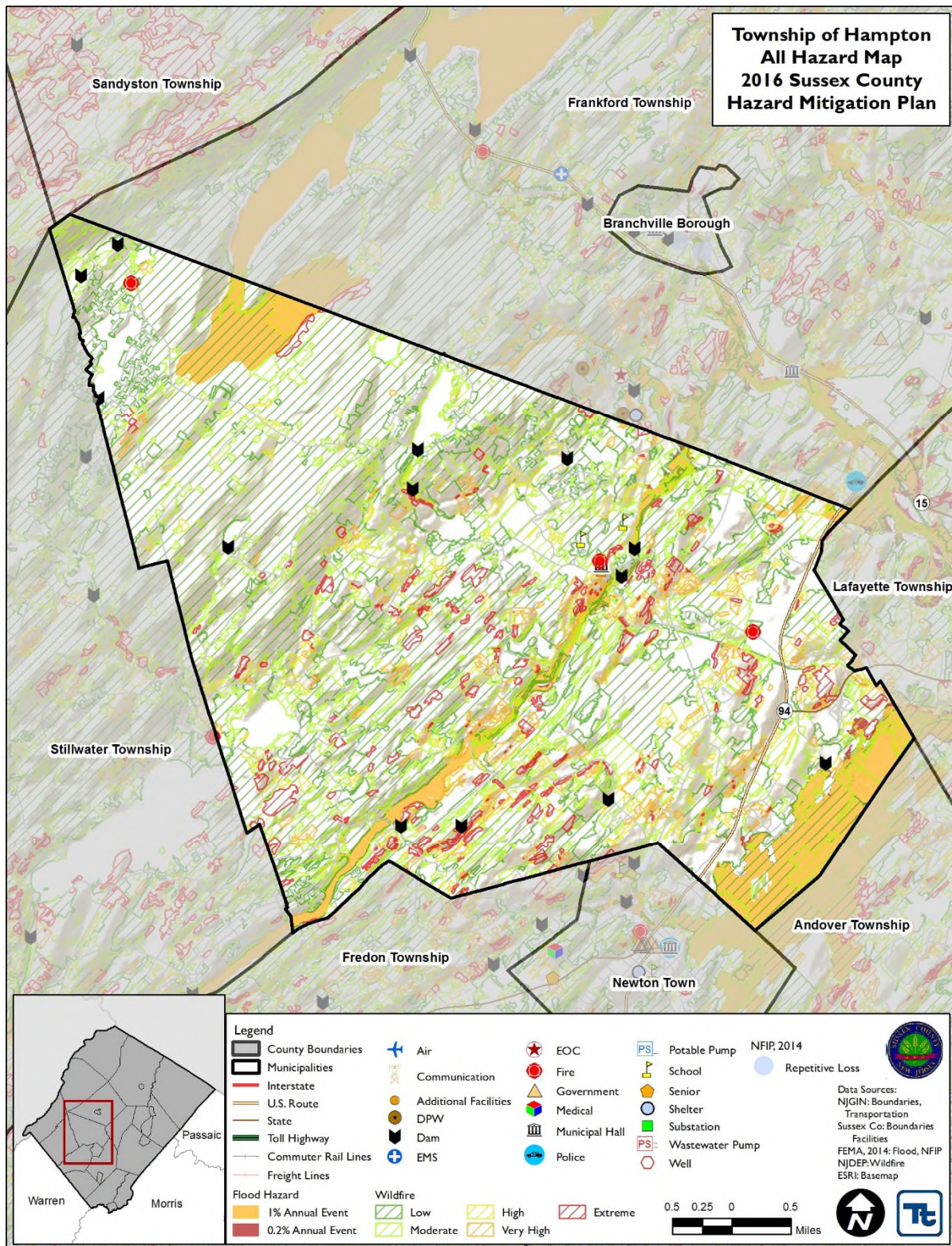
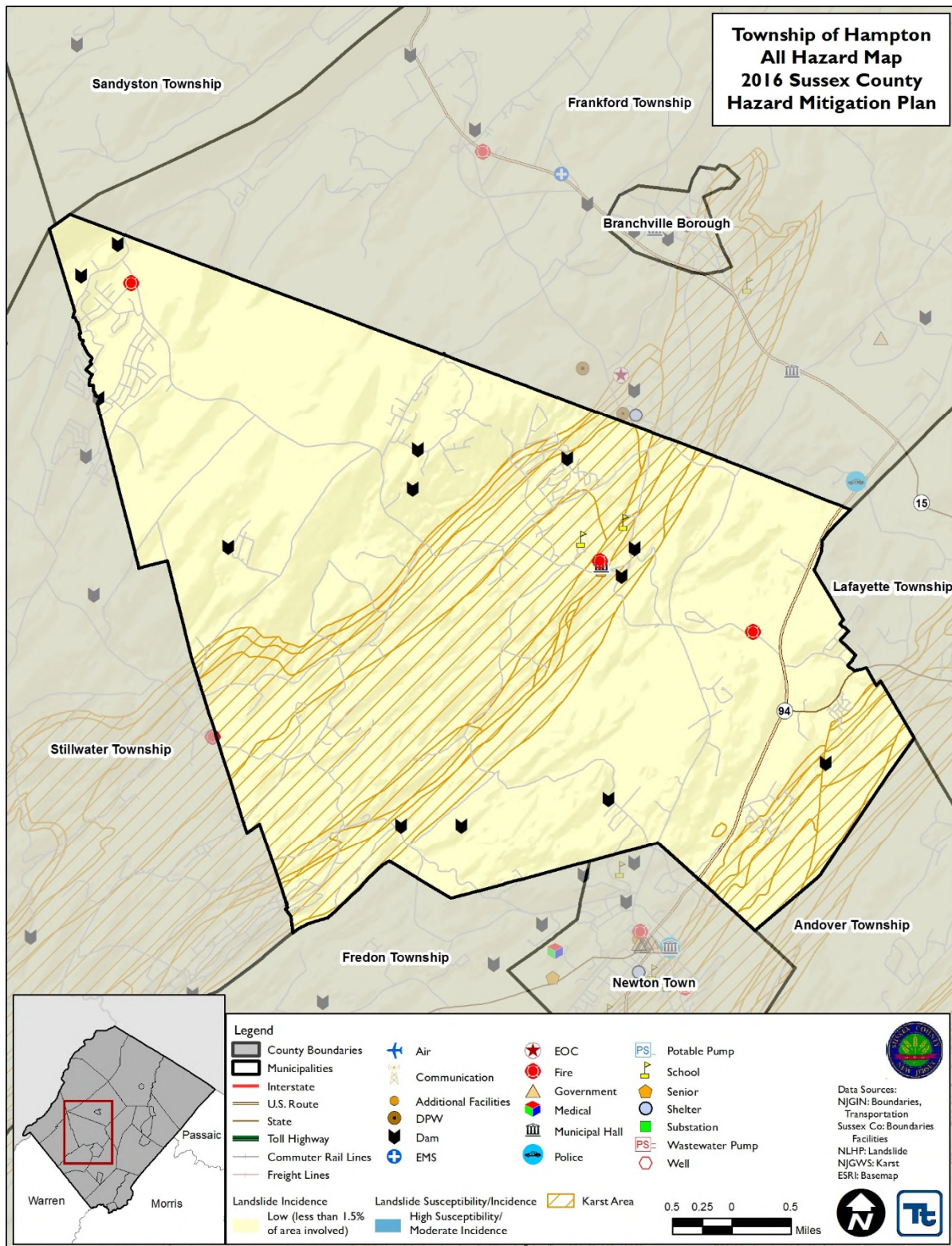




Figure 9.11-3. Township of Hampton Hazard Area Extent and Location Map 2





Action Number: Hampton-1

Mitigation Action/Initiative: Emergency generators for the Township

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Loss of power within the Township disrupts day-to-day and emergency operations
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase two generators for the Township
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install two emergency generators within the Township to provide backup power for critical and essential facilities.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township Administration and OEM
Local Planning Mechanism	Emergency Operations, Hazard Mitigation, Capital Improvement
Potential Funding Sources	HMGP with local match
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Hampton-1

Mitigation Action/Initiative: Emergency generators for the Township

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide power for residents in the event of a power outage
Property Protection	1	Allow critical facilities to function during power outages
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	Need to seek grant funding for this project
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	To be completed within five years
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	



Action Number:

Hampton-3

Mitigation Action/Initiative:

Purchase emergency vehicles for fire and EMS

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase emergency vehicles for fire and EMS
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase emergency vehicles for fire and EMS
Action/Project Category	SIP
Goals/Objectives Met	All
Applies to existing and/or new development; or not applicable	N/A
Benefits (losses avoided)	High
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township Administration
Local Planning Mechanism	Emergency Operations, Hazard Mitigation
Potential Funding Sources	Grant funding; municipal budget
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Hampton-3

Mitigation Action/Initiative: Purchase emergency vehicles for fire and EMS

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide emergency services to residents
Property Protection	1	Provide emergency services to community
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	Need to seek grant funding for this project
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	To be completed within five years
Local Champion	1	
Other Community Objectives	0	
Total	10	
Priority (High/Med/Low)	High	



Action Number:

Hampton-4

Mitigation Action/Initiative:

Stabilize roads to ensure life safety and passage – roads are deteriorating due to erosion from water.

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Unstable embankments due to longitudinal cracks and stream erosion impacted roads in the Township
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Stabilize Ike Williams and Old Swartswood Roads to ensure life safety and passage – roads are deteriorating due to erosion from water.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Stabilize Ike Williams and Old Swartswood Roads to ensure life safety and passage – roads are deteriorating due to erosion from water.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 5
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township Administration, NJDEP, Township Engineer
Local Planning Mechanism	Capital Improvements, Stormwater Management
Potential Funding Sources	Capital Improvement
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Hampton-4

Mitigation Action/Initiative: Stabilize roads to ensure life safety and passage – roads are deteriorating due to erosion from water.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Police, Fire, EOC, EMS, Public Information Dissemination
Property Protection	1	Protect roadway from further damage
Cost-Effectiveness	1	
Technical	1	Township has technical capabilities to complete this project
Political	1	Politically supported
Legal	1	
Fiscal	0	
Environmental	1	
Social	1	
Administrative	1	
Multi-Hazard	1	All
Timeline	0	
Local Champion	1	
Other Community Objectives	1	Provide access for nursery school children and the Sacred Heart Retreat Center which is accessed on a daily basis by approximately 75 children
Total	12	
Priority (High/Med/Low)	High	



9.12 Township of Hardyston

This section presents the jurisdictional annex for the Township of Hardyston.

9.12.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
William Hickerson, OEM Coordinator 149 Wheatsworth Road, Suite A, Hardyston, NJ 07419 Phone: (973) 615-5687 Email: whickerson@powerhawk.com	Marianne Smith, Township Manager 149 Wheatsworth Road, Suite A, Hardyston, NJ 07419 Phone: (973) 823-7020, x9410 Email: msmith@hardyston.com

9.12.2 Municipal Profile

The Township of Hardyston is located in northeastern Sussex County. It is bordered to the north by the Townships of Vernon and Wantage, to the south by the Township of Sparta and Morris County, to the east by Vernon Township and Morris County, and to the west by Lafayette Township. The Township covers an area of approximately 32.6 square miles. According to the U.S. Census, the 2010 population for the Township of Hardyston was 8,213. There are numerous streams located within the Township and include: Wallkill River, Hamburg Creek, Mud Pond Outlet Stream, Pequannock River, Lake Stockholm Brook, Franklin Pond Creek, Beaver Run, and Black Creek. The following unincorporated communities are located within the Township: Beaver Run, North Church, Big Springs, Rudeville, and Beaver Lake.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the maps in Section 9.12.8 of this annex which illustrate the hazard areas along with the location of potential new development.

Table 9.12-1. Growth and Development

Property or Development Name	Type (e.g., Res., Comm.)	# of Units/Structures	Location (address)	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to present					
Crystal Springs-Shotmeyer	Single Family	38	Coventry, Woodcot, Tarrington	Wildfire: Very High; Carbonate Hazard	Under construction
Crystal Springs – Shotmeyer	Multi-Family	1 (18 Units)	Tarrington Road	Wildfire: Very High; Carbonate Hazard	Under construction
Emerald Estates	Single Family	4	Emerald Drive/Ruby Court	Carbonate Hazard	Under construction
Estell Manor	Single Family	3	Estell Drive	Carbonate Hazard	Under construction
Crystal Springs – Balmorale	Single Family	2	Exeter Lane/Sutton Court	Wildfire: High; Carbonate Hazard	Under construction



Property or Development Name	Type (e.g., Res., Comm.)	# of Units/Structures	Location (address)	Known Hazard Zone(s)	Description/Status of Development
Ridgefield Commons	Single Family-Townhouse	8	Brookview	Carbonate Hazard	Under construction
Brecia Farms	Single Family – Townhomes	2	Anthony Lane/Davon Court	Carbonate Hazard	Under Construction
Crystal Springs-Shotmeyer	Single Family	50	Coventry, Woodcott, Tarrington	Wildfire: Very High; Carbonate Hazard	Under construction (approved 117 single family, 141 condos, 22 townhomes)
Crystal Springs – Shotmeyer	Multi-Family	1 (18 Units)	Tarrington Road	Wildfire: Very High; Carbonate Hazard	Under construction
Emerald Estates	Single Family	25	Emerald Drive/Ruby Court	Wildfire: Very High; Carbonate Hazard	Under construction (29 lot subdivision)
Estell Manor	Single Family	17	Estell Drive	Carbonate Hazard	Under construction (20 lot subdivision)
Crystal Springs – Balmorale	Single Family	15	Exeter Lane/Sutton Court	Wildfire: High; Carbonate Hazard	Under construction (28 lot subdivision)
Ridgefield Commons	Single Family-Townhouse	172	Virginia, Highview, Brookview	Carbonate Hazard	Under construction (303 planned unit development)
Brecia Farms	Single Family	18	Anthony Lane/Davon Court	Carbonate Hazard	Under construction (20 lot subdivision)

* Only location-specific hazard zones or vulnerabilities identified.

9.12.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.12-2. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	Roads in the Township were closed for up to three days. The state highways in the Township were opened after one day. All areas of the Township were effected by road closures and power outages for three days. The Township received reimbursement from FEMA for debris removal, preventative measures, roads and bridges, and donated resources.
October 29, 2011	Severe Storm	DR-4048	Yes	Two days of road closures, three days without power for hundreds of residents, 30 fire calls to



Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
				assist with water removal and problems in homes, five life support calls for emergency generators. One road repair for sink hole and three days of debris removal.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	Thousands of residents without power for up to 11 days. Municipal offices closed for five days due to no power. The 911 center on backup generators for 8 days, debris cleanup lasted 14 days The Township opened a shelter/warming station for eight days. The Township received public assistance from FEMA for emergency protection measures, debris removal and donated resources.

9.12.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Hardyston. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Hardyston.

Table 9.12-3. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	High*
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$859,826 2,500-Year GBS: \$13,708,981	Occasional	28	Medium
Flood	1% Annual Chance: \$1,929,690	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$1,042,265,110	Occasional	36	Medium
Hurricane	100-year MRP: \$376,990 500-year MRP: \$2,250,551 Annualized: \$21,546	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$376,990 500-year MRP: \$2,250,551 Annualized: \$21,546	Frequent	48	High
Severe Winter Weather	1% GBS: \$10,588,041 5% GBS: \$52,940,203	Frequent	51	High



Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$137,125,045	Frequent	33	High
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed due to the location of high hazard dams in the municipality

GBS = General building stock; MRP = Mean return period.

a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.

b. High = Total hazard priority risk ranking score of 31 and above

Medium = Total hazard priority risk ranking of 15-30+

Low = Total hazard risk ranking below 15

c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Hardyston.

Table 9.12-4. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Hardyston	10	1	\$60,787	0	0	1

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance flood boundary.

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.



9.12.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Community Rating System
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Hardyston.

Table 9.12-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes, 2014	State	Planning Board	
Capital Improvements Plan	Yes, 2014	Town Council	Town Manager	
Floodplain Management/Basin Plan	Part of master plan	State	Planning Board	
Stormwater Management Plan	Yes, 2005	State	Town Council	
Open Space Plan	Part of master plan	State	Planning Board	
Stream Corridor Management Plan	Part of master plan	State	Planning Board	
Watershed Management or Protection Plan	Part of master plan	State	HT Planning Board	
Economic Development Plan	No			
Comprehensive Emergency Management Plan	Yes, 2014	Township OEM	OEM	
Emergency Response Plan	Yes, 2014	Township OEM	OEM	
Post-Disaster Recovery Plan	No			
Transportation Plan	Part of Master Plan	State	Planning Board	
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State & Local	Construction Office	State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Zoning Board	Town Council
Subdivision Ordinance	Yes	Local	Zoning Board	Town council



Table 9.12-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State, Local	Construction Official	Chapter 96
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State, Local		N.J.A.C 7:13 – Flood Hazard Area Control Act
Growth Management Ordinances	Yes	State	Town Council	State
Site Plan Review Requirements	Yes	Local	Town Council	Town Council
Stormwater Management Ordinance	Yes	State	Town Council	State
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	No			

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Hardyston.

Table 9.12-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Planning Board
Mitigation Planning Committee	Yes	OEM
Environmental Board/Commission	No	
Open Space Board/Committee	No	
Economic Development Commission/Committee	Yes	Hardyston Township Economic Development Advisory Commission
Maintenance Programs to Reduce Risk	Yes	Town Manager Insurance related
Mutual Aid Agreements	Yes	Fire Dept, Police and EMS
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Deputy Manager/planner and Construction
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Construction
Planners or engineers with an understanding of natural hazards	Yes	Deputy Manager/Planner
NFIP Floodplain Administrator	Yes	Construction Official
Surveyor(s)	No	



Table 9.12-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Personnel skilled or trained in GIS and/or Hazus-MH applications	Yes	Zoning
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	OEM
Grant Writer(s)	Yes	OEM and Deputy Manager
Staff with expertise or training in benefit/cost analysis	Yes	OEM and Deputy Manager
Professionals trained in conducting damage assessments	Yes	OEM and Construction

Fiscal Capability

The table below summarizes financial resources available to the Township of Hardyston.

Table 9.12-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	Yes; Hardyston Town Council
Capital Improvements Project Funding	Yes; Hardyston Town Council
Authority to levy taxes for specific purposes	Yes; Hardyston Town Council
User fees for water, sewer, gas, or electric service	Yes; Hardyston Town Council
Impact Fees for homebuyers or developers of new development/homes	No
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes; Hardyston Town Council
Incur debt through special tax bonds	Yes; Hardyston Town Council
Incur debt through private activity bonds	Yes; Hardyston Town Council
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	No
Open Space Acquisition Funding Programs	Yes; Hardyston Town Council
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Hardyston.

Table 9.12-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		
Building Code Effectiveness Grading Schedule (BCEGS)	No		
Public Protection (ISO Fire Protection Classes 1 to 10)	No		
Storm Ready	No		
Firewise	No		

**Table 9.12-8. Education/Outreach and Community Classifications**

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Disaster/Safety Programs in/for Schools	Yes		
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	Yes	OEM	
Public-Private Partnerships	No		

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Township of Hardyston's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.12-9. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability			X
Administrative and Technical Capability			X
Fiscal Capability		X	
Community Political Capability			X
Community Resiliency Capability			X



Table 9.12-9. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Capability to Integrate Mitigation into Municipal Processes and Activities			X

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Joe Butto, Construction Official

Flood Vulnerability Summary

The Township does not maintain lists/inventories of properties that have been damaged by floods. They only maintain inventories on fire reports from alarms. Between Irene, Lee and Sandy, there were four homes damaged by fallen trees and approximately 75 basements flooded. The FPA makes substantial damage estimates for the Township and one was conducted for the most recent FEMA disaster declarations. It is unknown how many properties are currently interested in mitigation.

Resources

The FPA is the sole person assuming the responsibilities of floodplain administration for the Township; however, he does receive assistance from the OEM when needed. NFIP administration services and functions the FPA provide includes damage inspections and keeping dam reports. The Township does not provide any education or outreach to the community regarding flood hazards/risk. The FPA feels adequately supported and trained to fulfill his responsibilities as the municipal floodplain administrator. The FPA indicated that he would not consider attending continuing education and/or certification training on floodplain management.

Compliance History

The Township is currently in good standing with the NFIP. The date of the most recent compliance audit is unknown.

Regulatory

The Township's floodplain management regulations/ordinances exceed the FEMA and State minimum requirements. The master plan and planning board have a review for flood zones during application process. The community has not considered joining CRS as this time.

Community Rating System

The Township of Hardyston does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.



Planning

Land Use Planning: The Township has a Planning Board and a Zoning Board which reviews all applications for development and consider natural hazard risk areas in their review.

Hardyston Township Master Plan Reexamination 2014: This plan included the reaffirmation of the goals and objective outlined in the 2003 Master Plan.

Hardyston Master Plan 2003: This plan includes the identification of natural hazard risk areas like floodplains, wetlands, and steep slopes, as well as land use and zoning recommendations for managing those risks. The Plan included the following applicable goals and objectives:

Goal 7: Support increases of safety and health related activities such as fire, emergency squad, police protection and public health in order to meet and improve service to the community.

Objectives:

1. Evaluate safety and health facilities, and their levels of activity which are located in of serve Hampton Township, and evaluate their effectiveness in relation to the generally recognized norms.
2. Indicate where corrective measures may be needed to better serve the Hampton community.

Highlands: Hardyston is located in the New Jersey Highlands Region and is part of both the Highlands Planning and Preservation Areas. As such, the Township is one of 88 municipalities protected by and subject to the provisions of the Highlands Water Protection and Planning Act that protects, enhances and restores Highland's natural resources. The Highlands Act requires that future land use in the Highlands Region be guided by the Regional Master Plan's Land Use Capability Map (LUCM) Series which includes tools to identify and protect the natural, scenic and other resources of the region. In supporting and complying with the Highlands Act, the Township enacted amendments and updates to local zoning and development ordinances that ensure the protection of important resources and areas. The Highland Act creates three primary zones: a Protection Zone, a Conservation Zone and an Existing community Zone. Protection Zones are areas with the highest quality resources with extreme limitations on allowable development while Conservation Zones have significant agricultural lands and associated woodlands and environmental features with allowable development consisting primarily of agricultural uses. Existing Community Zones consist of areas of concentrated development with limited environmental constraints. These zones are overlaid with existing local zoning maps to identify and address issues of public interest including watershed management, open space preservation, historic preservation, flood protection among others.

Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter.

Chapter 96: Flood Damage Prevention - The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;



- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Article XXV Stormwater Management: The purposed of the Stormwater Control Chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of the Townships' citizens and businesses.

Chapter 185-4C. Environmentally Critical Areas: An area or feature which is of significant environmental value, including but not limited to stream corridors; natural heritage priority sites; habitats of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; and wellhead protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Nongame Species Program.

Operational and Administration

The Township has established a Planning Board, Zoning Board and an Environmental Committee, that aid in planning decisions to support the conservation and preservation of the Township's critical environmental features. Beyond that the Township employs and Planning Board Secretary and contracts out for professional legal, planning, and engineering services for development review.

Funding

Operating Budget: The Township's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Township has received funding from the NJDOT and The Garden State Preservation Trust Fund grant programs. The Township's 2014 Capital Budget includes line items for improvements to the Municipal Building, as well as a number of drainage and roadway improvements.

Education and Outreach

The Township's website posts information regarding upcoming community events and important municipal decisions on the home page. The Township has identified a mitigation action to implement the FireWise program. Refer to Table 9.12-11 for further information.

Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.12-10. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2016 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Hardyston Township 1	Implement Fire Wise Program throughout Township.	OEM Coordinator, Township Engineer	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Include in 2016 HMP	1. Education Program. Set up town hall meetings
Hardyston Township 2	Flood proofing of the Fire Company #1 and First Aid squad buildings located on Colson Terrace.	Township Engineer	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Include in 2016 HMP	1. Unknown need engineering reports (not funded)
Hardyston Township 3	Storm-water management study to correct storm drainage system located on Colson Terrace.	Department of Public Works Supervisor	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Include in 2016 HMP	1. Unknown need engineering reports (not funded)
Hardyston Township 4	Retrofit roof to meet current snow load standards at the Elementary School.	School Board Administrator	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Include in 2016 HMP	1. Obtain engineering report 2. Bid and complete construction
Hardyston Township 5	Retrofit Elementary School gymnasium windows with impact resistant glass and shutters.	School Board Administrator	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Include in 2016 HMP	1. Obtain engineering report 2. Bid and complete construction
Hardyston Township 6	Retrofit South West side of municipal building with impact resistant windows and shutters.	Township Manager	No Progress	1. 0% complete 2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured	Include in 2016 HMP	1. Obtain engineering report 2. Bid and complete construction
Hardyston Township 7	Conduct all-hazards public education and outreach	OEM Coordinator, in	No Progress	1. 0% complete	Include in 2016 HMP	1. Education Program. Set up town hall meetings



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2016 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
	program for hazard mitigation and preparedness.	coordination with SCDDEM		2. Budget and personnel constraints have restricted this action from moving forward 3. No funding secured		

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Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Township has not identified any additional mitigation projects/activities that have been completed since approval of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Township participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013). In May 2015, the Township participated in a second workshop led by FEMA Region 2 and NJOEM and was provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.12-11 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High,' 'Medium,' or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.12-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.12-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Hardyston-1	Ensure continuity of operations at critical facilities: Hardyston Township Critical Facilities Generators	New and Existing	All	1, 2, 6	OEM	High	Medium	HMGP with local cost share	Short Term	High	SIP	PP
Hardyston-2	Implement Fire Wise Program throughout Township. Create an education program and set up town hall meetings.	New and Existing	Wildfire	1, 2, 3, 4, 6	OEM Coordinator	Medium	Low	HMGP with local cost share	Short Term	High	EAP, LPR	PI
Hardyston-3	Stormwater management study to correct storm drainage system located on Colson Terrace.	New and Existing	Flood	1, 2, 5, 6	DPW and OEM	High	High	HMGP with local cost share	Short Term	High	SIP	PP
Hardyston-4	Conduct engineering study to determine the correct actions for retrofitting the roof of the elementary school to meet current snow load standards. Once completed, identify mitigation actions to correct the problem.	Existing	Severe Winter Weather	1, 2, 4, 5	School Board Administrator	Medium	Low	HMGP with local cost share; Municipal Budget	Short Term / DOF	Medium	SIP	PP
Hardyston-5	Conduct engineering study to determine the correct actions for retrofitting the gymnasium windows of the elementary school to make them impact resistant. Once completed, identify mitigation actions to correct the problem.	Existing	Severe Weather, Severe Winter Weather	1, 2, 4, 5	School Board Administrator	Medium	Low	HMGP with local cost share; Municipal Budget	Short Term / DOF	Medium	SIP	PP
Hardyston-6	Conduct engineering study to determine the correct actions for retrofitting the windows on the southwest side of the municipal building to make them impact resistant. Once completed, identify mitigation actions to correct the problem.	Existing	Severe Weather, Severe Winter Weather	1, 2, 4, 5	Township Manager	Medium	Low	HMGP with local cost share; Municipal Budget	Short Term / DOF	Medium	SIP	PP
Hardyston-7	Educate citizens on hazard mitigation and preparedness through Town Hall meetings and outreach programs.	N/A	All	All	OEM Coordinator	High	Medium	HMGP with local cost share	Short Term	High	EAP	PI
Hardyston-8	Establish a line item for mitigation project funding in both	New and Existing	All	All	Township	High	Low	Municipal Budget	Ongoing	Medium	LPR	PR



Table 9.12-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
	the municipal budget and Capital Improvement Plan.											
Hardyston-9	Adopt and enforce codes and standards beyond FEMA and state NFIP minimum requirements.	New and Existing	All	All	Township	High	Low	Municipal Budget	Ongoing	Medium	LPR	PR
Hardyston-10	Where applicable, Township job descriptions will incorporate hazard mitigation.	N/A	All	All	Township	High	Low	Municipal Budget	Ongoing	Medium	LPR	PR
Hardyston-11	Incorporate hazard mitigation in the daily practice of the Township; all projects identified in Township's annex will be a goal of the municipality.	N/A	All	All	Township	High	Low	Municipal Budget	Ongoing	Medium	LPR	PR
Hardyston-12	Establish a community resilience committee and advisor for the Township which will increase the Township's capacity to prepare for, mitigate, respond to and recover from hazard events in the community.	New and Existing	All	All	Township Administration, OEM Coordinator	High	Low	Municipal Budget	Ongoing	Medium	LPR	PR
Hardyston-13	Provide informational handouts or meetings to share best practices of hazard mitigation and increase the knowledge of mitigation throughout the Township.	New and Existing	All	All	Township Administration, OEM Coordinator	High	Low	Municipal Budget	Ongoing	Medium	LPR	PR
Hardyston-14	Develop a continuity of operations (COOP) plan which will identify mitigation opportunities.	N/A	All	All	Township	High	Low	Municipal Budget	Ongoing	Medium	LPR	PR
Hardyston-15	Correct the stormwater drainage on Colson Terrace.	Existing	Flood, Severe Weather	1, 2, 5, 6	Township OEM and DPW	High	High	HMGP with local cost share	Short Term / DOF	High	SIP	PP

Notes: Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS Community Rating System
 DPW Department of Public Works
 FEMA Federal Emergency Management Agency
 FPA Floodplain Administrator
 HMA Hazard Mitigation Assistance

Potential FEMA HMA Funding Sources:

FMA Flood Mitigation Assistance Grant Program
 HMGP Hazard Mitigation Grant Program
 PDM Pre-Disaster Mitigation Grant Program
 HMA Hazard Mitigation Assistance Program

Timeline:

Short 1 to 5 years
 Long Term 5 years or greater
 OG On-going program
 DOF Depending on funding



Acronyms and Abbreviations:

N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

Timeline:

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP)-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES)-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.12-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community	Total	High / Medium / Low
Hardyston-1	Hardyston Township Critical Facilities Generators	1	1	1	1	1	1	0	0	0	1	1	1	0	0	9	High
Hardyston-2	Implement Fire Wise Program throughout Township. Create an education program and set up town hall meetings.	1	1	1	0	1	0	1	1	1	0	0	1	1	1	10	High
Hardyston-3	Conduct engineering study on the flooding issues with Fire Company #1 and First Aid Squad buildings located on Colson Terrace. Once completed, identify mitigation actions to correct the problem.	1	1	1	1	1	1	0	1	0	0	1	1	1	0	10	Medium
Hardyston-4	Stormwater management study to correct storm drainage system located on Colson Terrace.	1	1	1	1	1	1	0	1	0	0	1	1	1	0	10	High
Hardyston-5	Conduct engineering study to determine the correct actions for retrofitting the roof of the elementary school to meet current snow load standards. Once completed, identify mitigation actions to correct the problem.	1	1	1	1	1	1	0	1	0	0	1	1	1	0	10	Medium
Hardyston-6	Conduct engineering study to determine the correct actions for retrofitting the gymnasium windows of the elementary school to make them impact resistant. Once completed, identify mitigation actions to correct the problem.	1	1	1	1	1	1	0	1	0	0	1	1	1	0	10	Medium
Hardyston-7	Conduct engineering study to determine the correct actions for retrofitting the windows on the southwest side of the municipal building to make them impact resistant. Once completed, identify mitigation actions to correct the problem.	1	1	1	1	1	1	0	1	0	0	1	1	1	0	10	Medium
Hardyston-8	Educate citizens on hazard mitigation and preparedness through Town Hall meetings and outreach programs.	1	1	1	1	1	1	1	0	1	1	1	0	0	0	10	High
Hardyston-9	Establish a line item for mitigation project funding in both the municipal budget and Capital Improvement Plan.	1	1	1	1	0	0	1	0	0	1	1	1	0	0	8	Medium
Hardyston-10	Adopt and enforce codes and standards beyond FEMA and state NFIP minimum requirements.	1	1	1	1	0	0	1	0	0	1	1	1	0	0	8	Medium
Hardyston-11	Where applicable, Township job descriptions will incorporate hazard mitigation.	1	1	1	1	0	0	1	0	0	1	1	1	0	0	8	Medium
Hardyston-12	Incorporate hazard mitigation in the daily practice of the Township; all projects identified in Township's annex will be a goal of the municipality.	1	1	1	1	0	0	1	0	0	1	1	1	0	0	8	Medium
Hardyston-13	Establish a community resilience committee and advisor for the Township which will increase the Township's capacity to prepare for, mitigate, respond to and recover from hazard events in the community.	1	1	1	1	0	0	1	0	0	1	1	1	0	0	8	Medium
Hardyston-14	Provide informational handouts or meetings to share best practices of hazard mitigation and increase the knowledge of mitigation throughout the Township.	1	1	1	1	0	0	1	0	0	1	1	1	0	0	8	Medium
Hardyston-15	Develop a continuity of operations (COOP) plan which will identify mitigation opportunities.	1	1	1	1	0	0	1	0	0	1	1	1	0	0	8	Medium



Table 9.12-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community	Total	High / Medium / Low
Hardyston-16	Correct the stormwater drainage on Colson Terrace.	1	1	1	1	1	1	0	1	0	0	1	1	1	0	10	High

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.12.6 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.12.7 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Hardyston that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Hardyston has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.12.8 Additional Comments

None at this time.

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Figure 9.12-1. Township of Hardyston Hazard Area Extent and Location Map 1

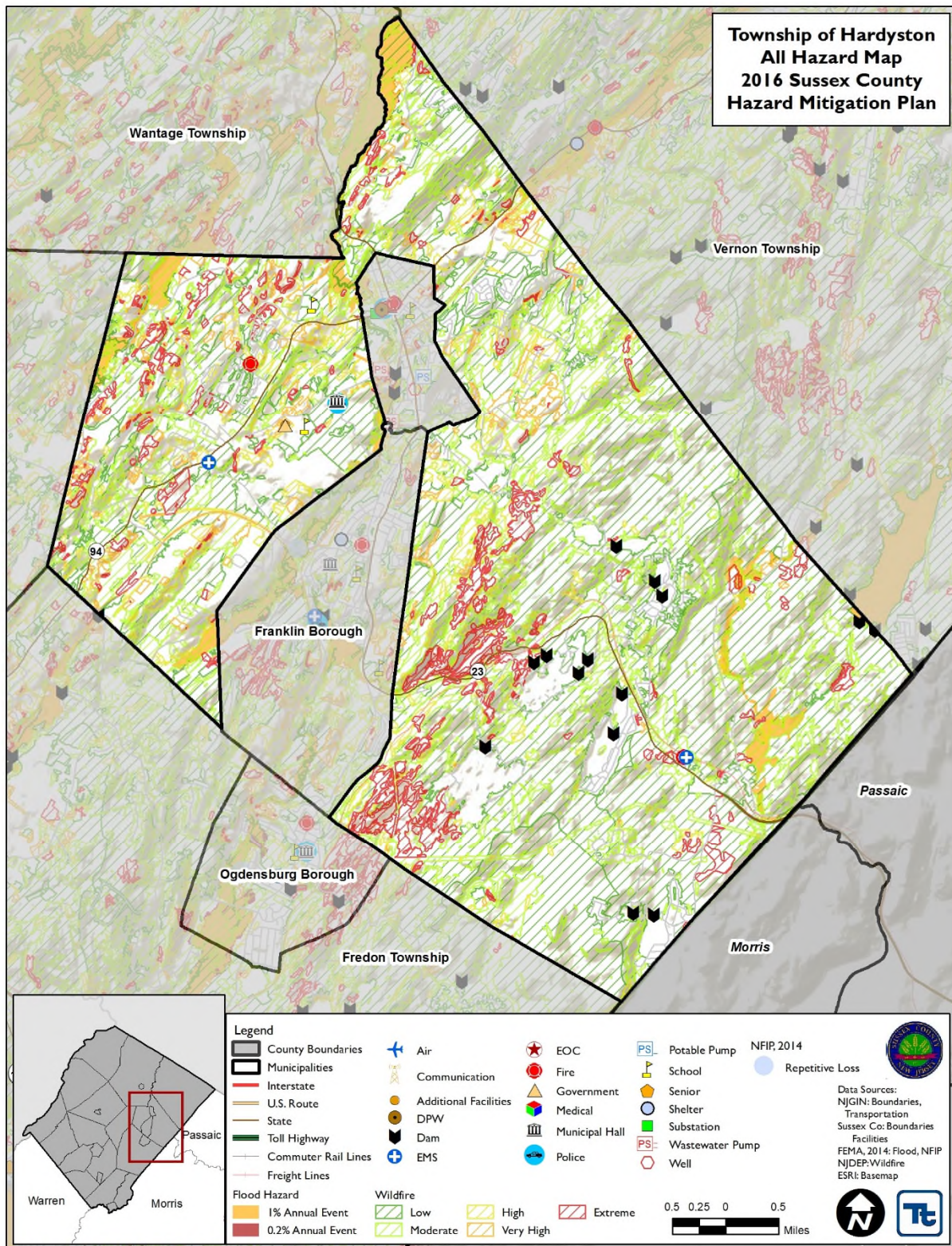
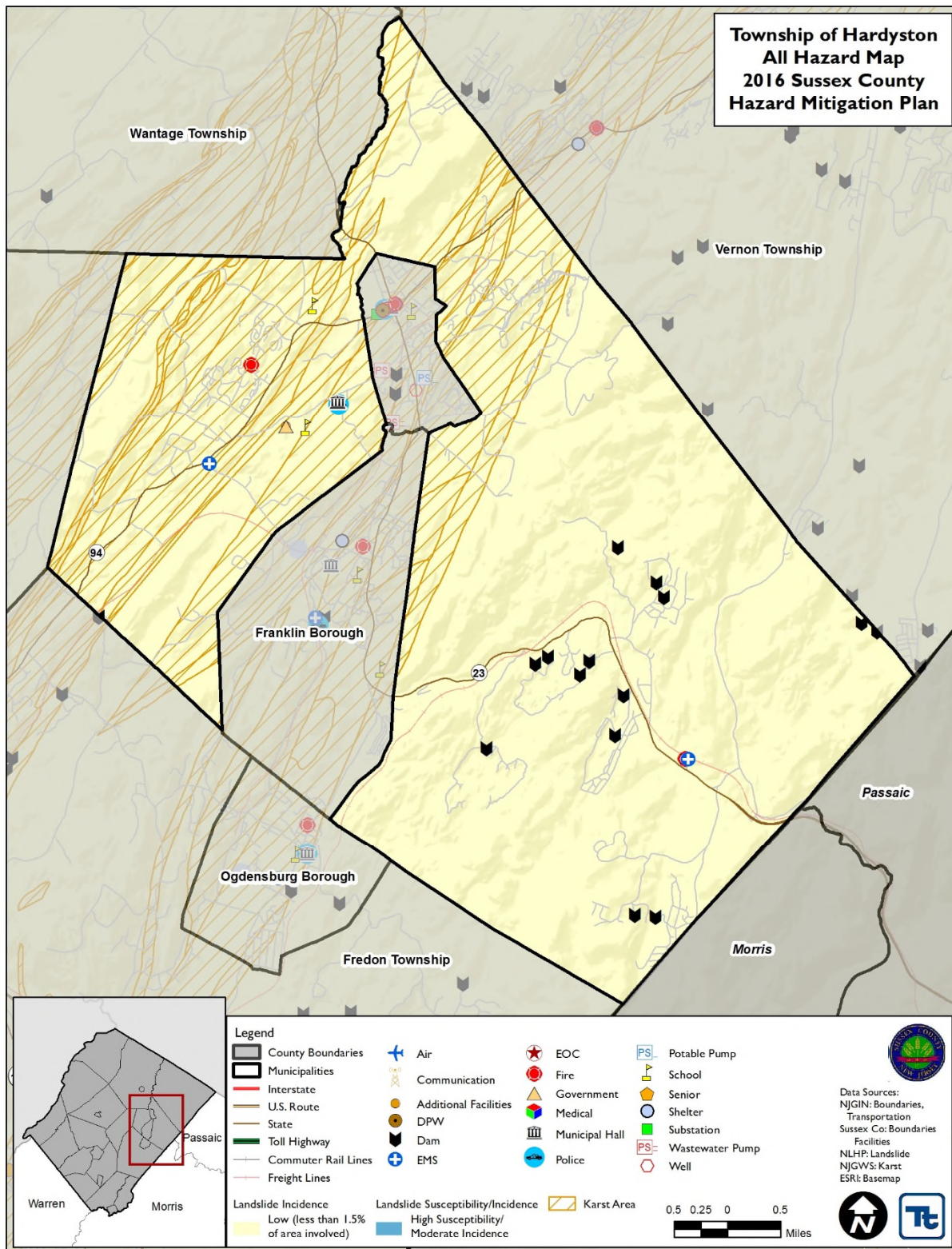




Figure 9.12-2. Township of Hardyston Hazard Area Extent and Location Map 2





Action Number:

Hardyston-1

Mitigation Action/Initiative:

Hardyston Township Critical Facilities Generators

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Loss of power to the community prevents the critical facilities from functioning in the event of an emergency
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install generators for critical facilities in the Township
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Hardyston Township Critical Facilities Generators
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	New and Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	OEM
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Hardyston-1

Mitigation Action/Initiative: Hardyston Township Critical Facilities Generators

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide power for those impacted during emergencies
Property Protection	1	Allow for continuity of operations
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	All
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	

**Action Number:** Hardyston-15**Mitigation Action/Initiative:** Flood proofing Colson Terrace and correct stormwater draining

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	Fire Station 1 and the EMS Squad building flood and the buildings are damaged during these flooding events
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	Flood proofing Colson Terrace and correct storm water draining for the
	1. Hardyston Twp. Fire Station 1 and EMS building located on Colson Terrace.
	2. Develop storm water plan and implement
	3. Relocate fire and EMS stations
Action/Project Intended for Implementation	
Description of Selected Action/Project	Flood proofing Colson Terrace and correct storm water draining for the Hardyston Twp. Fire Station 1 and EMS building located on Colson Terrace.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 5, 6
Applies to existing and/or new development; or not applicable	New and Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township OEM and DPW
Local Planning Mechanism	Stormwater Management
Potential Funding Sources	FEMA with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Hardyston-15

Mitigation Action/Initiative: Flood proofing Colson Terrace and correct stormwater draining

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	If water levels prevent fire trucks and EMS service from leaving fire station life and property risk greatly increase
Property Protection	1	Protect buildings in the area from flood damage
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	
Environmental	1	
Social	0	
Administrative	0	
Multi-Hazard	1	Flood, Severe Weather
Timeline	1	
Local Champion	1	
Other Community Objectives	0	
Total	10	
Priority (High/Med/Low)	High	



9.13 Borough of Hopatcong

This section presents the jurisdictional annex for the Borough of Hopatcong.

9.13.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Robert Haffner, OEM Coordinator 111 River Styx Road, Hopatcong, NJ 07843 Phone: (973) 934-1575 Email: rhaffner@hopatcong.org	Robert Elia, Borough Administrator 111 River Styx Road, Hopatcong, NJ 07843 Phone: (973) 770-1200 x4 Email: relia@hopatcong.org

9.13.2 Municipal Profile

Hopatcong Borough is located in southwestern Sussex County. It is bordered to the north by Sparta Township, to the east and south by Morris County, and to the west by Byram Township and Stanhope Borough. The Borough has a total area of 12.4 square miles. According to the U.S. Census, the 2010 population for the Borough of Hopatcong was 15,147. The following unincorporated communities are located within the Borough: Northwood, Byram Cover, Sperry Springs, Bonaparte Landing, Hopatcong Hills, and Hopatcong Heights. Streams in the Borough include: the Musconetcong River which makes up the eastern border of the Borough, and Lubbers Run. A portion of Lake Hopatcong is found in eastern Hopatcong Borough.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the maps in Section 9.13.8 of this annex which illustrate the hazard areas along with the location of potential new development.

Table 9.13-1. Growth and Development

Property or Development Name	Type (e.g. Res., Comm.)	# of Units/Structures	Location (address and/or Block & Lot)	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to present					
None identified at the time of this plan update.					
Known or Anticipated Development in the Next Five (5) Years					
Atkins/Hopatcong LLC	Residential	35 Units	16 Lawrie Road	Flood: 1% Chance	Borough Approval-Waiting DEP
Greentree at Hopatcong LLC	Residential and Commercial	15 Units/4,660 Residential	446 River Styx Road	None at this time	Being Built
Airport Road Properties	Commercial	2 Warehouses	6 Sparta-Stanhope Road	None at this time	Borough Approval
Greentree at Hopatcong LLC	Residential	9 Units	468 River Styx Road	None at this time	Borough Approval

** Only location-specific hazard zones or vulnerabilities identified.*



9.13.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.13-2. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
February 1-2, 2011	Winter Storm	N/A	N/A	Some roads closed due to power outages, CERT Team activated for warming stations.
March 11-12, 2011	Heavy Rain and Flooding	N/A	N/A	Roads flooded, CERT Team activated, Pump out of residential basements.
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	Multiple roads were closed in the Borough. There were also power outages and damages to residential properties. Some minor road culverts washed away. Protective measures were put in place and the roadways was repaired. Downed trees and power lines caused some damage as well. The Borough requested approximately \$34,000 from FEMA for public assistance.
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	The Borough opened a warming shelter that was set up by CERT. There was minor property damage from fallen tree limbs, utility poles and wires. There were scattered power outages throughout the Borough as well. Some roads were closed. Other losses to the Borough included police overtime due to road closures and CERT team for warming shelter.
October 29, 2011	Severe Storm	DR-4048	Yes	Multiple power outages, Warming stations set-up, CERT Team deployed, FEMA asst. requested and granted. Approx. \$27,000 received.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	A regional shelter was set up at the high school. There were road closures, power outages, and closed businesses due to power outages. Sewage pumps were damaged, roadways were closed due to downed trees, poles and wires. Many homes were damaged or destroyed due to high winds that brought down trees and branches. Some commercial properties sustained minor damage from high winds. The Borough requested public assistance for an estimated \$150,000. Protective measures were put into place by the police, fire, EMS and CERT. The DPW and fire department conducted debris removal/cleanup.
September 12, 2013	Heavy Rain and Flash Flooding	N/A	N/A	Trees fallen, power outages, property damage, roads shutdown.



9.13.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Borough of Hopatcong. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Borough of Hopatcong.

Table 9.13-3. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	Medium
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$1,045,562 2,500-Year GBS: \$17,280,283	Occasional	28	Medium
Flood	1% Annual Chance: \$10,897,002	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$0	Occasional	12	Low
Hurricane	100-year MRP: \$639,558 500-year MRP: \$2,920,265 Annualized: \$30,693	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$639,558 500-year MRP: \$2,920,265 Annualized: \$30,693	Frequent	48	High
Severe Winter Weather	1% GBS: \$14,594,479 5% GBS: \$72,972,394	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$10,988,987	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

GBS = General building stock; MRP = Mean return period.

- The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
- Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.



National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Borough of Hopatcong.

Table 9.13-4. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Borough of Hopatcong	20	11	\$128,582	0	0	0

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance flood boundary.

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.

9.13.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Borough of Hopatcong.

Table 9.13-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Land Use Board	2014 Master Plan Reexamination Report



Table 9.13-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Capital Improvements Plan	Yes	Local	Administration	% Year Plan
Floodplain Management/Basin Plan	No			
Stormwater Management Plan	No			
Open Space Plan	Yes	Local	Open Space	Open Space and Recreation Plan Update, 2011
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	No			
Comprehensive Emergency Management Plan	Yes	Local	OEM	Emergency Operation Plan
Emergency Response Plan	Yes	Local	OEM	Emergency Operation Plan
Post-Disaster Recovery Plan	Yes	Local	OEM	Emergency Operation Plan
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	Yes	State and Local	Highlands Council	Borough of Hopatcong Highlands Environmental Resource Inventory, 2013
Regulatory Capability				
Building Code	Yes	Local, State	Borough	State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Zoning	Chapter 242 – Zoning
Subdivision Ordinance	Yes	Local	Land Use Board	Chapter 209 – Subdivision of Land
NFIP Flood Damage Prevention Ordinance	Yes	Local, State, Federal	Construction	Chapter 124 – Floodplain
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	Local, State	Construction	N.J.A.C 7:13 – Flood Hazard Area Control Act
Growth Management Ordinances	Yes	State	Administration	Due to Highlands
Site Plan Review Requirements	Yes	Local, County, State	Land use Board	Chapter 191 – Site Plan Review
Stormwater Management Ordinance	Yes	Local, State	Engineer	Chapter 242 – Zoning, Stormwater Management Requirements
Municipal Separate Storm Sewer System (MS4)	Yes	Local	Engineer	Chapter 203 – Storm Sewer System
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes	Local	Borough	Chapter 100 – Deer Management



Table 9.13-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
				Chapter 132 – Highlands Chapter 154 – Natural Area Preserve

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Borough of Hopatcong.

Table 9.13-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Land Use Board
Mitigation Planning Committee	Yes	OEM
Environmental Board/Commission	Yes	Environmental Committee
Open Space Board/Committee	Yes	
Economic Development Commission/Committee	No	
Maintenance Programs to Reduce Risk	Yes	OEM
Mutual Aid Agreements	Yes	Fire Department/EMS/OEM
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Land Use Board, Engineers
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Borough Engineer
Planners or engineers with an understanding of natural hazards	Yes	Borough Engineer
NFIP Floodplain Administrator	Yes	Construction Official
Surveyor(s)	Yes	Borough Engineer
Personnel skilled or trained in GIS and/or Hazus-MH applications	No	
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	OEM
Grant Writer(s)	Yes	Millennium
Staff with expertise or training in benefit/cost analysis	Yes	Administrator
Professionals trained in conducting damage assessments	Yes	Construction

Fiscal Capability

The table below summarizes financial resources available to the Borough of Hopatcong.

Table 9.13-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	Yes
Capital Improvements Project Funding	Yes

**Table 9.13-7. Fiscal Capabilities**

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	Yes
Impact Fees for homebuyers or developers of new development/homes	No
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	Yes
Open Space Acquisition Funding Programs	Yes
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Borough of Hopatcong.

Table 9.13-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	NP	NP
Building Code Effectiveness Grading Schedule (BCEGS)	Yes	6	Approx. 2013
Public Protection (ISO Fire Protection Classes 1 to 10)	No		
Storm Ready	No	NP	NP
Firewise	No	NP	NP
Disaster/Safety Programs in/for Schools	Yes	Tetra	4/1/15
Organizations with Mitigation Focus (advocacy group, non-government)	Yes	---	Approx. 2011
Public Education Program/Outreach (through website, social media)	Yes	Daycares, group homes, etc.	Approx. 2008
Public-Private Partnerships			

N/A = Not Applicable. NP = Not Participating. - = Unavailable.

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:



- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Borough of Hopatcong's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.13-9. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability		X	
Administrative and Technical Capability		X	
Fiscal Capability	X-Funding		
Community Political Capability		X	
Community Resiliency Capability		X	
Capability to Integrate Mitigation into Municipal Processes and Activities.		X	

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

William O'Connor, Construction Official

Flood Vulnerability Summary

The Borough does not maintain lists of properties that have been damaged by floods. The Borough has very few properties in the floodplain.

Resources

The Construction Official and Town Engineer (consultant) assume the responsibilities of floodplain administration within the Borough. They provide record keeping (maps) and damage assessments for the Borough. However, they do not provide any education or outreach regarding flood hazards/risk or flood risk reduction. The FPA indicated that there are currently no barriers to running an effective floodplain management program and feels adequately supported and trained. He would welcome any continuing education or certification trainings on floodplain management if offered in the County.

Compliance History

The Borough is currently in good standing with the NFIP and the last compliance audit was conducted in 2011.



Regulatory

The Borough's floodplain management ordinances meets the minimum set by FEMA and the State. The Borough does have additional ordinances that support floodplain management and meet NFIP requirements.

Community Rating System

The Borough of Hopatcong does not participate in the Community Rating System (CRS) program and has not considered joining.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Borough has a Land Use Board which reviews all applications for development and consider natural hazard risk areas in their review.

2014 Master Plan Reexamination: Every ten years municipalities are required to review their Master Plans. Commencing in 2014, the Planning Board undertook this review which is reflected in the 2014 Master Plan Reexamination Report and Master Plan Amendments, adopted in April of 2014. The Reexamination Report includes a review and recommendation for changes to the 2008 Master Plan Reexamination. The Report Identified a continued objective from that 2008 Master Plan Reexamination that is applicable to hazard mitigation:

1. Establish green belts and large tracts of open space.
2. Protect the natural features and resources of the community

The Borough identified a new mitigation action to utilize the HMP when updating the Comprehensive Master Plan. Refer to Table 9.13-11 for further information.

Environmental Resource Inventory 2013 and Open Space and Recreation Plan 2011: These documents provide a comprehensive inventory of the environmental sensitive lands and associated hazards.

Highlands: Hopatcong Borough is located in the New Jersey Highlands Region and is part of the Highlands Area. As such, the Borough is one of 88 municipalities protected by and subject to the provisions of the Highlands Water Protection and Planning Act that protects, enhances and restores Highland's natural resources. The Highlands Act requires that future land use in the Highlands Region be guided by the Regional Master Plan's Land Use Capability Map (LUCM) Series which includes tools to identify and protect the natural, scenic and other resources of the region. In supporting and complying with the Highlands Act, the Borough enacted amendments and updates to local zoning and development ordinances that ensure the protection of important resources and areas. The Highland Act creates three primary zones: a Protection Zone, a Conservation Zone and an Existing community Zone. Protection Zones are areas with the highest quality resources with extreme limitations on allowable development while Conservation Zones have significant agricultural lands and associated woodlands and environmental features with allowable development consisting primarily of agricultural uses. Existing Community Zones consist of areas of concentrated development with limited environmental constraints. These zones are overlaid with existing local zoning maps to identify and address



issues of public interest including watershed management, open space preservation, historic preservation, flood protection among others.

Regulatory and Enforcement (Ordinances)

The Borough has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement and an Environmentally Sensitive Areas section included in the Land Use Chapter. The Borough also has a chapter specific to the hazards associated with environmentally sensitive areas.

Chapter 124: Flood Management <http://www.ecode360.com/9568939>

The purpose of this chapter is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 242-76: Stormwater Management

<http://www.ecode360.com/9573199?highlight=stormwater%20management,management,stormwater#9573199>

The purpose of the Stormwater Control chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of the citizens.

Chapter 191-23: Environmental Impact Statement

<http://www.ecode360.com/9570292?highlight=environmentally,environmental#9570292>

The purpose of this section of the Chapter is to allow the Borough to assess the impact of a proposed development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding and waste disposal.

Highlands: In addition, the Highlands Water Protection and Planning Act provides additional regulatory control over development within the Borough. While Major Highlands Development projects, as defined by the Highlands Act, still require local approvals, they must first receive a Highlands Resource Applicability Determination and be evaluated for consistency with the provisions of the Highlands Act. Major Highlands Development projects include a variety of projects such as any non-residential development, any residential development that disturbs one or more acres of land, any development that disturbs ¼ acres or more of forest among others. This process identifies any potential Highlands Resources on the site and if found requires adherence to relevant development standards and restrictions.



Operational and Administration

The Borough has established a Joint Land Use Board that is responsible for the review of development applications. The Borough has a Zoning officer as well as a planning and zoning board secretary.

Funding

Operating Budget: The Borough's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Borough has received funding from the NJDOT, Sustainable Jersey, The Garden State Preservation Trust Fund, and Clean Communities grant programs for the completion of mitigation and emergency response related projects including roadway and drainage improvements.

Education and Outreach

The Borough provides education and outreach regarding hazards through Hopatcong Days, community days and events.

The Borough's website's home page posts information regarding upcoming community events and important municipal decisions. The Borough's website also includes an emergency management information webpage.

Figure 9.13-1. Screenshot of Borough Website with Examples of their Emergency Information Notification



9.13.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own



table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.

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Table 9.13-10. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Hopatcong Borough 1	Retrofit roof, windows and doors to meet current high wind standards on Hudson Maxim School located on River Styx Road.	School Board Administrator	No Progress	Due to lack of funding, this project has not been completed.	Include in 2016 HMP	The windows of the school will be retrofitted to meet high wind standards; retrofitting the roof is not feasible
Hopatcong Borough 2	Retrofit roof to meet current snow load standards on Hopatcong Municipal Facility located on River Styx Road.	Borough Administrator	No Progress	Due to lack of funding, this project has not been completed.	Include in 2016 HMP	The roof of the municipal building will be retrofitted to meet the current snow load standards.
Hopatcong Borough 3	Harden shelter at Hopatcong High School to FEMA 361 Standards.	School Administrator	Complete	1. Funded by the Hopatcong Borough Board of Education. 2. Internal working of shelter funded by the Borough of Hopatcong	Discontinue	The shelter meets FEMA 361 standards and is recognized by FEMA and the American Red Cross as a regional shelter for Sussex County.
Hopatcong Borough 4	Backup generator for Hopatcong Fire Company #4 located on Jefferson Trail. Serves as shelter/reception center.	Station Commander	Complete	This project has been completed and was funded by the Borough.	Discontinue	This project has been completed and was funded by the Borough
Hopatcong Borough 5	Backup generator for Hopatcong Fire Department #3 located on Hopatchung Road. Serves as a shelter/reception center.	Station Commander	Complete	This project has been completed and was funded by the Borough.	Discontinue	This project has been completed and was funded by the Borough
Hopatcong Borough 6	Storm-water management system upgrade and improvement to alleviate flooding between Durban Ave and Wills Ave.	Municipal Engineer	No Progress	This is under NJDEP restriction	Include in 2016 HMP	The Borough will work with the NJDEP to alleviate flooding of the small stream that flows through this area of the Borough.



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Hopatcong Borough 7	Harden shelter at Civic Center located on Lakeside Blvd to FEMA 361 Standards.	Facility Administrator	Complete	The roof has been replaced and the renovations inside the building have been completed.	Discontinue	The roof has been replaced and the renovations inside the building have been completed.
Hopatcong Borough 8	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDM	In Progress	This is ongoing and conducted through Hopatcong Days, community days and events, etc.	Include in 2016 HMP	The Borough will continue and enhance their outreach program.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Borough has not identified any additional mitigation projects/activities that have been completed since approval of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Borough participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013). In May 2015, the Borough participated in a second workshop led by FEMA Region 2 and NJOEM and was provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.13-11 summarizes the comprehensive-range of specific mitigation initiatives the Borough would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High', 'Medium', or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.13-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.13-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Hopatcong-1	Ensure continuity of operations: Purchase and install Hopatcong Borough DPW Bldg Generators	Existing	All	1, 2, 6	DPW, OEM	High	High	HMGP with local cost share	Short Term	High	SIP	PP
Hopatcong-2	Utilize the Hazard Mitigation Plan (HMP) when updating the Comprehensive Master Plan; consider including hazard identification, hazard zones risk assessment information, and hazard mitigation goals as identified in the HMP. Further, the findings and recommendation of the HMP will be considered during any future site plan review processes.	Both	All	All	Planning	High	Low	Municipal Budget	Ongoing	Medium	LPR	PR
Hopatcong-3	Offer training on best practices for hazard mitigation and hazard identification for Borough employees.	N/A	All	All	OEM Coordinator	High	Low	Municipal Budget	Ongoing	Medium	EAP, LPR	PR, PI
Hopatcong-4	Retrofit the windows on Hudson Maxim School located on River Styx Road to meet high wind standards.	Existing	Severe Weather, Severe Winter Weather	1, 2, 6	Borough Administration	Medium	High	HMGP with local cost share	Short Term / DOF	Medium	SIP	PP
Hopatcong-5	Retrofit roof to meet current snow load standards on Hopatcong Municipal Facility located on River Styx Road.	Existing	Severe Winter Weather	1, 2, 6	Borough Administration	Medium	High	HMGP with local cost share	Short Term / DOF	Low	SIP	PP
Hopatcong-6	The Borough will work with the NJDEP to alleviate flooding of the small stream that flows through the area of Flora Avenue between Durban and Wills Avenue.	Existing	All	1, 2	Borough Administration, NJDEP	Medium	Medium	HMGP or other grants with local cost share	Long Term	Low	SIP	PP
Hopatcong-7	Enhance the current all-hazards public education and outreach program by developing, implementing and facilitating a multi-hazard public awareness program. Provide information on all types of hazards, preparedness	N/A	All	All	OEM with support from County OEM	Medium	Low	Municipal Budget	Ongoing	Medium	EAP	PI



Table 9.13-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
	and mitigation measures via the Borough website and social media.											
Hopatcong-8	Upgrade radio communication and pagers for fire department	N/A	All	1, 2, 6	Fire Department	Medium	Medium	HMGP with local cost share	Short Term	Medium	SIP	PP

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
HMA	Hazard Mitigation Assistance Program

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.



- *Structure and Infrastructure Project (SIP)*- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- *Natural Systems Protection (NSP)* – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- *Education and Awareness Programs (EAP)* – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- *Preventative Measures (PR)*-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- *Property Protection (PP)*-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- *Public Information (PI)*-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- *Natural Resource Protection (NR)*-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- *Structural Flood Control Projects (SP)*-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- *Emergency Services (ES)*-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.13-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Hopatcong-1	Hopatcong Borough DPW Bldg Generators	1	1	1	1	1	1	0	0	0	1	1	1	0	0	9	High
Hopatcong-2	Utilize the Hazard Mitigation Plan (HMP) when updating the Comprehensive Master Plan; consider including hazard identification, hazard zones risk assessment information, and hazard mitigation goals as identified in the HMP. Further, the findings and recommendation of the HMP will be considered during any future site plan review processes.	1	1	1	1	0	0	0	0	1	1	1	1	0	0	8	Medium
Hopatcong-3	Offer training on best practices for hazard mitigation and hazard identification for Borough employees.	1	1	1	1	0	0	0	0	1	1	1	1	0	0	8	Medium
Hopatcong-4	Retrofit the windows on Hudson Maxim School located on River Styx Road to meet high wind standards.	1	1	1	1	0	0	0	0	0	1	1	0	0	0	6	Medium
Hopatcong-5	Retrofit roof to meet current snow load standards on Hopatcong Municipal Facility located on River Styx Road.	1	1	0	0	-1	-1	0	0	0	0	1	0	0	0	1	Low
Hopatcong-6	The Borough will work with the NJDEP to alleviate flooding of the small stream that flows through the area of Durban and Wills Avenue.	1	1	0	0	0	1	0	1	0	0	0	0	0	0	4	Low
Hopatcong-7	Enhance the current all-hazards public education and outreach program by developing, implementing and facilitating a multi-hazard public awareness program. Provide information on all types of hazards, preparedness and mitigation measures via the Borough website and social media.	1	1	1	1	0	0	1	0	0	1	1	1	0	0	8	Medium

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.13.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.13.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Borough of Hopatcong that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Borough of Hopatcong has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.13.9 Additional Comments

None at this time.

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Figure 9.13-2. Borough of Hopatcong Hazard Area Extent and Location Map 1

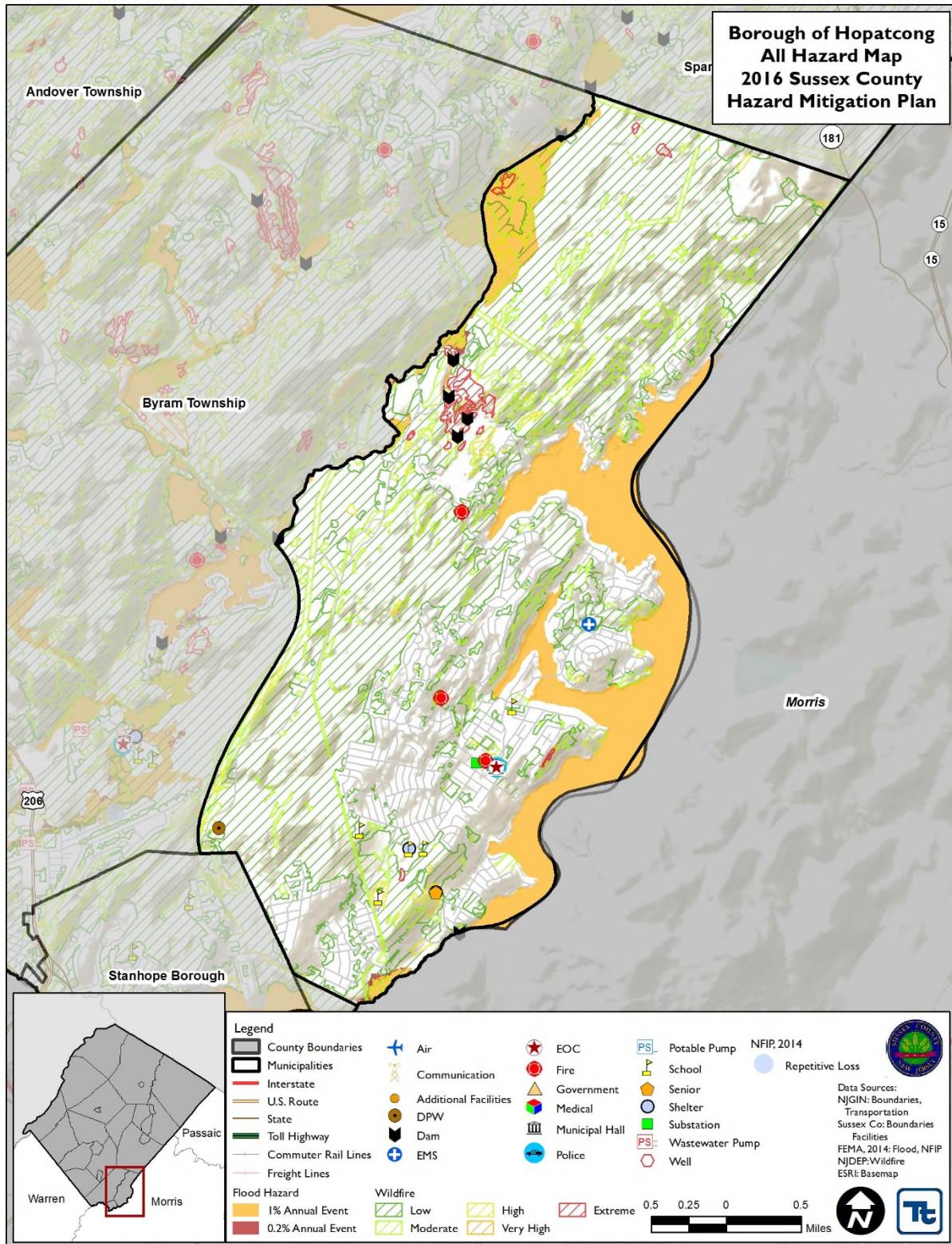
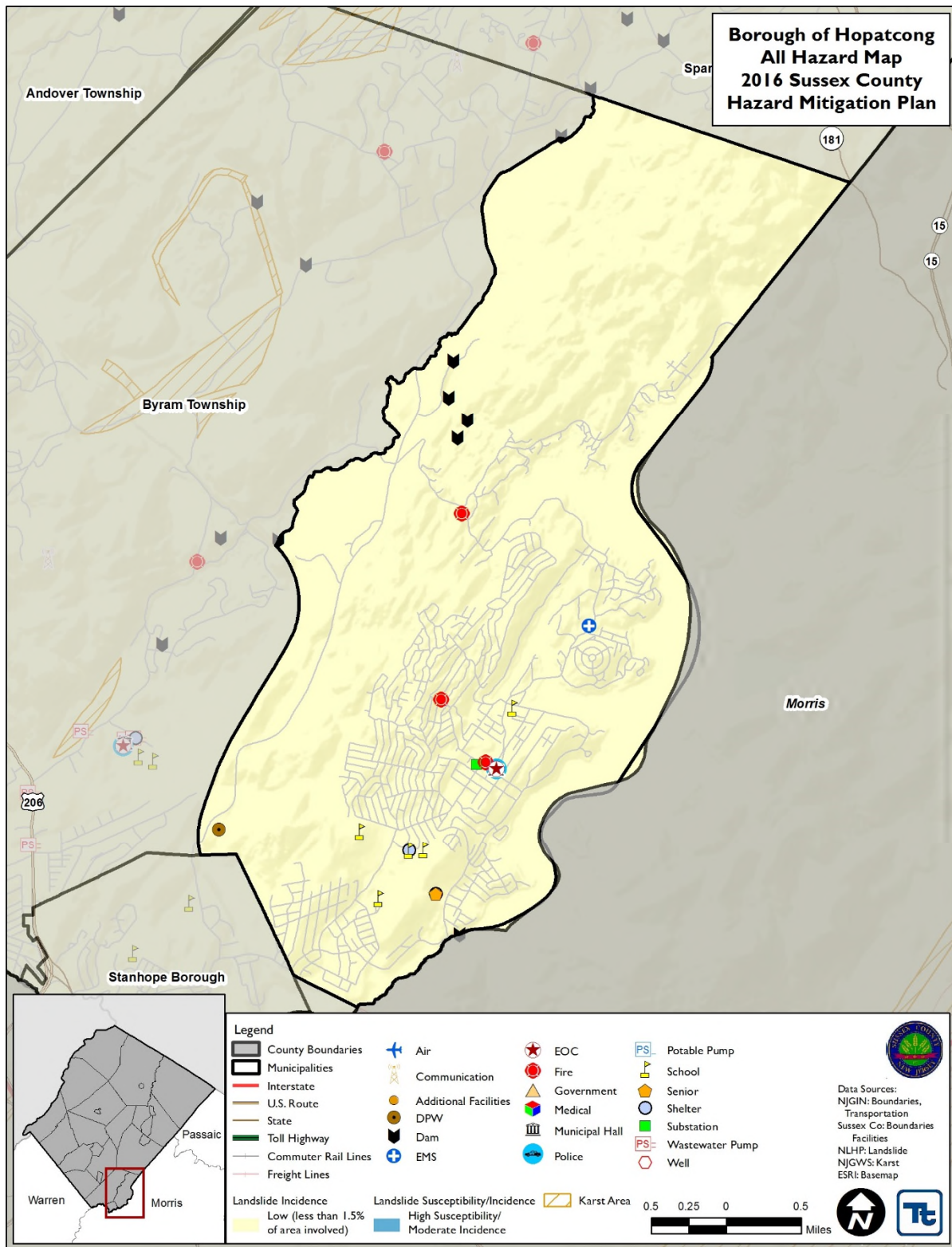




Figure 9.13-3. Borough of Hopatcong Hazard Area Extent and Location Map 2



**Action Number:**

Hopatcong-1

Mitigation Action/Initiative:

Generators for DPW building

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Loss of power to DPW building prevents operations to function during emergencies and hazard events
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install generators at DPW building
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install generators at DPW building
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority*	High
Plan for Implementation	
Responsible/Lead Agency/Department	DPW, OEM
Local Planning Mechanism	Emergency Operations
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Hopatcong-1

Mitigation Action/Initiative: Generators for DPW building

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Provide the DPW the ability to function in the event of a power outage
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	All
Timeline	1	To be completed in the next five years
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	

**Action Number:**

Hopatcong-4

Mitigation Action/Initiative:

Retrofit the windows on Hudson Maxim School located on River Styx Road to meet high wind standards.

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Severe Winter Weather
Specific problem being mitigated:	Windows do not meet the current high winds standards on the school.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit the windows on Hudson Maxim School located on River Styx Road to meet high wind standards.
	2. Construct new building – too costly
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit the windows on Hudson Maxim School located on River Styx Road to meet high wind standards.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium – loss of life and property
Estimated Cost	High
Priority	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Borough Administration
Local Planning Mechanism	School Budget
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Hopatcong-4

Mitigation Action/Initiative:

Retrofit the windows on Hudson Maxim School located on River Styx Road to meet high wind standards.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	
Timeline	0	
Local Champion	0	
Other Community Objectives	0	
Total	6	
Priority (High/Med/Low)	Medium	

**Action Number:**

Hopatcong-5

Mitigation Action/Initiative:

Retrofit roof on Municipal building to meet current snow load standards

Assessing the Risk	
Hazard(s) addressed:	Severe Winter Weather
Specific problem being mitigated:	Roof of municipal building does not meet current snow load standards
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit roof on Municipal building to meet current snow load standards
	2. Construct new municipal building – not feasible; too costly
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit roof on Municipal building to meet current snow load standards
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	High
Priority	Low
Plan for Implementation	
Responsible/Lead Agency/Department	Borough Administration
Local Planning Mechanism	TBD
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Hopatcong-5

Mitigation Action/Initiative: Retrofit roof on Municipal building to meet current snow load standards

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Life and property safety
Property Protection	1	Life and property safety
Cost-Effectiveness	0	
Technical	0	
Political	-1	
Legal	-1	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	0	
Multi-Hazard	1	
Timeline	0	
Local Champion	0	
Other Community Objectives	0	
Total	1	
Priority (High/Med/Low)	low	

**Action Number:**

Hopatcong-6

Mitigation Action/Initiative:

Alleviate flooding on Flora Avenue

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	The area of Flora Avenue, between Durban and Wills Avenue, floods due to the stream overflowing its banks during periods of heavy rain.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Alleviate flooding on Flora Avenue
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	The Borough will work with the NJDEP to alleviate flooding of the small stream that flows through the area of Flora Avenue between Durban and Wills Avenue.
Action/Project Category	SIP
Goals/Objectives Met	1, 2
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium
Priority	Low
Plan for Implementation	
Responsible/Lead Agency/Department	Borough Administration, NJDEP
Local Planning Mechanism	Stormwater Management
Potential Funding Sources	NJDEP, HMGP with local cost share
Timeline for Completion	Long Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Hopatcong-6

Mitigation Action/Initiative: Alleviate flooding on Flora Avenue

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Life and property safety
Property Protection	1	Life and property safety
Cost-Effectiveness	0	
Technical	0	
Political	0	
Legal	1	DEP involvement
Fiscal	0	
Environmental	1	DEP involvement
Social	0	
Administrative	0	
Multi-Hazard	0	
Timeline	0	
Local Champion	0	
Other Community Objectives	0	
Total	4	
Priority (High/Med/Low)	low	

**Action Number:**

Hopatcong-8

Mitigation Action/Initiative:

Upgrade radio communication and pagers for fire department

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	There are communication shortfalls within the Borough fire department
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Upgrade radio communication and pagers for fire department
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Upgrade radio communication and pagers for fire department
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	N/A
Benefits (losses avoided)	Medium
Estimated Cost	Medium
Priority	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Fire Department
Local Planning Mechanism	Emergency Operations
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Hopatcong-8

Mitigation Action/Initiative: Upgrade radio communication and pagers for fire department

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect life and property
Property Protection	1	Protect life and property
Cost-Effectiveness	0	
Technical	1	Technically feasible
Political	0	
Legal	1	Local authority will implement the action
Fiscal	-1	Cannot be funded under existing budget
Environmental	0	
Social	0	
Administrative	1	Self-maintained
Multi-Hazard	1	Quicker response to property loss and life
Timeline	1	Can be completed within 5 years provided grants available
Local Champion	1	Implementation by the fire department
Other Community Objectives	0	
Total	7	
Priority (High/Med/Low)	Medium	



9.14 Township of Lafayette

This section presents the jurisdictional annex for the Township of Lafayette.

9.14.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Rich Hughes, OEM Coordinator 33 Morris Farm Road, Lafayette, NJ 07848 Phone: (973) 985-5971 Email: hughesr22@gmail.com	Bill Macko, Deputy OEM Coordinator 33 Morris Farm Road, Lafayette, NJ 07848 Phone: (973) 383-8809 Email: ltrd@ptd.net

9.14.2 Municipal Profile

Lafayette Township is centrally located in Sussex County. It is bordered to the north by Wantage Township, to the east by Hardyston Township, to the south by Sparta and Andover Townships, and to the west by Frankford and Hampton Townships. The Township covers a total area of approximately 18.0 square miles. According to the U.S. Census, the 2010 population for the Township of Lafayette was 2,538. The following unincorporated communities are located within the Township: Harmonyville, Hopkins Corner, Warbasse, and Branchville Junction. There are many small ponds located throughout the Township and the Paulins Kill flows through the southwestern corner of the Township.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the maps in Section 9.14.8 of this annex which illustrate the hazard areas along with the location of potential new development.

Table 9.14-1. Growth and Development

Property or Development Name	Type (e.g., Res., Comm.)	# of Units/Structures	Location (address and/or Block & Lot)	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to present					
Advanced Housing Group Home	Residential	20 Units	10-12 Route 94	None at this time	Completed
Known or Anticipated Development in the Next Five Years					
Restaurant / Market w/ waste water treatment plant	Commercial	3 structures	37 Route 15	Wildfire: High	Approved
Carson Industries	Light Industrial	13 unit	173-175 Route 94	None at this time	Approved

** Only location-specific hazard zones or vulnerabilities identified.*

9.14.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material



or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.14-2. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	Downed trees and power lines; damages to roads and catch basins; road closures; flooding along Route 15; home was destroyed on Pond School Road; many homes damaged from the storm
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	Downed trees and power lines; damages to roads and catch basins; road closures; flooding; many homes damaged from the storm
October 29, 2011	Severe Storm	DR-4048	Yes	Downed trees and power lines; power outages throughout the Township. Overtime costs for debris clearing, snow removal, etc.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	Downed trees and power lines; debris removal; power outages

9.14.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Lafayette. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Lafayette.

Table 9.14-3. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	Medium
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$378,971 2,500-Year GBS: \$5,859,616	Occasional	28	Medium
Flood	1% Annual Chance: \$21,737,514	Frequent	18	Medium
Geologic	RCV Exposed to Carbonate Rock Areas: \$388,321,883	Occasional	36	Medium*
Hurricane	100-year MRP: \$146,281 500-year MRP: \$1,254,406 Annualized: \$9,379	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High



Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Severe Weather	100-Year MRP: \$146,281 500-year MRP: \$1,254,406 Annualized: \$9,379	Frequent	48	High
Severe Winter Weather	1% GBS: \$4,843,265 5% GBS: \$24,216,327	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$66,236,221	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed for this hazard based on input from the municipality, population exposed, and/or event history.
GBS = General building stock; MRP = Mean return period.

- a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- b. High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
- c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Lafayette.

Table 9.14-4. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Lafayette	12	6	\$125,200	1	0	5

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Note (5) A zero percentage denotes less than 1/100th percentage and not zero damages or vulnerability as may be the case.

Critical Facilities

The table below presents the number of critical facilities, by type, in the community located in the effective FEMA flood zones (1% and 0.2% annual chance boundaries).

**Table 9.14-5. Number of Critical Facilities in the DFIRM 1% and 0.2% Annual Chance Flood Boundaries**

Municipality	0.2% Annual Chance
	DPW
Lafayette, Township of	1

Source: Sussex County; FEMA, 2014

Other Vulnerabilities Identified by Municipality

The Township identified the following vulnerable areas in the community:

- Paulinskill River – when the river floods, it impacts State Route 15, Sunset Inn Road, Garrison Road, Decker Road, and Snover Road.
- Areas of steep slope are located throughout the Township
- During periods of heavy rain, many homes in the Township experience basement flooding. The fire department responds to these homes to assist with basement pump outs.

9.14.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Lafayette.

Table 9.14-6. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Planning Board	2012
Capital Improvements Plan	Yes	Local	Township Committee	Part of the municipal budget – put away funding for these projects; reviewed/updated annually
Floodplain Management/Basin Plan	No			
Stormwater Management Plan	Yes	Local	Emergency Management / Engineer	Reviewed annually



Table 9.14-6. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Open Space Plan	Yes	Local	Open Space Commission / Township Committee	Reviewed annually
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	Yes	Local	Economic Development Subcommittee (Township Committee, Planning Board)	Created subcommittee in 2015 to begin working on this
Comprehensive Emergency Management Plan	Yes	Local	Emergency Management	Reviewed in 2013
Emergency Response Plan	Yes	Local	Emergency Management	Reviewed in 2013
Post-Disaster Recovery Plan	No			
Transportation Plan	Yes	Local		Included in Master Plan
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State and Local	Building Department, Construction Official	State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.) Chapter 8 – Building and Housing
Zoning Ordinance	Yes	Local	Zoning Officer	Chapter 13 - Zoning
Subdivision Ordinance	Yes	Local	Land Use Board	Chapter 12 – Land Use; Chapter 14 – Land Use Procedures
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State and Local	Construction Official	Chapter 17 – Flood Damage Prevention
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State and Local	Construction Official	N.J.A.C 7:13 – Flood Hazard Area Control Act
Growth Management Ordinances	No			
Site Plan Review Requirements	Yes	Local	Site Plan Committee	Chapter 12 – Land Use
Stormwater Management Ordinance	Yes	Local	DPW	Chapter 21 – Stormwater Control
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			



Table 9.14-6. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	Yes	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes	Local		Ridgeline Preservation

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Lafayette.

Table 9.14-7. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Land Use Board
Mitigation Planning Committee	No	
Environmental Board/Commission	No	
Open Space Board/Committee	Yes	Open Space Advisory Committee; Recreation Committee
Economic Development Commission/Committee	Yes	In progress of developing – Economic Development Subcommittee
Maintenance Programs to Reduce Risk	Yes	DPW maintains tree trimming, culvert cleaning/repairs
Mutual Aid Agreements	Yes	Surrounding communities
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Municipal Engineer and Planner – contracted and appointed each year
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Municipal Engineer and Planner – contracted and appointed each year
Planner(s) or Engineer(s) with an understanding of natural hazards	Yes	Municipal Engineer and Planner – contracted and appointed each year
NFIP Floodplain Administrator	Yes	Construction Official
Surveyor(s)	Yes	Contracted when needed
Personnel skilled or trained in GIS and/or Hazus-MH applications	No	
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	
Grant Writer(s)	Yes	Contracted
Staff with expertise or training in benefit/cost analysis	Yes	Contracted
Professionals trained in conducting damage assessments	Yes	Part of emergency management



Fiscal Capability

The table below summarizes financial resources available to the Township of Lafayette.

Table 9.14-8. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	No
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	No
Impact Fees for homebuyers or developers of new development/homes	Yes
Stormwater Utility Fee	No
Incur debt through general obligation bonds	No
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	Don't Know
Other Federal or State Funding Programs	Yes
Open Space Acquisition Funding Programs	Yes
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Lafayette.

Table 9.14-9. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	NP	NP
Building Code Effectiveness Grading Schedule (BCEGS)			
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes		
Storm Ready	No	NP	NP
Firewise	No	NP	NP
Disaster/Safety Programs in/for Schools	Yes		
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	Yes		
Public-Private Partnerships	No		

NP = Not participating;

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule



(BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Township of Lafayette's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.14-10. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability		X	
Administrative and Technical Capability	X – due to staff duties and some are outsourced		
Fiscal Capability	X – not enough funding		
Community Political Capability		X	
Community Resiliency Capability	X – emergency services are volunteer; employee staff size is not large enough		
Capability to Integrate Mitigation into Municipal Processes and Activities		X	

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

ADD INFO FROM FPA HERE

Flood Vulnerability Summary

ADD INFO FROM FPA HERE

Resources

ADD INFO FROM FPA HERE



Compliance History

ADD INFO FROM FPA HERE

Regulatory

ADD INFO FROM FPA HERE

Community Rating System

The Township of Lafayette does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Township has a Land Use Board which reviews all applications for development and consider natural hazard risk areas in their review.

Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Control Chapter, Stormwater Management Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter. The Township also has a chapter specific to the hazards associated with environmentally sensitive areas.

Chapter XVII 270: Flood Control

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter XXI: Stormwater Control

The purposed of the Stormwater Control chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare the citizens.



Operational and Administration

The Township has established a Joint Land Use Board that are responsible for the review of development applications. The Township has a Zoning officer as well as a planning and zoning board secretary.

Funding

Operating Budget: The Township's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Township has received funding from the NJDOT, Sustainable Jersey, The Garden State Preservation Trust Fund, and Clean Communities grant programs for the completion of mitigation and emergency response related projects including roadway and drainage improvements.

Education and Outreach

The Township's website's home page posts information regarding upcoming community events and important municipal decisions.

9.14.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.14-11. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Lafayette Township 1	Retrofit roof to meet current snow load standards on the Lafayette Fire Company building located on Route 15	Station Commander	Complete	Roof has been replaced and meets current standards	Discontinue	The roof of the fire department has been replaced; therefore, this action will not be included in the plan update.
Lafayette Township 2	Retrofit roof to meet current snow load standards on Lafayette Department of Public Works Garage and Emergency Medical Services located on Morris Farm Road.	Director of Public Works	In Progress	Main DPW roof – no progress Salt shed & equipment storage shed - completed	Include in 2016 HMP	When replacing the roof of the DPW facility, current snow load standards will be incorporated.
Lafayette Township 3	Retrofit roof to meet current snow load standards of Lafayette Township Elementary School located on Beaver Run Road.	School Board Administrator	Complete	New roof in 2012	Discontinue	The roof of the school was replaced; therefore, this action will not be included in the plan update.
Lafayette Township 4	Retrofit Lafayette Township Elementary School with impact resistant windows and shutters. Located on Beaver Run Road.	School Board Administrator	No Progress		Discontinue	This is not a concern for the Township; therefore, this action will not be included in the plan update.
Lafayette Township 5	Retrofit Lafayette Federated Church (shelter) with impact resistant windows and shutters. Located on Route 15.	Facility Administrator	No Progress		Discontinue	This is not a concern for the Township; therefore, this action will not be included in the plan update.
Lafayette Township 6	Implement the Fire Wise Program throughout the township.	OEM Coordinator	No Progress		Discontinue	This is not a concern for the Township; therefore, this action will not be included in the plan update.



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Lafayette Township 7	Construct a storm-water runoff management system for Dennis Road and Pellettown Road.	Director of Public Works	Complete		Discontinue	This action has been completed; therefore, it will not be included in the plan update.
Lafayette Township 8	Culvert upgrade and improvement along Decker Road and Snover Road.	Director of Public Works	No Progress	Township road but the culvert is too large and is the responsibility of the County	Include in 2016 HMP	Decker and Snover Roads are owned by the Township; however, the culvert needs to be replaced by the County due to its size. This action will be included in the plan update.
Lafayette Township 9	Stormwater management system upgrade and improvement along Beaver Run Road.	OEM Coordinator	No Progress		Discontinue	County Road; not a major flooding concern for the Township
Lafayette Township 10	Stormwater management system upgrade and improvement along Meadows Road.	OEM Coordinator	Complete	DPW has made the repairs where needed	Discontinue	DPW has made the repairs where needed
Lafayette Township 11	Flood-proofing of the Emergency Medical Service and Fire Company building.	Municipal Fire Chief	No Progress		Discontinue	Not a concern for the Township; the buildings are not impacted by flooding
Lafayette Township 12	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	In Progress	Ongoing program in the Township	Include in 2016 HMP	



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Township has identified the following mitigation projects/activities that have also been completed but were not identified in the previous mitigation strategy in the 2011 Plan:

- New retaining wall, drainage and road improvements on Dennis Road – funding through FEMA reimbursement and grant from New Jersey.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Township participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013). FEMA Region 2 and NJOEM led a second workshop in May 2015 and provided the municipalities the results of the risk assessment to further assist with the identification of mitigation actions. Additionally, the Township attended an annex support meeting in October 2015 to identify and finalize mitigation actions for their community.

Table 9.14-11 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.14-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.14-12. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Lafayette-1	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect structures from future damage, with repetitive loss and severe repetitive loss properties as a priority when applicable. Phase 1: Identify appropriate candidates and determine most cost-effective mitigation option (in progress). Phase 2: Work with the property owners to implement selected action based on available funding and local match availability.											
Lafayette-1	See above.	Existing	Flood, Severe Weather Wildfire, Severe Winter Weather	All	Engineering via NFIP FPA with NJOEM, FEMA support	High	High	FEMA Mitigation Grant Programs and local budget (or property owner) for cost share	Ongoing (outreach and specific project identification); Long term DOF (specific project application and implementation)	High	SIP	PP
Lafayette-2	Purchase and install generators at the following locations: <ul style="list-style-type: none"> Township municipal building Township elementary school 	Existing	All	1, 2, 6	OEM, Township Committee	High	Medium	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Lafayette-3	Work with the State of New Jersey to alleviate the flooding of Route 15 from the Paulinskill River.	Existing	Flood, Severe Weather, Severe Winter Weather	All	Township, State of New Jersey	High	Medium to High	State Grants; Municipal Budget	Short Term / DOF	High	SIP	PP
Lafayette-4	Perform regular drainage system maintenance throughout Township. Purchase Vac-All to assist with this maintenance program.	Existing	Flood, Severe Weather, Severe Winter Weather	1, 2, 6	DPW	Medium to High	Low to Medium	Municipal Budget	Ongoing	High	SIP	PP
Lafayette-5	Portable generators and submersible pumps to assist homeowners during periods of flooding; allows fire department to respond to more critical events	Existing	All	1, 2, 6	OEM, Fire Department	High	Medium	Municipal Budget, grant funding where available	Short Term / DOF	Medium	SIP	PP
Lafayette-6	Install, reroute and increase the capability of storm drainage systems throughout the Township.	Existing	Flood, Severe Weather, Severe	1, 2, 5, 6	DPW	Medium	Medium	Municipal Budget, Grant funding	Short Term / DOF	Medium	SIP	PP



Table 9.14-12. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
			Winter Weather					where available				
Lafayette-7	When it comes time to replacing the roof of the Township DPW facility, current snow load standards will be incorporated into the design of the roof.	Existing	Severe Winter Weather	2, 6	DPW	Medium	Medium to High	Municipal Budget	Long Term	Medium	SIP	PP
Lafayette-8	Work with the County to upgrade culverts along Decker and Snover Roads. Due to the size of culverts, the County needs to do the work.	Existing	Flood, Severe Weather, Severe Winter Weather	1, 2, 5, 6	DPW, County Roads	High	Medium to High	Municipal and County Budgets	Short to Long Term	High	SIP	PP
Lafayette-9	Continue to enhance and develop the all-hazards public education and outreach program for hazard mitigation and preparedness for the Township.	N/A	All	All	Township	High	Low	Municipal Budget	Ongoing	High	EAP, LPR	PI, PR

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
RFC	Repetitive Flood Claims Grant Program (discontinued)
SRL	Severe Repetitive Loss Grant Program (discontinued)

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000



Costs:

Where actual project costs cannot reasonably be established at this time:

- Low Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
- Medium Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
- High Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where numerical project benefits cannot reasonably be established at this time:

- Low Long-term benefits of the project are difficult to quantify in the short term.
- Medium Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
- High Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP)-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES)-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.14-13. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High/Medium/Low
Lafayette-1	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition / relocation to protect structures from future damage, with repetitive loss and severe repetitive loss properties as a priority when applicable.	1	1	1	0	0	0	0	1	1	1	1	1	0	0	8	High
Lafayette-2	Purchase and install generators at the following locations: <ul style="list-style-type: none"> Township municipal building Township elementary school 	1	1	1	1	0	0	0	0	1	1	1	1	1	0	9	High
Lafayette-3	Work with the State of New Jersey to alleviate the flooding of Route 15 from the Paulinskill River.	1	1	1	1	0	0	0	1	1	1	1	0	1	0	9	High
Lafayette-4	Perform regular drainage system maintenance throughout Township. Purchase Vac-All to assist with this maintenance program.	1	1	1	1	0	0	0	1	1	1	1	0	1	0	9	High
Lafayette-5	Portable generators and submersible pumps to assist homeowners during periods of flooding; allows fire department to respond to more critical events	1	1	1	1	0	0	0	0	1	1	1	1	1	0	9	Medium
Lafayette-6	Install, reroute and increase the capability of storm drainage systems throughout the Township.	1	1	1	1	0	0	0	1	1	1	1	0	1	0	9	Medium
Lafayette-7	When it comes time to replacing the roof of the Township DPW facility,	1	1	1	1	0	0	0	1	1	1	1	0	1	0	9	Medium



Table 9.14-13. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High/Medium/Low
	current snow load standards will be incorporated into the design of the roof.																
Lafayette-8	Work with the County to upgrade culverts along Decker and Snover Roads. Due to the size of culverts, the County needs to do the work.	1	1	1	1	0	0	0	1	1	1	1	0	1	0	9	High
Lafayette-9	Continue to enhance and develop the all-hazards public education and outreach program for hazard mitigation and preparedness for the Township.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.14.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.14.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Lafayette that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Lafayette has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.14.9 Additional Comments

None at this time.

DRAFT



Figure 9.14-1. Township of Lafayette Hazard Area Extent and Location Map 1

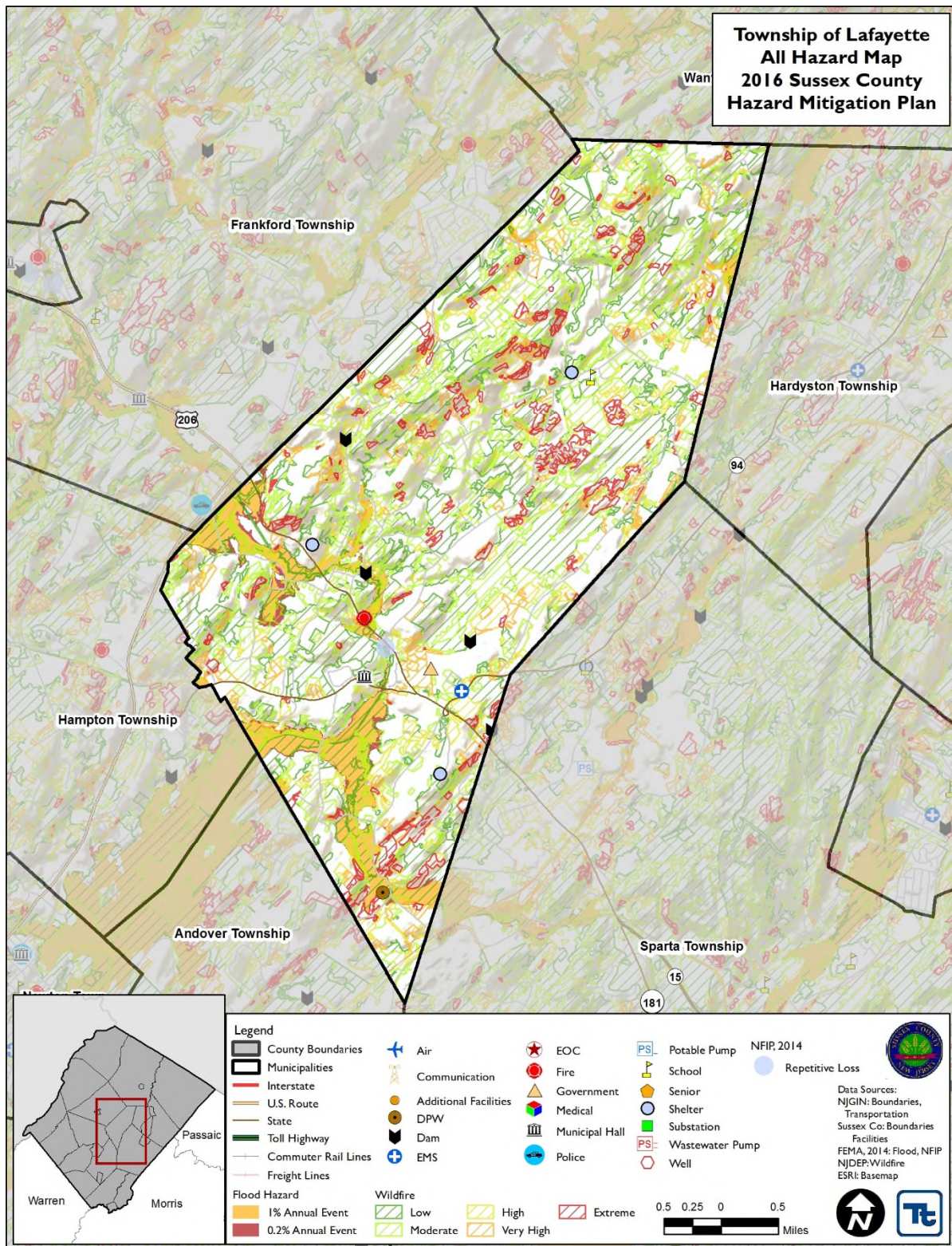
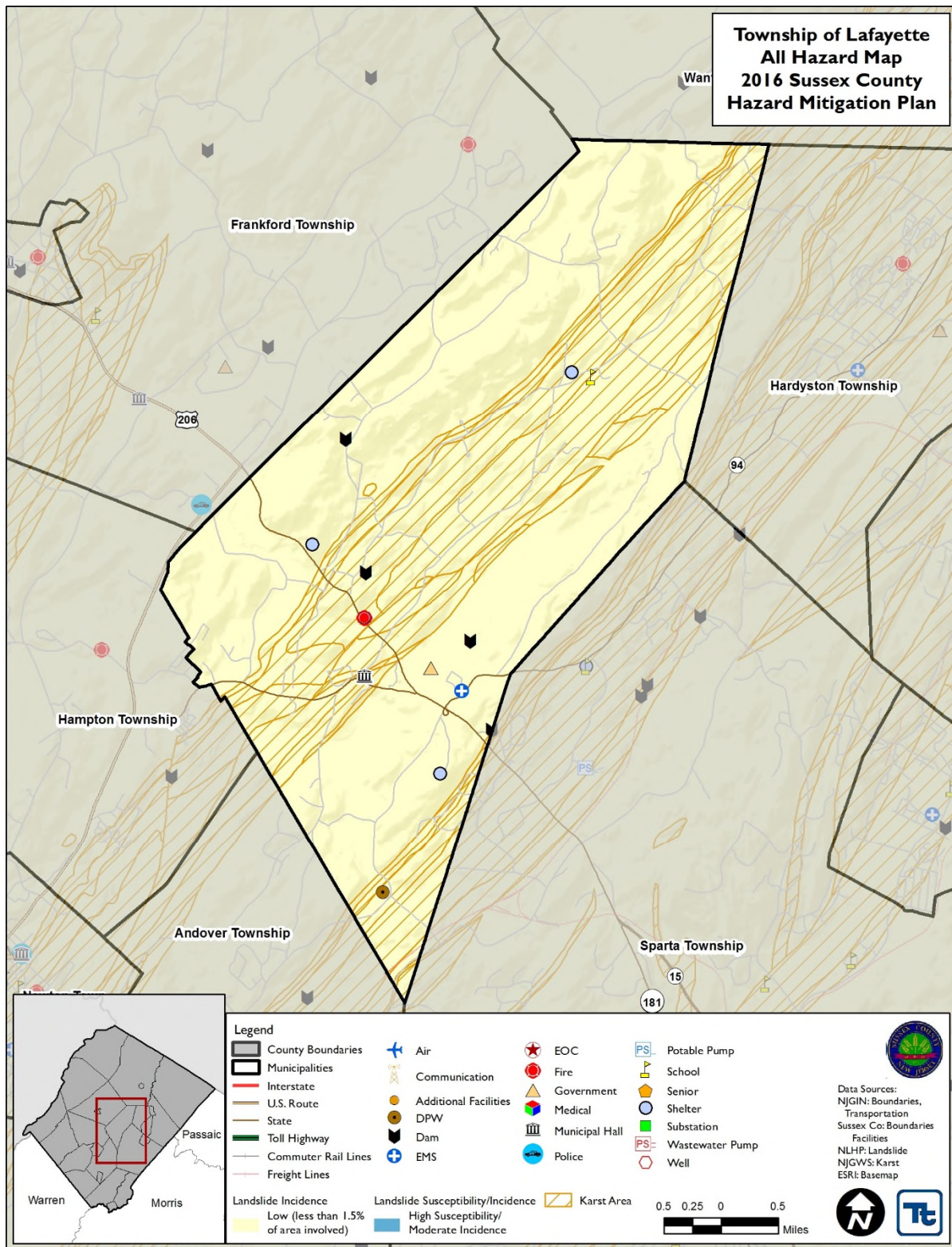




Figure 9.14-2. Township of Lafayette Hazard Area Extent and Location Map 2





Action Number:

Lafayette-2

Mitigation Action/Initiative:

Purchase and install generators at critical facilities

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Loss of power to critical facilities in the Township
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install generators at the municipal building and elementary school
	2. Use portable generators – not feasible for longer power outages
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install generators at the municipal building and elementary school
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township OEM and Committee
Local Planning Mechanism	Emergency Operations, Capital Improvement
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Lafayette-2

Mitigation Action/Initiative: Purchase and install generators at critical facilities

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide shelter for those impacted by power outages
Property Protection	1	Allow Township buildings to function during power outages
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	
Local Champion	1	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	



Action Number:

Lafayette-4

Mitigation Action/Initiative:

Perform regular drainage system maintenance throughout Township. Purchase Vac-All to assist with this maintenance program.

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather, Severe Winter Weather
Specific problem being mitigated:	Drainage systems in the Township become overwhelmed with debris and during periods of heavy rain, these areas flood. Using a vac-all would help with system maintenance.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Perform regular drainage system maintenance throughout Township. Purchase Vac-All to assist with this maintenance program.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Perform regular drainage system maintenance throughout Township. Purchase Vac-All to assist with this maintenance program.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium to High
Estimated Cost	Low to Medium
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	DPW
Local Planning Mechanism	Stormwater Management
Potential Funding Sources	Municipal Budget; Grant funding where available
Timeline for Completion	Ongoing
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Lafayette-4

Mitigation Action/Initiative: Perform regular drainage system maintenance throughout Township. Purchase Vac-All to assist with this maintenance program.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect areas in the Township from flooding and damages from floods
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	0	
Environmental	1	
Social	1	
Administrative	1	
Multi-Hazard	1	Flood, Severe Weather, Severe Winter Weather
Timeline	0	
Local Champion	1	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	



Action Number:

Lafayette-5

Mitigation Action/Initiative:

Portable generators and submersible pumps to assist homeowners during periods of flooding

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Fire department responds to all calls related to flooded basements. They only have a set number of pumps. While attending to these calls, there is less availability for more crucial events.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase portable generators and submersible pumps to assist homeowners during periods of flooding.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase portable generators and submersible pumps to assist homeowners during periods of flooding. This will alleviate the need of the fire department to conduct basement pump outs and be available for more critical events.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	OEM, Fire Department
Local Planning Mechanism	Emergency Operations
Potential Funding Sources	Municipal Budget; Grant Funding where available
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Lafayette-5

Mitigation Action/Initiative: Portable generators and submersible pumps to assist homeowners during periods of flooding

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide assistance to homes with flooded basements
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	Flood, Severe Weather
Timeline	1	
Local Champion	1	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	Medium	



9.15 Township of Montague

This section presents the jurisdictional annex for the Township of Montague.

9.15.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Jesse Brace-Revak, OEM Coordinator 277 Clove Road, Montague, NJ 07827 Phone: (908) 319-1813 Email: jbrace81@yahoo.com	Dave Coss, OEM Deputy 277 Clove Road, Montague, NJ 07827 Phone: (908)319-1811 Email: coss1101@yahoo.com

9.15.2 Municipal Profile

Montague Township is located in the northwest corner of Sussex County. It is bordered to the north by New York State, to the south by Frankford and Sandyston Townships, to the east by Wantage Township and to the west by Pennsylvania. The Township covers a total area of 43.9 square miles and according to the U.S. Census, the 2010 population for the Township of Montague was 3,847. The following unincorporated communities are located within the Township: Four Corners, Montague, Millville, and Duttonville. The Delaware River makes up the northern and western border between the Township and Pennsylvania. Big Flat Brook is a stream located in the southern end of the Township. There are many ponds and lakes located throughout the Township as well.

Growth/Development Trends

The Township of Montague did not note any recent residential/commercial development since 2010 or any major residential or commercial development, or major infrastructure development planned for the next five years in the municipality.

9.15.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.



Table 9.15-1. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	<p>The Township had to evacuate one home due to structural damage from a fallen tree. A set of 12 homes were evacuated in another part of the Township due to a brook overflowing its banks and causing a major wash out of the roadway and surrounding areas. A shelter was set up at the Town Hall for residents that needed it throughout the storm. The Town Hall was also used as a charging station for phones and computers and water and ice were distributed to residents.</p> <p>Approximately 70% of the roads (local, county and state) were closed during the storm for approximately 24 hours. After the storm passed, about 30% of the roads in the Township were closed due to downed utility wires and poles. Two roads in the Township were damaged – Bierskill Road and Brook Heaven Road. Bierskill Road had major damage; the road washed out due to flooding from a brook and a temporary road had to be put in. Brook Heaven Road had minor damage due to brook and storm washout and was open within a week. Utility outages occurred with some portions of the Township not having power for 23 days.</p> <p>The Township requested public assistance from FEMA.</p>
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	<p>The Town Hall was opened and available to residents after the storm mainly due to large power outages. The shelter in the Township was set up for a charging station and water distribution. Many of the roads in the Township were closed due to downed trees and power lines. Most of the Township was without power for up to 20 days. Most of the commercial areas were up and going within a week. Public assistance was requested.</p>

9.15.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Montague. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Montague.

Table 9.15-2. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	High*



Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$336,634 2,500-Year GBS: \$4,837,353	Occasional	28	Medium
Flood	1% Annual Chance: \$12,396,929	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$481,080,865	Occasional	36	High
Hurricane	100-year MRP: \$51,076 500-year MRP: \$1,525,789 Annualized: \$8,449	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$51,076 500-year MRP: \$1,525,789 Annualized: \$8,449	Frequent	48	High
Severe Winter Weather	1% GBS: \$5,506,313 5% GBS: \$27,531,564	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$116,618,913	Frequent	36	High
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was increased to high due to the location of high hazard dams in the municipality

GBS = General building stock; MRP = Mean return period.

a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.

b. High = Total hazard priority risk ranking score of 31 and above

Medium = Total hazard priority risk ranking of 15-30+

Low = Total hazard risk ranking below 15

c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.



National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Montague.

Table 9.15-3. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Montague	17	13	\$155,437	1	0	4

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance flood boundary.

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.

9.15.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms



Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Montague.

Table 9.15-4. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Land Use	Re-examination Adopted 12/8/2011
Capital Improvements Plan	Yes	Local	Twp. Comm.	Adopted Budget 4/14/2015
Floodplain Management/Basin Plan	No			
Stormwater Management Plan	No			
Open Space Plan	No			
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	No			
Comprehensive Emergency Management Plan	No			
Emergency Response Plan	Yes	Local, County	Township OEM	Emergency Operations Plan
Post-Disaster Recovery Plan	No			
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State & Local		State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Land Use	Chapter 76
Subdivision Ordinance	Yes	Local	Land Use	Chapter 60
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State, Local		Chapter 38
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State, Local		
Growth Management Ordinances	No			
Site Plan Review Requirements	Yes	Local	Land Use	Chapter 60
Stormwater Management Ordinance	Yes	Local	Twp. Comm.	Chapter 56
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			
Post-Disaster Recovery	No			



Table 9.15-4. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Ordinance				
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	No			

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Montague.

Table 9.15-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Land Use Board
Mitigation Planning Committee	No	
Environmental Board/Commission	No	
Open Space Board/Committee	No	
Economic Development Commission/Committee	Yes	
Maintenance Programs to Reduce Risk	No	
Mutual Aid Agreements	Yes	Fire/DPW
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Harold E. Pellow & Associates
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	No	
Planners or engineers with an understanding of natural hazards	No	
NFIP Floodplain Administrator	Yes	Bob Huber
Surveyor(s)	No	
Personnel skilled or trained in GIS and/or Hazus-MH applications	No	
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	
Grant Writer(s)	Yes	
Staff with expertise or training in benefit/cost analysis	No	
Professionals trained in conducting damage assessments	No	

Fiscal Capability

The table below summarizes financial resources available to the Township of Montague.

**Table 9.15-6. Fiscal Capabilities**

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	No
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	No
User fees for water, sewer, gas, or electric service	No
Impact Fees for homebuyers or developers of new development/homes	No
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	No
Open Space Acquisition Funding Programs	No
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Montague.

Table 9.15-7. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		
Building Code Effectiveness Grading Schedule (BCEGS)	TBD		
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	6/9	Being Reviewed
Storm Ready	No		
Firewise	No		
Disaster/Safety Programs in/for Schools	TBD		
Organizations with Mitigation Focus (advocacy group, non-government)	TBD		
Public Education Program/Outreach (through website, social media)	TBD		
Public-Private Partnerships	TBD		

NP = Not participating;

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no



classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Township of Montague's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.15-8. Self-Assessment of Capability – Please mark each with an 'X' to indicate your capability.

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability			
Administrative and Technical Capability			
Fiscal Capability			
Community Political Capability			
Community Resiliency Capability			
Capability to Integrate Mitigation into Municipal Processes and Activities.			

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Robert Huber, Construction Official

Flood Vulnerability Summary

The Township maintains a list of properties that have been flooded in the past. Flooding that has impacted these homes is caused by the river. A few of the houses have been sold recently and the new owners have not contacted the Township about any flood issues. During recent FEMA declared disasters (Irene, Lee and Sandy), the Township did not make any substantial damage estimates. There is currently no interest in



mitigation by any homeowner in the municipality. If properties were mitigated, funding sources were be from grant funding.

Resources

The construction official for the Township is the sole person assuming the role and responsibilities of the floodplain administration. His services include damage assessments and limited education and outreach. The Township provides information on flood hazards/risk and flood risk reduction at the municipal building. There are currently no barriers to running an effective floodplain management program and the FPA feels adequately supported and trained to fulfill his responsibilities as the floodplain administrator.

Compliance History

The Township is currently in good standing with the NFIP and the most recent compliance audit was conducted within the last five years.

Regulatory

The Township's flood damage prevention ordinance meets the minimum requirements set by FEMA and the State of New Jersey.

Community Rating System

The Township of Montague does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Township has a Joint Land Use Board which reviews all applications for development and consider natural hazard risk areas in their review.

Montague Township Master Plan Reexamination 2014: This plan updated a number of the goals and objectives from the 2004 Master Plan. None of the goals were mitigation related. The Master Plan also incorporates natural hazard risk/mitigation.

Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter. When updating these ordinances, hazard mitigation is and will be a priority.

Chapter 38: Flood Damage Prevention: The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;



- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 56: Stormwater Control: The purposed of the Stormwater Control Chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of the Townships' citizens and businesses.

Chapter 55-12: Environmental Impact Statement: The purpose of this section of the Chapter is to allow the Township to assess the impact of a proposed development upon the natural environment. Before approving any major subdivision or any site plan that involves a nonresidential use in which there is proposed a new structure, an addition or alteration to an existing structure, a change of use or an expansion of an existing use, the Planning Board shall take into consideration the effect of the proposal for development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding, waste disposal, soil erosion and the preservation of trees and other vegetation.

Operational and Administration

The Township has established a Land Use Board to review all development applications in the Township. Beyond that the Township employs and Planning Board Secretary and contracts out for professional legal, planning, and engineering services for development review.

Funding

Operating Budget: The Township's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Township has received funding from the NJDOT and The Garden State Preservation Trust Fund grant programs. The Township's 2014 Capital Budget includes line items for improvements to the Municipal Building, as well as a number of drainage and roadway improvements.

Education and Outreach

The Township's website posts information regarding upcoming community events and important municipal decisions on the home page. The Township also conducts outreach by having informational brochures available to residents at the Town Hall.



Figure 1. Screenshot of Township Website with Examples of their Emergency Information

Important Emergency Contacts

Immediate Emergency Dial 911.

Fire Department (973) 293-7441

Blue Ridge Rescue Squad (972) 948-4828

NJ Office of Emerg. Mgmt. (609) 963-6992

NJ State Police Augusta, NJ Barracks (973) 383-1514

Montague Emergency Management Coordinator - Jesse Brace-Revak (908) 319-1813

First Energy (Jersey Central Power & Light) (973) 401-8860 | (973) 219-6791
To Report an Outage: (800) 545-7738

Orange & Rockland To Report an Outage (877) 434-4100

Jersey Central <http://outages.firstenergycorp.com/nj.html> | 888.544.4877 (1.888.LIGHTSS)

CenturyLink Customer Service numbers: Residential: 800 366 8201 | Business: 877 365 0045

Traffic Incidents: 511nj.org

If you have an immediate emergency, call 911

The County of Sussex Division of Emergency Management will provide regular updates on the County website and social media channels:
[Twitter](#) • [Facebook](#) • [Subscribe to Email Alerts](#) • [Watch our Alerts web page for the latest updates](#)

9.15.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community’s mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under ‘Capability Assessment’ presented previously in this annex.



Table 9.15-9. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Montague Township 1	Acquisition/Elevation of two Repetitive Loss properties on River Road.	OEM Coordinator	No Progress	There has been no progress on this project as it is not needed in this plan update.	Discontinue	This initiative will be discontinued as it is not needed in this plan update.
Montague Township 2	Retrofit roof to current standards for snow load on Montague Fire Department building located on Clove Road.	Station Commander	No Progress	There has been no progress on this initiative due to lack of funding.	Include in 2016 HMP	The roof at the fire department is flat and failing. It is over 20 years old and in need of replacement. This action will be included in the 2016 HMP Update.
Montague Township 3	Retrofit roof to current standards for high winds on Montague Fire Department building located on Clove Road.	Station Commander	No Progress	There has been no progress on this initiative due to lack of funding.	Include in 2016 HMP	This facility is used as a shelter for first responders during emergencies. The windows are over 30 years old. This action will be included in the 2016 HMP Update.
Montague Township 4	Retrofit roof to current standards for high winds on Montague Elementary School (shelter) located on Route 206.	School Board Administrator	No Progress	There has been no progress on this initiative due to lack of funding.	Include in 2016 HMP	This action will be included in the 2016 HMP Update.
Montague Township 5	Retrofit roof to current standards for snow load on Montague Elementary School (shelter) located on Route 206.	School Board Administrator	Complete	The roof of the school has been replaced and meets current standards for snow load. The project was funded by the local school budget.	Discontinue	Project has been completed.
Montague Township 6	Backup generator for Montague Elementary School (shelter) located on Route 206.	OEM Coordinator	No Progress	There has been no progress on this initiative due to lack of funding.	Include in 2016 HMP	Include in the 2016 HMP Update.
Montague Township 7	Retrofit roof to current standards for snow load on Montague Department of Public Works building	DPW Administrator	Complete	This project was completed approximately five years ago. The roof meets current standards for snow load. The project was funded by the local	Discontinue	Project has been completed.



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
	located on Weider Road.			Township budget.		
Montague Township 8	Retrofit roof to current standards for high winds on Montague Department of Public Works building located on Weider Road.	DPW Administrator	Complete	This project was completed approximately five years ago. The roof meets current standards for high winds. The project was funded by the local Township budget.	Discontinue	Project has been completed.
Montague Township 9	Retrofit municipal building with impact resistant windows and shutters located on Clove Road.	Municipal Engineer	No Progress	There has been no progress on this initiative due to lack of funding.	Include in 2016 HMP	Include in the 2016 HMP Update.
Montague Township 10	Implementation of the Fire Wise Program throughout the Township.	OEM Coordinator	In Progress	The Township is currently working with New Jersey Forest Fire Service to implement this project for the past three years.	Include in 2016 HMP	Include in the 2016 HMP Update.
Montague Township 11	Warning system installation along flood areas on River Road.	OEM Coordinator	No Progress	There has been no progress on this initiative due to lack of funding.	Include in 2016 HMP	The Township will add three warning systems along flood areas on River Road. This will help better warn the Township in the event of flooding.
Montague Township 12	Elevate river banks for a half mile along the Delaware and Benekill Rivers	Township Engineer	No Progress	There has been no progress on this initiative due to lack of funding.	Include in 2016 HMP	Conduct a study along the river banks of the Delaware and Benekill Rivers to identify areas that need to be elevated to reduce flooding impacts.
Montague Township 13	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	In Progress	The Township conducts outreach by having informational brochures available at the Town Hall for residents.	Include in 2016 HMP	This is an ongoing initiative that the Township will enhance and continue to conduct.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Township has not identified any additional mitigation projects/activities that have been completed since approval of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Township participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013). In May 2015, FEMA Region 2 and NJOEM led a workshop and provided the results of the risk assessment to further assist the communities with the identification of mitigation actions. Additionally, in September 2015, the Township participated in an annex support meeting to identify and finalize the community's mitigation actions.

Table 9.15-10 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.15-11 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.15-10. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Montague-1	Retrofit roof to current standards for snow load on Montague Fire Department building located on Clove Road.	Existing	Severe Winter Weather	1, 2, 6	Station Commander	High	Medium	HMGP with local budget for cost share	Short Term / DOF	High	SIP	PP
Montague-2	Retrofit roof to current standards for high winds on Montague Fire Department building located on Clove Road.	Existing	Severe Weather, Severe Winter Weather	1, 2, 6	Station Commander	High	Medium	HMGP with local budget for cost share	Short Term / DOF	High	SIP	PP
Montague-3	Retrofit roof to current standards for high winds on Montague Elementary School (shelter) located on Route 206.	Existing	Severe Weather, Severe Winter Weather	1, 2, 6	School Board Administrator	High	Medium	HMGP with local budget for cost share	Short Term / DOF	High	SIP	PP
Montague-4	Backup generator for Montague Elementary School (shelter) located on Route 206.	Existing	All	1, 2, 6	OEM Coordinator	High	High	HMGP with local budget for cost share	Short Term / DOF	High	SIP	PP
Montague-5	Retrofit municipal building with impact resistant windows and shutters located on Clove Road.	Existing	Severe Winter Weather	1, 2, 6	Municipal Engineer	High	Medium	HMGP with local budget for cost share	Short Term / DOF	High	SIP	PP
Montague-6	Work with the New Jersey Forest Fire Service to implement the FireWise program for the Township	N/A	Wildfire	All	OEM Coordinator	Medium	Low	Municipal Budget; NJDEP	Short Term / DOF	High	EAP, NSP	PI, NR
Montague-7	The Township will add three warning systems along flood areas on River Road. This will help better warn the Township in the event of flooding.	New and Existing	Flood, Severe Weather	1, 2, 3, 4, 5	OEM Coordinator	High	Medium	HMGP with local budget for cost share	Short Term / DOF	High	SIP, NSP	PP, NR
Montague-8	Conduct a study along the river banks of the Delaware and Benekill Rivers to identify areas that need to be elevated to reduce flooding impacts.	New and Existing	Flood, Severe Weather	1, 2, 3, 4, 5	Township Engineer	Medium	Medium	HMGP with local budget for cost share	Short Term / DOF	Medium	LPR, NSP	PR, NR
Montague-9	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	New and Existing	All	All	OEM Coordinator, in coordination with SCDEM	High	Low	Municipal Budget	Ongoing	High	EAP	PI



Table 9.15-10. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Montague-10	Review the current hazard mitigation plan prior to updating land use, zoning changes, or development permitting.	New and Existing	All	All	Township	High	Low	Municipal Budget	Ongoing	High	LPR	PR
Montague-11	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect structures from future damage, with repetitive loss and severe repetitive loss properties as a priority when applicable. Phase 1: Identify appropriate candidates and determine most cost-effective mitigation option. Phase 2: Work with the property owners to implement selected action based on available funding and local match availability.											
	See above.	Existing	Flood, Severe Weather Wildfire, Severe Winter Weather		Engineering via NFIP FPA with NJOEM, FEMA support	High	High	FEMA Mitigation Grant Programs and local budget (or property owner) for cost share	Ongoing (outreach and specific project identification); Long term DOF (specific project application and implementation)	High	SIP	PP

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
HMA	Hazard Mitigation Assistance Program

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000



Costs:

Where actual project costs cannot reasonably be established at this time:

- Low Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
- Medium Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
- High Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where numerical project benefits cannot reasonably be established at this time:

- Low Long-term benefits of the project are difficult to quantify in the short term.
- Medium Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
- High Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP)-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES)-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.15-11. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action / Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Montague-1	Retrofit roof to current standards for snow load on Montague Fire Department building located on Clove Road.	1	1	1	1	0	0	1	0	0	1	1	1	0	0	8	High
Montague-2	Retrofit roof to current standards for high winds on Montague Fire Department building located on Clove Road.	1	1	1	1	0	0	1	0	0	1	1	1	0	0	8	High
Montague-3	Retrofit roof to current standards for high winds on Montague Elementary School (shelter) located on Route 206.	1	1	1	1	0	0	1	0	0	1	1	1	0	0	8	High
Montague-4	Backup generator for Montague Elementary School (shelter) located on Route 206.	1	1	1	1	1	1	1	0	0	1	1	1	0	0	10	High
Montague-5	Retrofit municipal building with impact resistant windows and shutters located on Clove Road.	1	1	1	1	0	0	1	0	0	1	1	1	0	0	8	High
Montague-6	Work with the New Jersey Forest Fire Service to implement the FireWise program for the Township	1	1	1	1	0	0	0	1	0	1	-1	1	1	0	7	High
Montague-7	The Township will add three warning systems along flood areas on River Road. This will help better warn the Township in the event of flooding.	1	1	1	1	0	0	-1	1	0	0	1	1	1	0	7	High
Montague-8	Conduct a study along the river banks of the Delaware and Benekill Rivers to identify areas that need to be elevated to reduce flooding impacts.	1	1	1	1	0	0	-1	1	0	0	1	1	1	0	7	Medium
Montague-9	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	1	1	1	1	1	1	0	0	0	1	1	1	0	0	9	High
Montague-10	Review the current hazard mitigation plan prior to updating land use, zoning changes, or development permitting.	1	1	1	1	1	1	0	0	0	1	1	1	0	0	9	High
Montague-11	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect structures from future damage, with repetitive loss and severe repetitive loss properties as a priority when applicable.	1	1	1	1	1	1	0	0	0	1	1	1	0	0	9	High

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.15.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.15.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Montague that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Montague has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.15.9 Additional Comments

None at this time.

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Figure 9.15-2. Township of Montague Hazard Area Extent and Location Map 1

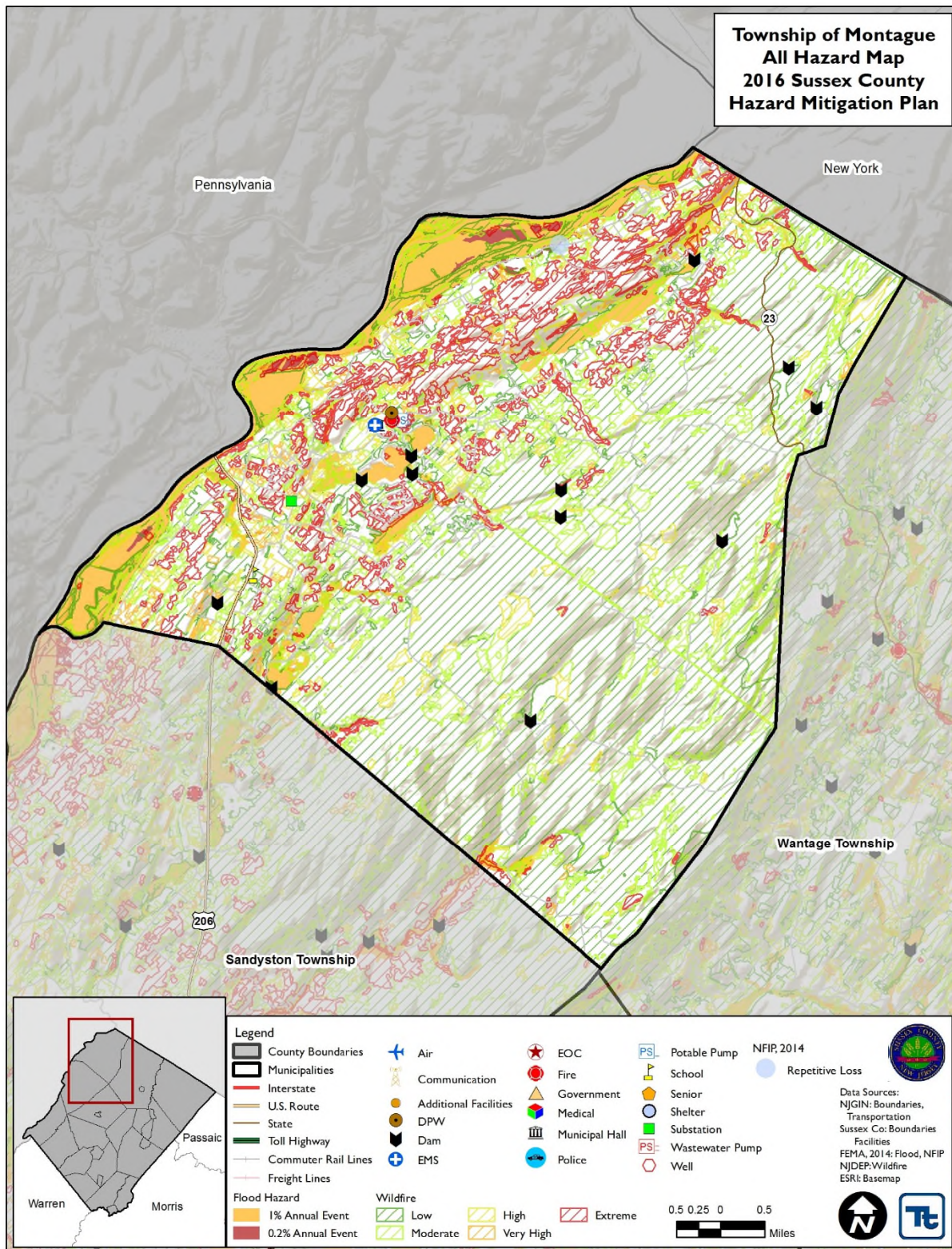
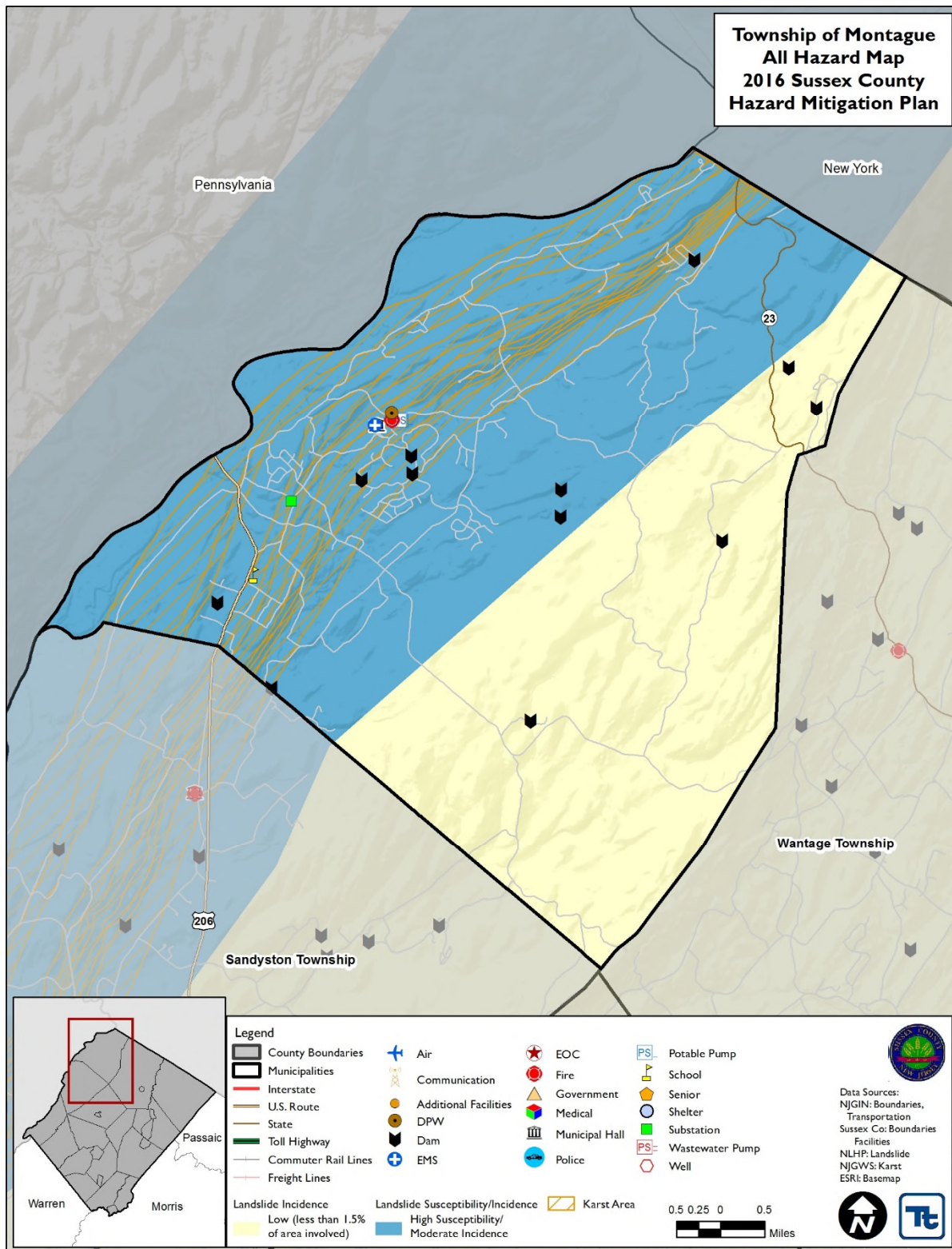




Figure 9.15-3. Township of Montague Hazard Area Extent and Location Map 2



**Action Number:** Montague-1**Mitigation Action/Initiative:** Retrofit roof of Montague Fire Department on Clove Road

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Severe Winter Weather
Specific problem being mitigated:	The roof at the fire department is flat and failing. It is over 20 years old and in need of replacement. This facility is used a shelter for first responders.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit roof of Montague Fire Department on Clove Road to meet current snow load and high wind standards
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit roof of Montague Fire Department on Clove Road to meet current snow load and high wind standards
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Fire Department, Township
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local budget for cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Montague-1

Mitigation Action/Initiative: Retrofit roof of Montague Fire Department on Clove Road

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Allow for continuity of operations in the event of an emergency
Property Protection	1	Reduce damages to building from heavy snow or strong winds
Cost-Effectiveness	1	Little to no repair costs
Technical	1	
Political	0	
Legal	0	
Fiscal	1	Township will seek grant funding
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	Severe Weather, Severe Winter Weather
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	8	
Priority (High/Med/Low)	High	



Action Number:

Montague-2

Mitigation Action/Initiative:

Retrofit roof of Montague Elementary School (shelter)

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Severe Winter Weather
Specific problem being mitigated:	The roof of the school is not retrofitted for current standards for high winds and faces exposure to strong wind events and at risk for being damaged from these types of events.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit roof of Montague Elementary School (shelter) to meet high wind standards
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit roof of Montague Elementary School (shelter) to meet high wind standards
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	School Administration, Township
Local Planning Mechanism	School Budget
Potential Funding Sources	HMGP with local budget for cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Montague-2

Mitigation Action/Initiative: Retrofit roof of Montague Elementary School (shelter)

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Allow for continuity of operations in the event of an emergency
Property Protection	1	Reduce damages to building from strong winds
Cost-Effectiveness	1	Little to no repair costs after roof is retrofitted
Technical	1	
Political	0	
Legal	0	
Fiscal	1	Township will seek grant funding
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	Severe Weather, Severe Winter Weather
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	8	
Priority (High/Med/Low)	High	



Action Number: Montague-3

Mitigation Action/Initiative: Generator Montague Elementary School (shelter)

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Loss of power impacts the school which is used as a shelter; without power, the school cannot function as a proper shelter
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install backup generator for elementary school located on Route 206
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install backup generator for elementary school; the school is used as a shelter for the Township
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	School Administration, Township
Local Planning Mechanism	School Budget
Potential Funding Sources	HMGP with local budget for cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Montague-3

Mitigation Action/Initiative: Generator Montague Elementary School (shelter)

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Allow for continuity of operations in the event of an emergency
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	1	Township will seek grant funding
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	All
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	10	
Priority (High/Med/Low)	High	

**Action Number:**

Montague-4

Mitigation Action/Initiative:

Retrofit municipal building with impact resistant windows and shutters located on Clove Road.

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Severe Winter Weather
Specific problem being mitigated:	The municipal building is at risk to wind damage; if damaged, the municipal building cannot conduct day-to-day operations or emergency operations properly.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit municipal building with impact resistant windows and shutters located on Clove Road.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit municipal building with impact resistant windows and shutters located on Clove Road.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township Administration, Municipal Engineer
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local budget for cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Montague-4

Mitigation Action/Initiative: Retrofit municipal building with impact resistant windows and shutters located on Clove Road.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Allow for continuity of operations in the event of an emergency
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	1	Township will seek grant funding
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	All
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	10	
Priority (High/Med/Low)	High	



Action Number:

Montague-6

Mitigation Action/Initiative:

Warning systems along River Road

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	Lack of flood warning systems along River Road gives the Township little to no warning as to when flooding will occur along this floodprone area in the Township.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Install three warning systems along flood areas of River Road.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Install three warning systems along flood areas of River Road. This will help better warn the Township in the event of flooding.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 3, 4, 5
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	OEM Coordinator
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local budget for cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Montague-6

Mitigation Action/Initiative: Warning systems along River Road

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect residents along River Road from flooding
Property Protection	1	Reduce the impact of flooding
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	-1	
Environmental	1	
Social	0	
Administrative	0	
Multi-Hazard	1	Severe Weather, Flood
Timeline	1	
Local Champion	1	
Other Community Objectives	0	
Total	7	
Priority (High/Med/Low)	High	



9.16 Town of Newton

This section presents the jurisdictional annex for the Town of Newton.

9.16.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Kenneth Teets, OEM Coordinator 39 Trinity Street, Newton, NJ 07860 Phone: (973) 383-3521 Email: kteets@newtonpolice.org	Debra Millikin, Deputy Town Manager 39 Trinity Street, Newton, NJ 07860 Phone: (973) 383-3521, x226 Email: dmillikin@newtontownhall.com

9.16.2 Municipal Profile

The Town of Newton is located centrally in Sussex County and is the county seat of the County. It is bordered to the north by Hampton Township, to the south and east by Andover Township and to the west by Fredon Township. The Town covers an area of approximately 3.2 square miles. The Paulins Kill Tributary flows through the Town and the Pequest River is found in the southern end of the Town. According to the U.S. Census, the 2010 population for the Town of Newton was 7,997.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the map in Section 9.16.8 of this annex which illustrates the hazard areas along with the location of potential new development.

Table 9.16-1. Growth and Development

Property or Development Name	Type (e.g. Res., Comm.)	# of Units/Structures	Location (address and/or Block & Lot)	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to present					
Martarano (Grande Villaggio)	Residential	45 Units	100 Sparta Avenue	Wetlands surrounding property	Town houses – under construction
Newton Town Center	Residential / Commercial	60 apartments	Spring Street	None	60+ senior housing – low to moderate income; retail component as well
Thor Labs	Industrial	To Be Determined	Sparta and Diller Avenues block	Wetlands along Diller Ave.	
Known or Anticipated Development in the Next Five (5) Years					
McGuire's	Residential / Commercial	To Be Determined	Main Street	None	Residential housing, hotels – in proposal stage
Hicks Avenue Redevelopment	Residential / Mixuse	~70 units	Hicks Avenue	Wetlands in small portion	

* Only location-specific hazard zones or vulnerabilities identified.



9.16.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.16-2. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	The Town's water system that goes through Sparta Glen washed out from the Wallkill River. This portion was encased in concrete; however, there was an area that washed out which was not encased. The Town's EOC was operational. There was flooding at the town park and on lower Mill Street.
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	The Town's EOC was operational. There were power outages throughout the Town, downed power lines, debris, and road closures.

9.16.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Town of Newton. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Town of Newton.

Table 9.16-3. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	High*
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$675,651 2,500-Year GBS: \$10,576,744	Occasional	28	Medium
Flood	1% Annual Chance: \$32,280,254	Frequent	18	Medium
Geologic	RCV Exposed to Carbonate Rock Areas: \$808,978,405	Frequent	54	Medium**



Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Hurricane	100-year MRP: \$234,314 500-year MRP: \$2,392,334 Annualized: \$16,211	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$234,314 500-year MRP: \$2,392,334 Annualized: \$16,211	Frequent	48	High
Severe Winter Weather	1% GBS: \$9,265,520 5% GBS: \$46,327,599	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$2,455,940	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed due to the location of high hazard dams in the municipality

** The hazard ranking was changed for this hazard based on input from the municipality, population exposed, and/or event history.

GBS = General building stock; MRP = Mean return period.

a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.

b. High = Total hazard priority risk ranking score of 31 and above

Medium = Total hazard priority risk ranking of 15-30+

Low = Total hazard risk ranking below 15

c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Town of Newton.

Table 9.16-4. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Town of Newton	26	3	\$58,654	0	0	13

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Note (5) A zero percentage denotes less than 1/100th percentage and not zero damages or vulnerability as may be the case.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance boundary.



Other Vulnerabilities Identified by Municipality

The Town identified the following vulnerabilities:

- There are two nursing homes, one retirement community/assistant living/nursing facility, two nursing homes, and dialysis center. There is a need for backup power at several of these facilities.
- Floodprone areas in the Town include: Woodside Avenue (Route 206), Clinton Street, Mill Street, High Street, Main Street, and Nelson Street
- There are three floodgates in the Town: Dam Site #2 (Swartwood Road), Dam Site #3 (below the softball fields at Sussex County Community College), and Dam Site #3 (college property above Hortons Pond).

9.16.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Town of Newton.

Table 9.16-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Planning Board	Town of Newton master Plan, August 2008 (2009/2010)
Capital Improvements Plan	Yes	Local	Town Manager	Annually; part of the municipal budget; 5-year projection
Floodplain Management/Basin Plan	No			
Stormwater Management Plan	Yes	Local	DPW and Town Engineer	
Open Space Plan	Yes	Local	Planning Board	Town of Newton Master Plan, August 2008
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	Yes	Local	Licensed Operator	Part of the Forestry Plan
Economic Development Plan	Yes	Local	Planning Board	Town of Newton master Plan, August 2008



Table 9.16-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Comprehensive Emergency Management Plan	Yes	Local	OEM	Incorporated into the EOP; currently updating
Emergency Response Plan	Yes	Local	OEM	
Post-Disaster Recovery Plan	Yes	Local	OEM	Incorporated into the EOP; currently updating
Transportation Plan	Yes	Local	Planning Board	Circulation Plan
Strategic Recovery Planning Report	No			
Other Plans:	Yes	Local	Town Administration	Newton Community Forestry Management Plan (2010)
Regulatory Capability				
Building Code	Yes	State & Local	Construction	State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Code Enforcement	Chapter 320 – Zoning (2011)
Subdivision Ordinance	Yes	Local	Planning Board	Chapter 240 – Land Subdivision and Site Plan Review (2011)
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State and Local	Construction Official	Chapter 120 – Flood Damage Prevention (2011)
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State and Local	Construction Official	N.J.A.C 7:13 – Flood Hazard Area Control Act
Growth Management Ordinances	Yes	Local	Code Enforcement	Chapter 320 – Zoning (2011)
Site Plan Review Requirements	Yes	Local	Planning Board	Chapter 240 – Land Subdivision and Site Plan Review
Stormwater Management Ordinance	Yes	Local	Town	Chapter 258 – Stormwater Control
Municipal Separate Storm Sewer System (MS4)	Yes	Local	Town	Chapter 228, Article 7 – Sewer and Water; Municipal Separate Storm Sewer
Natural Hazard Ordinance	Yes	Local	Code Enforcement	Chapter 320 – Zoning (2011) – Steep Slopes
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	Yes	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes	Local	Town	Chapter 166 – Land Use Procedures Chapter 262 – Stream Obstruction Chapter 297 – Tree Bank Chapter 299 – Trees

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Town of Newton.



Table 9.16-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Planning and Zoning Boards
Mitigation Planning Committee	No	
Environmental Board/Commission	Yes	Shade Tree Commission
Open Space Board/Committee	Yes	Recreation Committee; Shade Tree Commission
Economic Development Commission/Committee	Yes	Economic Development Commission
Maintenance Programs to Reduce Risk	No	
Mutual Aid Agreements	Yes	Surrounding municipalities
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Professional Engineer - consultant
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Professional Engineer - consultant
Planners or engineers with an understanding of natural hazards	Yes	Professional Engineer and Planners- consultant
NFIP Floodplain Administrator	Yes	Construction Official
Surveyor(s)	Yes	Professional Engineer - consultant
Personnel skilled or trained in GIS and/or Hazus-MH applications	Yes	Professional Engineer - consultant
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	Kenneth Teets, OEM Coordinator
Grant Writer(s)	Yes	Deputy Town Manager
Staff with expertise or training in benefit/cost analysis	No	
Professionals trained in conducting damage assessments	Yes	Building/Construction Department

Fiscal Capability

The table below summarizes financial resources available to the Town of Newton.

Table 9.16-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	Yes – housing rehab program that is a revolving fund
Capital Improvements Project Funding	Yes – part of annual budget
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	Yes
Impact Fees for homebuyers or developers of new development/homes	No – pilots for some of the redevelopment plans
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No

**Table 9.16-7. Fiscal Capabilities**

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Other Federal or State Funding Programs	Yes – USDA rural development
Open Space Acquisition Funding Programs	No
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Town of Newton.

Table 9.16-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	REACH OUT TO HARDYSTON		
Public Protection (ISO Fire Protection Classes 1 to 10)	No		
Storm Ready	No	NP	N/A
Firewise	No	NP	N/A
Disaster/Safety Programs in/for Schools	Yes	Lockdown and Fire Drills every month; fire safety month	
Organizations with Mitigation Focus (advocacy group, non-government)	Yes – SCMUA	Walkill River group – plantings in the floodplain	
Public Education Program/Outreach (through website, social media)	Yes	Facebook, twitter, town website, Nixle	
Public-Private Partnerships	Yes	Wallkill River	

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>



- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Town of Newton's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.16-9. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability		X – create an ordinance	
Administrative and Technical Capability	X – lack of staff		
Fiscal Capability	X		
Community Political Capability	X		
Community Resiliency Capability	X – currently working on		
Capability to Integrate Mitigation into Municipal Processes and Activities.		X	

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Joseph Butto, Construction Official

Flood Vulnerability Summary

The Town of Newton does not maintain lists/inventories of properties that have been damaged by floods. During recent storm events (Irene, Lee, Sandy), there were no reports of damaged structures within the municipality. The FPA did not make substantial damage estimates. There is currently no interest in mitigation within the Town.

Resources

The FPA is the sole person assuming the responsibilities of floodplain administration and does not provide any NFIP administration services or functions to residents of the Town. Additionally, the Town and FPA do not provide any education or outreach to the community regarding flood hazards/risk or flood risk reduction. The FPA stated that training is a barrier to running an effective floodplain management program in the Town. He also indicated that he does not feel adequately supported or trained to fulfill his responsibilities as the municipal FPA and he would consider attending continuing education and/or certification training on floodplain management.

Compliance History

It is unknown if the Town is in good-standing with the NFIP and it is unknown when the most recent compliance audit was conducted.



Regulatory

The FPA does not know if the Town's floodplain management regulations/ordinances exceed the FEMA and State minimum requirements. The Planning and Zoning Boards are usually notified by engineers on efforts to reduce flood risk. The FPA is unsure if the Town of Newton has considered joining CRS.

Community Rating System

The Town of Newton does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Land Use Planning: The Town has a Joint Land Use Board which reviews all applications for development and consider natural hazard risk areas in their review.

Newton Master Plan Reexamination 2008: This plan includes the identification of natural hazard risk areas like floodplains, wetlands, and steep slopes, as well as land use and zoning recommendations for managing those risks. The Plan included the following applicable goals and objectives:

1. Conserve and protect environmentally sensitive areas (e.g. steep slopes, wetlands, and floodplains) in Newton.
2. Utilize modern water runoff control techniques to improve local drainage patterns from new development and to enhance the environment.
3. Promote green building techniques, low impact development, energy efficient buildings and the use of alternative energy.

Regulatory and Enforcement (Ordinances)

The Town has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement.

Chapter 275: Flood Damage Prevention

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and



H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 258: Stormwater Control:

The purposed of the Stormwater Control Chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of the Town's citizens and businesses.

Chapter 240-3f: Environmentally Impact Statement

The purpose of this section of the Chapter is to allow the Town to assess the impact of a proposed development upon the natural environment. Before approving any major subdivision or any site plan that involves a nonresidential use in which there is proposed a new structure, an addition or alteration to an existing structure, a change of use or an expansion of an existing use, the Planning Board shall take into consideration the effect of the proposal for development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding, waste disposal, soil erosion and the preservation of trees and other vegetation.

Operational and Administration

Newton's land use practices are guided by the decisions and recommendations of the Planning Board. The Planning Board is regulated by the New Jersey Municipal Land Use Law and guided by Newton's Land Use Ordinance.

The Planning Board is responsible for evaluating and rendering decisions on applications for development such as site plans, subdivisions, and variances. The Planning Board has reviewed a wide array of applications ranging from high-tech industrial development to the establishment of retail, commercial, and residential properties.

With the elimination of the Zoning Board of Adjustment at the end of 2010, the Planning Board is now also responsible for use variances. An application for a use variance is submitted when a use is not permitted in the zone, e.g. if a property is in a residential district and the owner wants to create a retail store on the property, then the owner would need to apply for a use variance. The retail use is not permitted in the residential zone and would require use variance approval

Funding

Operating Budget: The Towns operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Town has received funding from the NJDOT and The Garden State Preservation Trust Fund grant programs. The Town's 2014 Capital Budget includes line items for improvements to the Municipal Building, as well as a number or drainage and roadway improvements.

Education and Outreach

The Town's website posts information regarding upcoming community events and important municipal decisions on the home page.



Figure 9.16-1. Screenshot of Town Website with Examples of their Emergency Information



9.16.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.16-10. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Newton Town 1	Retrofit roof to meet current standards for high winds on Halstead School located on Halstead Street	School Board Administrator	No Progress	Not complete – roof has not been replaced	Discontinue	The Town feels this is not a concern at this time; therefore, this action will not be included in the 2016 HMP Update.
Newton Town 2	Retrofit oldest portion of building with impact resistant windows of Newton Memorial Hospital located on High Street.	Memorial Hospital Administrator	No Progress	Not complete – Town does not have jurisdiction over the hospital property	Discontinue	The Town does not have jurisdiction over the hospital; therefore, this action will not be included in the 2016 HMP Update.
Newton Town 3	Retrofit roof to meet current snow load standards for two sections of Newton Memorial Hospital located on High Street.	Memorial Hospital Administrator	No Progress	Not complete – Town does not have jurisdiction over the hospital property	Discontinue	The Town does not have jurisdiction over the hospital; therefore, this action will not be included in the 2016 HMP Update.
Newton Town 4	Retrofit roof to meet current standards for high winds on Newton High School located on Ryerson Avenue.	School Board Administrator	Complete	Roof was replaced and upgraded to current building code	Discontinue	The roof of the high school was replaced; therefore, this action will not be included in the 2016 HMP Update.
Newton Town 5	Retrofit roof to meet current standards for snow load on school located on Merriam Avenue.	School Board Administrator	No Progress	Not complete – roof has not been replaced	Discontinue	The Town feels this is not a concern at this time; therefore, this action will not be included in the 2016 HMP Update.
Newton Town 6	Retrofit roof section over vehicle bays to meet current standards for snow load of Newton First Aid Squad 65 located on Sussex Street.	First Aid Squad Administrator	No Progress	Not complete – roof has not been replaced	Discontinue	The Town feels this is not a concern at this time; therefore, this action will not be included in the 2016 HMP Update.
Newton Town 7	Implement Fire Wise Program throughout the Town.	OEM Coordinator	No Progress	Not complete – it has been discussed; but not implemented	Include in 2016 HMP	The Town will include this in the 2016 HMP as it is still a concern for the municipality.



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Newton Town 8	Install armoring at Dam #4 located on Sussex County College property.	Town Engineer	Complete	The Town tore away some of the earth around the emergency spillway and reinforced	Discontinue	The project has been completed; therefore, this action will not be included in the 2016 HMP.
Newton Town 9	Install armoring at Dam #2 located on Swartswood Road.	Town Engineer	In Progress	Currently in progress; working with NJDEP; should be completed within the next five years	Include in 2016 HMP	The Town is currently working the NJDEP; this action will be included in the 2016 HMP.
Newton Town 10	Conduct inundation study for Morris Lake Dam located on Morris Lake Road.	Town Engineer	Complete	The study for the Morris Lake Dam was completed.	Discontinue	The study has been completed; therefore, this action will not be included in the 2016 HMP.
Newton Town 11	Upgrade capacity of Merriam Avenue School stormwater pump facility.	DPW Administrator	No Progress	Due to lack of funding, this action has not been completed.	Include in 2016 HMP	This action will be included in the 2016 HMP.
Newton Town 12	Retrofit roof to meet current standards for high winds on Newton Municipal Building located on Trinity Street.	Town Manager	No Progress	As of the date of this plan, the roof does not need replacing.	Include in 2016 HMP	When the time comes for roof replacement, it will meet current standards for high winds.
Newton Town 13	Retrofit roof to meet current standards for snow load on Fire House #1 located on Mill Street	Station Commander	Complete	Upgraded to current standards	Discontinue	The roof has been replaced and meets current standards; therefore, this action will not be included in the 2016 HMP.
Newton Town 14	Retrofit roof to meet current standards for snow load of Fire House #2 located on Woodside Avenue.	Station Commander	No Progress	As of the date of this plan, the roof does not need replacing.	Include in 2016 HMP	When the time comes for roof replacement, it will meet current standards for snow loads.
Newton Town 15	Storm-water management system upgrade and improvement access way to DPW Garage located on Moran Street.	DPW Administrator	No Progress	Due to lack of funding, this action has not been completed.	Include in 2016 HMP	Storm-water management system upgrade and improvement access way to DPW Garage located on Moran Street.
Newton Town 16	Retrofit roof to meet current standards for snow load of	Deputy Town Manager	Complete	Roof has been upgraded to meet current building code standards	Discontinue	The roof has been replaced and meets current standards;



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
	one waste water treatment plant located on Townsend Street.					therefore, this action will not be included in the 2016 HMP.
Newton Town 17	Retrofit two buildings with impact resistant windows and shutters at the Sussex County Community College	College Administrator	No Progress	At the time of this plan, the windows are not in need of replacement.	Include in 2016 HMP	When the time comes to replace the windows, they will be impact resistant windows and shutters.
Newton Town 18	Retrofit two buildings to meet current snow load standards at the Sussex County Community College	College Administrator	No Progress	At the time of this plan, the roofs are not in need of replacement.	Include in 2016 HMP	When it comes time to replace the roofs, they will meet current snow load standards.
Newton Town 19	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	In Progress	The Town currently uses social media (Facebook, Twitter and Nixle) and the municipal website.	Include in 2016 HMP	The Town will include this in the 2016 HMP.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Town has identified the following mitigation projects/activities that have also been completed but were not identified in the previous mitigation strategy in the 2011 Plan:

- Dam Site #2 on Swartswood Road – the Town is in the process of working with the NJDEP to raise the area to the 100-year flood level
- Dam Site #4 – the Town tore away some of the earth around the emergency spillway and reinforced

Proposed Hazard Mitigation Initiatives for the Plan Update

The Town participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013). In May 2015, the Town participated in a second workshop led by FEMA Region 2 and NJOEM and was provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.16-11 summarizes the comprehensive-range of specific mitigation initiatives the Town would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.16-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.16-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Newton-1	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect structures from future damage, with repetitive loss and severe repetitive loss properties as a priority when applicable. Phase 1: Identify appropriate candidates and determine most cost-effective mitigation option. Phase 2: Work with the property owners to implement selected action based on available funding and local match availability.											
	See above.	Existing	Flood, Severe Weather, Wildfire, Severe Winter Weather	All	Engineering via NFIP FPA with NJOEM, FEMA support	High	High	FEMA Mitigation Grant Programs and local budget (or property owner) for cost share	Ongoing (outreach and specific project identification); Long term DOF (specific project application and implementation)	High	SIP	PP
Newton-2	Utilize the Hazard Mitigation Plan (HMP) when updating the Comprehensive Master Plan; consider including hazard identification, hazard zones risk assessment information, and hazard mitigation goals as identified in the HMP. Further, the findings and recommendation of the HMP will be considered during any future site plan review processes.	Both	All	All	Planning	High	Low	Municipal	Short	High	LPR	PR
Newton-3	Fire House #2 is in need of updating/renovating. This will include the incorporation of the Town EOC.	Both	All	All	Town Administration, Fire Department, OEM	High	High	Grant Funding where available; municipal budget	Short Term / DOF	High	SIP	PP
Newton-4	Dam Site #2 - the Town is in the process of working with the NJDEP to raise the area to the 100-year flood level	Existing	Dam Failure, Flood, Severe Weather	1, 2, 5	Town DPW and Engineering, NJDEP	High	Medium to High	NJDEP and municipal budget	Short Term	High	SIP	PP
Newton-5	Work with the County and NJDOT to identify and address	Existing	Flood, Severe Weather	1, 2, 5	Town DPW, County, and NJDOT	High	High	NJDOT	Short Term / DOF	High	SIP	PP



Table 9.16-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
	the drainage issues along Woodside Avenue.											
Newton-6	Backup generators for the municipal schools – used for shelters for the Town	Existing	All	1, 2, 6	School Board, Town Administration	High	Medium to High	HMGP with local cost share; municipal / school budget	Short Term / DOF	High	SIP	PP
Newton-7	Backup power for the nursing homes and dialysis center located in the Town	Existing	All	1, 2, 6	Building Operators with support from the Town	High	Medium to High	HMGP with local cost share; building budgets	Short Term / DOF	High	SIP	PP
Newton-8	Upgrade capacity of Merriam Avenue School stormwater pump facility.	Existing	Flood, Severe Weather	1, 2	Town DPW and Engineer	High	Medium to High	Grant Funding where available; municipal budget	Short Term / DOF	High	SIP	PP
Newton-9	Retrofit roof to meet current standards for high winds on Newton Municipal Building located on Trinity Street.	Existing	Hurricanes / Tropical Storms, Severe Weather, Severe Winter Weather	1, 2, 6	Town Administration	Medium	Medium to High	Municipal Budget	Short Term / DOF	Medium	SIP	PP
Newton-10	Retrofit roof to meet current standards for snow load of Fire House #2 located on Woodside Avenue.	Existing	Severe Winter Weather	1, 2, 6	Town Engineer and Fire Department	Medium	Medium to High	Municipal Budget	Short Term / DOF	Medium	SIP	PP
Newton-11	Stormwater management system upgrade and improvement access way to DPW Garage located on Moran Street.	Existing	Flood, Severe Weather	1, 2, 6	Town DPW and Engineer	Medium to High	Medium to High	Grant funding where available; municipal budget	Short Term / DOF	High	SIP	PP



Table 9.16-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Newton-12	Retrofit two buildings with impact resistant windows and shutters at the Sussex County Community College	Existing	Hurricanes / Tropical Storms, Severe Weather, Severe Winter Weather	1, 2, 6	Engineering and School Administration	Medium	Medium to High	School Budget	Short Term / DOF	Medium	SIP	PP
Newton-13	Retrofit two buildings to meet current snow load standards at the Sussex County Community College	Existing	Severe Winter Weather	1, 2, 6	Engineering and School Administration	Medium	Medium to High	School Budget	Short Term / DOF	Medium	SIP	PP
Newton-14	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	N/A	All	All	Town Administration, OEM	High	Low	Municipal Budget	Ongoing	High	LPR, EAP	PI, PR

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
RFC	Repetitive Flood Claims Grant Program (discontinued)
SRL	Severe Repetitive Loss Grant Program (discontinued)

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:



Costs:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- *Local Plans and Regulations (LPR)* – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- *Structure and Infrastructure Project (SIP)*- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- *Natural Systems Protection (NSP)* – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- *Education and Awareness Programs (EAP)* – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- *Preventative Measures (PR)*-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- *Property Protection (PP)*-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- *Public Information (PI)*-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- *Natural Resource Protection (NR)*-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- *Structural Flood Control Projects (SP)*-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- *Emergency Services (ES)*-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.16-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High/Medium/Low
Newton-1	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition / relocation to protect structures from future damage, with repetitive loss and severe repetitive loss properties as a priority when applicable.	1	1	1	1	1	1	1	0	1	1	1	1	1	1	13	High
Newton-2	Utilize the Hazard Mitigation Plan (HMP) when updating the Comprehensive Master Plan	1	1	1	1	1	1	1	0	1	1	1	1	1	1	13	High
Newton-3	Fire House #2 is in need of updating/renovating. This will include the incorporation of the Town EOC.	1	1	1	1	1	1	-1	0	1	1	1	0	1	1	10	High
Newton-4	Dam Site #2 - the Town is in the process of working with the NJDEP to raise the area to the 100-year flood level	1	1	1	0	1	1	0	1	1	1	1	1	1	0	11	High
Newton-5	Work with the County and NJDOT to identify and address the drainage issues along Woodside Avenue.	1	1	1	1	1	-1	0	1	1	0	1	0	1	0	8	High
Newton-6	Backup generators for the municipal schools – used for shelters for the Town	1	1	1	1	1	1	0	0	1	1	1	1	1	1	12	High
Newton-7	Backup power for the nursing homes and dialysis center located in the Town	1	1	1	1	0	0	-1	0	1	0	1	0	1	0	6	High
Newton-8	Upgrade capacity of Merriam Avenue School stormwater pump facility.	1	1	1	1	1	1	0	0	1	1	1	1	1	1	12	High
Newton-9	Retrofit roof to meet current standards for high winds on Newton Municipal Building located on Trinity Street.	1	1	1	0	0	1	0	0	1	1	1	0	0	0	7	Medium
Newton-10	Retrofit roof to meet current standards for snow load of Fire House #2 located on Woodside Avenue.	1	1	1	0	0	1	0	0	1	1	1	0	0	0	7	Medium
Newton-11	Stormwater management system upgrade and improvement access	1	1	1	1	1	1	1	0	1	1	1	0	1	1	12	High



Table 9.16-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High/Medium/Low
	way to DPW Garage located on Moran Street.																
Newton-12	Retrofit two buildings with impact resistant windows and shutters at the Sussex County Community College	1	1	1	0	0	-1	0	0	1	0	1	0	0	0	4	Medium
Newton-13	Retrofit two buildings to meet current snow load standards at the Sussex County Community College	1	1	1	0	0	-1	0	0	1	0	1	0	0	0	4	Medium
Newton-14	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	1	1	1	1	1	1	1	0	1	1	1	1	1	1	13	High

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.16.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.16.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Town of Newton that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Town of Newton has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.16.9 Additional Comments

None at this time.

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Figure 9.16-1. Town of Newton Hazard Area Extent and Location Map 1

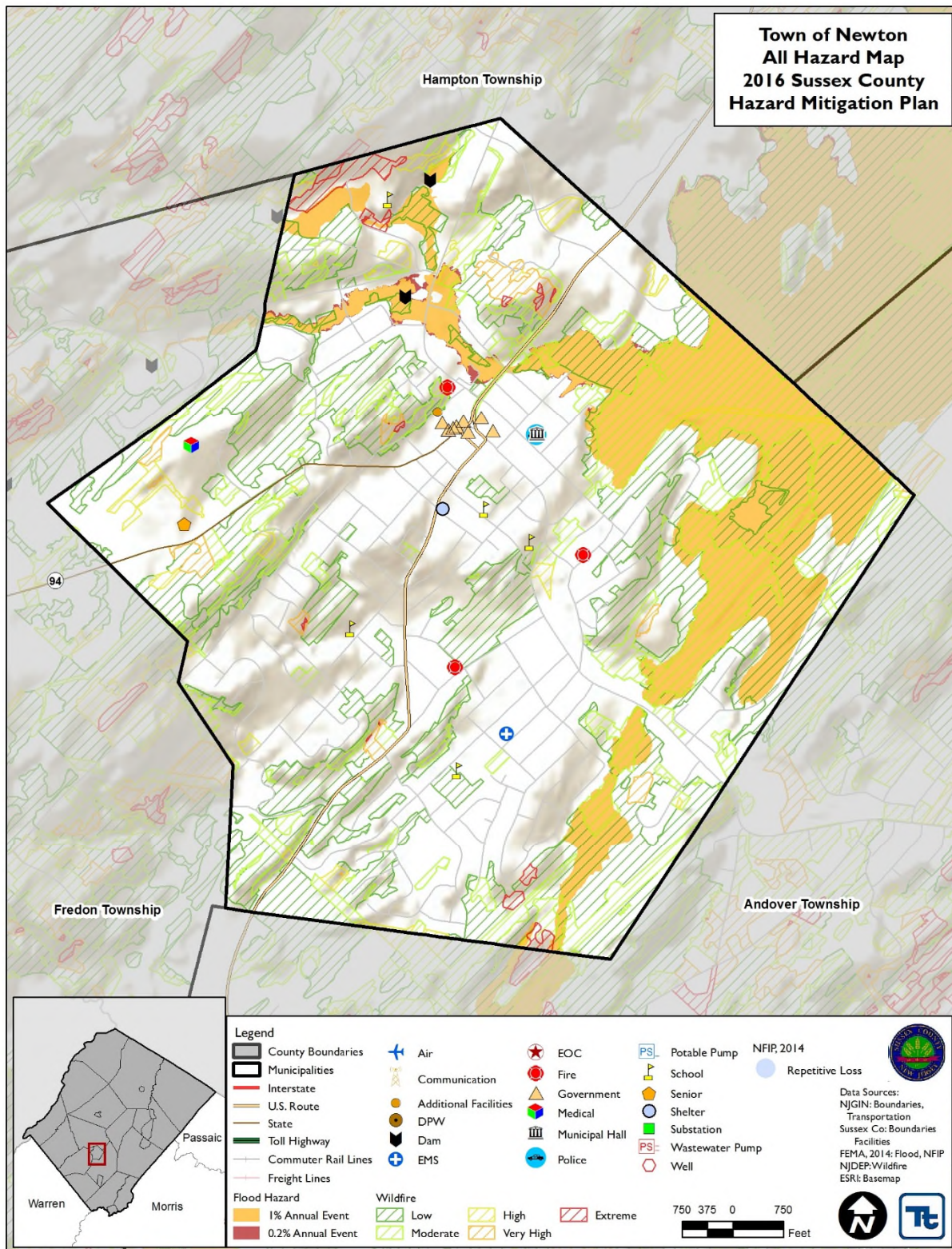
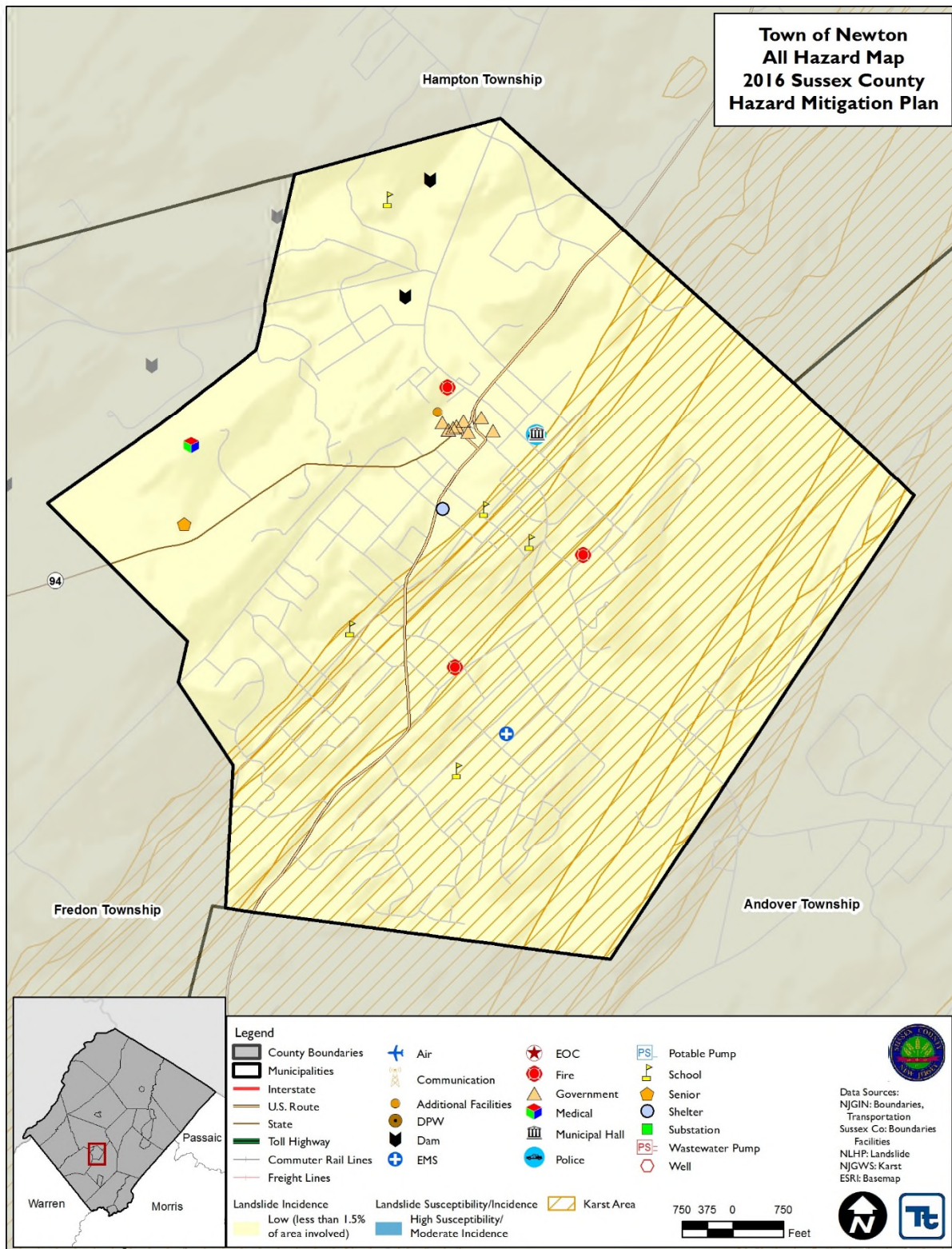




Figure 9.16-2. Town of Newton Hazard Area Extent and Location Map 2





Action Number: Newton-3
Action Name: Fire House #2 update/renovation

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	The fire house is in need of updating/renovating.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Fire House #2 update/renovation
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Fire House #2 is in need of updating/renovating. This will include the incorporation of the Town EOC.
Mitigation Action/Project Type	SIP
Goals Met	All
Applies to existing structures/infrastructure, future, or not applicable	Both
Benefits (losses avoided)	High
Estimated Cost	High
Priority*	High
Plan for Implementation	
Responsible Organization	Planning
Local Planning Mechanism	Capital Improvements, Emergency Management
Potential Funding Sources	Grant Funding where available; municipal budget
Timeline for Completion	Shor Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

* Refer to results of Prioritization (see next page)



Action Number:

Newton-3

Action Name:

Fire House #2 update/renovation

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	-1	Need to seek grant funding
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	0	
Agency Champion	1	
Other Community Objectives	1	
Total	10	
Priority (High/Med/Low)	High	



Action Number:

Newton-4

Action Name:

Dam Site #2 - raise the area to the 100-year flood level

Assessing the Risk	
Hazard(s) addressed:	Dam Failure, Flood, Severe Weather
Specific problem being mitigated:	This area is below the 100-year flood level and prone to flooding
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Dam Site #2 - raise the area to the 100-year flood level
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Dam Site #2 - the Town is in the process of working with the NJDEP to raise the area to the 100-year flood level
Mitigation Action/Project Type	SIP
Goals Met	1, 2, 5
Applies to existing structures/infrastructure, future, or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium to High
Priority*	High
Plan for Implementation	
Responsible Organization	Town Administration, Fire Department, OEM
Local Planning Mechanism	Emergency Management
Potential Funding Sources	NJDEP and municipal budget
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

* Refer to results of Prioritization (see next page)



Action Number:

Newton-4

Action Name:

Dam Site #2 - raise the area to the 100-year flood level

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect those that live within the area of the dam
Property Protection	1	Protect surrounding properties
Cost-Effectiveness	1	
Technical	0	
Political	1	
Legal	1	
Fiscal	0	Project has been started; Town working with NJDEP
Environmental	1	
Social	1	
Administrative	1	
Multi-Hazard	1	Dam Failure, Flood, Severe Weather
Timeline	1	
Agency Champion	1	
Other Community Objectives	0	
Total	11	
Priority (High/Med/Low)	High	



Action Number:

Newton-5

Action Name:

Address the drainage issues along Woodside Avenue.

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	This area is a state highway and floods during periods of heavy precipitation
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Address the drainage issues along Woodside Avenue.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Work with the County and NJDOT to identify and address the drainage issues along Woodside Avenue.
Mitigation Action/Project Type	SIP
Goals Met	1, 2, 5
Applies to existing structures/infrastructure, future, or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority*	High
Plan for Implementation	
Responsible Organization	Town DPW and Engineering, NJDEP
Local Planning Mechanism	Stormwater Management, Emergency Management
Potential Funding Sources	NJDOT
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

* Refer to results of Prioritization (see next page)



Action Number:

Newton-5

Action Name:

Address the drainage issues along Woodside Avenue.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect residents that live in the area of Woodside Avenue
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	-1	This is a state road and NJDOT is responsible for this roadway
Fiscal	0	
Environmental	1	
Social	1	
Administrative	0	
Multi-Hazard	1	Flood, Severe Weather
Timeline	0	
Agency Champion	1	
Other Community Objectives	0	
Total	8	
Priority (High/Med/Low)	High	



Action Number:

Newton-6

Action Name:

Backup generators for the municipal schools

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Lack of backup power for the schools in the Town that serve as shelters during emergencies
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Backup generators for the municipal schools
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Backup generators for the municipal schools – used for shelters for the Town
Mitigation Action/Project Type	SIP
Goals Met	1, 2, 6
Applies to existing structures/infrastructure, future, or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium to High
Priority*	High
Plan for Implementation	
Responsible Organization	Town DPW, County, and NJDOT
Local Planning Mechanism	Capital Improvements, Emergency Management
Potential Funding Sources	HMGP with local cost share; municipal / school budget
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

* Refer to results of Prioritization (see next page)



Action Number:

Newton-6

Action Name:

Backup generators for the municipal schools

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Allow building to function properly in the event of a power outage
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	
Agency Champion	1	
Other Community Objectives	1	
Total	12	
Priority (High/Med/Low)	High	



Action Number:

Newton-7

Action Name:

Backup power for the nursing homes and dialysis center

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Lack of backup power at the nursing facilities in the Town
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Backup power for the nursing homes and dialysis center
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Backup power for the nursing homes and dialysis center located in the Town
Mitigation Action/Project Type	SIP
Goals Met	1, 2, 6
Applies to existing structures/infrastructure, future, or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium to High
Priority*	High
Plan for Implementation	
Responsible Organization	School Board, Town Administration
Local Planning Mechanism	Capital Improvements, Emergency Management
Potential Funding Sources	HMGP with local cost share; building budgets
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

* Refer to results of Prioritization (see next page)



Action Number:

Newton-7

Action Name:

Backup power for the nursing homes and dialysis center

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Allow building to function properly in the event of a power outage
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	-1	
Environmental	0	
Social	1	
Administrative	0	
Multi-Hazard	1	All hazards
Timeline	0	
Agency Champion	1	
Other Community Objectives	0	
Total	6	
Priority (High/Med/Low)	High	

**Action Number:**

Newton-8

Action Name:

Upgrade capacity of Merriam Avenue School stormwater pump facility.

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	The pump facility in this part of Town is prone to flooding during periods of heavy rain
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Upgrade capacity of Merriam Avenue School stormwater pump facility. 2. Do nothing – current problem continues 3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Upgrade capacity of Merriam Avenue School stormwater pump facility.
Mitigation Action/Project Type	SIP
Goals Met	1, 2
Applies to existing structures/infrastructure, future, or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium to High
Priority*	High
Plan for Implementation	
Responsible Organization	Building Operators with support from the Town
Local Planning Mechanism	Capital Improvements, Stormwater Management
Potential Funding Sources	Grant Funding where available; municipal budget
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

* Refer to results of Prioritization (see next page)



Action Number:

Newton-8

Action Name:

Upgrade capacity of Merriam Avenue School stormwater pump facility.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Reduce flooding impacts to the pump facility
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	Flood, Severe Weather
Timeline	1	
Agency Champion	1	
Other Community Objectives	1	
Total	12	
Priority (High/Med/Low)	High	



Action Number:

Newton-9

Action Name:

Retrofit roof of Newton Municipal Building

Assessing the Risk	
Hazard(s) addressed:	Hurricanes / Tropical Storms, Severe Weather, Severe Winter Weather
Specific problem being mitigated:	Building may or may not meet current high wind standards and pose a risk of being damaged during periods of high winds
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit roof of Newton Municipal Building
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit roof to meet current standards for high winds on Newton Municipal Building located on Trinity Street.
Mitigation Action/Project Type	SIP
Goals Met	1, 2, 6
Applies to existing structures/infrastructure, future, or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium to High
Priority*	Medium
Plan for Implementation	
Responsible Organization	Town DPW and Engineer
Local Planning Mechanism	Capital Improvements
Potential Funding Sources	Municipal Budget
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

* Refer to results of Prioritization (see next page)



Action Number:

Newton-9

Action Name:

Retrofit roof of Newton Municipal Building

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect building's roof from high winds
Cost-Effectiveness	1	
Technical	0	
Political	0	
Legal	1	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	Hurricanes / Tropical Storms, Severe Weather, Severe Winter Weather
Timeline	0	
Agency Champion	0	
Other Community Objectives	0	
Total	7	
Priority (High/Med/Low)	Medium	



Action Number: Newton-10
Action Name: Retrofit roof of Fire House #2

Assessing the Risk	
Hazard(s) addressed:	Severe Winter Weather
Specific problem being mitigated:	Building may or may not meet current snow load standards and pose a risk of being damaged during periods of heavy snow
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit roof of Fire House #2
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit roof to meet current standards for snow load of Fire House #2 located on Woodside Avenue.
Mitigation Action/Project Type	SIP
Goals Met	1, 2, 6
Applies to existing structures/infrastructure, future, or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium to High
Priority*	Medium
Plan for Implementation	
Responsible Organization	Town Administration
Local Planning Mechanism	Capital Improvements
Potential Funding Sources	Municipal Budget
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

* Refer to results of Prioritization (see next page)



Action Number: Newton-10
Action Name: Retrofit roof of Fire House #2

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect building from roof damage due to heavy snow
Cost-Effectiveness	1	
Technical	0	
Political	0	
Legal	1	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	Severe Winter Weather
Timeline	0	
Agency Champion	0	
Other Community Objectives	0	
Total	7	
Priority (High/Med/Low)	Medium	



Action Number:	Newton-11
Action Name:	Stormwater management system upgrade and improvement access way to DPW Garage located on Moran Street.

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	This area tends to flood during periods of heavy rain
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Stormwater management system upgrade and improvement access way to DPW Garage located on Moran Street.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Stormwater management system upgrade and improvement access way to DPW Garage located on Moran Street.
Mitigation Action/Project Type	SIP
Goals Met	1, 2, 6
Applies to existing structures/infrastructure, future, or not applicable	Existing
Benefits (losses avoided)	Medium to High
Estimated Cost	Medium to High
Priority*	High
Plan for Implementation	
Responsible Organization	Town Engineer and Fire Department
Local Planning Mechanism	Capital Improvements, Stormwater Management
Potential Funding Sources	Grant funding where available; municipal budget
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

* Refer to results of Prioritization (see next page)



Action Number:

Newton-11

Action Name:

Stormwater management system upgrade and improvement access way to DPW Garage located on Moran Street.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Reduce flood damage to the access way of the DPW garage
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	1	
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	Flood, Severe Weather
Timeline	0	
Agency Champion	1	
Other Community Objectives	1	
Total	12	
Priority (High/Med/Low)	High	

**Action Number:**

Newton-12

Action Name:

Retrofit two buildings with impact resistant windows and shutters at the Sussex County Community College

Assessing the Risk	
Hazard(s) addressed:	Hurricanes / Tropical Storms, Severe Weather, Severe Winter Weather
Specific problem being mitigated:	Buildings do not have impact resistant windows or shutters and may be prone to damages during periods of strong winds.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit two buildings with impact resistant windows and shutters at the Sussex County Community College
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit two buildings with impact resistant windows and shutters at the Sussex County Community College
Mitigation Action/Project Type	SIP
Goals Met	1, 2, 6
Applies to existing structures/infrastructure, future, or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium to High
Priority*	Medium
Plan for Implementation	
Responsible Organization	Town DPW and Engineer
Local Planning Mechanism	Capital Improvements
Potential Funding Sources	School Budget
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

* Refer to results of Prioritization (see next page)



Action Number:

Newton-12

Action Name:

Retrofit two buildings with impact resistant windows and shutters at the Sussex County Community College

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Reduce impacts to the college from high winds
Cost-Effectiveness	1	
Technical	0	
Political	0	
Legal	-1	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	0	
Multi-Hazard	1	Hurricanes / Tropical Storms, Severe Weather, Severe Winter Weather
Timeline	0	
Agency Champion	0	
Other Community Objectives	0	
Total	4	
Priority (High/Med/Low)	Medium	



Action Number:	Newton-13
Action Name:	Retrofit two buildings to meet current snow load standards at the Sussex County Community College

Assessing the Risk	
Hazard(s) addressed:	Severe Winter Weather
Specific problem being mitigated:	Buildings may or may not meet current snow load standards and pose a risk of being damaged during periods of heavy snow
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit two buildings to meet current snow load standards at the Sussex County Community College 2. Do nothing – current problem continues 3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit two buildings to meet current snow load standards at the Sussex County Community College
Mitigation Action/Project Type	SIP
Goals Met	1, 2, 6
Applies to existing structures/infrastructure, future, or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium to High
Priority*	Medium
Plan for Implementation	
Responsible Organization	Engineering and School Administration
Local Planning Mechanism	Capital Improvements
Potential Funding Sources	School Budget
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:

* Refer to results of Prioritization (see next page)



Action Number:

Newton-13

Action Name:

Retrofit two buildings to meet current snow load standards at the Sussex County Community College

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Reduce impacts to the college building roofs from heavy snow
Cost-Effectiveness	1	
Technical	0	
Political	0	
Legal	-1	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	0	
Multi-Hazard	1	Severe Winter Weather
Timeline	0	
Agency Champion	0	
Other Community Objectives	0	
Total	4	
Priority (High/Med/Low)	Medium	



9.17 Borough of Ogdensburg

This section presents the jurisdictional annex for the Borough of Ogdensburg.

9.17.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Steven Ciasullo, Mayor 14 Highland Avenue, Ogdensburg, NJ 07439 Email: sciasullo@hotmail.com	Phyllis Drouin, RMC 14 Highland Avenue, Ogdensburg, NJ 07439 Email: pdrouin@embarqmail.com

9.17.2 Municipal Profile

The Borough of Ogdensburg is located in eastern Sussex County. It bordered to the north by Franklin Borough, to the east by Sparta Township and Hardyston Township, and to the south and west by Sparta Township. The Borough has a total area of approximately 2.3 square miles. South Ogdensburg is an unincorporated community located within the Borough. According to the U.S. Census, the 2010 population for the Borough of Ogdensburg was 2,410. The Wallkill River and its tributaries flow through the Borough. Heaters Pond is large pond that is located along the Borough's eastern border.

Growth/Development Trends

The Borough of Ogdensburg did not note any recent residential/commercial development since 2010 or any major residential or commercial development, or major infrastructure development planned for the next five years in the municipality.

9.17.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.17-1. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	Flooding and power outages; road closures throughout Borough; downed trees and power lines; large amount of debris from downed trees and flooding; clogging of Saw Mill Brook – debris from peoples yards caused the clogging. Shelter was open for residents.
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	Flooding and power outages; road closures throughout Borough; downed trees and power lines; large amount of debris from downed trees and flooding



Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
October 29, 2011	Severe Storm	DR-4048	Yes	Road closures, downed power lines and trees, snow removal, long term power outages, shelters open to residents
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	Road closures, some street flooding, downed power lines and trees, power outages

9.17.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Borough of Ogdensburg. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Borough of Ogdensburg.

Table 9.17-2. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	Medium
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$195,496 2,500-Year GBS: \$3,104,875	Occasional	28	Medium
Flood	1% Annual Chance: \$6,482,101	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$302,371,341	Frequent	54	Medium*
Hurricane	100-year MRP: \$83,270 500-year MRP: \$495,557 Annualized: \$4,680	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$83,270 500-year MRP: \$495,557 Annualized: \$4,680	Frequent	48	High
Severe Winter Weather	1% GBS: \$2,504,644 5% GBS: \$12,523,219	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$8,743,647	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:



- * The hazard ranking was changed for this hazard based on input from the municipality, population exposed, and/or event history.
 GBS = General building stock; MRP = Mean return period.
- The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
 - High = Total hazard priority risk ranking score of 31 and above
 Medium = Total hazard priority risk ranking of 15-30+
 Low = Total hazard risk ranking below 15
 - Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Borough of Ogdensburg.

Table 9.17-3. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Borough of Ogdensburg	8	8	\$53,266	1	0	0

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance flood boundary.

Other Vulnerabilities Identified by Municipality

The Borough identified the following vulnerable areas in the community:

- Corner of Cork Hill and Passaic Streets – this area of the Borough tends to flood during periods of heavy rain.
- Glen Brook Road and Thomas Place – this area floods during periods of heavy rain
- Center Street in the lower end floods during periods of heavy rain
- Predmore Road – floods during periods of heavy rain
- Brooks Flat Rad – floods during periods of heavy rain
- All from the Wallkill River and Sawmill Brook

9.17.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification



- Self-Assessment of Capability
- National Flood Insurance Program
- Community Rating System
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Borough of Ogdensburg.

Table 9.17-4. Planning and Regulatory Tools

Tool / Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept. /Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Borough Council	December 2008
Capital Improvements Plan	No			
Floodplain Management / Basin Plan	Yes	Local	Borough Council	Borough has identified flood areas mapped
Stormwater Management Plan	Yes	Local	Borough Council	Stormwater Management Plan, November 2007
Open Space Plan	Yes	Local	Borough Council	Master Plan
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	No			
Comprehensive Emergency Management Plan	No			
Emergency Response Plan	Yes	Local	Borough Council	Emergency Operations Plan, November 2011
Post-Disaster Recovery Plan	No			
Transportation Plan	No			
Strategic Recovery Planning Report	Yes	Local	Borough Council	Strategic Growth Plan, February 2005
Other Plans:				
Regulatory Capability				
Building Code	Yes	State & Local	Borough	State Uniform Construction Code Act (N.J.S.A. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Borough	Land Development
Subdivision Ordinance	Yes	Local	Borough	Land Development
NFIP Flood Damage Prevention Ordinance	Yes	Local	Engineer	
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	No			
Growth Management Ordinances	No			



Table 9.17-4. Planning and Regulatory Tools

Tool / Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept. /Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Site Plan Review Requirements	No			
Stormwater Management Ordinance	Yes	Local	DPW	Chapter 502 – Drainage, September 15, 2006
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	Yes	Local	Engineer	Flood Damage Prevention
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	Yes	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	No			

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Borough of Ogdensburg.

Table 9.17-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/ Agency/Position
Administrative Capability		
Planning Board	Yes	Land Use Board
Mitigation Planning Committee	No	
Environmental Board/Commission	No	
Open Space Board/Committee	No	
Economic Development Commission/Committee	No	
Maintenance Programs to Reduce Risk	Yes	
Mutual Aid Agreements	Yes	
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Borough Engineer
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	No	
Planners or engineers with an understanding of natural hazards	Yes	Borough Engineer
NFIP Floodplain Administrator	Yes	Borough Engineer
Surveyor(s)	Yes	Contracted
Personnel skilled or trained in GIS and/or Hazus-MH applications	Yes	Borough Engineer
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	



Table 9.17-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/ Agency/Position
Grant Writer(s)	Yes	Borough Engineer
Staff with expertise or training in benefit/cost analysis	Yes	Borough Engineer
Professionals trained in conducting damage assessments	Yes	Borough Engineer

Fiscal Capability

The table below summarizes financial resources available to the Borough of Ogdensburg.

Table 9.17-6. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	Yes
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	Yes
Impact Fees for homebuyers or developers of new development/ homes	Yes
Stormwater Utility Fee	Yes
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	Yes
Open Space Acquisition Funding Programs	Yes
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Borough of Ogdensburg.

Table 9.17-7. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	NP	NP
Building Code Effectiveness Grading Schedule (BCEGS)	TBD		
Public Protection (ISO Fire Protection Classes 1 to 10)	TBD		
Storm Ready	No	NP	NP
Firewise	No	NP	NP
Disaster/Safety Programs in/for Schools	Yes		
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	Yes		

**Table 9.17-7. Education/Outreach and Community Classifications**

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Public-Private Partnerships	TBD		

NP = Not participating.

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Borough of Ogdensburg's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.17-8. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability		X	
Administrative and Technical Capability		X	
Fiscal Capability	X – lack of funding		
Community Political Capability		X	
Community Resiliency Capability		X	
Capability to Integrate Mitigation into Municipal Processes and Activities.		X	



National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Gene Buczynski, Engineer

Flood Vulnerability Summary

ADD INFO FROM FPA HERE

Resources

ADD INFO FROM FPA HERE

Compliance History

ADD INFO FROM FPA HERE

Regulatory

ADD INFO FROM FPA HERE

Community Rating System

The Borough of Ogdensburg does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Borough has a Land Use Board which reviews all applications for development and

Environmental Resource Inventory 2011: This document provides a comprehensive inventory of the environmental sensitive lands and associated hazards.

Highlands: Ogdensburg Borough is located in the New Jersey Highlands Region and is part of the Highlands Area. As such, the Borough is one of 88 municipalities protected by and subject to the provisions of the Highlands Water Protection and Planning Act that protects, enhances and restores Highland's natural resources. The Highlands Act requires that future land use in the Highlands Region be guided by the Regional Master Plan's Land Use Capability Map (LUCM) Series which includes tools to identify and protect the natural, scenic and other resources of the region. In supporting and complying with the Highlands Act, the Borough enacted amendments and updates to local zoning and development ordinances that ensure the protection of important resources and areas. The Highland Act creates three primary zones: a Protection Zone, a Conservation Zone and an Existing community Zone. Protection Zones are areas with the highest quality resources with extreme limitations on allowable development while Conservation Zones have significant agricultural lands and associated woodlands and environmental features with allowable development consisting primarily of agricultural uses. Existing Community Zones consist of areas of concentrated development with limited environmental constraints. These zones are overlayed with existing local zoning maps to identify and address



issues of public interest including watershed management, open space preservation, historic preservation, flood protection among others.

Regulatory and Enforcement (Ordinances)

The Borough has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement and an Environmentally Sensitive Areas section included in the Land Use Chapter. The Borough also has a chapter specific to the hazards associated with environmentally sensitive areas.

Flood Damage Prevention

The purpose of this chapter is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 502: Stormwater Management

The purpose of the Stormwater Control chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of the citizens.

Highlands: In addition, the Highlands Water Protection and Planning Act provides additional regulatory control over development within the Borough. While Major Highlands Development projects, as defined by the Highlands Act, still require local approvals, they must first receive a Highlands Resource Applicability Determination and be evaluated for consistency with the provisions of the Highlands Act. Major Highlands Development projects include a variety of projects such as any non-residential development, any residential development that disturbs one or more acres of land, any development that disturbs ¼ acres or more of forest among others. This process identifies any potential Highlands Resources on the site and if found requires adherence to relevant development standards and restrictions.

Operational and Administration

The Borough has established a Joint Land Use Board that is responsible for the review of development applications. The Borough has a Zoning officer as well as a planning and zoning board secretary.

Funding

Operating Budget: The Borough's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.



Grants: The Borough has received funding from the NJDOT, Sustainable Jersey, The Garden State Preservation Trust Fund, and Clean Communities grant programs for the completion of mitigation and emergency response related projects including roadway and drainage improvements.

Education and Outreach

The Borough's website's home page posts information regarding upcoming community events and important municipal decisions. The Borough identified a new mitigation action to enhance their public outreach and education program on hazard mitigation and preparedness. Refer to Table 9.17-11 for further information.

9.17.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.17-9. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Ogdensburg Borough 1	Acquisition / elevation of one repetitive loss property located on Richardsville Road	OEM Coordinator	No Progress	Due to lack of funding, this project has not been completed.	Include in 2016 HMP	This action will be included in the plan update.
Ogdensburg Borough 2	Retrofit roof to meet current snow load standards for Ogdensburg Elementary School located at 100 Main Street	School Administration	No Progress	The Borough does not have jurisdiction over the elementary school building.	Discontinue	The Borough does not have jurisdiction over the elementary school building; therefore, this action will not be included in the plan update.
Ogdensburg Borough 3	Backup generator for Ogdensburg Elementary School located at 100 Main Street. Facility utilized as a shelter.	School Administration	No Progress	The Borough does not have jurisdiction over the elementary school building.	Discontinue	The Borough does not have jurisdiction over the elementary school building; therefore, this action will not be included in the plan update.
Ogdensburg Borough 4	Dredge Heaters Pond to increase holding capacity.	DPW Supervisor	No Progress	Due to lack of funding, this project has not been completed.	Include in 2016 HMP	Dredge Heaters Pond and armor dam.
Ogdensburg Borough 5	Backup generator for Ogdensburg Fire Department located on Main Street. Facility utilized as a shelter.	Station Commander	No Progress	Due to lack of funding, this project has not been completed.	Include in 2016 HMP	
Ogdensburg Borough 6	Implement Fire Wise Program throughout the Borough.	OEM Coordinator	No Progress		Discontinue	Not a concern to the Borough at this time.
Ogdensburg Borough 7	Stream bank stabilization (vegetation addition) on Middle Sawmill Brook from RR tracks to Route 517.	Borough Engineer	No Progress	Due to lack of funding, this project has not been completed.	Include in 2016 HMP	Stream bank stabilization (vegetation addition) on Middle Sawmill Brook from RR tracks to Route 517.
Ogdensburg Borough 8	Armoring and bank stabilization on Heaters	Borough Engineer	In Progress	Began engineering study; but need funding to complete project	Include in 2016 HMP	Dredge Heaters Pond and armor dam.



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
	Pond Dam located at Edison Road.					
Ogdensburg Borough 9	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	In Progress		Include in 2016 HMP	Continue to enhance and develop the Borough's public outreach and education programs for hazard mitigation and preparedness.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Borough has identified the following mitigation projects/activities that have also been completed but were not identified in the previous mitigation strategy in the 2011 Plan:

- Culvert cleaning and replacement; catch basin maintenance; tree trimming program
- Generator at Borough Hall

Proposed Hazard Mitigation Initiatives for the Plan Update

Sussex County held a mitigation action workshop in April 2015 and provided the municipalities with the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013). In May 2015, a second workshop was led by FEMA Region 2 and NJOEM and the results to the risk assessment were provided to further assist with the identification of mitigation actions. In October 2015, the Borough attended an annex support meeting to complete with the identification of mitigation actions for the community.

Table 9.17-10 summarizes the comprehensive-range of specific mitigation initiatives the Borough would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.17-11 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.17-10. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Ogdensburg-1	Implement the engineering study conducted on Heaters Pond – armor the dam on the pond and stabilize the bank of Heaters Pond.	Existing	Dam Failure, Severe Weather	All	Engineering, Borough administration	High	Medium to High	HMGP with local cost share	Short Term / DOF	Medium	SIP	PP
Ogdensburg-2	Upgrade the emergency warning system in the Borough, including additional fire sirens.	Existing	All	All	Fire Department, OEM	High	Low	Local Budget	Short Term / DOF	High	SIP, EAP	PP, PI
Ogdensburg-3	Implement Reverse 911 system for the Borough	N/A	All	All	OEM, Township Administration	High	Low	Local Budget	Short Term / DOF	Medium	SIP, EAP	PP, PI
Ogdensburg-4	Implement a debris clearing program of the Wallkill River and Saw Mill Brook	Existing	Severe Weather; Severe Winter Weather	2, 5	Engineering and DPW, working with contractors and local utilities	Medium – High (reduced risk of utility outages; life safety)	Medium	Local Budget	Short	Medium	NSP	NR
Ogdensburg-5	Continue to enhance and develop the Borough's public outreach and education programs for hazard mitigation and preparedness.	N/A	All Hazards	All	Elected Official's Office	Medium	Low	Municipal Budget; HMA programs with local or county match	Short	High	EAP	PI
Ogdensburg-6	Ensure continuity of operations at critical facilities. At this time the following is identified: purchase and install backup generators at the following critical facilities: • First Aid Squad • Meadow Road pump station • Fire Department	Existing	All	1, 2, 6	Engineering, OEM	Medium to High	Medium to High	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Ogdensburg-7	Stream bank stabilization (vegetation addition) on Middle Sawmill Brook from RR tracks to Route 517.	Existing	Severe Weather, Flood, Severe Winter Weather	All	Engineering, Borough Administration	Medium	Medium to High	HMGP with local cost share	Short Term / DOF	Medium	SIP	PP



Table 9.17-10. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Ogdensburg-8	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect structures from future damage, with repetitive loss and severe repetitive loss properties as a priority when applicable. Phase 1: Identify appropriate candidates and determine most cost-effective mitigation option. Phase 2: Work with the property owners to implement selected action based on available funding and local match availability.											
	See above.	Existing	Flood, Severe Weather Wildfire, Severe Winter Weather	1, 2, 5	Engineering via NFIP FPA with NJOEM, FEMA support	High	High	HMGP and local budget (or property owner) for cost share	Ongoing (outreach and specific project identification); Long term DOF (specific project application and implementation)	High	SIP	PP

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
RFC	Repetitive Flood Claims Grant Program (discontinued)
SRL	Severe Repetitive Loss Grant Program (discontinued)

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reappropriation of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.



Costs:

High Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

High Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- *Local Plans and Regulations (LPR)* – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- *Structure and Infrastructure Project (SIP)*- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- *Natural Systems Protection (NSP)* – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- *Education and Awareness Programs (EAP)* – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- *Preventative Measures (PR)* - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- *Property Protection (PP)* - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- *Public Information (PI)* - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- *Natural Resource Protection (NR)* - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- *Structural Flood Control Projects (SP)* - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- *Emergency Services (ES)* - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.17-11. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Ogdensburg-1	Implement the engineering study conducted on Heaters Pond – armor the dam on the pond and stabilize the bank of Heaters Pond.	1	1	1	1	1	0	0	1	0	1	1	1	0	0	9	Medium
Ogdensburg-2	Upgrade the emergency warning system in the Borough, including additional fire sirens.	1	1	1	1	1	0	0	0	1	1	1	1	1	0	10	High
Ogdensburg-3	Implement Reverse 911 system for the Borough	1	1	1	1	1	0	0	0	1	1	1	1	1	0	10	Medium
Ogdensburg-4	Implement a debris clearing program of the Wallkill River and Saw Mill Brook	0	1	1	1	1	0	0	1	0	1	1	1	0	0	9	Medium
Ogdensburg-5	Continue to enhance and develop the Borough's public outreach and education programs for hazard mitigation and preparedness.	1	1	1	1	1	0	0	0	1	1	1	1	1	0	10	High
Ogdensburg-6	Purchase and install backup generators at the following critical facilities: • First Aid Squad • Meadow Road pump station • Fire Department	1	1	1	1	1	0	0	0	1	1	1	1	1	0	10	High
Ogdensburg-7	Stream bank stabilization (vegetation addition) on Middle Sawmill Brook from RR tracks to Route 517.	0	1	1	1	1	0	0	1	0	1	1	1	0	0	9	Medium
Ogdensburg-8	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition / relocation to protect structures from future damage, with repetitive loss and severe repetitive loss	1	1	1	1	1	0	0	0	1	1	1	1	1	0	10	High



Table 9.17-11. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
	properties as a priority when applicable.																

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.

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9.17.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.17.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Borough of Ogdensburg that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Borough of Ogdensburg has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.17.9 Additional Comments

None at this time.

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Figure 9.17-1. Borough of Ogdensburg Hazard Area Extent and Location Map 1

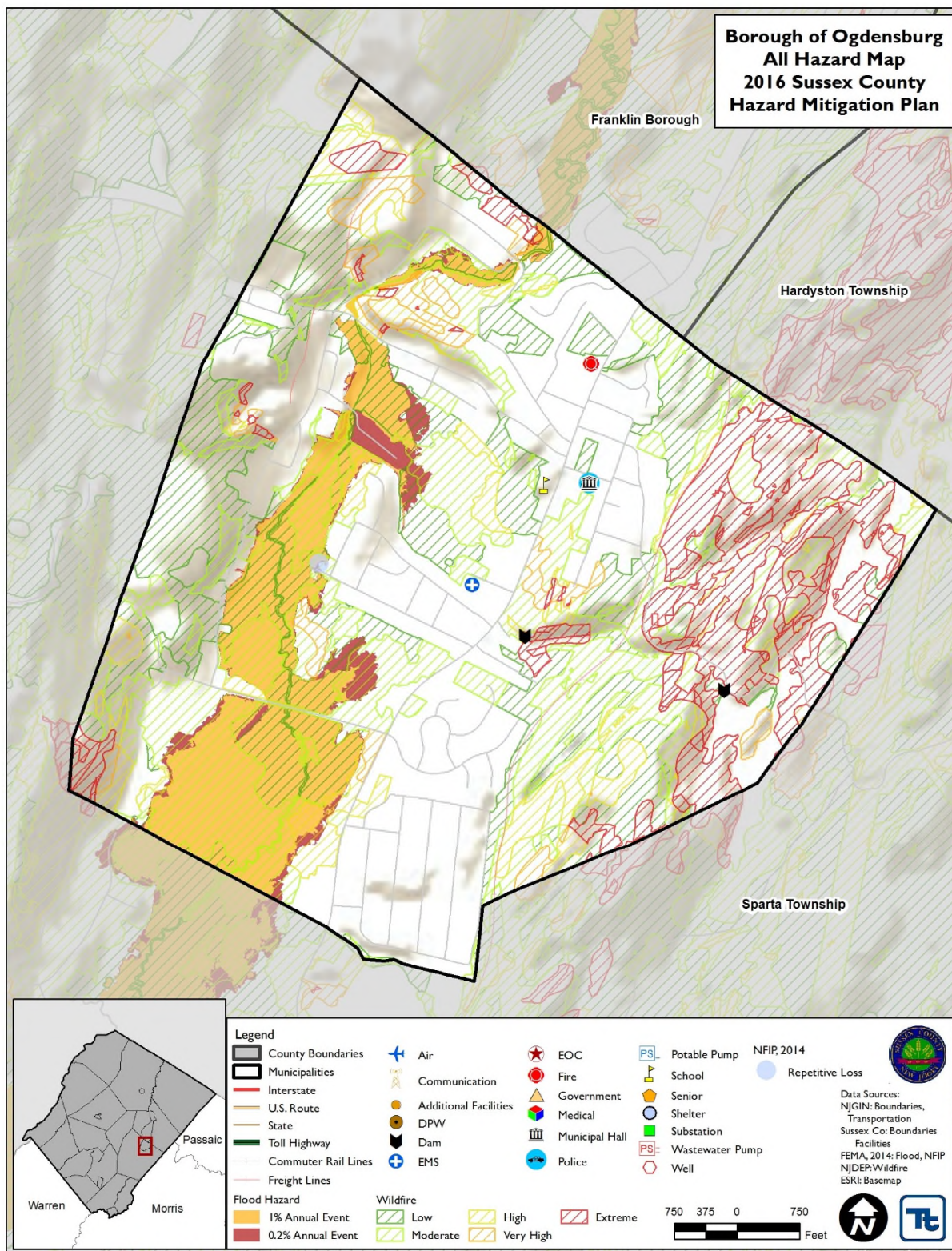
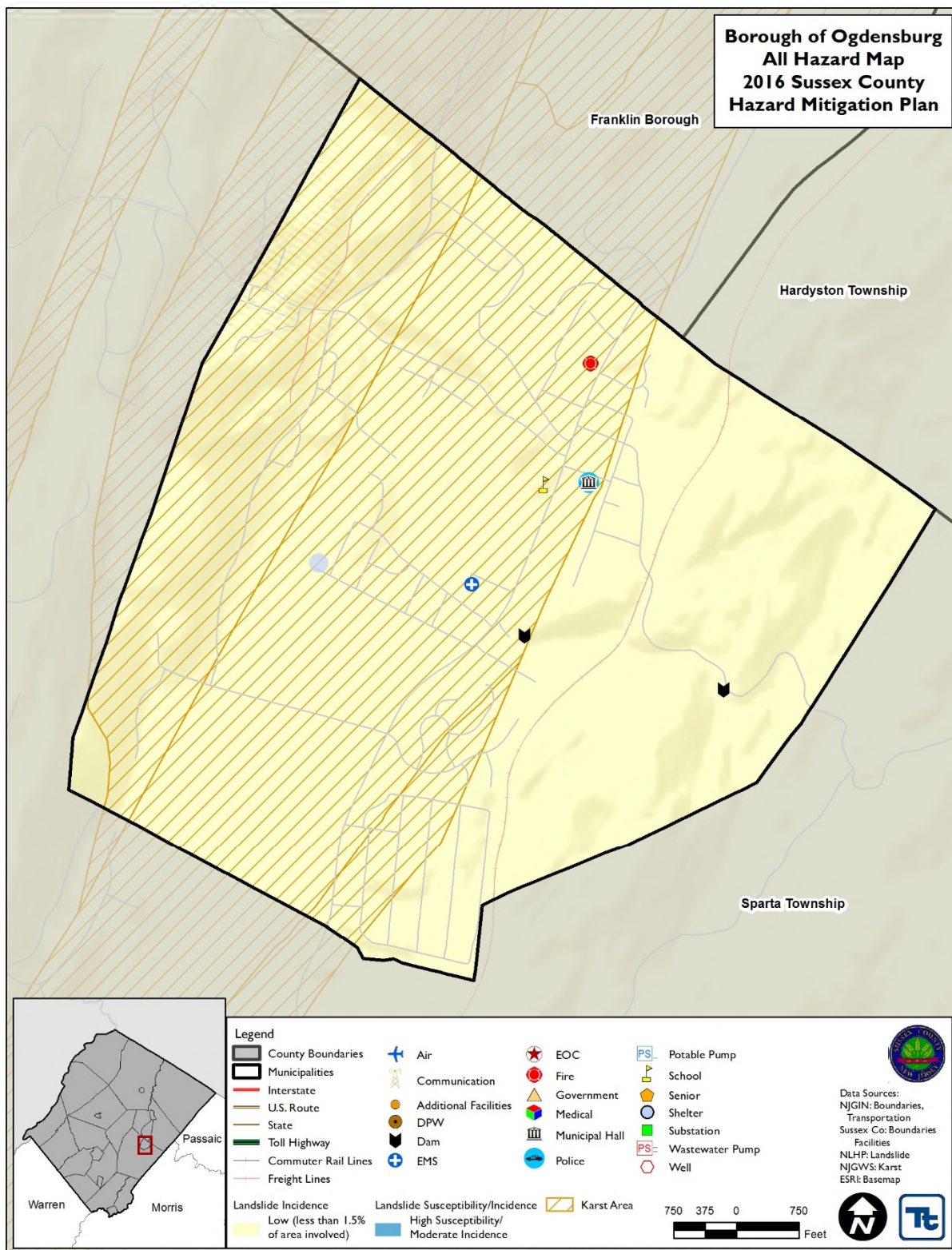




Figure 9.17-2. Borough of Ogdensburg Hazard Area Extent and Location Map 2





Action Number:

Ogdensburg-1

Mitigation Action/Initiative:

Implement the engineering study conducted on Heaters Pond – armor the dam on the pond and stabilize the bank of Heaters Pond.

Assessing the Risk	
Hazard(s) addressed:	Dam Failure, Severe Weather
Specific problem being mitigated:	Risk of dam failure
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Implement the engineering study conducted on Heaters Pond – armor the dam on the pond and stabilize the bank of Heaters Pond.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Implement the engineering study conducted on Heaters Pond – armor the dam on the pond and stabilize the bank of Heaters Pond.
Action/Project Category	SIP
Goals/Objectives Met	All
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium to High
Priority	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Engineering, Borough Administration
Local Planning Mechanism	Emergency Operations, Capital Improvement
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Ogdensburg-1

Mitigation Action/Initiative: Implement the engineering study conducted on Heaters Pond – armor the dam on the pond and stabilize the bank of Heaters Pond.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect the residents that live near Heaters Pond
Property Protection	1	Prevent the dam from failing
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	0	
Fiscal	0	
Environmental	1	
Social	0	
Administrative	1	
Multi-Hazard	1	Dam Failure, Severe Weather
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	Medium	



Action Number:

Ogdensburg-2

Mitigation Action/Initiative:

Upgrade the emergency warning system in the Borough, including additional fire sirens.

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Lack of warning systems in the Borough
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Upgrade the emergency warning system in the Borough, including additional fire sirens.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Upgrade the emergency warning system in the Borough, including additional fire sirens.
Action/Project Category	SIP, EAP
Goals/Objectives Met	All
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Low
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Fire Department, OEM
Local Planning Mechanism	Emergency Operations, Capital Improvement
Potential Funding Sources	Local Budget
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Ogdensburg-2

Mitigation Action/Initiative: Upgrade the emergency warning system in the Borough, including additional fire sirens.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Alert residents in the event of an emergency
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	0	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	
Local Champion	1	
Other Community Objectives	0	
Total	10	
Priority (High/Med/Low)	High	



Action Number:

Ogdensburg-6

Mitigation Action/Initiative:

Purchase and install backup generators at the following critical facilities

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Loss of power to critical facilities in the Borough prevent them from functioning properly in emergencies.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install backup generators at the following critical facilities
	2. Use portable generators – not feasible during longer power outages
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install backup generators at the following critical facilities: <ul style="list-style-type: none">• First Aid Squad• Meadow Road pump station• Fire Department
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium to High
Estimated Cost	Medium to High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Engineering, OEM
Local Planning Mechanism	Emergency Operations, Capital Improvement
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Ogdensburg-6

Mitigation Action/Initiative: Purchase and install backup generators at the following critical facilities

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide shelter and drinking water for residents
Property Protection	1	Allow facilities to operate during power outages
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	All
Timeline	1	
Local Champion	1	
Other Community Objectives	0	
Total	10	
Priority (High/Med/Low)	High	



Action Number:

Ogdensburg-7

Mitigation Action/Initiative:

Stream bank stabilization (vegetation addition) on Middle Sawmill Brook from RR tracks to Route 517.

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather, Severe Winter Weather
Specific problem being mitigated:	Need vegetation in this area to protect the stream bank and stream
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Stream bank stabilization (vegetation addition) on Middle Sawmill Brook from RR tracks to Route 517.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Stream bank stabilization (vegetation addition) on Middle Sawmill Brook from RR tracks to Route 517.
Action/Project Category	SIP
Goals/Objectives Met	All
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium to High
Priority	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Engineering, Borough Administration
Local Planning Mechanism	Capital Improvement
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Ogdensburg-7

Mitigation Action/Initiative: Stream bank stabilization (vegetation addition) on Middle Sawmill Brook from RR tracks to Route 517.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	0	
Property Protection	1	Protect structures and railroad tracks from flood damage in this area
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	0	
Fiscal	0	
Environmental	1	Stabilize slopes in this area
Social	0	
Administrative	1	
Multi-Hazard	1	Severe Weather, Flood, Severe Winter Weather
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	Medium	



9.18 Township of Sandyston

This section presents the jurisdictional annex for the Township of Sandyston.

9.18.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Stanley J. Dukus, Deputy OEM Coordinator 133 Route 645, Sandyston, NJ 07826 Phone: (973) 293-3003 Email: standsr@optonline.net	Amanda F. Lobban, Municipal Clerk 133 Route 645, Sandyston, NJ 07826 Phone: (973) 948-3520, x200 Email: clerk@sandystontownship.com

9.18.2 Municipal Profile

Sandyston Township is a small rural township located in the northwestern portion of Sussex County. It has a total area of 43.3 square miles. According to the U.S. Census, the 2010 population for the Township of Sandyston was 1,998. The Township is bordered to the north by Montague Township, to the south by Frankford and Hampton Townships, to the east by Wantage and Frankford Townships, and to the west by Pennsylvania. The Delaware River makes up the entire western border of the Township. Big Flat Brook, Little Flat Brook, and Tuttles Corner Brook are all streams located within the Township. The following unincorporated communities are located within the Township: Shaytown, Hainesville, Abertown, Layton, Bevans, Tuttles Corner, and Normanook.

Growth/Development Trends

The Township of Sandyston did not note any recent residential/commercial development since 2010 or any major residential or commercial development, or major infrastructure development planned for the next five years in the municipality.

9.18.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.18-1. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	Loss of services: between one day and one year. Infrastructure damage: roads, bridges and culverts only. Minor facility and structure damage.
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	Minimal road closures.
October 29, 2011	Severe Storm	DR-4048	Yes	Roads were restricted due to heavy snow fall.



Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	Minimal loss of services. Generator at municipal building and EOC sustained damages.

9.18.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Sandyston. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Sandyston.

Table 9.18-2. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	High*
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$235,819 2,500-Year GBS: \$3,436,620	Occasional	28	Medium
Flood	1% Annual Chance: \$25,738,467	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$230,730,635	Frequent	42	High
Hurricane	100-year MRP: \$27,921 500-year MRP: \$846,807 Annualized: \$4,502	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$27,921 500-year MRP: \$846,807 Annualized: \$4,502	Frequent	48	High
Severe Winter Weather	1% GBS: \$3,596,430 5% GBS: \$17,982,152	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$62,747,631	Frequent	36	High
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed due to the location of high hazard dams in the municipality
GBS = General building stock; MRP = Mean return period.



- a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- b. High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
- c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Sandyston.

Table 9.18-3. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Sandyston	12	3	\$209,806	0	0	4

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance boundary.

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.

9.18.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Community Rating System
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms



Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Sandyston.

Table 9.18-4. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Twsp. Comm.	Master Plan 2008
Capital Improvements Plan	No	Local	Twsp. Comm.	In progress.
Floodplain Management/Basin Plan	No			
Stormwater Management Plan	Yes	Local	DPW	Storm Water 2005
Open Space Plan	Yes	Local	Twsp. Comm.	Master Plan 2008
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	Yes	Local	Twsp. Comm.	Master Plan 2008
Comprehensive Emergency Management Plan	Yes	Local	OEM	E.O.P. 8/2013
Emergency Response Plan	Yes	Local	OEM	E.O.P. 8/2013
Post-Disaster Recovery Plan	No			
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State & Local	Building Department	State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Zoning	Chapter 150 - Zoning
Subdivision Ordinance	Yes	Local	Building Department	Chapter 137 – Subdivision and Site Plan Review
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State, Local	Construction Official	Chapter 75 – Flood Damage Prevention
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	No			
Growth Management Ordinances	No			
Site Plan Review Requirements	Yes	Local	Bldg. Dept.	Chapter 137 – Subdivision and Site Plan Review
Stormwater Management Ordinance	Yes	Local	DPW	Chapter 138 – Stormwater Control
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			



Table 9.18-4. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	No			

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Sandyston.

Table 9.18-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Land Use/Zoning Board
Mitigation Planning Committee	No	
Environmental Board/Commission	No	
Open Space Board/Committee	No	
Economic Development Commission/Committee	No	
Maintenance Programs to Reduce Risk	No	
Mutual Aid Agreements	Yes	Sussex County
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Harold Pellow Assoc. J. Caldwell and Associates
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Harold Pellow Assoc.
Planners or engineers with an understanding of natural hazards	Yes	As per need, Bids for Prof. Services.
NFIP Floodplain Administrator	Yes	Construction Official
Surveyor(s)	Yes	Daniel Kent Inc.
Personnel skilled or trained in GIS and/or Hazus-MH applications	No	
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	Twsp. EMC
Grant Writer(s)	No	
Staff with expertise or training in benefit/cost analysis	No	
Professionals trained in conducting damage assessments	Yes	As per need, Bids for Prof. Services.

Fiscal Capability

The table below summarizes financial resources available to the Township of Sandyston.



Table 9.18-6. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	Don't know
Capital Improvements Project Funding	CFO & Twsp. Comm.
Authority to levy taxes for specific purposes	Tax Asser
User fees for water, sewer, gas, or electric service	No
Impact Fees for homebuyers or developers of new development/homes	Twsp. Comm.
Stormwater Utility Fee	No
Incur debt through general obligation bonds	CFO & Twsp. Comm.
Incur debt through special tax bonds	CFO & Twsp. Comm.
Incur debt through private activity bonds	Unknown
Withhold public expenditures in hazard-prone areas	Unknown
Other Federal or State Funding Programs	CFO & Twsp. Comm.
Open Space Acquisition Funding Programs	Unknown
Other	

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Sandyston.

Table 9.18-7. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	NP	NP
Building Code Effectiveness Grading Schedule (BCEGS)	No		
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	Fire Department – 10	25 plus years ago.
Storm Ready	No	NP	NP
Firewise	No	NP	NP
Disaster/Safety Programs in/for Schools	Yes	School Administration	
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	Yes	Social Media	
Public-Private Partnerships	No		

N/A = Not Applicable. NP = Not Participating. - = Unavailable. TBD = To Be Determined.

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no



classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Township of Sandyston's capability to work in a hazard mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.18-8. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability		X	
Administrative and Technical Capability		X	
Fiscal Capability	X - limited funds		
Community Political Capability		X	
Community Resiliency Capability			X
Capability to Integrate Mitigation into Municipal Processes and Activities		X	

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Robert W. Huber, Construction Official

Flood Vulnerability Summary

The Township does not maintain lists or inventories of properties damaged by flooding. During Sandy, two homes were damaged. The FPA did not make Substantial Damage estimates during Sandy or other recent events. There is currently one property in the process of mitigation in the Township and this is being funded by private sources.

Resources

The FPA is the sole person assuming the responsibilities of floodplain administration within the Township. There is a part time administration assistant that will assist the FPA. NFIP administration services and functions provided by the FPA include permit review, inspections, damage assessments, record keeping, GIS, education and outreach. Outreach provided to the community includes advising the public at large and



handing out pamphlets on flood hazards/risk and flood risk reduction. The FPA indicated that there are barriers to running an effective program which includes money and time; however, he feels adequately supported as the municipal floodplain administrator. Additionally, the FPA would welcome continuing education and certification training on floodplain management.

Compliance History

The Township is in good standing with the NFIP; however, the Township has never had a compliance audit conducted.

Regulatory

The Township's flood damage prevention ordinance exceeds the minimum set by FEMA and the State and the Township has other ordinances and program that support floodplain management.

Community Rating System

The Township of Sandyston does not participate in the Community Rating System (CRS) program; however, the Township has considered joining and would attend a CRS seminar if offered.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Township has a Joint Land Use Board Board which reviews all applications for development and consider natural hazard risk areas in their review.

Sandyston Township Vision Plan 2010: This report, or Vision Statement, summarizes the results of three public sessions and provides an account of the myriad of issues and ideas that were discussed and put forward as part of the Sandyston Township Vision Sessions. The Vision Statement was submitted to the State Planning Commission as part of Sandyston Township's petition for Plan Endorsement. This document identified critical issues, challenges and opportunities for the Township.

Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter.

Chapter 75: Flood Damage Prevention

The purpose of this chapter to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;



- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 138: Stormwater Management

The purposed of the Stormwater Control Chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of the Townships' citizens and businesses.

Chapter 138-17C.(2): Environmental Site Analysis

A written and graphic description of the natural and man-made features of the site and its environs. This description should include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site. Particular attention should be given to unique, unusual, or environmentally sensitive features and to those that provide particular opportunities or constraints for development

Operational and Administration

The Township has established a Planning Board, Zoning Board and an Environmental Committee, that aid in planning decisions to support the conservation and preservation of the Township's critical environmental features. Beyond that the Township employs and Planning Board Secretary and contracts out for professional legal, planning, and engineering services for development review.

Funding

Operating Budget: The Township's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Township has received funding from the NJDOT and The Garden State Preservation Trust Fund grant programs. The Township's 2014 Capital Budget includes line items for improvements to the Municipal Building, as well as a number or drainage and roadway improvements.

Education and Outreach

The Township's website posts information regarding upcoming community events and important municipal decisions on the home page. The Township has disaster and emergency mitigation and management information on the emergency management web page.


The Township identified new mitigation initiatives to implement FireWise as well as conduct a public outreach and education program on hazard mitigation and preparedness. Refer to Table 9.18-11 for more information.

Figure 9.18-1. Screenshot of Township Website with Examples of their Emergency Information

[Emergency Management](#)

Sandyston Township

Stanley Dutkus, Deputy Emergency Management Coordinator
973-948-3520, extension 207



Get More Information

- ➔ Find out which disasters could occur in your area!
- ➔ Ask how to prepare for each disaster!
- ➔ As how you would be warned of an emergency
- ➔ [Click here to visit the to learn more about "Outbound 911" Community Alerting System which is an automated system that notifies homes and businesses of emergencies.](#)
- ➔ Learn about the evacuation routes in Sandyston Township
- ➔ Ask about special assistance for elderly or disabled persons
- ➔ [Click here for the Federal Emergency Management Agency website](#)
- ➔ [Contact the Sussex County Chapter of the American Red Cross](#)

Flash Flood, Hurricane, Hazardous Materials Spill, Earthquake, Tornado, Winter Storm, Fire: These are all examples of disasters that can affect you and your family. Disasters happen anytime and anywhere. After a disaster, local officials and relief workers will be on the scene, but they cannot reach everyone immediately. You could get help in hours or it could take days. Would your family be prepared to cope with the emergency until help arrives? Your family will cope best by preparing for disaster before it strikes. One way to prepare is by assembling a Disaster Supplies Kit.

Family Disaster Supplies Kit

- Water**
 - ➔ Store one gallon of water per person per day (two quarts for drinking, two quarts for food preparation/sanitation)
 - ➔ Keep at least a three-day supply of water for each person in your household
- Food**
 - ➔ Ready-to-eat canned meats, fruits and vegetables and canned juices, milk, soup (if powdered - store extra water)
 - ➔ Staples - sugar, salt, pepper
 - ➔ High energy foods - peanut butter, jelly, crackers, granola bars, trail mix
 - ➔ Vitamins
 - ➔ Foods for infants, elderly persons or persons on special diets
 - ➔ Comfort/Stress Foods - cookies, hard candy, sweetened cereals, lollipops, instant coffee, tea bags
- First Aid Kit**
 - ➔ Sterile adhesive bandages in assorted sizes, gauze pads, scissors, tweezers, needle, moistened towelettes, antiseptic, thermometer, tongue blades (2), safety pins, cleansing agent/soap, latex gloves, sunscreen
 - ➔ Non-prescription drugs including aspirin, nonasprin pain reliever, anti-diarrhea medication, antacid, Syrup of Ipecac, Laxative
- Tools and Supplies**
 - ➔ Paper cups, plates and plastic utensils, battery operated radio and extra batteries, flashlight and extra batteries, cash or traveler's checks, change, non-electric can opener, utility knife, fire extinguisher; tube tent, pliers, tape, matches in waterproof container, aluminum foil, plastic storage containers, signal flare, paper, pencil, needles and thread; medicine dropper
 - ➔ Sanitation Supplies like toilet paper, towelettes, soap, liquid detergent, feminine supplies, personal hygiene items, plastic garbage bags, ties; plastic bucket with tight lid, disinfectant, household chlorine bleach
- Clothing and Bedding**
 - ➔ Sturdy shoes and/or workboots, rain gear, blankets or sleeping bags, hat and gloves, thermal underwear, sunglasses
- Special Items**
 - ➔ Items for baby like formula, diapers, bottles, powdered milk and medications

9.18.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.18-9. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Sandyston Township 1	Implement Fire Wise Program throughout the Township.	OEM Coordinator	In Progress	Due to lack of funding, this project has not been completed.	Include in 2016 HMP	Continue to implement the FireWise program within the Township.
Sandyston Township 2	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	In Progress	Due to personnel and budget constraints, this project has not been completed.	Include in 2016 HMP	Include in the 2016 HMP update.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Township has not identified any additional mitigation projects/activities that have been completed since approval of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Township participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013). In May 2015, the Township participated in a second workshop led by FEMA Region 2 and NJOEM and was provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.18-10 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High', 'Medium', or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.18-11 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.18-10. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Sandyston-1	Sandyston Township Sunrise Communications Tower Generator	Existing	All	1, 2, 6	Township OEM	Medium	Medium to High	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Sandyston-2	To ensure continuity of operations, install generator Wiring at Municipal Complex	Existing	All	1, 2, 6	Township OEM	Medium	Medium to High	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Sandyston-3	Emergency Generator for DPW Garage & Fire Station #2	Existing	All	1, 2, 6	Township OEM	Medium	Medium to High	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Sandyston-4	Implement Fire Wise Program throughout the Township.	New and Existing	Wildfire	1, 2, 3	Fire Department, OEM	Medium	Low	Municipal Budget	Ongoing	Medium	LPR, EAP	PR, PI
Sandyston-5	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	New and Existing	All	All	Township OEM	Medium	Low	Municipal Budget	Ongoing	Medium	LPR, EAP	PR, PI
Sandyston-6	Install early warning devices in the Township.	New	All	1, 2, 3	Fire Department	Medium	Medium	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Sandyston-7	Protect school building from severe weather related incidents	Existing	Severe Weather	1, 2	Board of Education	Medium	Medium	HMGP with local cost share; School Budget	Short Term / DOF	Medium	SIP	PP
Sandyston-8	Purchase a mini pumper four-wheel drive unit with extended crew cab to support wildland and structural fires.	N/A	Wildfire	1, 2, 3, 6	Fire Department	Medium	High	Grants, Municipal Budget	Short Term / DOF	High	SIP	PP
Sandyston-9	Work with the PUC and FCC for regulations requiring phone providers to maintain phone service during loss of power.	Existing	All	All	Township	Medium	Low	Municipal Budget	Ongoing	High	LPR	PR
Sandyston-10	Protect roadway crossing the Delaware River from damages and debris during hazard events.	Existing	All	All	Private Toll Bridge Owner/Operator	Medium	TBD	Toll Bridge Owner/Operator, Municipal Budget	Short Term	High	SIP	PP
Sandyston-11	Initiate a program to verify that all dams in the community meet the state safety requirements.	Existing	Dam Failure	All	NJDEP, Dam Owners, Township	Medium	High	Grants, Municipal Budget	Short Term	High	LPR	PR

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.



Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
RFC	Repetitive Flood Claims Grant Program (discontinued)
SRL	Severe Repetitive Loss Grant Program (discontinued)

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.



- *Structural Flood Control Projects (SP)-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.*
- *Emergency Services (ES)-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities*

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Table 9.18-11. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Sandyston-1	Sandyston Township Sunrise Communications Tower Generator	1	1	1	1	0	0	0	0	0	1	1	1	1	0	8	High
Sandyston-2	Generator Wiring at Municipal Complex	1	1	1	1	0	0	0	0	0	1	1	1	1	0	8	High
Sandyston-3	Emergency Generator for DPW Garage & Fire Station #2	1	1	1	1	0	0	0	0	0	1	1	1	1	0	8	High
Sandyston-4	Implement Fire Wise Program throughout the Township.	1	1	1	1	0	0	0	1	0	1	0	1	0	0	7	Medium
Sandyston-5	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	1	1	1	1	0	0	0	1	0	1	1	1	0	0	8	Medium
Sandyston-6	Install early warning devices in the Township.	1	1	0	1	1	0	0	0	1	0	1	0	0	0	6	High
Sandyston-7	Protect school building from severe weather related incidents	1	1	0	0	1	0	0	1	1	0	1	0	1	0	7	High
Sandyston-8	Purchase a mini pumper four-wheel drive unit with extended crew cab to support wildland and structural fires.	1	1	1	1	1	0	0	1	1	0	1	0	1	0	9	High
Sandyston-9	Work with the PUC and FCC for regulations requiring phone providers to maintain phone service during loss of power.	1	1	1	1	1	1	0	1	1	0	1	0	1	0	10	High
Sandyston-10	Protect roadway crossing the Delaware River from damages and debris during hazard events.	1	1	1	1	1	1	0	1	1	0	1	0	0	0	9	High
Sandyston-11	Initiate a program to verify that all dams in the community meet the state safety requirements.	1	1	0	1	1	1	0	1	1	0	1	0	0	0	8	High

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.18.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.18.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Sandyston that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Sandyston has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.18.9 Additional Comments

None at this time.



Figure 9.18-2. Township of Sandyston Hazard Area Extent and Location Map 1

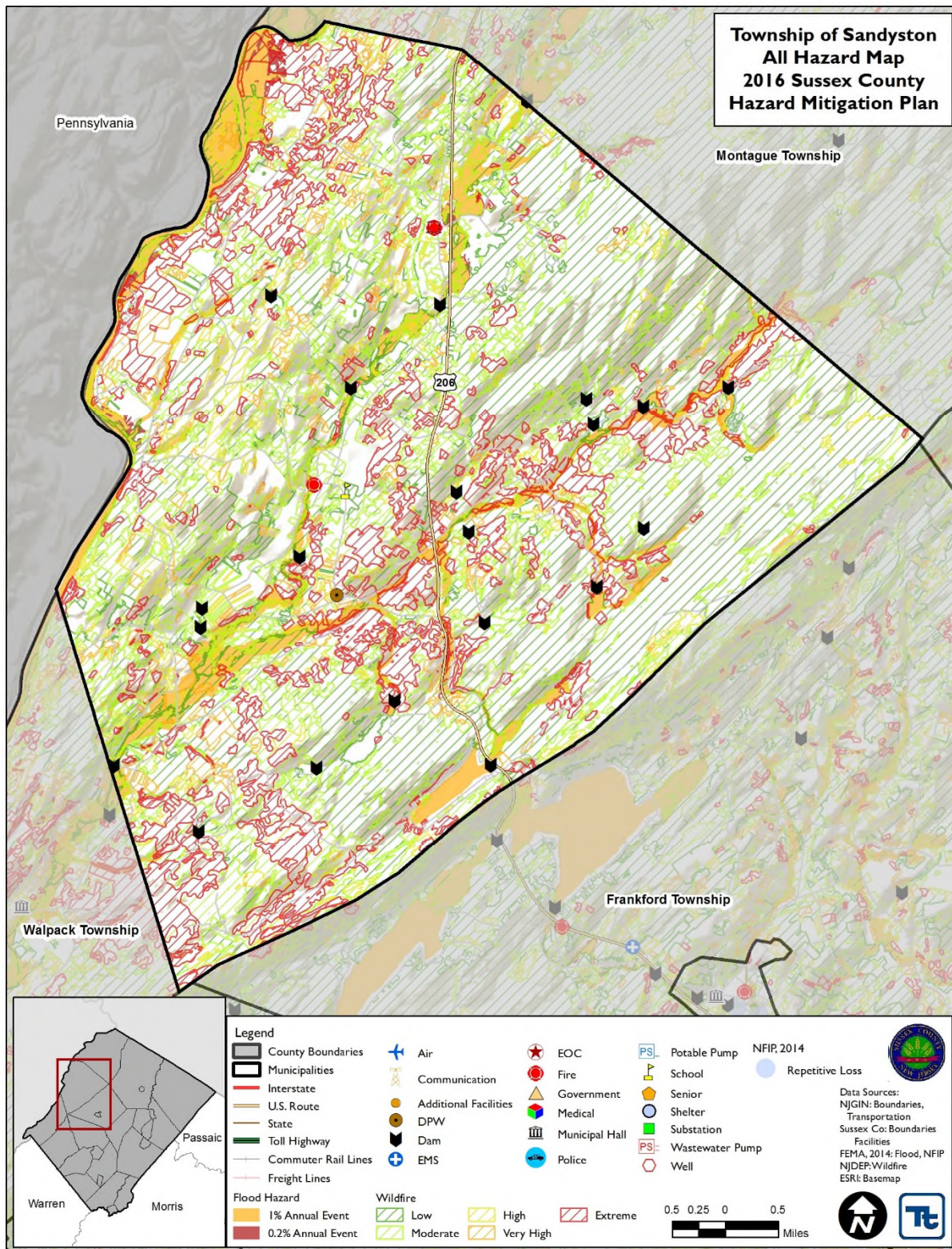
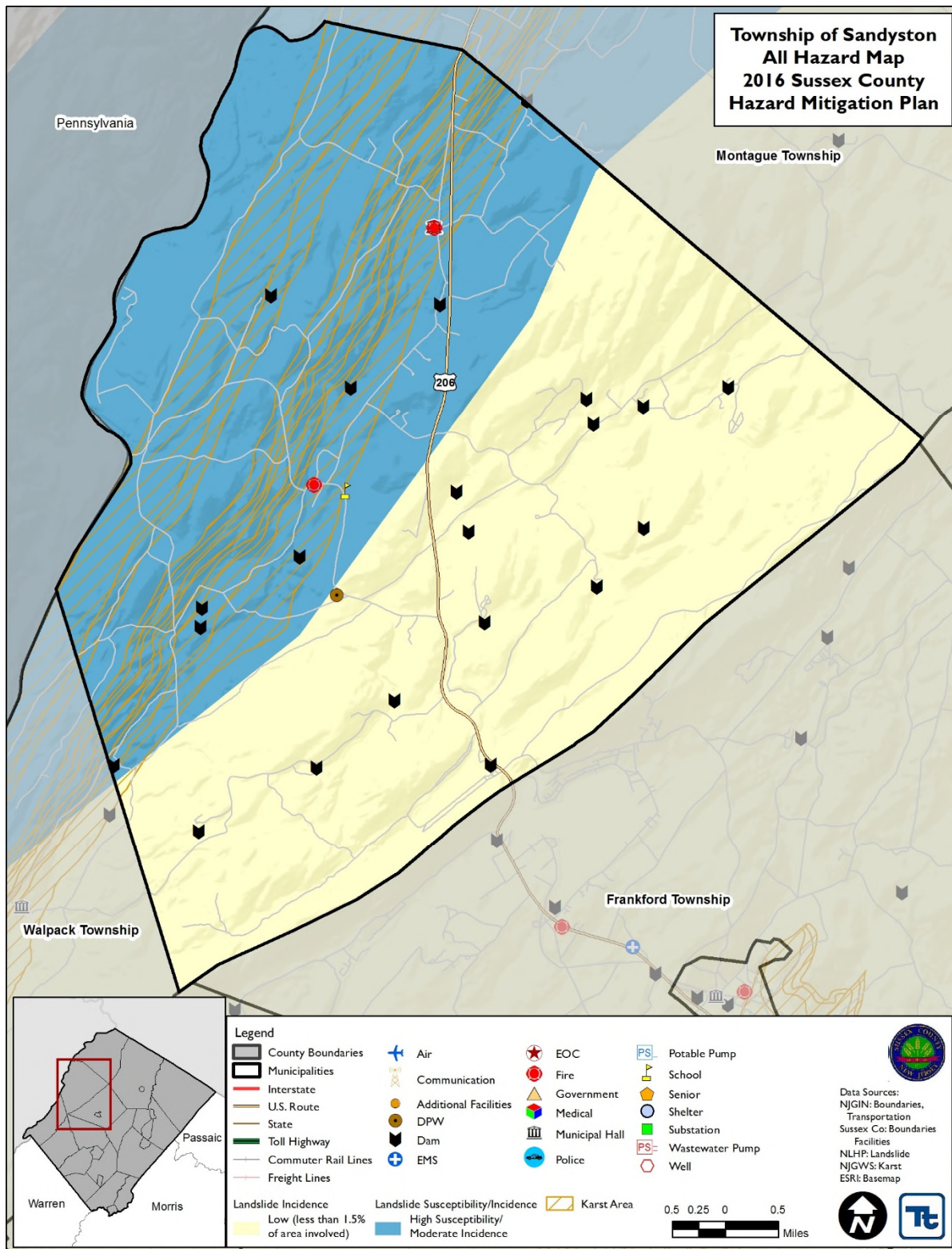




Figure 9.18-3. Township of Sandyston Hazard Area Extent and Location Map 2





Action Number: Sandyston-1

Mitigation Action/Initiative: Sandyston Township Sunrise Communications Tower Generator

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Loss of power to communications tower
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Sandyston Township Sunrise Communications Tower Generator
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Sandyston Township Sunrise Communications Tower Generator
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium to High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township OEM
Local Planning Mechanism	Emergency Operations
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sandyston-1

Mitigation Action/Initiative: Sandyston Township Sunrise Communications Tower Generator

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Provides communications tower with power in the event of a power outage
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	All
Timeline	1	Short Term – less than five years; depends on funding
Local Champion	1	
Other Community Objectives	0	
Total	8	
Priority (High/Med/Low)	High	



Action Number:

Sandyston-2

Mitigation Action/Initiative:

Generator Wiring at Municipal Complex

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Generator at municipal complex needs to be wired
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Generator Wiring at Municipal Complex
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Generator Wiring at Municipal Complex
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium to High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township OEM
Local Planning Mechanism	Emergency Operations
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sandyston-2

Mitigation Action/Initiative: Generator Wiring at Municipal Complex

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	All
Timeline	1	Short Term – less than five years; depends on funding
Local Champion	1	
Other Community Objectives	0	
Total	8	
Priority (High/Med/Low)	High	



Action Number:

Sandyston-3

Mitigation Action/Initiative:

Emergency Generator for DPW Garage & Fire Station #2

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	DPW garage and Fire Station #2 are in need of backup power; cannot operate during an emergency if there is no power
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Emergency Generator for DPW Garage & Fire Station #2
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Emergency Generator for DPW Garage & Fire Station #2
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium to High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township OEM
Local Planning Mechanism	Emergency Operations
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sandyston-3

Mitigation Action/Initiative: Emergency Generator for DPW Garage & Fire Station #2

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide emergency services to those in need during times of power outages
Property Protection	1	Allow these buildings to operate during power outages
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	All
Timeline	1	Short Term – less than five years; depends on funding
Local Champion	1	
Other Community Objectives	0	
Total	8	
Priority (High/Med/Low)	High	



Action Number:

Sandyston-6

Mitigation Action/Initiative:

Early warning devices in the Township

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Lack of a public notification system within the Township
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Install early warning devices throughout the Township
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Placement of Early Warning Devices throughout the Twsp.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 3
Applies to existing and/or new development; or not applicable	New
Benefits (losses avoided)	Medium
Estimated Cost	Medium
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Fire Department
Local Planning Mechanism	Emergency Operations
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sandyston-6

Mitigation Action/Initiative: Early warning devices in the Township

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Warning system for residents in the event of an emergency
Property Protection	1	
Cost-Effectiveness	0	
Technical	1	
Political	1	
Legal	0	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	0	
Multi-Hazard	1	All
Timeline	0	
Local Champion	0	
Other Community Objectives	0	
Total	6	
Priority (High/Med/Low)	High	



Action Number: Sandyston-7

Mitigation Action/Initiative: Protect school building from severe weather related incidents

Assessing the Risk	
Hazard(s) addressed:	Severe Weather
Specific problem being mitigated:	School building is not protected from severe weather related incidents
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Protect school during extreme weather related incidents
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Protect school building from severe weather related incidents
Action/Project Category	SIP
Goals/Objectives Met	1, 2
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium
Priority	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Board of Education
Local Planning Mechanism	Emergency Operations
Potential Funding Sources	HMGP with local cost share; School Budget
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sandyston-7

Mitigation Action/Initiative: Protect school building from severe weather related incidents

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect students
Property Protection	1	Protect building
Cost-Effectiveness	0	
Technical	0	
Political	1	
Legal	0	
Fiscal	0	
Environmental	1	
Social	1	
Administrative	0	
Multi-Hazard	1	
Timeline	0	
Local Champion	1	
Other Community Objectives	0	
Total	7	
Priority (High/Med/Low)	High	



Action Number: Sandyston-8

Mitigation Action/Initiative: Purchase equipment to support wildland and structural fire protection

Assessing the Risk	
Hazard(s) addressed:	Wildfire
Specific problem being mitigated:	Lack of equipment to support wildland and structure fires within the Township
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase equipment to support wildland and structural fire protection
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase equipment to support wildland and structural fire protection
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	New and Existing
Benefits (losses avoided)	Medium
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Fire Department
Local Planning Mechanism	Emergency Operations
Potential Funding Sources	Grant funding; municipal budget
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sandyston-8

Mitigation Action/Initiative: Purchase equipment to support wildland and structural fire protection

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Allows fire department another means of transportation during a fire
Property Protection	1	Allows fire department another means of transportation during a fire
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	0	
Fiscal	0	
Environmental	1	
Social	1	
Administrative	0	
Multi-Hazard	1	Wildfire
Timeline	0	
Local Champion	1	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	



Action Number:

Sandyston-10

Mitigation Action/Initiative:

Protect roadway crossing the Delaware River from damages and debris during hazard events.

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	This roadway is the only access in the Township that crosses the river. During hazard events, the bridge may close due to impassable roads, downed debris, etc.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Protect roadway crossing the Delaware River from damages and debris during hazard events.
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Protect roadway crossing the Delaware River from damages and debris during hazard events.
Action/Project Category	SIP
Goals/Objectives Met	All
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	TBD
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Private Toll Bridge Owner/Operator
Local Planning Mechanism	Emergency Operations, Transportation
Potential Funding Sources	Toll Bridge Owner/Operator, Municipal Budget
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sandyston-10

Mitigation Action/Initiative: Protect roadway crossing the Delaware River from damages and debris during hazard events.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	
Environmental	1	
Social	1	
Administrative	0	
Multi-Hazard	1	All
Timeline	0	
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	High	



9.19 Township of Sparta

This section presents the jurisdictional annex for the Township of Sparta.

9.19.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Ernest Reigstad, Police Chief 65 Main Street, Sparta, NJ 07871 Phone: (973) 726-4010 Email: ereigstad@spartapd.org	Eric Powell, Municipal Engineer 65 Main Street, Sparta, NJ 07871 Phone: (973) 726-3607 Email: eric.powell@spartanjersey.org

9.19.2 Municipal Profile

Sparta Township is located in southwestern Sussex County and has a total area of 38.9 square miles. According to the U.S. Census, the 2010 population for the Township of Sparta was 19,722. The Township is bordered to the north by Lafayette and Hardyston Townships, to the south by Byram Township and Hopatcong Borough, to the east by Morris County and to the west by Andover and Lafayette Townships. Streams that flow through Sparta Township include: Wallkill River and its tributaries, Russia Brook tributaries, Sparta Junction Brook, Wildcat Branch, Sparta Glen Brook, Tar Hill Brook tributaries, and Lubbers Run tributaries. Lake Mohawk is a large lake located in the southwest corner of the Township. Other lakes and ponds are located throughout the Township as well. The following unincorporated communities are located within the Township: Ackerson, Woodruffs Gap, Houses Corner, Sparta Junction, Sussex Mills, Upper Mohawk, and Lake Mohawk.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the map in Section 9.19.8 of this annex which illustrates the hazard areas along with the location of potential new development.

Table 9.19-1. Growth and Development

Property or Development Name	Type (e.g., Res., Comm.)	# of Units/Structures	Location (address and/or Block & Lot)	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to present					
Roundtop at Sparta	Residence	124	Woodport Road	Could not locate	100% complete
Chapel Hill	Residence	30	Father John's Lane	Could not locate	90% complete
Jersey Investors	Commercial	4	Town Center Drive	Could not locate	75% complete
Windsor Lake	Residence	18 – 20 homes	Fox Run Road	None	~50-60% complete
Known or Anticipated Development in the Next Five (5) Years					
North Village	Residence/Commercial	100+ Residence/8 Commercial	Rt. 15 North	Could not locate	Site Plan Approval
Millrace Village	Residential	54 Units	Glen Road	Could not locate	Site Plan Prelim

* Only location-specific hazard zones or vulnerabilities identified.



9.19.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.19-2. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
June 14, 2008	Lightning	N/A	N/A	Germany Flats. Damage to pumps, controls & water supply facility.
March 11-12, 2011	Heavy Rain and Flooding	N/A	N/A	A mudslide in the Township forced the closure of County Route 620 for two to three days.
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	Sussex Mills Road was closed for two to three days due to a mudslide. Stateion Road was closed for three days due to slope failure and subsequent restoration work. Route 15, near the Bagel Station, was flooded. Sewer lines from Lions Gate were exposed due to high flows in the river. There was basement flooding on Valley Manor Drive. Public Assistance was requested by the Township.
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	Sussex Mills Road was closed for two to three days due to a mudslide. Stateion Road was closed for three days due to slope failure and subsequent restoration work. Route 15, near the Bagel Station, was flooded. Sewer lines from Lions Gate were exposed due to high flows in the river. There was basement flooding on Valley Manor Drive. Public Assistance was requested by the Township.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	Hurricane Sandy resulted in widespread power outages for up to 14 days in the Township. There were numerous road closures due to downed trees and power lines. The Buttonwood well house was damaged from fallen trees. There was damage to Ungerman Field – broken light poles and damage to fencing. The Town Hall lost roof shingles and there was damage to the DPW salt dome. Alpine School lost power due to damaged service lines. The bleachers and press box at Sparta High School were also damaged. There were numerous private homes that suffered damage due to fallen trees. Public Assistance was requested by the Township.

9.19.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Sparta. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.



Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Sparta.

Table 9.19-3. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	High*
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$2,296,088 2,500-Year GBS: \$37,195,525	Occasional	28	Medium
Flood	1% Annual Chance: \$12,217,391	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$809,670,046	Frequent	36	Medium**
Hurricane	100-year MRP: \$1,298,365 500-year MRP: \$7,146,354 Annualized: \$66,034	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$1,298,365 500-year MRP: \$7,146,354 Annualized: \$66,034	Frequent	48	High
Severe Winter Weather	1% GBS: \$30,839,931 5% GBS: \$154,199,657	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$109,041,519	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed due to the location of high hazard dams in the municipality

** The hazard ranking was changed for this hazard based on input from the municipality, population exposed, and/or event history.

GBS = General building stock; MRP = Mean return period.

a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.

b. High = Total hazard priority risk ranking score of 31 and above

Medium = Total hazard priority risk ranking of 15-30+

Low = Total hazard risk ranking below 15

c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Sparta.



Table 9.19-4. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Sparta	61	6	\$32,999	0	0	1

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance flood boundary.

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.

9.19.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Community Rating System
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Sparta.

Table 9.19-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Y 1984	Local	Planning	
Capital Improvements Plan	Yes	Local	Engineering/ DPW	
Floodplain Management/Basin Plan	No			



Table 9.19-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Stormwater Management Plan	Yes	Local	Engineering	Element of Master Plan
Open Space Plan	Yes	Local	Planning	Element of Master Plan
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	Yes	Local	Planning	Element of Master Plan
Economic Development Plan	No			
Comprehensive Emergency Management Plan	Yes	Local	Police	OEM
Emergency Response Plan	Yes	Local	Police	OEM
Post-Disaster Recovery Plan	No			
Transportation Plan	Yes	Local	Planning	Element of Master Plan
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State & Local		State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local		Chapter 18
Subdivision Ordinance	Yes	Local		Chapter 18
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State, Local	Construction Official	Chapter 28
NFIP: Cumulative Substantial Damages				
NFIP: Freeboard	Yes	State, Local		
Growth Management Ordinances	Yes	Local		Chapter 18
Site Plan Review Requirements	Yes	Local	Planning	Chapter 18
Stormwater Management Ordinance	Yes	Local	Engineering	Chapter 18
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	No			



Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Sparta.

Table 9.19-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Community Development
Mitigation Planning Committee	Yes	Public Safety Committee, STEP, CERT
Environmental Board/Commission	Yes	Community Development
Open Space Board/Committee	No	
Economic Development Commission/Committee	Yes	Community Development
Maintenance Programs to Reduce Risk	No	
Mutual Aid Agreements	Yes	Sparta Police Department, Fire Department and Surrounding Towns
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Town Engineer
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Town Engineer
Planners or engineers with an understanding of natural hazards	Yes	Town Engineer
NFIP Floodplain Administrator	Yes	Construction Official
Surveyor(s)	No	
Personnel skilled or trained in GIS and/or Hazus-MH applications	Yes	Town Engineer
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	Police Chief
Grant Writer(s)	Yes	Consultant
Staff with expertise or training in benefit/cost analysis	No	
Professionals trained in conducting damage assessments	No	

Fiscal Capability

The table below summarizes financial resources available to the Township of Sparta.

Table 9.19-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	Yes/ Grant consultant
Capital Improvements Project Funding	Yes/Town Engineer – CFO
Authority to levy taxes for specific purposes	Yes/ Town Council
User fees for water, sewer, gas, or electric service	Yes/ Utility Director
Impact Fees for homebuyers or developers of new development/homes	No
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes/ Municipal CFO
Incur debt through special tax bonds	Don't Know
Incur debt through private activity bonds	Don't Know

**Table 9.19-7. Fiscal Capabilities**

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Withhold public expenditures in hazard-prone areas	Don't Know
Other Federal or State Funding Programs	Yes/ Township Engineer
Open Space Acquisition Funding Programs	Yes/ Planning
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Sparta.

Table 9.19-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	Yes		
Building Code Effectiveness Grading Schedule (BCEGS)	Yes	Class 3	2014
Public Protection (ISO Fire Protection Classes 1 to 10)	No		
Storm Ready	No		
Firewise	No		
Disaster/Safety Programs in/for Schools	No		
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	Yes	Website/Facebook	
Public-Private Partnerships	TBD		

N/A = Not Applicable. NP = Not Participating.

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>



- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Township of Sparta's capability to work in a hazard mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.19-9. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability		X	
Administrative and Technical Capability			X
Fiscal Capability		X	
Community Political Capability		X	
Community Resiliency Capability		X	
Capability to Integrate Mitigation into Municipal Processes and Activities.		X	

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Jan Opt Hof, Construction Official

Flood Vulnerability Summary

The Township does not maintain lists or inventories of properties that have been damaged by floods. During Irene, Lee and Sandy, the Township only experienced damage from wind/trees, not flooding. Substantial Damage estimates were not declared for any of these events. It is unknown if any residents are interested in mitigation.

Resources

The construction official is the sole person assuming the role and responsibilities of the Township's FPA. The FPA does not provide any NFIP administrative services/functions or outreach/education regarding flooding to the community. The FPA indicated that they do not feel adequately supported or trained to fulfill the role as the FPA. Continuing education and/or certification training on floodplain management would be welcomed.

Compliance History

The Township entered the NFIP on October 16, 1984 and is currently in good standing with the program. It is unknown as to when the most recent compliance audit was conducted.

Regulatory

The FPA is unsure if the Township's flood damage prevention ordinance exceeds the FEMA and state minimum requirements. There are other local ordinances, plans and programs that support floodplain management within the Township. The Township does not participate in CRS and is currently not interested in joining or attending a CRS seminar.



Community Rating System

The Township of Sparta does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Township has a Planning Board and Zoning Board of Adjustments which review all applications for development and consider natural hazard risk areas in their review.

Sparta Township Highlands Plan Element 2011: This Plan articulates the goals and objectives for the Township as they relate to the Highlands and includes the following applicable goals and objectives:

1. To require protective buffers adjacent to Highlands Open Waters of sufficient width and composition to protect the integrity of the water resource from impairment due to proximate land uses and/or development activities.
2. Minimum standards for such buffers should be consistent with those of the NJDEP and the RMP.
3. To require use of Low Impact Development Best Management Practices (see Section K) for any development activity proposed within a Riparian Area to minimize both alteration of natural vegetation and increase in impervious area and to provide for mitigation through restoration of impaired Riparian Areas in the same HUC14 subwatershed.
4. Land disturbance within all Steep Slope Protection Areas should incorporate Low Impact Development (see Section K) techniques to minimize the extent of such disturbance and the potential negative impacts resulting from it.
5. To carefully examine land development applications for potential impacts to Carbonate Rock Areas, whether by direct disturbance, or by indirect means such as introduction of additional stormwater runoff. Stormwater management LID standards that preserve or mimic the natural hydrologic features and characteristics of the land.
6. LID practices that minimize land disturbance during construction activities.
7. LID best management practices where any development application proposes disturbance of a Highlands resource, including but not limited to Steep Slope Protection Areas, Forest Areas, Critical Habitat Areas, Highlands Open Waters and Riparian Areas, and Prime Ground Water Recharge Areas.
8. To require submission of any and all information, technical data, geotechnical studies and/or analyses that may be necessary to locate and determine the extent of affected carbonate rock features during the course of development reviews.

Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter.

Chapter XXVIII: Flood Damage Prevention

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:



- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter XVIII-138-18.53f.: Stormwater Control

The purposed of the Stormwater Control Chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of the Townships' citizens and businesses.

Highlands: In addition, the Highlands Water Protection and Planning Act provides additional regulatory control over development within the Township. While Major Highlands Development projects, as defined by the Highlands Act, still require local approvals, they must first receive a Highlands Resource Applicability Determination and be evaluated for consistency with the provisions of the Highlands Act. Major Highlands Development projects include a variety of projects such as any non-residential development, any residential development that disturbs one or more acres of land, any development that disturbs ¼ acres of more of forest among others. This process identifies any potential Highlands Resources on the site and if found requires adherence to relevant development standards and restrictions.

Operational and Administration

The Township has established a Planning Board, Zoning Board and an Environmental Committee, that aid in planning decisions to support the conservation and preservation of the Township's critical environmental features. Beyond that the Township employs and Planning Board Secretary and contracts out for professional legal, planning, and engineering services for development review.

Funding

Operating Budget: The Township's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Township has received funding from the NJDOT and The Garden State Preservation Trust Fund grant programs. The Township's 2014 Capital Budget includes line items for improvements to the Municipal Building, as well as a number of drainage and roadway improvements.

Education and Outreach

The Township's website posts information regarding upcoming community events and important municipal decisions on the home page. The Township has disaster and emergency mitigation and management information on the emergency management web page.

The Township identified mitigation initiatives to implement Fire Wise as well as conduct an all-hazards public education and outreach program for hazard mitigation and preparedness. In addition, the Township would like to enhance STEP and CERT programs.



Figure 9.19-1. Screenshot of Township Website with Examples of their Emergency Information



9.19.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.19-10. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Sparta Township 1	Emergency generator for shelter located within Sparta Ambulance Service building located on Sparta Avenue	OEM Coordinator	In Progress	Currently in progress; researching vendors	Include in 2016 HMP	
Sparta Township 2	Harden Sparta DPW building located on Prices Lane to FEMA 361 Standards	DPW Administrator	In Progress	Due to budget constraints, this project has not been completed.	Include in 2016 HMP	Identify Funding Opportunities to harden Sparta DPW building located on Prices Lane to FEMA 361 Standards
Sparta Township 3	Retrofit impact resistant windows and shutters on Germany Flats Pump Facility located on Park Lake Drive.	Facility Administrator	In Progress	Due to budget constraints, this project has not been completed.	Include in 2016 HMP	Identify Funding Opportunities to harden Sparta DPW building located on Prices Lane to FEMA 361 Standards
Sparta Township 4	Stream bank stabilization along Sparta Glen Brook (3500 feet)	Township Engineer	In Progress	Due to budget constraints, this project is only 60% complete. It is being funded through the capital budget.	Include in 2016 HMP	Seek additional funding sources/partners
Sparta Township 5	Stream bank stabilization along Wallkill River at Station Park (1500 feet)	Township Engineer	In Progress	The Township planted Hipara along the stream bank. Additional vegetation planting is 40% complete. This is being funded through the capital budget.	Include in 2016 HMP	
Sparta Township 6	Stormwater management system upgrade and improvement along Hopkins Corner Road and Valley Manner Drive	OEM Coordinator	Complete	This project has been completed and was funded by the Township's operating budget.	Discontinue	
Sparta Township 7	Implement Fire Wise Program throughout the Township.	OEM Coordinator	No Progress	Due to budget and personnel constraints, this project has not been completed.	Include in 2016 HMP	
Sparta Township 8	Retrofit impact resistant windows and shutters on	School Administration	No Progress	County building	Discontinue	This facility is owned by the county and the township has no jurisdiction over it;



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
	two buildings of the Sussex County Technical School.					therefore, it will not be included in the 2016 HMP
Sparta Township 9	Retrofit two buildings to meet current snow load standards at the Sussex County Technical School.	School Administration	No Progress	County building	Discontinue	This facility is owned by the county and the township has no jurisdiction over it; therefore, it will not be included in the 2016 HMP
Sparta Township 10	Flood-proofing of the Sparta High School.	School Board Administrator	No Progress	School owned by the Board of Education	Discontinue	This facility is owned the Sparta Board of Education and the township does have jurisdiction over it; therefore, it will not be included in the 2016 HMP.
Sparta Township 11	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	In Progress	The Township has established STEP and CERT.	Include in 2016 HMP	Enhance STEP and CERT.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Township has not identified any additional mitigation projects/activities that have been completed since approval of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Township participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013). In May 2015, the Township participated in a second workshop led by FEMA Region 2 and NJOEM and was provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.19-11 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High', 'Medium', or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.19-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.19-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Sparta-1	Ensure continuity of operations at critical facilities. At this time the following was identified: Emergency generator for shelter located within Sparta Ambulance Service building located on Sparta Avenue	Existing	All	1, 2, 6	Emergency Management	High	Medium	HMGP with local cost share	Short Term / DOF	Medium	SIP	PP
Sparta-2	Harden Sparta DPW building located on Prices Lane to FEMA 361 Standards	Existing	Flood, Severe Weather	1, 2, 6	Emergency Management	High	Medium	HMGP with local cost share	Short Term / DOF	Medium	SIP	PP
Sparta-3	Retrofit impact resistant windows and shutters on Germany Flats Pump Facility located on Park Lake Drive.	Existing	Severe Weather, Severe Winter Weather	1, 2, 6	Emergency Management	High	Medium	HMGP with local cost share	Short Term / DOF	Medium	SIP	PP
Sparta-4	Stream bank stabilization along Sparta Glen Brook (3500 feet)	Existing	Flood, Severe Weather	1, 2, 6	Emergency Management	High	Medium	HMGP with local cost share	Short Term / DOF	Medium	SIP	PP
Sparta-5	Stream bank stabilization along Walkill River at Station Park (1500 feet)	Existing	Flood, Severe Weather	1, 2	Township Engineer	High	High	Federal/State Grants, Local Budget	Short term	High	SIP	PP
Sparta-6	Implement Fire Wise Program throughout the Township.	New and Existing	Wildfire	All	Fire Department	High	Low to Medium	Local Budget	Short Term / DOF	Medium	LPR	PR
Sparta-7	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness. Enhance STEP and CERT programs.	N/A	All	All	Township	High	Low	Local Budget	Ongoing	High	LPR, EAP	PR, PI
Sparta-8	Replace Culvert at West Mountain Road	Existing	Flood, Severe Weather	1, 2, 6	Township engineer	High	High	Federal/State Grants, Local Budget	Short Term	Medium to High	SIP	PP
Sparta-9	Lake Grinell Dam/ Spillway Reconstruction	Existing	Flood, Severe Weather	1, 2, 6	Township Engineer	High	High	Federal/State Grants, NJDEP Loan Program, Local budget	Short Term	Medium to High	SIP, NSP	PP, NR
Sparta-10	Improve overall stability of Private Dams	Existing	Dam Failure	1, 2	Township Engineer	Medium	Medium	Federal and State Grants,	Long Term	Medium	SIP, NSP	PP, NR



Table 9.19-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
								NJDEP loan program				

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
RFC	Repetitive Flood Claims Grant Program (discontinued)
SRL	Severe Repetitive Loss Grant Program (discontinued)

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.



- *Natural Systems Protection (NSP)* – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- *Education and Awareness Programs (EAP)* – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- *Preventative Measures (PR)*-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- *Property Protection (PP)*-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- *Public Information (PI)*-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- *Natural Resource Protection (NR)*-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- *Structural Flood Control Projects (SP)*-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- *Emergency Services (ES)*-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.19-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Sparta-1	Emergency generator for shelter located within Sparta Ambulance Service building located on Sparta Avenue	1	1	1	1	0	0	0	0	1	1	1	1	0	0	8	Medium
Sparta-2	Harden Sparta DPW building located on Prices Lane to FEMA 361 Standards	1	1	1	1	1	1	0	0	0	1	1	1	0	0	9	Medium
Sparta-3	Retrofit impact resistant windows and shutters on Germany Flats Pump Facility located on Park Lake Drive.	1	1	1	1	1	1	0	0	0	1	1	1	0	0	9	Medium
Sparta-4	Stream bank stabilization along Sparta Glen Brook (3500 feet)	1	1	1	-1	0	1	-1	1	0	1	1	-1	1	1	6	Medium
Sparta-5	Stream bank stabilization along Wallkill River at Station Park (1500 feet)	1	1	1	-1	0	1	-1	1	0	1	1	-1	1	1	6	High
Sparta-6	Implement Fire Wise Program throughout the Township.	1	1	1	1	0	0	1	0	0	1	0	0	1	0	7	Medium
Sparta-7	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness. Enhance STEP and CERT programs.	1	1	1	1	1	1	1	0	0	1	1	1	0	0	10	High
Sparta-8	Replace Culvert at West Mountain Road	1	-1	1	1	1	1	0	1	0	1	0	1	1	-1	7	Medium to High
Sparta-9	Lake Grinell Dam/ Spillway Reconstruction	1	1	1	0	0	1	0	1	1	1	1	1	1	1	11	Medium to High
Sparta-10	Improve overall stability of Private Dams	1	1	0	0	1	0	0	1	1	0	0	-1	0	0	4	Medium

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.19.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.19.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Sparta that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Sparta has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.19.9 Additional Comments

None at this time.

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Figure 9.19-2. Township of Sparta Hazard Area Extent and Location Map 1

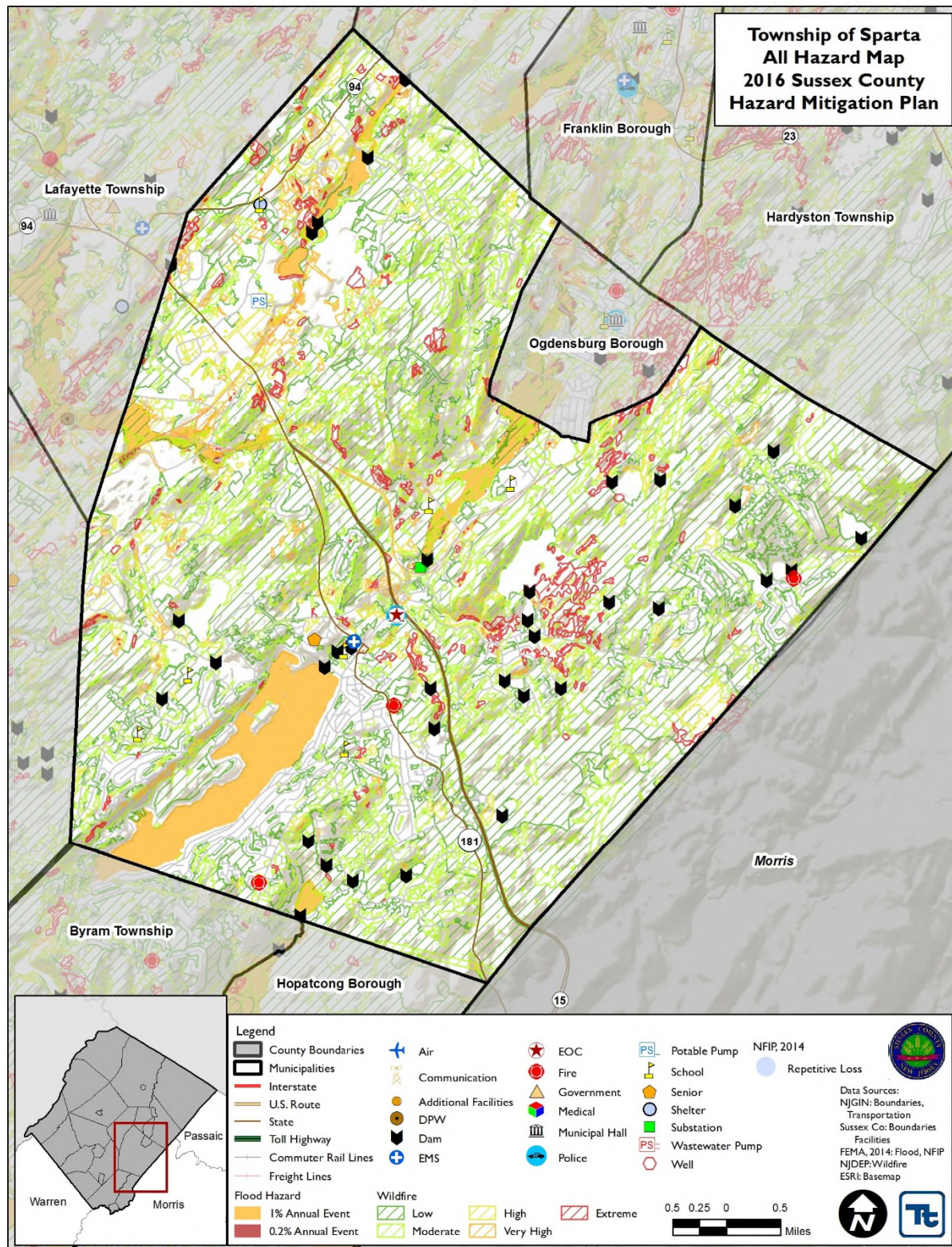
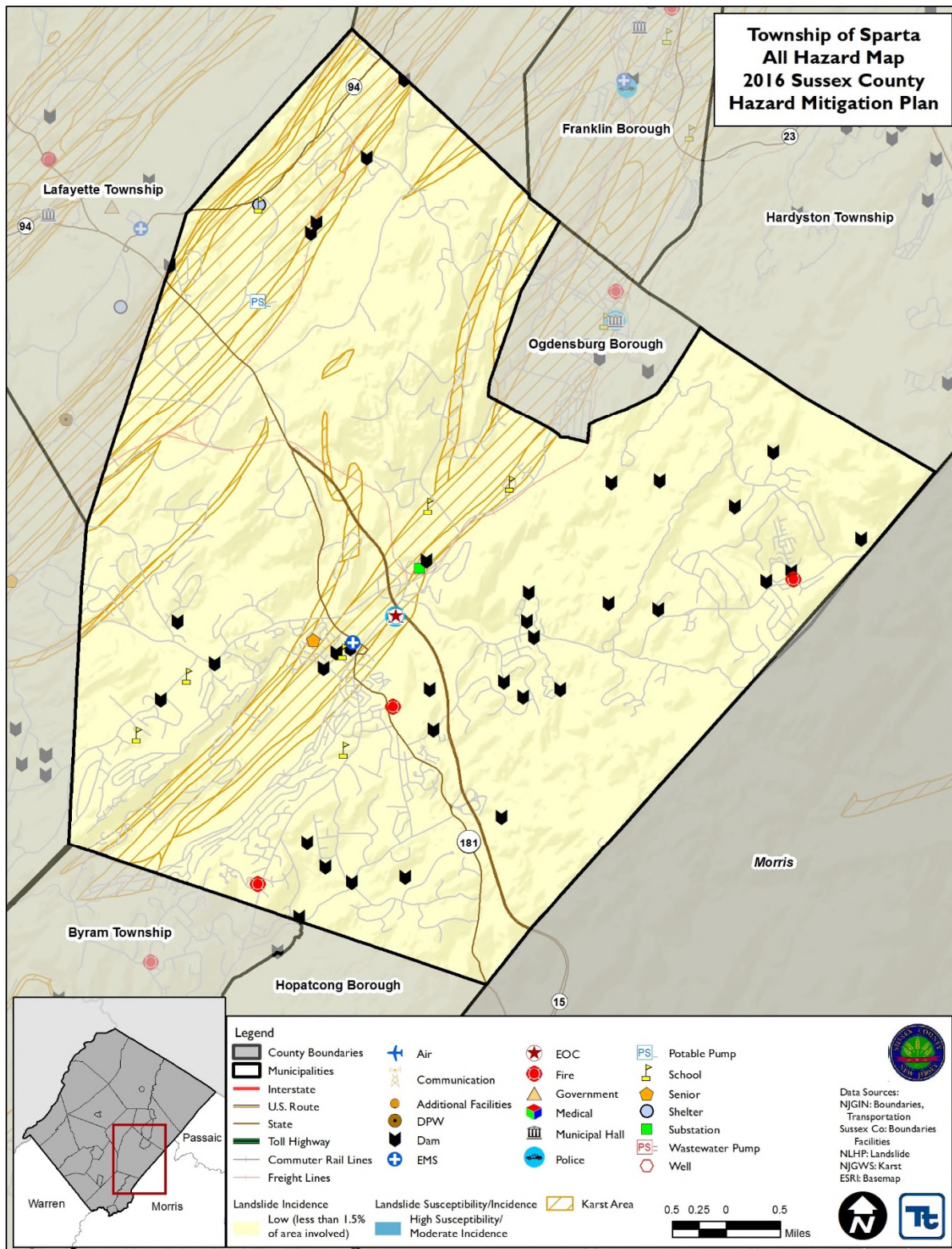




Figure 9.19-3. Township of Sparta Hazard Area Extent and Location Map 2





Action Number:

Sparta-1

Mitigation Action/Initiative:

Emergency generator for shelter at Sparta Ambulance Service building

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Loss of power to the ambulance building impacts the emergency services provided by the Township EMS; this facility is also used a shelter for the Township
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install a generator at the Sparta Ambulance Service building
	2. Use portable generators – not feasible for long-term power outages
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Emergency generator for shelter located within Sparta Ambulance Service building located on Sparta Avenue
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Emergency management
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sparta-1

Mitigation Action/Initiative: Emergency generator for shelter at Sparta Ambulance Service building

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide shelter for residents
Property Protection	1	Allow building to function properly during power outages
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All
Timeline	1	Completed within five years
Local Champion	0	
Other Community Objectives	0	
Total	8	
Priority (High/Med/Low)	Medium	



Action Number:

Sparta-2

Mitigation Action/Initiative:

Harden Sparta DPW building located on Prices Lane

Assessing the Risk	
Hazard(s) addressed:	Severe Weather
Specific problem being mitigated:	DPW building cannot withstand winds of tornadoes or hurricanes if they were to impact the Township
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Harden Sparta DPW building located on Prices Lane to FEMA 361 Standards
	2. Construct new building – too costly
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Harden Sparta DPW building located on Prices Lane to FEMA 361 Standards
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Emergency Management
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sparta-2

Mitigation Action/Initiative: Harden Sparta DPW building located on Prices Lane

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect DPW building from wind damages
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	Building owned by Township
Fiscal	0	
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	Medium	



Action Number:

Sparta-3

Mitigation Action/Initiative:

Retrofit impact resistant windows and shutters on Germany Flats Pump Facility

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Severe Winter Weather
Specific problem being mitigated:	Windows of the pump facility are not impact resistant and pose a threat in the event of a high wind event
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit impact resistant windows and shutters on Germany Flats Pump Facility
	2. Construct new building – too costly
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit impact resistant windows and shutters on Germany Flats Pump Facility located on Park Lake Drive.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Emergency Management
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sparta-3

Mitigation Action/Initiative: Retrofit impact resistant windows and shutters on Germany Flats Pump Facility

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect pump facility building from wind damages
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	Severe Weather, Severe Winter Weather
Timeline	1	
Local Champion	0	
Other Community Objectives	0	
Total	9	
Priority (High/Med/Low)	Medium	



Action Number: Sparta-4

Mitigation Action/Initiative: Stream bank stabilization along Sparta Glen Brook (3500 feet)

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	The bank along Sparta Glen Brook is at risk of erosion and flood damage
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Stream bank stabilization along Sparta Glen Brook (3500 feet)
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Stream bank stabilization along Sparta Glen Brook (3500 feet)
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Emergency Management
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sparta-4

Mitigation Action/Initiative: Stream bank stabilization along Sparta Glen Brook (3500 feet)

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect residents from impacts of flooding and erosion along Sparta Glen Brook
Property Protection	1	Protect properties from impacts of flooding and erosion along Sparta Glen Brook
Cost-Effectiveness	1	
Technical	-1	
Political	0	
Legal	1	
Fiscal	-1	
Environmental	1	
Social	0	
Administrative	1	
Multi-Hazard	1	
Timeline	-1	
Local Champion	1	
Other Community Objectives	1	
Total	6	
Priority (High/Med/Low)	Medium	

**Action Number:** Sparta-5**Mitigation Action/Initiative:** Stream bank stabilization along Walkill River at Station Park (1500 feet)

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	Significant Bank Erosion/ pavement damage; loss/damage to roadway and utility piping
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. No Action – current problem continues
	2. Monitoring of Area/ adding additional stone or rip rap as needed
	3. Complete restoration of bank and river
Action/Project Intended for Implementation	
Description of Selected Action/Project	Restore & Stabilize roadway embankment along Walkill River.
Action/Project Category	SIP
Goals/Objectives Met	Protect Public Property / Infrastructure
Applies to existing and/or new development; or not applicable	Existing Development
Benefits (losses avoided)	Road Damage / Existing Pipe Damage, JCP&L substation damage
Estimated Cost	\$1 million (High)
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township of Sparta
Local Planning Mechanism	Township Engineering Office
Potential Funding Sources	Federal / State Grants/ Local Capital
Timeline for Completion	Within 5 years
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sparta-5

Mitigation Action/Initiative: Stream bank stabilization along Walkill River at Station Park (1500 feet)

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	NYSW Tressel
Cost-Effectiveness	1	Loss of Utility Infrastructure in the area, affect town center commercial district, rendering it closed. (Millions)
Technical	-1	Beyond of scope of in house staff/ hiring of consultant for task
Political	0	
Legal	1	No property acquisition required
Fiscal	-1	Significant costs associated and budget strain
Environmental	1	If slope fails, potential sewage leak into Walkill River a C1 stream
Social	0	
Administrative	1	Full time Engineer/ DPW
Multi-Hazard	1	Water, Sewer, Natural Gas
Timeline	-1	Take multiple years to accomplish
Local Champion	1	/ Manager/ Township Engineer
Other Community Objectives	1	Protection of infrastructure, roadways, sewer lines
Total	6	
Priority (High/Med/Low)	High	



Action Number:

Sparta-8

Mitigation Action/Initiative:

Replace Culvert at West Mountain Road

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	Road floods during significant rain preventing feasible access to Sparta High School. This is also leading to road flooding, shoulder erosion and culvert damage.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Replace Culvert at West Mountain Road
	2. Do nothing – current problem continues
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Replace Existing Culvert with larger unit. Elevate Roadway to allow for larger storm events. This will alleviate flooding of properties and roadway in the area, including Sparta High School.
Action/Project Category	SIP
Goals/Objectives Met	Protect Public Property/ Continuity of Operations (Sparta High School)
Applies to existing and/or new development; or not applicable	Existing Development
Benefits (losses avoided)	Isolation of High School, eliminates damage to road.
Estimated Cost	\$600,000 (high)
Priority	Medium to High
Plan for Implementation	
Responsible/Lead Agency/Department	Township of Sparta
Local Planning Mechanism	Township Engineering Office
Potential Funding Sources	Federal / State Grants/ Local Capital
Timeline for Completion	Around 2 years
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sparta-8

Mitigation Action/Initiative: Replace Culvert at West Mountain Road

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Potential for Flood Waters to Sweep Away Car
Property Protection	-1	
Cost-Effectiveness	1	Would eliminate need to close High School (Staff cost and everything associated)
Technical	1	
Political	1	
Legal	1	
Fiscal	0	Current capital funding is limited / need outside assistance.
Environmental	1	Would also provide wildlife crossing (turtles and any other protected species)
Social	0	
Administrative	1	Full time Engineer/ DPW
Multi-Hazard	0	
Timeline	1	
Local Champion	1	Township Council/ Manager/ Board of Education
Other Community Objectives	-1	
Total	7	
Priority (High/Med/Low)	Medium High	

**Action Number:**

Sparta-9

Mitigation Action/Initiative:

Lake Grinell Dam/ Spillway Reconstruction

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	Loss of Municipal Roadway and significant loss to private property
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. No Action (NJDEP says we have to)
	2. Reconstruct spillway in accordance with NJDEP regulations
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Replace Existing Spillway.
Action/Project Category	SIP/ NRP
Goals/Objectives Met	Protect Public/ Private Property/ Including Municipal Roadway)
Applies to existing and/or new development; or not applicable	N/A
Benefits (losses avoided)	No longer loose roadway if breeched and no damage to private property downstream.
Estimated Cost	\$250k (High)
Priority	Medium to High
Plan for Implementation	
Responsible/Lead Agency/Department	Township of Sparta/ Lake Grinell Association
Local Planning Mechanism	Township Engineering Office
Potential Funding Sources	Federal / State Grants/ Local Capital (NJDEP Loan Program)
Timeline for Completion	Around 2 years
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sparta-9

Mitigation Action/Initiative: Lake Grinell Dam/ Spillway Reconstruction

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect Life and Property
Property Protection	1	
Cost-Effectiveness	1	
Technical	0	
Political	0	
Legal	1	
Fiscal	0	Current capital funding is limited / need outside assistance.
Environmental	1	
Social	1	
Administrative	1	Full time Engineer/ DPW
Multi-Hazard	1	
Timeline	1	Less than 2 years, (NJDEP requirements)
Local Champion	1	
Other Community Objectives	1	
Total	11	
Priority (High/Med/Low)	High	

**Action Number:** Sparta-10**Mitigation Action/Initiative:** Improve overall stability of Private Dams

Assessing the Risk	
Hazard(s) addressed:	Dam Failure
Specific problem being mitigated:	Potential Breach of Privately Owned Dams
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. No Action (NJDEP says we have to)
	2. Improve overall stability of Private Dams
	3. No other feasible options were identified
Action/Project Intended for Implementation	
Description of Selected Action/Project	Improve overall stability of Private Dams
Action/Project Category	SIP/ NRP
Goals/Objectives Met	Protect Public/ Private Property/ Including Municipal Infrastructure
Applies to existing and/or new development; or not applicable	N/A
Benefits (losses avoided)	Medium
Estimated Cost	Medium
Priority*	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	NJ DEP, Township Engineer
Local Planning Mechanism	Township Engineering Office
Potential Funding Sources	Federal / State Grants/ (NJDEP Loan Program)
Timeline for Completion	10 Years
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Sparta-10

Mitigation Action/Initiative: Improve overall stability of Private Dams

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect Life and Property
Property Protection	1	
Cost-Effectiveness	0	
Technical	0	
Political	1	
Legal	0	
Fiscal	0	
Environmental	1	
Social	1	
Administrative	0	Full time Engineer/ DPW
Multi-Hazard	0	
Timeline	-1	10 year potential
Local Champion	0	
Other Community Objectives	0	
Total	4	
Priority (High/Med/Low)	Medium	



9.20 Borough of Stanhope

This section presents the jurisdictional annex for the Borough of Stanhope.

9.20.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Brian McNeilly, Borough Administrator 77 Main Street, Stanhope, NJ 07874 Phone: (973) 347-8042 Email: bmcneilly@stanhopenj.gov	Eric Keller, Borough Engineer 77 Main Street, Stanhope, NJ 07874 Phone: (973) 291-2919 Email: ekeller@bowmanconsulting.com

9.20.2 Municipal Profile

The Borough of Stanhope is located at the southern tip of Sussex County. It has a total area of 2.2 square miles and is bordered to the north and west by Byram Townships, to the north and east by Hopatcong Borough and to the south by Morris County. According to the U.S. Census, the 2010 population for the Borough of Stanhope was 3,610. Lake Musconetcong is a large lake located in the southeastern portion of the Borough. Tributaries of the Musconetcong River flow through the Borough.

Growth/Development Trends

The Borough of Stanhope did not note any recent residential/commercial development since 2010 or any major residential or commercial development, or major infrastructure development planned for the next five years in the municipality.

9.20.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.20-1. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
February 12-13, 2008	Winter Storm	N/A	N/A	DPW overtime for snow removal. Cost of materials applied to the road surface.
October 28, 2008	Heavy Snow and Strong Winds	N/A	N/A	DPW and Police overtime due to sporadic power loss for traffic control and debris removal.
February 1-2, 2011	Winter Storm	N/A	N/A	DPW overtime for snow removal. Cost of materials applied to the road surface.
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	DPW and Police overtime due to sporadic power loss for traffic control and debris removal. Robert Place road closure due to wash out and failure of drainage ditch alongside of the road. Damage to



Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
				road culvert on Dell Road. Emergency Protective Measures-\$7,158.63 (Fire Dept., Police, DPW)
October 29, 2011	Severe Storm	DR-4048	Yes	DPW and Police overtime due to widespread power loss for traffic control and debris removal. Damage to municipal facility. Power outage effecting 100% of the town for 5 days. Schools closed for 5 days. Force Labor (Police, Fire and DPW) \$6,831.92. 30 tons of road salt \$2463.76. Standby generator usage \$23,972.76. Contract Brush Removal \$6,212.76. DPW Brush Removal \$12,221.38.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	DPW and Police overtime due to widespread power loss for traffic control and debris removal. Damage to municipal facility. Residents self-evacuated no documentation on number or where to. Sheltering provided by the Red Cross at Hopatcong High School. Unofficial warming stations located at Stanhope Firehouse and Borough Hall. Majority of the town w/o power for 12 days following the storm. Following road were closed due to downed wires and/or trees: Main St, Linden Ave, Brooklyn Rd, Musconetcong Ave, Spring Ln, Highland Ave, Lloyd Ave. Roads were closed on Oct 29th thru Nov 3rd, 2012. Schools closed for 10 days. Falling tree destroyed the radio system at Well #4. The impact also destroyed the variable frequency drive of the pump, the power supply for the base station. The physical building had damage to the roof and the shed located next it. Three private residence were damaged during the storm. Two were repaired. One was 100% loss and was rebuilt. Force Labor (DPW) – Debris Removal \$35,000.00. Fire Department (Equipment and Manpower) \$10,500.00.

9.20.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Borough of Stanhope. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Borough of Stanhope.

Table 9.20-2. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Rare	6	Low
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0	Occasional	28	Medium



Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
	500-Year GBS: \$455,982 2,500-Year GBS: \$7,417,681			
Flood	1% Annual Chance: \$2,329,655	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$0	Occasional	12	Low
Hurricane	100-year MRP: \$194,327 500-year MRP: \$1,050,050 Annualized: \$10,106	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$194,327 500-year MRP: \$1,050,050 Annualized: \$10,106	Frequent	48	High
Severe Winter Weather	1% GBS: \$5,570,980 5% GBS: \$27,854,900	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$655,396	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

GBS = General building stock; MRP = Mean return period.

- The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
- Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Borough of Stanhope.

Table 9.20-3. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Borough of Stanhope	7	2	\$16,257	0	0	0

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.



Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance flood boundary.

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.

9.20.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Community Rating System
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Borough of Stanhope.

Table 9.20-4. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Land Use	Re-Examination – May 8, 2006
Capital Improvements Plan	No			
Floodplain Management/Basin Plan	No			
Stormwater Management Plan	Yes 2-5-15	State	Boro Eng.	
Open Space Plan	Yes	Local	Land Use	Part of the Master Plan
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	No			
Comprehensive Emergency Management Plan	Yes	Local	OEM	
Emergency Response Plan	Yes	Local	OEM	
Post-Disaster Recovery Plan	No			
Transportation Plan	Yes	Local/County/ State		
Strategic Recovery Planning Report	No			



Table 9.20-4. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State/Local		State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Land Use	Chapter 100 of Borough Code
Subdivision Ordinance	Yes	Local	Land Use	Chapter 100 of Borough Code
NFIP Flood Damage Prevention Ordinance	Yes	Federal/State/Local	Construction Official	Chapter 100, Article 21 – Flood Damage Prevention
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State, Local		
Growth Management Ordinances	No			
Site Plan Review Requirements	Yes	Local	Land Use	Chapter 100 of Borough Code
Stormwater Management Ordinance	Yes	Local	Land Use	Chapter 100 of Borough Code
Municipal Separate Storm Sewer System (MS4)	Yes	State	Boro Eng	
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes	Local	Zoning	Chapter 100 of Borough Code

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Borough of Stanhope.

Table 9.20-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Land Use Board
Mitigation Planning Committee	No	
Environmental Board/Commission	Yes	Mayor and Council
Open Space Board/Committee	No	
Economic Development Commission/Committee	No	
Maintenance Programs to Reduce Risk	No	
Mutual Aid Agreements	Yes	Fire Department
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Borough Engineer / Planner



Table 9.20-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Borough Engineer / Construction Official
Planners or engineers with an understanding of natural hazards	Yes	Borough Engineer
NFIP Floodplain Administrator	Yes	Construction Official
Surveyor(s)	Yes	Borough Engineer's Office
Personnel skilled or trained in GIS and/or Hazus-MH applications	No	
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	Emergency Management Coordinator
Grant Writer(s)	Yes	Millennium Strategies
Staff with expertise or training in benefit/cost analysis	No	
Professionals trained in conducting damage assessments	No	

Fiscal Capability

The table below summarizes financial resources available to the Borough of Stanhope.

Table 9.20-6. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	No
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	Yes
Impact Fees for homebuyers or developers of new development/homes	No
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	
Incur debt through private activity bonds	
Withhold public expenditures in hazard-prone areas	
Other Federal or State Funding Programs	
Open Space Acquisition Funding Programs	No
Other	



Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Borough of Stanhope.

Table 9.20-7. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		
Building Code Effectiveness Grading Schedule (BCEGS)	TBD		
Public Protection (ISO Fire Protection Classes 1 to 10)	TBD		
Storm Ready	No		
Firewise	No		
Disaster/Safety Programs in/for Schools	TBD		
Organizations with Mitigation Focus (advocacy group, non-government)	TBD		
Public Education Program/Outreach (through website, social media)	Yes	Municipal website	
Public-Private Partnerships	TBD		

N/A = Not applicable. NP = Not participating. - = Unavailable. TBD = To be determined.

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Borough of Stanhope's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.



Table 9.20-8. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability	No Limited staff; Few people have numerous roles/responsibilities		
Administrative and Technical Capability	No Limited staff; Few people have numerous roles/responsibilities		
Fiscal Capability	No Limited staff; Few people have numerous roles/responsibilities		
Community Political Capability	No Limited staff; Few people have numerous roles/responsibilities		
Community Resiliency Capability	No Limited staff; Few people have numerous roles/responsibilities		
Capability to Integrate Mitigation into Municipal Processes and Activities	No Limited staff; Few people have numerous roles/responsibilities		

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Thomas Pershouse, Construction Official

Flood Vulnerability Summary

The Borough does not maintain lists or inventories of properties that have been damaged by flooding. During Irene, Lee and Sandy, the only type of damage sustained was wind and tree damage only. Substantial Damage estimates were not declared for these events nor does the FPA make Substantial Damage estimates.

Resources

The Construction Official is the only person identified in the Flood Damage Prevention Ordinance as the FPA and he does not have other staff to use if needed. Duties of the municipal FPA is minimal due to the lack of structures in the floodplain. The Borough does not provide any education or outreach to the community regarding flood hazards/risk or flood risk reduction. The FPA stated that there are currently no barriers to running an effective floodplain management program. He would attend a training if needed.

Compliance History

The Borough entered the NFIP on November 17, 1982 and is currently in good standing. However, it is unknown as to when the most recent compliance audit was conducted.

Regulatory

The Borough's flood damage prevention ordinance meets the minimum set by FEMA and the State of New Jersey. In addition to the ordinance, the Borough reviews all projects for impervious coverage and for stormwater management.



Community Rating System

The Borough of Stanhope does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Borough has a Joint Land Use Board which reviews all applications for development and consider natural hazard risk areas in their review.

The Borough identified several integration actions (refer to Table 9.20-11). These include when updating the Zoning Ordinance, the Borough will recognize hazard areas as limits on changes to zoning within the municipality. In addition, the Borough will use the HMP update when updating the Comprehensive Master Plan.

Stanhope Borough Highlands Plan Element 2011: This Plan articulates the goals and objectives for the Township as they relate to the Highlands Standards and includes the following applicable goals and objectives:

1. To require protective buffers adjacent to Highlands Open Waters of sufficient width and composition to protect the integrity of the water resource from impairment due to proximate land uses and/or development activities.
2. Minimum standards for such buffers should be consistent with those of the NJDEP and the RMP.
3. To require use of Low Impact Development Best Management Practices (see Section K) for any development activity proposed within a Riparian Area to minimize both alteration of natural vegetation and increase in impervious area and to provide for mitigation through restoration of impaired Riparian Areas in the same HUC14 subwatershed.
4. Land disturbance within all Steep Slope Protection Areas should incorporate Low Impact Development (see Section K) techniques to minimize the extent of such disturbance and the potential negative impacts resulting from it.
5. To carefully examine land development applications for potential impacts to Carbonate Rock Areas, whether by direct disturbance, or by indirect means such as introduction of additional stormwater runoff. Stormwater management LID standards that preserve or mimic the natural hydrologic features and characteristics of the land.
6. LID practices that minimize land disturbance during construction activities.
7. LID best management practices where any development application proposes disturbance of a Highlands resource, including but not limited to Steep Slope Protection Areas, Forest Areas, Critical Habitat Areas, Highlands Open Waters and Riparian Areas, and Prime Ground Water Recharge Areas.
8. To require submission of any and all information, technical data, geotechnical studies and/or analyses that may be necessary to locate and determine the extent of affected carbonate rock features during the course of development reviews.

Environmental Commission: The Environmental Commission actively protects our natural resources, promotes Open Space, and offers educational programs to our residents. Every year the Environmental Commission co-sponsors a Community Clean-Up Day together with the NJ Clean Communities Program. This



Commission works closely with the Lake Musconetcong Regional Planning Board, the Sussex County Soil Conservation District, the Sussex County Municipal Authority, and the NJ Department of Environmental Protection to ensure our natural resources are protected and preserved.

Highlands: Stanhope Borough is located in the New Jersey Highlands Region and is part of the Highlands Area. As such, the Borough is one of 88 municipalities protected by and subject to the provisions of the Highlands Water Protection and Planning Act that protects, enhances and restores Highland's natural resources. The Highlands Act requires that future land use in the Highlands Region be guided by the Regional Master Plan's Land Use Capability Map (LUCM) Series which includes tools to identify and protect the natural, scenic and other resources of the region. In supporting and complying with the Highlands Act, the Borough enacted amendments and updates to local zoning and development ordinances that ensure the protection of important resources and areas. The Highland Act creates three primary zones: a Protection Zone, a Conservation Zone and an Existing community Zone. Protection Zones are areas with the highest quality resources with extreme limitations on allowable development while Conservation Zones have significant agricultural lands and associated woodlands and environmental features with allowable development consisting primarily of agricultural uses. Existing Community Zones consist of areas of concentrated development with limited environmental constraints. These zones are overlayed with existing local zoning maps to identify and address issues of public interest including watershed management, open space preservation, historic preservation, flood protection among others.

Regulatory and Enforcement (Ordinances)

The Borough has multiple chapters and articles pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement section included in the Land Use Chapter. The Borough also has a chapter specific to the hazards associated with environmentally sensitive areas.

Chapter 100 Article XXI: Flood Damage Prevention

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 100 Article XXVII: Stormwater Control

The purposed of the Stormwater Control chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare the citizens.

Chapter-100-38: Environmental Impact Statement



The purpose of this section of the Chapter is to allow the Borough to assess the impact of a proposed development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding and waste disposal.

Highlands: In addition, the Highlands Water Protection and Planning Act provides additional regulatory control over development within the Borough. While Major Highlands Development projects, as defined by the Highlands Act, still require local approvals, they must first receive a Highlands Resource Applicability Determination and be evaluated for consistency with the provisions of the Highlands Act. Major Highlands Development projects include a variety of projects such as any non-residential development, any residential development that disturbs one or more acres of land, any development that disturbs ¼ acres of more of forest among others. This process identifies any potential Highlands Resources on the site and if found requires adherence to relevant development standards and restrictions.

Operational and Administration

The Borough has established a Joint land Use Board and Environmental Commission that are responsible for the review of development applications. The Borough has a Zoning officer as well as a planning and zoning board secretary.

Funding

Operating Budget: The Borough's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

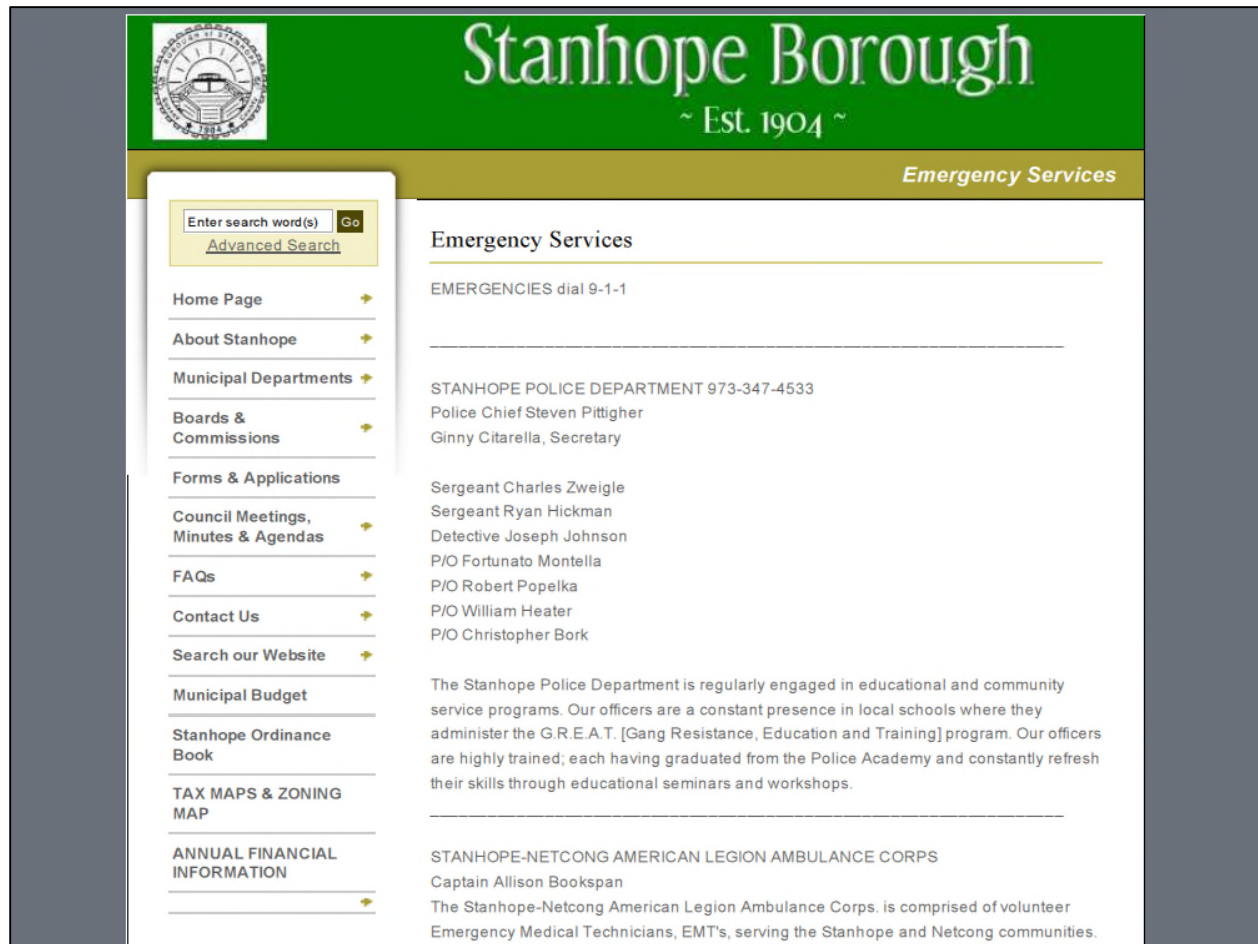
Grants: The Borough has received funding from the NJDOT, Sustainable Jersey, The Garden State Preservation Trust Fund, and Clean Communities grant programs for the completion of mitigation and emergency response related projects including roadway and drainage improvements.

Education and Outreach

The Borough's website's home page posts information regarding upcoming community events and important municipal decisions.



Figure 9.20-1. Screenshot of Township Website with Examples of their Posted Mitigation/Emergency Information



9.20.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.20-9. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Stanhope Borough 1	Backup generator for Lenape Valley Regional High School. Facility is utilized as the primary ARC approved Shelter.	School Board Administrator	No Progress	Due to budget and personnel constraints, this project has not been completed.	Include in 2016 HMP	Purchase and install a backup generator for Lenape Valley Regional High School which is used as the primary ARC shelter in the Borough.
Stanhope Borough 2	Flood proofing and elevation of utilities for the Compact Building on Furnace Street.	Facility Administrator	No Progress	Due to budget and personnel constraints, this project has not been completed.	Include in 2016 HMP	Flood proof and elevate the utilities of the compact building on Furnace Street.
Stanhope Borough 3	Flood-proofing of the Byram Lakes Elementary School.	School Board Administrator	No Progress	This action is for a facility not located within the Borough.	Discontinue	The school is located in Byram Township; therefore, this action will not be included in the 2015 HMP Update.
Stanhope Borough 4	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	No Progress	Due to budget and personnel constraints, this project has not been completed.	Include in 2016 HMP	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Borough has not identified any additional mitigation projects/activities that have been completed since approval of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Borough participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013). In May 2015, a second workshop was led by FEMA Region 2 and NJOEM and provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.20-10 summarizes the comprehensive-range of specific mitigation initiatives the Borough would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High,' 'Medium,' or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.20-11 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.20-10. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Stanhope-1	Purchase and install a backup generator for Lenape Valley Regional High School which is used as the primary ARC shelter in the Borough.	Existing	All	1, 2, 3, 6	Emergency Management	High	High	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Stanhope-2	Flood proof and elevate the utilities of the compact building on Furnace Street.	Existing	Flood, Severe Weather	1, 2, 3, 6	Emergency Management	High	Medium	HMGP with local cost share	Short Term / DOF	Medium	SIP	PP
Stanhope-3	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	N/A	All	All	Borough Administration	High	Low	Municipal Budget	Ongoing	High	EAP	PI
Stanhope-4	Utilize the Hazard Mitigation Plan (HMP) when updating the Comprehensive Master Plan; consider including hazard identification, hazard zones risk assessment information, and hazard mitigation goals as identified in the HMP. Further, the findings and recommendation of the HMP will be considered during any future site plan review processes.	Both	All	All	Planning	High	Low	Municipal	Short	High	LPR	PR
Stanhope-5	Develop specific design guidelines and development review procedures for new construction, replacement, relocation and substantial improvement in hazard areas within the Borough.	New and Existing	All	All	Borough Administration	High	Low	Municipal Budget	Ongoing	High	LPR	PR
Stanhope-6	When updating the Zoning Ordinance, the Borough will recognize hazard areas as limits on changes to zoning within the municipality.	N/A	All	All	Borough Administration	High	Low	Municipal Budget	Ongoing	High	LPR	PR
Stanhope-7	Ensure hazard mitigation initiatives are incorporated into the capital improvement plan; budget for some of these projects.	N/A	All	All	Borough Administration	High	Low	Municipal Budget	Ongoing	High	LPR	PR



Table 9.20-10. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Stanhope-8	Incorporate risk assessment and hazard mitigation initiatives into planning efforts.	N/A	All	All	Borough Administration	High	Low	Municipal Budget	Ongoing	High	LPR	PR

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
RFC	Repetitive Flood Claims Grant Program (discontinued)
SRL	Severe Repetitive Loss Grant Program (discontinued)

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.



- *Natural Systems Protection (NSP)* – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- *Education and Awareness Programs (EAP)* – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- *Preventative Measures (PR)*-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- *Property Protection (PP)*-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- *Public Information (PI)*-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- *Natural Resource Protection (NR)*-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- *Structural Flood Control Projects (SP)*-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- *Emergency Services (ES)*-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.20-11. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Stanhope-1	Purchase and install a backup generator for Lenape Valley Regional High School which is used as the primary ARC shelter in the Borough.	1	1	1	1	0	0	0	0	1	1	1	1	1	1	10	High
Stanhope-2	Flood proof and elevate the utilities of the compact building on Furnace Street.	1	1	1	1	0	0	-1	0	0	1	0	0	1	0	5	Medium
Stanhope-3	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Stanhope-4	Utilize the Hazard Mitigation Plan (HMP) when updating the Comprehensive Master Plan; consider including hazard identification, hazard zones risk assessment information, and hazard mitigation goals as identified in the HMP. Further, the findings and recommendation of the HMP will be considered during any future site plan review processes.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Stanhope-5	Develop specific design guidelines and development review procedures for new construction, replacement, relocation and substantial improvement in hazard areas within the Borough.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Stanhope-6	When updating the Zoning Ordinance, the Borough will recognize hazard areas as limits on changes to zoning within the municipality.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Stanhope-7	Ensure hazard mitigation initiatives are incorporated into the capital improvement plan; budget for some of these projects.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Stanhope-8	Incorporate risk assessment and hazard mitigation initiatives into planning efforts.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.20.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.20.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Borough of Stanhope that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Borough of Stanhope has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.20.9 Additional Comments

None at this time.

DRAFT



Figure 9.20-2. Borough of Stanhope Hazard Area Extent and Location Map 1

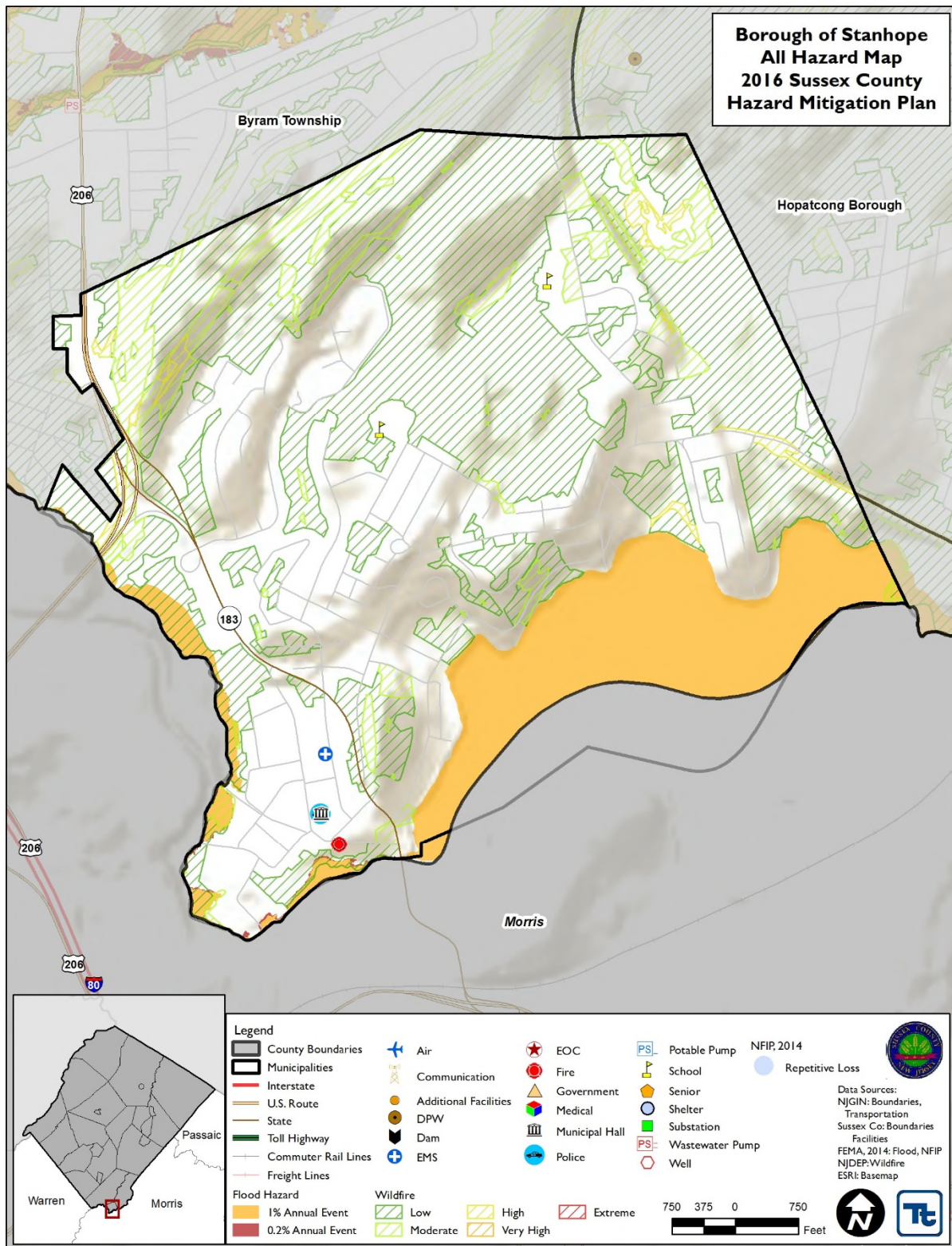
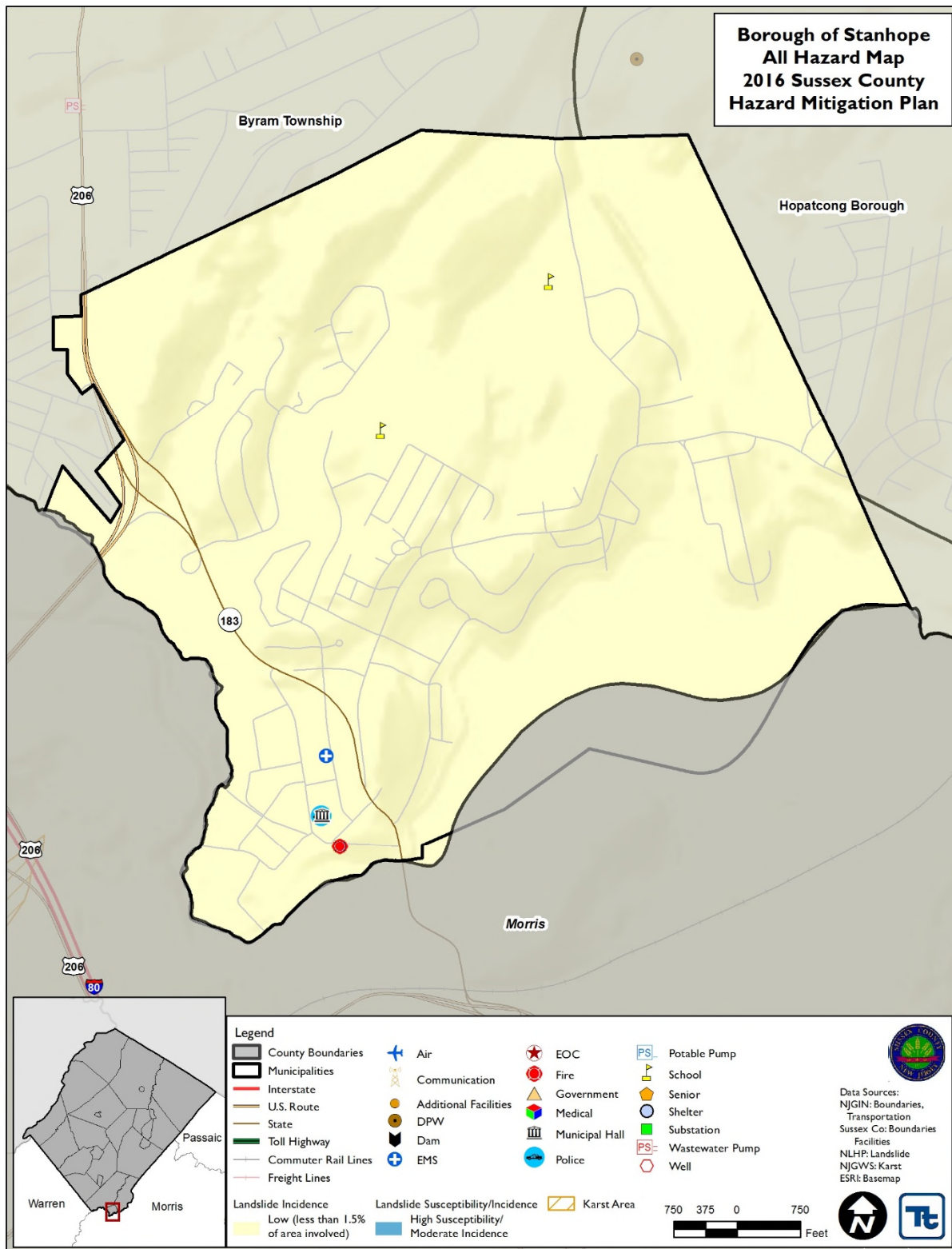




Figure 9.20-3. Borough of Stanhope Hazard Area Extent and Location Map 2



**Action Number:**

Stanhope-1

Mitigation Action/Initiative:

Purchase and install a backup generator for Lenape Valley Regional High School

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Loss of power in the Borough prevents the High School from functioning properly – it is an identified shelter for the Borough
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install a backup generator for Lenape Valley Regional High
	2. Purchase portable generator – not feasible for long-term power outages
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install a backup generator for Lenape Valley Regional High School which is used as the primary ARC shelter in the Borough.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 3, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Emergency Management
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Stanhope-1

Mitigation Action/Initiative: Purchase and install a backup generator for Lenape Valley Regional High School

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide a shelter for residents during an emergency
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	0	
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All
Timeline	1	Short Term – within five years
Local Champion	1	
Other Community Objectives	1	
Total	10	
Priority (High/Med/Low)	High	



Action Number:

Stanhope-2

Mitigation Action/Initiative:

Flood proof and elevate the utilities of the compact building on Furnace Street.

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	The Compact Building on Furnace Street has utilities that may be damaged by flooding.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Flood proof and elevate utilities at building on Furnace Street
	2. Rebuild building – too costly
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Flood proof and elevate utilities at building on Furnace Street
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 3, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium
Priority	Medium
Plan for Implementation	
Responsible/Lead Agency/Department	Emergency Management
Local Planning Mechanism	Emergency Management
Potential Funding Sources	HMGP with local cost share
Timeline for Completion	Short term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: Stanhope-2

Mitigation Action/Initiative: Flood proof and elevate the utilities of the compact building on Furnace Street.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect building from flood damage
Cost-Effectiveness	1	
Technical	1	
Political	0	
Legal	0	
Fiscal	-1	Need to obtain grants to pay for upgrades
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	0	
Timeline	0	
Local Champion	1	
Other Community Objectives	0	
Total	5	
Priority (High/Med/Low)	Medium	



9.21 Township of Stillwater

This section presents the jurisdictional annex for the Township of Stillwater.

9.21.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Timmy Lee Fisher, Mayor 964 Stillwater Road, Newton, NJ 07860 Phone: (973) 579-5080 Email: clerk@stillwatertwp.com	Lynda Knott, Municipal Clerk 964 Stillwater Road, Newton, NJ 07860 Phone: (973) 383-9484 Email: clerk@stillwatertwp.com

9.21.2 Municipal Profile

Stillwater Township is located in southwest Sussex County. It covers an area of 27.1 square miles and is bordered to the north by Sandyston Township, to the east by Frankford and Hampton Townships, to the south by Warren County, and to the west by Warren County and Walpack Township. According to the U.S. Census, the 2010 population for the Township of Stillwater was 4,099. The following unincorporated communities are located within the Township: Five Points, Swartswood, Paulinskill, Middleville, and Stillwater. There are many streams located throughout the Township and include: Blair Creek and its tributaries, Trout Brook and its tributaries, Swartswood Creek and its tributaries, Troy Brook and its tributaries, and Paulins Kill and its tributaries.

Growth/Development Trends

The Township of Stillwater did not note any recent residential/commercial development since 2010 or any major residential or commercial development, or major infrastructure development planned for the next five years in the municipality.

9.21.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.21-1. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 27 – October 6, 2011	Hurricane Irene / Lee	DR-4021 (Irene) DR-4039 (Lee)	Yes	Power outages up to 19 days; flooding throughout the Township. The fire departments in the Township were opened as shelters for residents. Creeks overflowed their banks and creating their own paths. Roadways washed out and the Township had to replace catch basins. Approximately \$100,000 in overtime and costs to the Township.



Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
October 29, 2011	Severe Storm	DR-4048	Yes	Power outages for several days; numerous downed trees and wires. The fire departments in the Township were opened as shelters for residents. Township had to conduct debris removal. Approximately \$15,000 in overtime and costs to the Township.
October 2012	Hurricane Sandy	DR-4086	Yes	Power outages for 14 days; many downed trees and power lines. The fire departments in the Township were opened as shelters for residents. Township conducted debris removal. Approximately \$65,000 in overtime and costs to the Township.

9.21.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Stillwater. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Stillwater.

Table 9.21-2. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	Medium
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$381,305 2,500-Year GBS: \$5,840,833	Occasional	28	Medium
Flood	1% Annual Chance: \$9,759,944	Frequent	18	Medium
Geologic	Exposed to Carbonate Rock Areas: \$511,409,996	Frequent	54	Medium*
Hurricane	100-year MRP: \$100,479 500-year MRP: \$1,447,091 Annualized: \$8,210	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$100,479 500-year MRP: \$1,447,091 Annualized: \$8,210	Frequent	48	High
Severe Winter Weather	1% GBS: \$5,812,546 5% GBS: \$29,062,730	Frequent	51	High



Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$48,558,461	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed for this hazard based on input from the municipality, population exposed, and/or event history.
GBS = General building stock; MRP = Mean return period.

- a. The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- b. High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
- c. Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Stillwater.

Table 9.21-3. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Stillwater	7	3	\$87,323	0	0	0

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance boundary.

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.



9.21.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Community Rating System
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Stillwater.

Table 9.21-4. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Planning Board	Re-Examination November 7, 2012
Capital Improvements Plan	Yes	Local	Engineering & DPW	Updated annually; April 2016
Floodplain Management/Basin Plan	No			
Stormwater Management Plan	Yes	Local	Engineer	Originally done in 2005; became part of Master Plan (included in reexamination)
Open Space Plan	Yes	Local	Planning Board and Environmental Commission	2012 – the ERI was updated in 2014
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	No			
Comprehensive Emergency Management Plan	Yes	Local	Emergency Management	2014
Emergency Response Plan	Yes	Local	Emergency Management	2014
Post-Disaster Recovery Plan	Yes	Local	Emergency Management	2014
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State & Local	Construction Official	State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)



Table 9.21-4. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
				Chapter 240 – Land Development
Zoning Ordinance	Yes	Local	Zoning Officer	Chapter 240, Article 11 – Land Development / Zoning
Subdivision Ordinance	Yes	Local	Zoning Officer	Chapter 240, Article 6 – Land Development / Subdivision and Site Plan Review and Approval
NFIP Flood Damage Prevention Ordinance	Yes	Local	Construction	Chapter 202 – Flood Damage Prevention
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State		
Growth Management Ordinances	No			
Site Plan Review Requirements	Yes			
Stormwater Management Ordinance	Yes	Local		§240-89 – Stormwater management
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	Yes	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes			Steep Slopes – Land Use ordinance within Township code

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Stillwater.

Table 9.21-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	
Mitigation Planning Committee	No	
Environmental Board/Commission	Yes	
Open Space Board/Committee	Yes	
Economic Development Commission/Committee	No	
Maintenance Programs to Reduce Risk	Yes	
Mutual Aid Agreements	Yes	
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Professional contract



Table 9.21-5. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Professional contract
Planners or engineers with an understanding of natural hazards	Yes	Professional contract
NFIP Floodplain Administrator	Yes	Construction Official
Surveyor(s)	No	
Personnel skilled or trained in GIS and/or Hazus-MH applications	Yes	Township Engineer
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	Joseph Sugar
Grant Writer(s)	No	
Staff with expertise or training in benefit/cost analysis	Yes	CFO
Professionals trained in conducting damage assessments	Yes	Engineer

Fiscal Capability

The table below summarizes financial resources available to the Township of Stillwater.

Table 9.21-6. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	No
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	No
Impact Fees for homebuyers or developers of new development/homes	Yes – COAH fees
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	No
Open Space Acquisition Funding Programs	Yes
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Stillwater.

Table 9.21-7. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		



Table 9.21-7. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Building Code Effectiveness Grading Schedule (BCEGS)	Yes	4.4	2009; currently being updated
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	04/4X	July 1, 2014
Storm Ready	No		
Firewise	Yes – Lake Plymouth Community Association		2006
Disaster/Safety Programs in/for Schools	Yes		
Organizations with Mitigation Focus (advocacy group, non-government)	Yes		
Public Education Program/Outreach (through website, social media)	Yes		
Public-Private Partnerships	No		

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Township of Stillwater's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.



Table 9.21-8. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability			X
Administrative and Technical Capability			X
Fiscal Capability	X – limited staff		
Community Political Capability			X
Community Resiliency Capability			X
Capability to Integrate Mitigation into Municipal Processes and Activities			X

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

James Cutler, Construction Official

Flood Vulnerability Summary

The Township does not maintain lists/inventories of properties that have been damaged by floods. During Irene and Lee, several private homes and one fire department building were damaged. The fire department had substantial damage and has been repaired using FEMA and township funds. It is unknown if there is any interest in mitigation (elevation or acquisition) in the Township.

Resources

The Construction Official is the appointed floodplain administrator for the Township. Lynda Knott, RMC (municipal clerk) provides assistance with the floodplain administrator's responsibilities. NFIP administration services provided include permit review and inspections. The Township currently does not provide any education or outreach to the community regarding flood hazards/risk or flood risk reduction.

The FPA indicated that there are currently no barriers to running an effective floodplain management program in the Township; however, he does not feel adequately supported or trained to fulfill his responsibilities as the municipal floodplain administrator. The FPA indicated that he would consider attending continuing education and certification training if offered in the county.

Compliance History

Stillwater Township is currently in good standing with the NFIP; however, it is unknown as to when the most recent compliance audit was conducted.

Regulatory

The Township's flood damage prevention ordinance meets the minimum set by FEMA and the State of New Jersey. There are no additional ordinances, plans or programs within the Township that support floodplain management.

Community Rating System

The Township of Stillwater does not participate in the Community Rating System (CRS) program.



Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Township has a Planning Board and a Zoning Board which reviews all applications for development and consider natural hazard risk areas in their review.

Stillwater Township Master Plan Reexamination 2012: This plan included the reaffirmation of the goals and objective outlined in the 1999 Master Plan. It recommended that the Township adopt the update Recreation and Open space Plan as part of the Master Plan. The Open Space and Recreation Plan includes mapping and the identification of environmentally sensitive areas like floodplains that may be prone to hazards.

Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement included in the Site Plan Review Chapter.

Chapter 202: Flood Damage Prevention

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 240-89: Stormwater Management

The purposed of the Stormwater Control Chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of the Township's citizens and businesses.

Chapter 240-85.: Environmentally Impact Statement

The purpose of this section of the Chapter is to allow the Township to assess the impact of a proposed development upon the natural environment. Before approving any major subdivision or any site plan that involves a nonresidential use in which there is proposed a new structure, an addition or alteration to an existing



structure, a change of use or an expansion of an existing use, the Planning Board shall take into consideration the effect of the proposal for development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding, waste disposal, soil erosion and the preservation of trees and other vegetation.

Operational and Administration

The Township has established a Planning Board, Zoning Board and an Environmental Committee, that aid in planning decisions to support the conservation and preservation of the Township's critical environmental features. Beyond that the Township employs and Planning Board Secretary and contracts out for professional legal, planning, and engineering services for development review.

Funding

Operating Budget: The Township's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Township has received funding from the NJDOT and The Garden State Preservation Trust Fund grant programs. The Township's 2014 Capital Budget includes line items for improvements to the Municipal Building, as well as a number of drainage and roadway improvements.

Education and Outreach

The Township's website posts information regarding upcoming community events and important municipal decisions on the home page.

The Township has identified two new mitigation initiatives related to outreach: 1) Provide hazard mitigation, preparedness and response information via social media and website; 2) Implement Fire Wise program. Refer to Table 9.21-11 for more information.

Figure 9.21-1. Screenshot of Township Website with Examples of their Posted Mitigation/Emergency Information

9.21.6 Mitigation Strategy and Prioritization

This section discusses past mitigation actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.21-9. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Stillwater Township 1	Retrofit doors and windows to meet FEMA hurricane resistant standards on Stillwater Township School located on Stillwater Road. Older section of building will need more extensive reconstruction.	School Board Administrator	Complete	This project has been completed.	Discontinue	This project has been completed and will not be included in the 2015 HMP Update.
Stillwater Township 2	Retrofit roof to meet current snow load standards on Swartswood Fire Department Fire Company located on County Route 612.	Station Commander	Complete	The Swartswood Fire Department is no longer recognized by the Township	Discontinue	
Stillwater Township 3	Retrofit roof to meet current snow load standards the Stillwater Fire Department located on Stillwater Road.	Station Commander	Complete	Completed – funded through the Stillwater Fire Department (they own the building)	Discontinue	This action has been completed and will not be included in the 2016 HMP update.
Stillwater Township 4	Streambank stabilization along the Paulinskill River at Kohlbocker Road.	Municipal Engineer	Complete	Funded through ANJEC grant and remainder by municipal budget	Discontinue	This project has been completed; therefore, it will not be included in the 2016 HMP update.
Stillwater Township 5	Stream-bank stabilization of Neldon's Brook effecting Swartswood Fire Department Fire Company located on County Route 612.	Municipal Engineer	Complete	This project has been completed.	Discontinue	This project has been completed and will not be included in the 2015 HMP Update.
Stillwater Township 6	Flood proofing of two homes located West End Drive.	Municipal Engineer	No Progress	Engineer stated these houses need to be either elevated or acquired; flood proofing will not help.	Include in 2016 HMP	Mitigate (elevate or acquire) two homes on West End Drive



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Stillwater Township 7	Implement Fire Wise Program throughout the Township.	OEM Coordinator	No Progress	Due to limited staff and funding, this project has not been completed.	Include in 2016 HMP	The Township will include this initiative in the 2015 HMP Update.
Stillwater Township 8	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	No Progress	Due to limited staff and funding, this project has not been completed.	Include in 2016 HMP	The Township will include this initiative in the 2015 HMP Update.

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Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Township has identified the following mitigation projects/activities that have also been completed but were not identified in the previous mitigation strategy in the 2011 Plan:

- Culvert and basin upgrades replacements; debris removal; dead tree removal; oil/stone roadways each year to maintain their integrity.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Township participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013). In May 2015, the Township participated in a second workshop led by FEMA Region 2 and NJOEM and was provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.21-10 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High,' 'Medium,' or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.21-11 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.21-10. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Stillwater-1	Ensure continuity of operations at critical facilities. The following location is identified at this time: Stillwater Township Town Hall Generator	Existing	All	1, 2, 6	Township Committee	High	Medium	Bond, FEMA HMGP funding	Short Term (2 years)	High	SIP	PP
Stillwater-2	Provide information on all types of hazards, preparedness and mitigation measures, and responses through social media and on the Township website.	N/A	All	All	Township	High	Low	Township Budget	On Going	High	LPR, EAP	PR, PI
Stillwater-3	Implement Fire Wise Program throughout the Township.	N/A	Wildfire	1, 2, 3, 5	Township	Medium	Low to Medium	Township Budget	Short Term / DOF	Medium	EAP	PI
Stillwater-4	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect structures from future damage. Phase 1: Identify appropriate candidates and determine most cost-effective mitigation option. Phase 2: Work with the property owners to implement selected action based on available funding and local match availability.											
	See above.	Existing	Flood	1, 2	Township / Homeowner	High	High	FEMA Mitigation Grant Programs and local budget (or property owner) for cost share	Ongoing (outreach and specific project identification); Long term DOF (specific project application and implementation)	Medium	SIP	PP

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
RFC	Repetitive Flood Claims Grant Program (discontinued)
SRL	Severe Repetitive Loss Grant Program (discontinued)

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding



Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP)-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES)-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.



Table 9.21-11. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High/Medium/Low
Stillwater-1	Stillwater Township Town Hall Generator	1	1	1	0	1	1	1	1	1	1	1	1	1	1	13	High
Stillwater-2	Provide information on all types of hazards, preparedness and mitigation measures, and responses through social media and on the Township website.	1	1	1	1	1	1	1	0	1	1	1	1	1	0	12	High
Stillwater-3	Implement Fire Wise Program throughout the Township.	1	1	1	1	0	0	1	1	0	1	0	1	0	0	8	Medium
Stillwater-4	Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition / relocation to protect structures from future damage.	1	1	1	0	0	0	0	0	0	1	0	1	1	0	6	Medium

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.21.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.21.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Stillwater that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Stillwater has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.21.9 Additional Comments

None at this time.

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Figure 9.21-2. Township of Stillwater Hazard Area Extent and Location Map 1

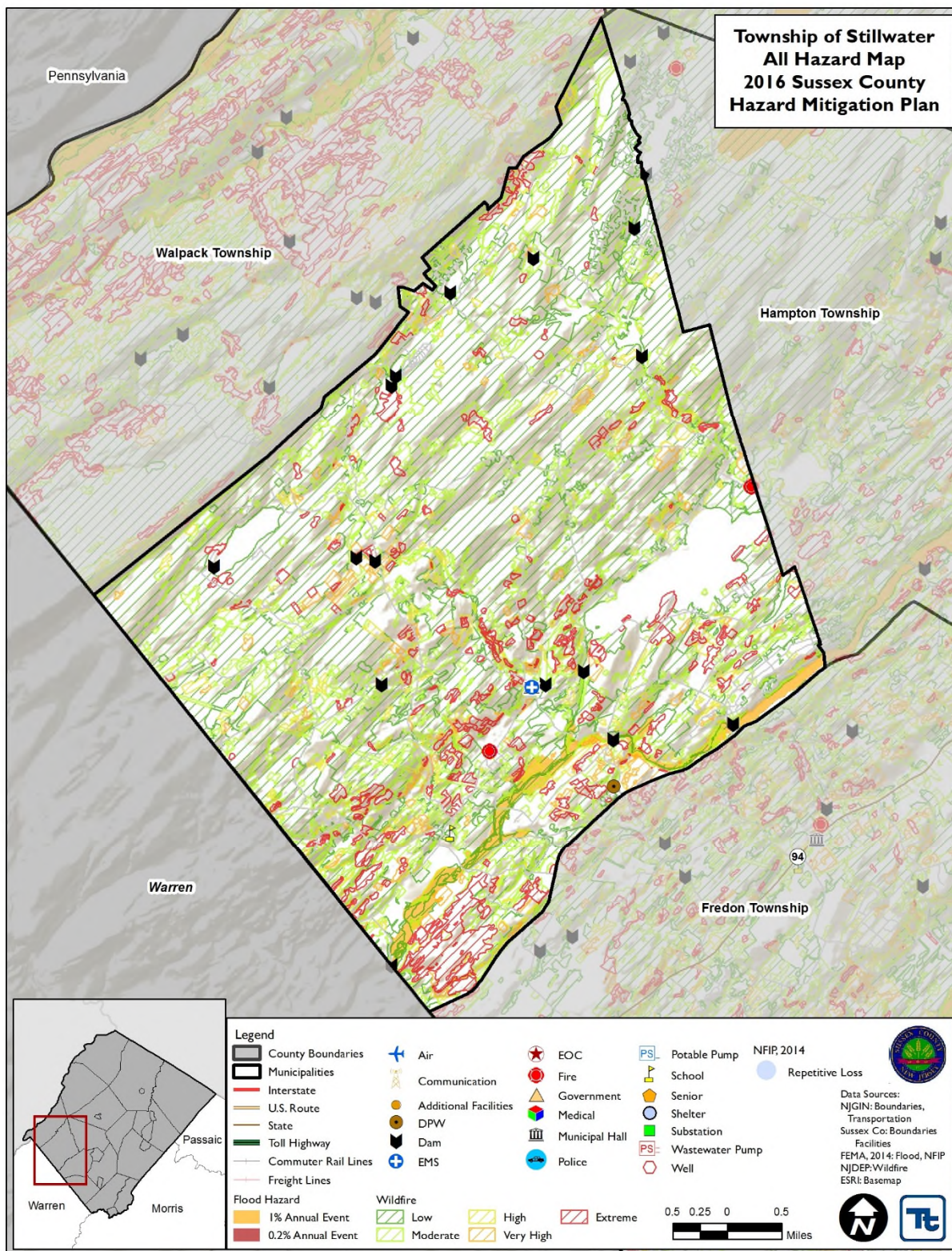
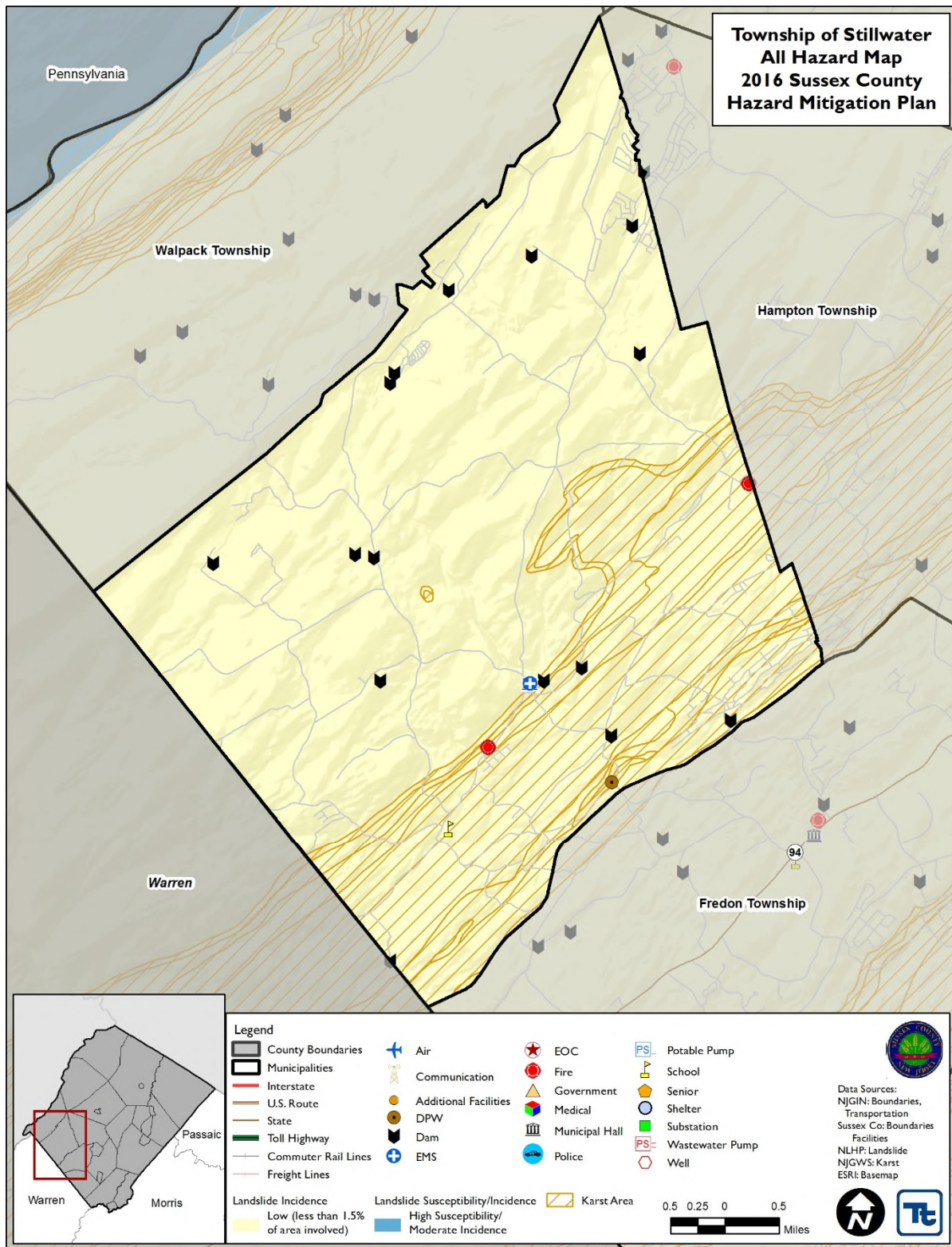




Figure 9.21-3. Township of Stillwater Hazard Area Extent and Location Map 2





Action Number:

Stillwater-1

Mitigation Action/Initiative:

Generator for Town Hall

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	Ensure continuity of operations at critical facilities. The Township does not have backup power at Town Hall which serves as the EOC
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install backup generator
	2. Building new EOC – not feasible; costly
	3. Do nothing – current problem continues
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install generator at the Stillwater Township Town Hall.
Action/Project Category	SIP
Goals/Objectives Met	1, 2, 6
Applies to existing and/or new development; or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	Medium - \$45,000
Priority	High
Plan for Implementation	
Responsible/Lead Agency/Department	Township Committee
Local Planning Mechanism	Emergency Management
Potential Funding Sources	Bond, FEMA HMGP grant funding
Timeline for Completion	Short Term – 2 years
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: 4/1/2016 Progress on Action/Project: Contractor to install generator in April 2016



Action Number: Stillwater-1

Mitigation Action/Initiative: Generator for Town Hall

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	
Cost-Effectiveness	1	
Technical	0	
Political	1	
Legal	1	
Fiscal	1	
Environmental	1	
Social	1	
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	Project will be completed in two years
Local Champion	1	
Other Community Objectives	1	
Total	13	
Priority (High/Med/Low)	High	



9.22 Borough of Sussex

This section presents the jurisdictional annex for the Borough of Sussex.

9.22.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Floyd Southard, OEM Coordinator 2 Main Street, Sussex, NJ 07461 Phone: (973) 534-7258 Email: fsouthard@embarqmail.com	Mark Zsack, Borough Administrator 2 Main Street, Sussex, NJ 07461 Phone: (973) 903-4544 Email: sussexadmin@embarqmail.com

9.22.2 Municipal Profile

The Borough of Sussex is located in northern Sussex County and is fully surrounded by the Township of Wantage. It has a total area of 0.6 square miles. According to the U.S. Census, the 2010 population for the Borough of Sussex was 2,130. Clove Brook flows through the Borough.

Growth/Development Trends

The Borough of Sussex did not note any recent residential/commercial development since 2010 or any major residential or commercial development, or major infrastructure development planned for the next five years in the municipality.

9.22.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.22-1. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	JCP&L substation flooded which resulted in a five-day borough-wide power outage. Additionally, the sewer pump station flooded.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	Sussex Firehouse roof was partially blown off.

9.22.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following



summarizes the hazard vulnerabilities and their ranking in the Borough of Sussex. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.

Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Borough of Sussex.

Table 9.22-2. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	High*
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$209,104 2,500-Year GBS: \$3,151,032	Occasional	28	Medium
Flood	1% Annual Chance: \$7,476,643	Frequent	18	Medium
Geologic	RCV Exposed to Carbonate Rock Areas: \$0	Occasional	12	Low
Hurricane	100-year MRP: \$55,658 500-year MRP: \$554,374 Annualized: \$3,951	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$55,658 500-year MRP: \$554,374 Annualized: \$3,951	Frequent	48	High
Severe Winter Weather	1% GBS: \$2,596,515 5% GBS: \$12,982,573	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$1,034,252	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed due to the location of high hazard dams in the municipality

GBS = General building stock; MRP = Mean return period.

- The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
- Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.



National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Borough of Sussex.

Table 9.22-3. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Borough of Sussex	8	5	\$80,363	0	0	3

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

The table below presents the number of critical facilities, by type, in the community located in the effective FEMA flood zones (1% and 0.2% annual chance boundaries).

Table 9.22-4. Number of Critical Facilities in the DFIRM 1% and 0.2% Annual Chance Flood Boundaries

Municipality	0.2% Annual Chance Substation
Sussex, Borough of	1*

Source: Sussex County; FEMA, 2011

*Not owned by the Borough

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.

9.22.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Community Rating System
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms



Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Borough of Sussex.

Table 9.22-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Planner	9-21-2009
Capital Improvements Plan	Yes	Local	CFO	
Floodplain Management/Basin Plan	No			
Stormwater Management Plan	No			
Open Space Plan	No			
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	No			
Comprehensive Emergency Management Plan	No			
Emergency Response Plan	Yes	Local	OEM	
Post-Disaster Recovery Plan	No			
Transportation Plan	No			
Strategic Recovery Planning Report	No			
Other Plans:	Yes	Local	Borough Council	Route 23 Redevelopment Plan (11/26/13)
Regulatory Capability				
Building Code	Yes	State/Local		State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Zoning Officer	Chapter 19
Subdivision Ordinance	Yes	Local	Land Use Board	Chapter 18
NFIP Flood Damage Prevention Ordinance	Yes	Federal/State/Local		Chapter 22 – Flood Hazard Areas
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State/Local		
Growth Management Ordinances	No			
Site Plan Review Requirements	Yes	Local	Land Use Board	Chapter 21
Stormwater Management Ordinance	Yes	Local	Engineer	



Table 9.22-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Municipal Separate Storm Sewer System (MS4)	Yes	Local	DPW	
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	No			

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Borough of Sussex.

Table 9.22-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Planning & Zoning
Mitigation Planning Committee	No	
Environmental Board/Commission	Yes	Shadetree Commission
Open Space Board/Committee	No	
Economic Development Commission/Committee	No	
Maintenance Programs to Reduce Risk	No	
Mutual Aid Agreements	Yes	
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Planner-Ken Nelson, Engineer-Harold Pellow
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Planner-Ken Nelson, Engineer-Harold Pellow
Planners or engineers with an understanding of natural hazards	Yes	Planner-Ken Nelson, Engineer-Harold Pellow
NFIP Floodplain Administrator	Yes	Municipal Zoning Enforcement Officer – Kevin Kervatt
Surveyor(s)	No	
Personnel skilled or trained in GIS and/or Hazus-MH applications	No	
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	OEM
Grant Writer(s)	Yes	Bruno Associates
Staff with expertise or training in benefit/cost analysis	Yes	CFO
Professionals trained in conducting damage assessments	Yes	Water Sewer Engineer



Fiscal Capability

The table below summarizes financial resources available to the Borough of Sussex.

Table 9.22-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	No
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	Yes (Special Assessments)
User fees for water, sewer, gas, or electric service	Yes
Impact Fees for homebuyers or developers of new development/homes	No
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	Yes
Open Space Acquisition Funding Programs	No
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Borough of Sussex.

Table 9.22-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		
Building Code Effectiveness Grading Schedule (BCEGS)	No		
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	6	
Storm Ready	No		
Firewise	No		
Disaster/Safety Programs in/for Schools	No		
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	Yes		
Public-Private Partnerships	No		

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule



(BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Borough of Sussex's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.22-9. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability			
Administrative and Technical Capability			
Fiscal Capability			
Community Political Capability			
Community Resiliency Capability			
Capability to Integrate Mitigation into Municipal Processes and Activities			

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Kevin Kervatt, Municipal Zoning Enforcement Officer

Flood Vulnerability Summary

ADD INFO FROM FPA HERE

Resources

ADD INFO FROM FPA HERE

Compliance History

ADD INFO FROM FPA HERE



Regulatory

ADD INFO FROM FPA HERE

Community Rating System

The Borough of Sussex does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Borough has a Planning Board and Zoning Board of Adjustments which reviews all applications for development and consider natural hazard risk areas in their review.

2009 Master Plan: The 2009 Plan included updated information related to the physical characteristics and natural features of the Borough, which are illustrated on various maps contained herein. The Plan included the following applicable goals and objectives:

GOAL #1: To respect the portions of the natural environment still remaining in and around Sussex Borough.

Objective #1: Conserve open space and other valuable natural resources through the proper use of land and facilities, both public and private.

Objective #2: Maintain and supplement the public park and street tree resources that exist within the Borough and encourage the protection of trees on privately owned land.

Objective #3: Protect the environmentally and aesthetically sensitive resources of the community.

Objective #4: Encourage the use of green building technology on future projects and specifically on redevelopment projects.

Regulatory and Enforcement (Ordinances)

The Borough has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement included in the Land Use Chapter. The Borough also has a chapter specific to the hazards associated with environmentally sensitive areas.

Chapter XXII128: Flood Damage Prevention

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;



- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter XXV: Stormwater Management

The purposed of the Stormwater Management chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare the citizens.

Chapter XXI-21-10: Environmental Impact Statement

The purpose of this section of the Chapter is to allow the Borough to assess the impact of a proposed development upon the natural environment, particularly with respect to potable water, pollution of all kinds, flooding and waste disposal.

Operational and Administration

The Borough has established a Planning board and Zoning Board of Adjustments that are responsible for the review of development applications. The Borough has a Zoning officer as well as a planning and zoning board secretary.

Funding

Operating Budget: The Borough's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Borough has received funding from the NJDOT, Sustainable Jersey, The Garden State Preservation Trust Fund, and Clean Communities grant programs for the completion of mitigation and emergency response related projects including roadway and drainage improvements.

Education and Outreach

The Borough's website's home page posts information regarding upcoming community events and important municipal decisions. The Borough has identified a new mitigation initiative to conduct a public outreach and education program on hazard mitigation and preparedness (Sussex Boro – 11); refer to Table 9.22-12.

9.22.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.

- Raise Sewer Pumps; lead agency: DPW; funded through grant funds; plans have been developed but no funds available.



Table 9.22-10. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Sussex Borough 1	Stream bank stabilization, rip-wrap instillation surrounding confluence of Clove Brook and Papakating Creek.	Director of Public Works	No Progress	No progress has been made on this project.	Include in 2016 HMP	This project will be included in the Borough's mitigation initiatives for the 2016 Plan Update.
Sussex Borough 2	Stream bank stabilization of town reservoir and feeder waterway to water treatment plant.	Director of Public Works	No Progress	No progress has been made on this project.	Include in 2016 HMP	This project will be included in the Borough's mitigation initiatives for the 2016 Plan Update.
Sussex Borough 3	Armoring of Lake Rutherford Dam located in High Point State Park.	Director of Public Works	In Progress	This project is currently in the proposal phase.	Include in 2016 HMP	This project will be included in the Borough's mitigation initiatives for the 2016 Plan Update.
Sussex Borough 4	Armoring of Colesville Reservoir Dam located Brink Road	Director of Public Works	In Progress	This project is currently in the proposal phase.	Include in 2016 HMP	This project will be included in the Borough's mitigation initiatives for the 2016 Plan Update.
Sussex Borough 5	Retrofit impact resistant windows and shutters on Sussex Fire Department building located on Loomis Avenue.	Station Commander	No Progress	No progress has been made on this project.	Include in 2016 HMP	This project will be included in the Borough's mitigation initiatives for the 2016 Plan Update.
Sussex Borough 6	Retrofit impact resistant windows and shutters on Sussex Middle School located on Loomis Avenue	School Board Administrator	No Progress	No progress has been made on this project.	Include in 2016 HMP	This project will be included in the Borough's mitigation initiatives for the 2016 Plan Update.
Sussex Borough 7	Retrofit roof to meet current standards for snow load on original section of Sussex middle School located on Loomis Avenue.	School Board Administrator	No Progress	No progress has been made on this project.	Include in 2016 HMP	This project will be included in the Borough's mitigation initiatives for the 2016 Plan Update.



<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Sussex Borough 8	Backup generator for shelter at Sussex Christian School located on Unionville Avenue	OEM Coordinator	No Progress	No progress has been made on this project.	Include in 2016 HMP	This project will be included in the Borough's mitigation initiatives for the 2016 Plan Update.
Sussex Borough 9	Backup generator for shelter at Emergency Operations Center located on Main Street.	OEM Coordinator	No Progress	No progress has been made on this project.	Include in 2016 HMP	This project will be included in the Borough's mitigation initiatives for the 2016 Plan Update.
Sussex Borough 10	Backup generator for shelter at Department of Public Works garage located on Brookside Avenue.	OEM Coordinator	No Progress	No progress has been made on this project.	Include in 2016 HMP	This project will be included in the Borough's mitigation initiatives for the 2016 Plan Update.
Sussex Borough 11	Implement Fire Wise Program throughout the Borough.	OEM Coordinator	No Progress	No progress has been made on this project.	Include in 2016 HMP	This project will be included in the Borough's mitigation initiatives for the 2016 Plan Update.
Sussex Borough 12	Flood-proofing of the Sussex Boro Fire Company building.	Municipal Fire Chief	No Progress	No progress has been made on this project.	Include in 2016 HMP	This project will be included in the Borough's mitigation initiatives for the 2016 Plan Update.
Sussex Borough 13	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	No Progress	No progress has been made on this project.	Include in 2016 HMP	This project will be included in the Borough's mitigation initiatives for the 2016 Plan Update.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Borough has not identified any additional mitigation projects/activities that have been completed since approval of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Borough participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013). In May 2015, a second workshop was led by FEMA Region 2 and NJOEM and provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.22-11 summarizes the comprehensive-range of specific mitigation initiatives the Borough would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High,' 'Medium,' or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.22-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.22-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Sussex Boro-1	Stream bank stabilization, rip-wrap instillation surrounding confluence of Clove Brook and Papakating Creek.	Existing	Flood	2	DPW Manager	Medium	High	FEMA grants with local cost share	Short Term / DOF	High	NSP	NR
Sussex Boro-2	Stream bank stabilization of town reservoir and feeder waterway to water treatment plant.	Existing	Flood	1, 2, 5	DPW Manager	Medium	High	FEMA grants with local cost share	Short Term	High	SIP, NSP	PP, NR
Sussex Boro-3	Armoring of Lake Rutherford Dam located in High Point State Park.	Existing	Dam Failure, Flood, Severe Weather	1, 2, 5, 6	DPW Manager	High	High	FEMA with local cost share	Short Term	High	SIP, NSP	PP, NR
Sussex Boro-4	Armoring of Colesville Reservoir Dam located Brink Road	Existing	Dam Failure, Flood, Severe Weather	1, 2, 5, 6	DPW Manager	High	High	FEMA with local cost share	Short Term	High	SIP, NSP	PP, NR
Sussex Boro-5	Retrofit impact resistant windows and shutters on Sussex Fire Department building located on Loomis Avenue.	Existing	Severe Weather, Severe Winter Weather	2, 6	Station Commander	Medium	Medium	FEMA with local cost share	Short Term	High	SIP	PP
Sussex Boro-6	Retrofit impact resistant windows and shutters on Sussex Middle School located on Loomis Avenue	Existing	Severe Weather, Severe Winter Weather	2, 6	School Administration	High	Medium	FEMA with local cost share; educational grants	Short Term	High	SIP	PP
Sussex Boro-7	Retrofit roof to meet current standards for snow load on original section of Sussex middle School located on Loomis Avenue.	Existing	Severe Weather, Severe Winter Weather	2, 6	School Administration	High	High	FEMA with local cost share; educational grants	Short Term	High	SIP	PP
Sussex Boro-8	Ensure continuity of operations at critical facilities. The following were identified at this time: 1. Backup generator for shelter at Sussex Christian School located on Unionville Avenue	Existing	All	1, 6	OEM Coordinator	High	High	FEMA with local cost share; educational grants	Short Term / DOF	High	SIP	PP



Table 9.22-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
	2. Backup generator for shelter at Emergency Operations Center located on Main Street. 3. Backup generator for shelter at Department of Public Works garage located on Brookside Avenue.											
Sussex Boro-9	Implement Fire Wise Program throughout the Borough.	New and Existing	Wildfire	1, 2, 3, 4	OEM Coordinator	Medium	Low	FEMA mitigation grant with local cost share; municipal budget	Short Term	Low	EAP	PR
Sussex Boro-10	Flood-proofing of the Sussex Boro Fire Company building.	Existing	Flood	1, 2, 6	Municipal Fire Chief	Medium	Medium	FEMA mitigation grant with local cost share; municipal budget	Short Term / DOF	Medium	SIP	PP
Sussex Boro-11	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	N/A	All	1, 2, 3, 4	OEM Coordinator	Medium	Low	FEMA mitigation grant with local cost share; municipal budget	Short Term	Low	EAP	PR
Sussex Boro-12	Raise sewer pumps	Existing	Flood, Severe Weather	2, 6	DPW	High	High	FEMA grants with local cost share; municipal budget	Short Term	High	SIP	PP
Sussex Boro-13	Sewer pumps and DPW garage floor	Existing	Flood	2	DPW Manager	Medium	High	FEMA grants with local cost share	Short Term / DOF	High	NSP, SIP	NR, PP

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
RFC	Repetitive Flood Claims Grant Program (discontinued)
SRL	Severe Repetitive Loss Grant Program (discontinued)

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)-These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.



- *Structural Flood Control Projects (SP)*-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- *Emergency Services (ES)*-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities

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Table 9.22-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Sussex Boro-1	Stream bank stabilization, rip-wrap installation surrounding confluence of Clove Brook and Papakating Creek.	0	1	1	1	1	-1	-1	0	0	-1	1	1	1	1	5	High
Sussex Boro-2	Stream bank stabilization of town reservoir and feeder waterway to water treatment plant.	1	1	1	1	1	-1	-1	1	1	-1	1	1	1	0	7	High
Sussex Boro-3	Armoring of Lake Rutherford Dam located in High Point State Park.	1	1	1	1	1	1	-1	0	0	0	1	1	1	0	8	High
Sussex Boro-4	Armoring of Colesville Reservoir Dam located Brink Road	1	1	1	1	1	1	-1	0	0	0	1	1	1	0	8	High
Sussex Boro-5	Retrofit impact resistant windows and shutters on Sussex Fire Department building located on Loomis Avenue.	1	1	1	1	1	1	-1	1	0	1	1	1	1	1	11	High
Sussex Boro-6	Retrofit impact resistant windows and shutters on Sussex Middle School located on Loomis Avenue	1	1	1	1	1	1	-1	1	0	1	1	1	1	1	11	High
Sussex Boro-7	Retrofit roof to meet current standards for snow load on original section of Sussex middle School located on Loomis Avenue.	1	1	1	1	1	1	-1	1	0	1	1	1	1	1	11	High
Sussex Boro-8	Ensure continuity of operations at critical facilities	1	1	1	1	1	1	0	0	1	1	1	1	1	1	11	High
Sussex Boro-9	Implement Fire Wise Program throughout the Borough.	0	0	1	0	0	0	1	0	0	0	1	1	0	0	4	Low
Sussex Boro-10	Flood-proofing of the Sussex Boro Fire Company building.	1	1	1	0	0	0	0	0	0	1	1	1	0	0	6	Medium
Sussex Boro-11	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Sussex Boro-12	Raise sewer pumps	0	1	1	1	1	1	1	0	1	1	0	1	1	0	10	High
Sussex Boro-13	Sewer pumps and DPW garage floor	0	1	1	1	1	-1	-1	0	0	-1	1	1	1	1	5	High

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.22.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.22.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Borough of Sussex that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Borough of Sussex has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.22.9 Additional Comments

None at this time.



Figure 9.22-1. Borough of Sussex Hazard Area Extent and Location Map 1

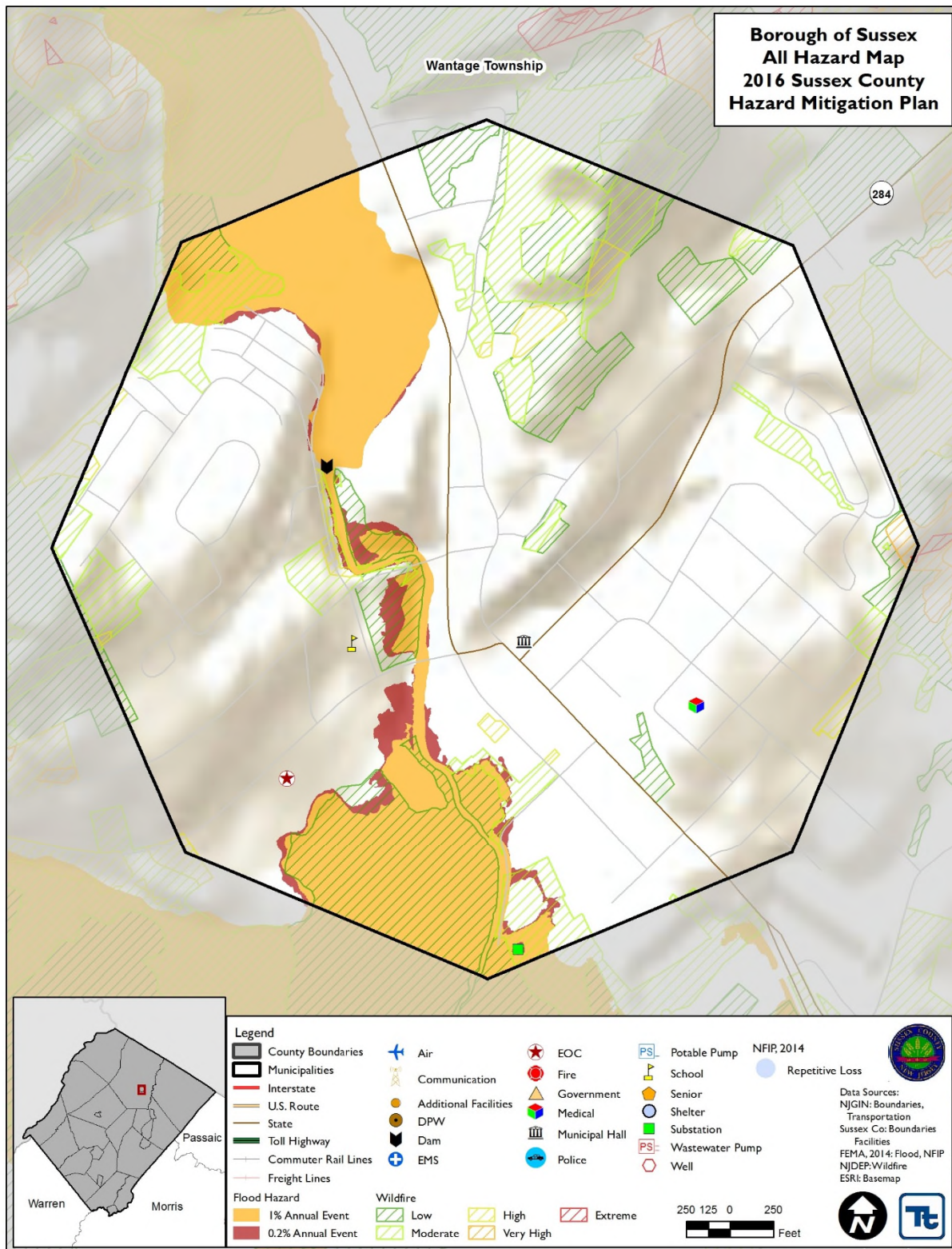
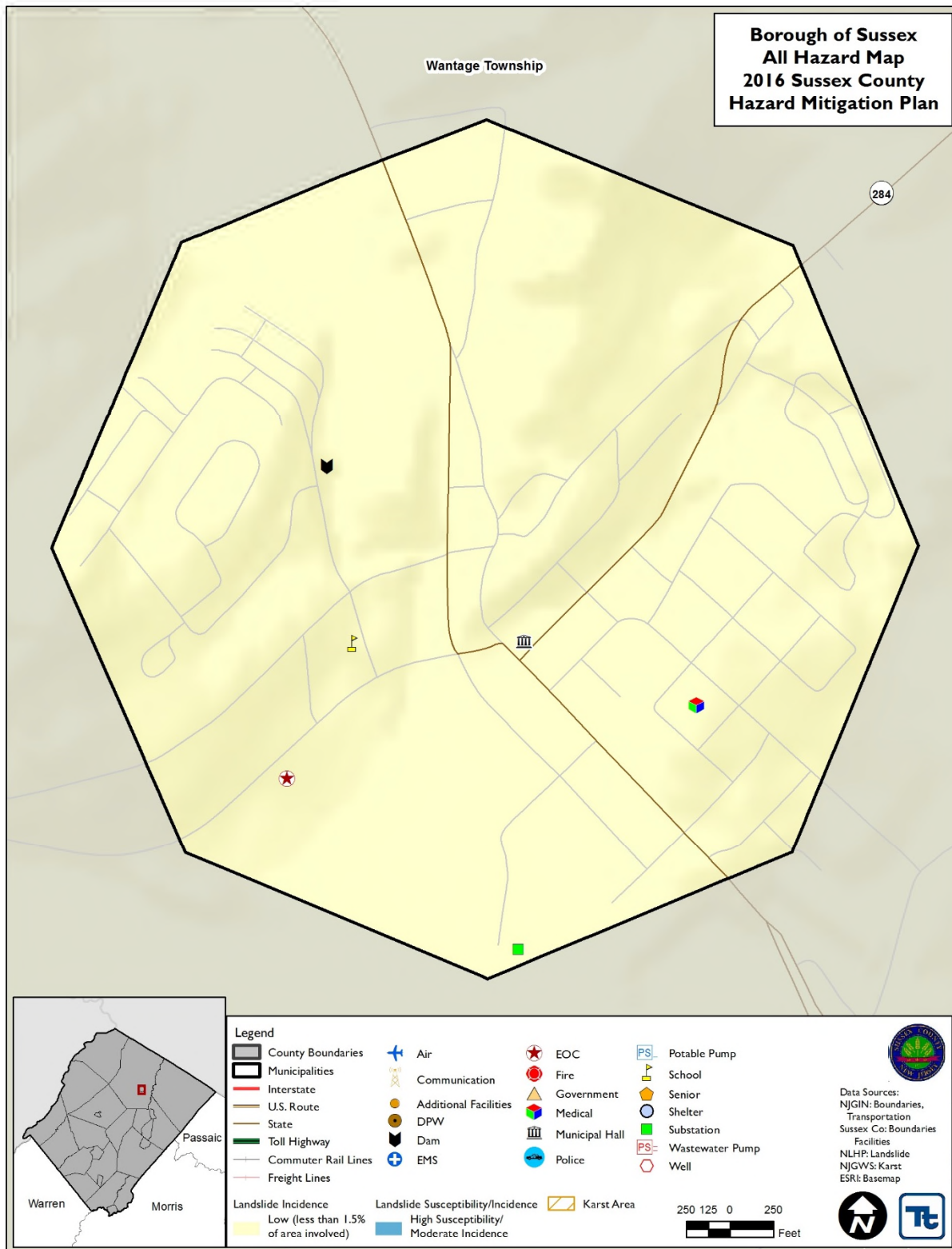




Figure 9.22-2. Borough of Sussex Hazard Area Extent and Location Map 2





Action Number:

Sussex Boro-1

Mitigation Action/Initiative:

Streambank stabilization of Clove Brook and Papakating Creek

Assessing the Risk	
Hazard(s) addressed:	Flood
Specific problem being mitigated:	The confluence of Clove Brook and Papakating Creek is unstable and prone to erosion during periods of flood.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Rip-wrap stream
	2. Do nothing – current problem continues
	3. No other feasible options were identified for this project
Action/Project Intended for Implementation	
Description of Selected Action/Project	Stream bank stabilization, rip-wrap instillation surrounding confluence of Clove Brook and Papakating Creek
Action/Project Category	NSP
Goals Met	2
Applies to existing and or new development, or not applicable	existing
Benefits (losses avoided)	Replacing pumps and equipment
Estimated Cost	high
Priority	high
Plan for Implementation	
Responsible Organization	DPW Manager
Local Planning Mechanism	Stormwater plan
Potential Funding Sources	FEMA Mitigation, Municipal
Timeline for Completion	Short-depends on funding
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Sussex Boro-1

Mitigation Action/Initiative:

Streambank stabilization of Clove Brook and Papkating Creek

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	0	
Property Protection	1	Protect surrounding properties from erosion and flooding
Cost-Effectiveness	1	Reduce repair costs due to flooding
Technical	1	
Political	1	
Legal	-1	
Fiscal	-1	
Environmental	0	
Social	0	
Administrative	-1	
Multi-Hazard	1	
Timeline	1	
Agency Champion	1	
Other Community Objectives	1	
Total	5	
Priority (High/Med/Low)	High	



Action Number:

Sussex Boro-2

Mitigation Action/Initiative:

Stream bank stabilization of town reservoir and feeder waterway to water treatment plant.

Assessing the Risk	
Hazard(s) addressed:	Flood
Specific problem being mitigated:	The waterway leading to the water treatment plant floods
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Stabilize stream bank
	2. Do nothing
	3. No other feasible options were identified for this project
Action/Project Intended for Implementation	
Description of Selected Action/Project	Stream bank stabilization of town reservoir and feeder waterway to water treatment plant.
Action/Project Category	SIP, NSP
Goals Met	1, 2, 5
Applies to existing and or new development, or not applicable	Existing
Benefits (losses avoided)	Medium – filtering of water treatment plant increases
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible Organization	DPW Manager
Local Planning Mechanism	Capital Improvement
Potential Funding Sources	FEMA grants with local cost share
Timeline for Completion	Short Term (2 years)
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Sussex Boro-2

Mitigation Action/Initiative:

Stream bank stabilization of town reservoir and feeder waterway to water treatment plant.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect the water treatment plant from flood damage; reduce damage to water supply for Borough residents
Property Protection	1	Protect the water treatment plant from flood damage
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	-1	
Fiscal	-1	
Environmental	1	
Social	1	
Administrative	-1	
Multi-Hazard	1	
Timeline	1	
Agency Champion	1	
Other Community Objectives	0	
Total	7	
Priority (High/Med/Low)	High	

**Action Number:** Sussex Boro-3**Mitigation Action/Initiative:** Armoring of Lake Rutherford Dam located in High Point State Park.

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	Flooding of roadway and potential houses if breached, flooded during Hurricane Irene
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Armor dam
	2. Do nothing – current problem continues
	3. No other feasible options were identified for this project
Action/Project Intended for Implementation	
Description of Selected Action/Project	Armoring of Lake Rutherford Dam located in High Point State Park.
Action/Project Category	NSP
Goals Met	1,2,5,6
Applies to existing and or new development, or not applicable	existing
Benefits (losses avoided)	Roadway repairs, home repairs, water treatment plant repairs
Estimated Cost	high
Priority	high
Plan for Implementation	
Responsible Organization	DPW Manager
Local Planning Mechanism	Capital Improvement
Potential Funding Sources	FEMA grants with local cost share
Timeline for Completion	Short Term (2 years)
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: 8/3/15 Progress on Action/Project: Plans being worked on for this project



Action Number:

Sussex Boro-3

Mitigation Action/Initiative:

Armoring of Lake Rutherford Dam located in High Point State Park.

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect roadway and homes flood damage
Property Protection	1	Protect roadway and homes flood damage
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	-1	
Environmental	0	
Social	0	
Administrative	0	
Multi-Hazard	1	
Timeline	1	
Agency Champion	1	
Other Community Objectives	0	
Total	8	
Priority (High/Med/Low)	High	

**Action Number:**

Sussex Boro-4

Mitigation Action/Initiative:

Armoring of Colesville Reservoir Dam located Brink Road

Assessing the Risk	
Hazard(s) addressed:	Dam Failure, Flood, Severe Weather
Specific problem being mitigated:	Area of the dam floods after heavy rains
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Armor dam
	2. Do nothing
	3. No other feasible options were identified for this project
Action/Project Intended for Implementation	
Description of Selected Action/Project	Armoring of Colesville Reservoir Dam located Brink Road
Action/Project Category	NSP, SIP
Goals Met	1, 2, 5, 6
Applies to existing and or new development, or not applicable	Existing
Benefits (losses avoided)	High – prevent roadway flooding and potential damage to homes
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible Organization	DPW Manager
Local Planning Mechanism	Capital Improvement
Potential Funding Sources	FEMA grants with local cost share
Timeline for Completion	Shor Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Sussex Boro-4

Mitigation Action/Initiative:

Armoring of Colesville Reservoir Dam located Brink Road

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect residents in the area of the dam
Property Protection	1	Protect homes and properties near the area of the dam
Cost-Effectiveness	1	Reduce / eliminate repair costs
Technical	1	
Political	1	
Legal	1	
Fiscal	-1	
Environmental	0	
Social	0	
Administrative	0	
Multi-Hazard	1	Dam failure, flood and severe weather
Timeline	1	
Agency Champion	1	
Other Community Objectives	0	
Total	8	
Priority (High/Med/Low)	High	



Action Number:

Sussex Boro-5

Mitigation Action/Initiative:

Retrofit impact resistant windows at Sussex Firehouse

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Severe Winter Weather
Specific problem being mitigated:	Potential damage to fire house during periods of strong winds
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit impact resistant windows at Sussex Firehouse
	2. Do nothing
	3. No other feasible options were identified for this project
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit impact resistant windows at Sussex Firehouse
Action/Project Category	SIP
Goals Met	2, 6
Applies to existing and or new development, or not applicable	Existing
Benefits (losses avoided)	Medium – loss of using firehouse
Estimated Cost	Medium
Priority	High
Plan for Implementation	
Responsible Organization	Station Commander
Local Planning Mechanism	Capital Improvement
Potential Funding Sources	FEMA grants with local cost share
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Sussex Boro-5

Mitigation Action/Initiative:

Retrofit impact resistant windows at Sussex Firehouse

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect firehouse from wind damage
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	-1	
Environmental	1	
Social	0	
Administrative	1	
Multi-Hazard	1	Severe Weather, Severe Winter Weather
Timeline	1	
Agency Champion	1	
Other Community Objectives	0	
Total	11	
Priority (High/Med/Low)	High	



Action Number:

Sussex Boro-6

Mitigation Action/Initiative:

Retrofit impact resistant windows at Sussex Middle School

Assessing the Risk	
Hazard(s) addressed:	Severe Weather, Severe Winter Weather
Specific problem being mitigated:	Potential damage to middle school
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Retrofit impact resistant windows at Sussex Middle School
	2. Do nothing
	3. No other feasible options were identified for this project
Action/Project Intended for Implementation	
Description of Selected Action/Project	Retrofit impact resistant windows at Sussex Middle School
Action/Project Category	SIP
Goals Met	2, 6
Applies to existing and or new development, or not applicable	Existing
Benefits (losses avoided)	High – loss of using school and a shelter
Estimated Cost	Medium
Priority	High
Plan for Implementation	
Responsible Organization	School Administration
Local Planning Mechanism	Capital Improvement
Potential Funding Sources	FEMA mitigation grant with local cost share; education grants
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Sussex Boro-6

Mitigation Action/Initiative:

Retrofit impact resistant windows at Sussex Middle School

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protect students from injuries as a result of wind damage
Property Protection	1	Protect school from wind damage
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	-1	
Environmental	1	
Social	0	
Administrative	1	
Multi-Hazard	1	Severe Weather, Severe Winter Weather
Timeline	1	
Agency Champion	1	
Other Community Objectives	0	
Total	11	
Priority (High/Med/Low)	High	



Action Number:

Sussex Boro-8

Mitigation Action/Initiative:

Ensure continuity of operations at critical facilities

Assessing the Risk	
Hazard(s) addressed:	All
Specific problem being mitigated:	School does not have a backup generator and it serves as a shelter for the community. Municipal building does not have back up power and need to be in service to operate as an EOC/shelter also for continuity of operations. DPW does not have backup power and needs to be in service for storm operations.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install a backup generator
	2. Do nothing
	3. No other feasible options were identified for this project
Action/Project Intended for Implementation	
Description of Selected Action/Project	Backup generator for shelter at Sussex Christian School located on Unionville Avenue. Obtain back-up power to ensure continuity of operations at school, which is also a shelter for the Borough. Purchase a generator for the municipal building to ensure continuity of operations during and post hazard events. Purchase a generator for the DPW garage to ensure continuity of operations during and post hazard events.
Action/Project Category	SIP
Goals Met	1, 6
Applies to existing and or new development, or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible Organization	OEM Coordinator
Local Planning Mechanism	Capital Improvement, HMP
Potential Funding Sources	FEMA grants with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Sussex Boro-8

Mitigation Action/Initiative:

Ensure continuity of operations at critical facilities

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Provide shelter to residents who are in need during an emergency
Property Protection	1	Allow for continuity of operations of school to function as shelter; allow DPW to remain in operation during hazard events
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	0	Grant is needed to implement
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	All
Timeline	1	
Agency Champion	1	
Other Community Objectives	0	
Total	11	
Priority (High/Med/Low)	High	



Action Number:

Sussex Boro-9

Mitigation Action/Initiative:

Floodproofing the Sussex Borough Firehouse

Assessing the Risk	
Hazard(s) addressed:	Flood
Specific problem being mitigated:	The firehouse building has the potential to flood during periods of heavy rain. This impacts the equipment and the Borough's ability to respond to emergencies.
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Floodproof the firehouse
	2. Do nothing
	3. No other feasible options were identified for this project
Action/Project Intended for Implementation	
Description of Selected Action/Project	Floodproof the fire house
Action/Project Category	SIP
Goals Met	1, 2, 6
Applies to existing and or new development, or not applicable	Existing
Benefits (losses avoided)	Medium
Estimated Cost	Medium
Priority	Medium
Plan for Implementation	
Responsible Organization	Fire Chief
Local Planning Mechanism	Emergency Management
Potential Funding Sources	FEMA grants with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Sussex Boro-9

Mitigation Action/Initiative:

Floodproofing the Sussex Borough Firehouse

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Protect firehouse from flood damage
Cost-Effectiveness	1	
Technical	0	
Political	0	
Legal	0	
Fiscal	0	
Environmental	0	
Social	0	
Administrative	1	
Multi-Hazard	1	Flood, Severe Weather
Timeline	1	
Agency Champion	0	
Other Community Objectives	0	
Total	6	
Priority (High/Med/Low)	Medium	



Action Number: Sussex Boro-12
Mitigation Action/Initiative: Raise sewer pumps to avoid flood damage

Assessing the Risk	
Hazard(s) addressed:	Flood, Severe Weather
Specific problem being mitigated:	Sewer pumps and electrical components are located in floodprone areas and have the potential of becoming damaged during flooding events
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Raise sewer pumps
	2. Do nothing
	3. No other feasible options were identified for this project
Action/Project Intended for Implementation	
Description of Selected Action/Project	Raise sewer pumps to avoid damage from flooding/heavy rains
Action/Project Category	SIP
Goals Met	2, 6
Applies to existing and or new development, or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible Organization	DPW Manager
Local Planning Mechanism	Capital Improvement, HMP
Potential Funding Sources	FEMA grant funds with local cost share
Timeline for Completion	Short Term
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Sussex Boro-12

Mitigation Action/Initiative:

Raise sewer pumps to avoid flood damage

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	0	
Property Protection	1	
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	
Fiscal	1	Need funding
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	0	
Timeline	1	
Agency Champion	1	
Other Community Objectives		
Total	10	
Priority (High/Med/Low)	High	



Action Number: Sussex Boro-13
Mitigation Action/Initiative: Sewer pumps and DPW garage floor

Assessing the Risk	
Hazard(s) addressed:	Flood
Specific problem being mitigated:	TBD
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Install sewer pumps
	2. Do nothing
	3. No other feasible options were identified for this project
Action/Project Intended for Implementation	
Description of Selected Action/Project	TBD
Action/Project Category	SIP, NSP
Goals Met	2, 6
Applies to existing and or new development, or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	High
Priority	High
Plan for Implementation	
Responsible Organization	DPW Manager
Local Planning Mechanism	Emergency Management
Potential Funding Sources	FEMA with local cost share
Timeline for Completion	Short Term / DOF
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Sussex Boro-13

Mitigation Action/Initiative:

Sewer pumps and DPW garage floor

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	0	
Property Protection	1	Protect the DPW garage from damages; allow for continuity of operations
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	-1	
Fiscal	-1	
Environmental	0	
Social	0	
Administrative	-1	
Multi-Hazard	1	Flood, Severe Weather
Timeline	1	Project will be completed within five years
Agency Champion	1	
Other Community Objectives	1	
Total	5	
Priority (High/Med/Low)	High	



9.23 Township of Vernon

This section presents the jurisdictional annex for the Township of Vernon.

9.23.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Mayor Harry Shortway Address: 973.764.4055, ext. 2241 hshortway@vernontwp.com	Ken Clark Address: 973-764-4055, ext. 2271 firemarshal@vernontwp.com

9.23.2 Municipal Profile

Vernon Township is located in the northeast corner of Sussex County. It has a total area of 70.6 square miles and according to the U.S. Census, the 2010 population for the Township of Vernon was 23,943. The Township is most populous municipalities and has the largest area in the County. It is bordered to the north by New York State, to the south by Hardyston Township, to the east by Passaic County, and to the west by Wantage Township. The following unincorporated communities are located within the Township: Owens, Willow Brook, Wantage, Independence Corner, McAfee, Sand Hills, Glenwood, Vernon Valley, DeKays, Highlands Lakes, Kampe, Cherry Ridge, and Wawayanda. There are many ponds and streams located throughout the Township and include, but not limited to: Highland Lake, Wawayanda Lake, Lake Wildwood, Double Kill, Wawayanda Creek, Pochuck Creek and its tributaries, Black Creek and its tributaries, and the Wallkill River.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the map in Section 9.23.8 of this annex which illustrates the hazard areas along with the location of potential new development.

Table 9.23-1. Growth and Development

Property or Development Name	Type (e.g. Res., Comm.)	# of Units / Structures	Location (address and/or Block & Lot)	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to present					
Mountain Creek Day Lodge	Commercial		Provide address or block and lot	Could not locate	
Urgent Care Center	Medical		Provide address or block and lot	Could not locate	
KDC Solar	Utility		Provide address or block and lot	Could not locate	
Known or Anticipated Development in the Next Five Years					
Theta 456	Residence		Provide address or block and lot	Could not locate	
CVS Pharmacy	Commercial		Provide address or block and lot	Could not locate	

** Only location-specific hazard zones or vulnerabilities identified.*



9.23.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.23-2. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26-September 5, 2011	Hurricane Irene	DR-4021	Yes	<p>Various road closures during the impact of storm and the following weeks. Intermittent flooding and road closures Township wide. Sewer pipes clogged and backed up. Unpredictable ponding and flooding. Private and lake communities affected.</p> <p>Numerous homes were flooded within the Township and several families had to evacuate their homes. Persons were also trapped in their vehicles as they were submerged due to fast moving water over roadway. Trees and wires were down on roadways throughout the Township. Flooding damaged roadways and bridges and retaining walls collapsed in parts of the Township. A sinkhole formed on Maple Grange Road, forcing the road to close.</p> <p>DPW force account labor costs: \$10,611.70; direct administrative costs (DPW): \$191.23 Police force Overtime expenses: \$20,219.49</p>
October 26-November 8, 2012	Hurricane Sandy	DR-4086	Yes	<p>Vegetative debris deposited throughout Township requiring immediate clearance which posed a threat to lives, public health and safety, and improved property. Power was out for seven days.</p> <p>Numerous trees and power lines were down in the Township, causing road closures and power outages. Many homes were damaged due to fallen trees.</p> <p>DPW force account labor costs: \$25,184.01; Direct administrative costs (DPW): 250.64; VTMUA force account labor costs: 1,921.24.</p>

9.23.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Vernon. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.



Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Vernon.

Table 9.23-3. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	High*
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$2,405,223 2,500-Year GBS: \$37,991,811	Occasional	28	Medium
Flood	1% Annual Chance: \$42,000,012	Frequent	18	Medium
Geologic	RCV Exposed to Carbonate Rock Areas: \$1,429,071,427	Frequent	39	Medium**
Hurricane	100-year MRP: \$1,058,261 500-year MRP: \$5,431,322 Annualized: \$57,212	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$1,058,261 500-year MRP: \$5,431,322 Annualized: \$57,212	Frequent	48	High
Severe Winter Weather	1% GBS: \$30,630,729 5% GBS: \$153,153,647	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$143,230,061	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

* The hazard ranking was changed due to the location of high hazard dams in the municipality

** The hazard ranking was changed for this hazard based on input from the municipality, population exposed, and/or event history.

GBS = General building stock; MRP = Mean return period.

- The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
- Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Vernon.

**Table 9.23-4. NFIP Summary**

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Vernon	46	20	\$165,380	0	0	9

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

The table below presents the number of critical facilities, by type, in the community located in the effective FEMA flood zones (1% and 0.2% annual chance boundaries).

Table 9.23-5. Number of Critical Facilities in the DFIRM 1% and 0.2% Annual Chance Flood Boundaries

Municipality	1% Annual Chance	0.2% Annual Chance
	Shelter	Shelter
Vernon, Township of	1	1

Source: Sussex County; FEMA, 2011

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.

9.23.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Community Rating System
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Vernon.



Table 9.23-6. Planning and Regulatory Tools

Tool / Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept. /Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes	Local	Land Use/ Engineer	2010 Master Plan Update
Capital Improvements Plan	Yes	Local	Administrator	
Floodplain Management / Basin Plan	Yes	County/Local	Engineer	Code Chapter 275-3.4
Stormwater Management Plan	Yes	Local	Land Use/ Engineer	Code Chapter 330-Article XII
Open Space Plan	Yes	Local	Land Use/Planner	Code Chapter 244
Stream Corridor Management Plan	Yes	Local	NEED INFO	Code Chapter 330-Article XII
Watershed Management or Protection Plan	NEED INFO	NEED INFO	NEED INFO	NEED INFO
Economic Development Plan	NEED INFO	NEED INFO	NEED INFO	NEED INFO
Comprehensive Emergency Management Plan	NEED INFO	NEED INFO	NEED INFO	NEED INFO
Emergency Response Plan	NEED INFO	NEED INFO	NEED INFO	NEED INFO
Post-Disaster Recovery Plan	NEED INFO	NEED INFO	NEED INFO	NEED INFO
Transportation Plan	NEED INFO	NEED INFO	NEED INFO	NEED INFO
Strategic Recovery Planning Report	NEED INFO	NEED INFO	NEED INFO	NEED INFO
Other Plans:	NEED INFO	NEED INFO	NEED INFO	NEED INFO
Regulatory Capability				
Building Code	Yes	State/Local	Construction Department	State Uniform Construction Code Act (N.J.S. 52:27D-119 et seq.)
Zoning Ordinance	Yes	Local	Land Use/Engineer	Code Chapter 330
Subdivision Ordinance	Yes	Local	Land Use/Engineer	Code Chapter 333-Article VI
NFIP Flood Damage Prevention Ordinance	Yes	Federal/State/Local	Construction Official	Code Chapter 275
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State/Local		
Growth Management Ordinances	No			
Site Plan Review Requirements	Yes	Local	Land Use/Engineer	Code Chapter 333-Article VI
Stormwater Management Ordinance	Yes	Local		Code Chapter 330-Article XII
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			



Table 9.23-6. Planning and Regulatory Tools

Tool / Program (code, ordinance, plan)	Do you have this? (Yes/No) If Yes, date of adoption or update	Authority (local, county, state, federal)	Dept. /Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes	Local	Land Use/Engineer	Code Chapter 330-Article XII. Slopes, environmental sensitive areas, etc.

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Vernon.

Table 9.23-7. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/ Agency/Position
Administrative Capability		
Planning Board	Yes	Vernon Township Land Use Board
Mitigation Planning Committee	No	
Environmental Board/Commission	Yes	Vernon Township Environmental Commission
Open Space Board/Committee	No	
Economic Development Commission/Committee	Yes	Vernon Township Economic Development Advisory Committee
Maintenance Programs to Reduce Risk	No	
Mutual Aid Agreements	Yes	
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Engineer/Planner
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Engineer
Planners or engineers with an understanding of natural hazards	Yes	Engineer
NFIP Floodplain Administrator	Yes	Construction Official
Surveyor(s)	No	
Personnel skilled or trained in GIS and/or Hazus-MH applications	No	
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	Roy Wherry, Emergency Management Coordinator
Grant Writer(s)	No	
Staff with expertise or training in benefit/cost analysis	No	
Professionals trained in conducting damage assessments	No	



Fiscal Capability

The table below summarizes financial resources available to the Township of Vernon.

Table 9.23-8. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	No
Capital Improvements Project Funding	Yes
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas, or electric service	Sewer only
Impact Fees for homebuyers or developers of new development/homes	Don't know
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	Don't know
Other Federal or State Funding Programs	Yes
Open Space Acquisition Funding Programs	Yes
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Vernon.

Table 9.23-9. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		
Building Code Effectiveness Grading Schedule (BCEGS)			
Public Protection (ISO Fire Protection Classes 1 to 10)			
Storm Ready	No		
Firewise	No		
Disaster/Safety Programs in/for Schools			
Organizations with Mitigation Focus (advocacy group, non-government)			
Public Education Program/Outreach (through website, social media)			
Public-Private Partnerships			

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule



(BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Township of Vernon's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.23-10. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability			
Administrative and Technical Capability			
Fiscal Capability			
Community Political Capability			
Community Resiliency Capability			
Capability to Integrate Mitigation into Municipal Processes and Activities.			

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

NAME, TITLE

Flood Vulnerability Summary

ADD INFO FROM FPA HERE

Resources

ADD INFO FROM FPA HERE

Compliance History

ADD INFO FROM FPA HERE



Regulatory

ADD INFO FROM FPA HERE

Community Rating System

The Township of Vernon does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Township has a Joint Land Use Board which reviews all applications for development and consider natural hazard risk areas in their review.

Vernon Township Master Plan Reexamination 2010: This plan includes the identification of natural hazard risk areas like floodplains, wetlands, and steep slopes, as well as land use and zoning recommendations for managing those risks. The Plan included the following applicable goals and objectives:

1. Review ordinances to ensure that well-heads, steep slopes and scenic vistas are adequately protected.
2. Ensure that ridgeline protection ordinances provide a clear definition and mapping of what is protected along with methods for ensuring protection of the resource.
3. Review ordinances to ensure that environmentally sensitive areas are protected using best management practices for development in those areas. To preserve and protect Vernon's Natural Resources.
4. Review existing environmental ordinances to ensure they are adequate to preserve environmentally sensitive areas.
5. Adopt necessary protections in the Highlands Preservation Area to be consistent with the Highlands Regional Master Plan.
6. Encourage clustering techniques for developments in order to preserve open space and farmland.
7. Identify, preserve and protect open space areas with significant scenic views and/or important historical, cultural, environmental or agricultural significance.
8. Ensure that ridgeline protection ordinances provide a clear definition and mapping of what is protected along with methods for ensuring protection of the resource.
9. Minimize the impacts of development on environmentally sensitive areas such as wetlands, stream corridors, and aquifer recharge areas.

Highlands: Vernon is located in the New Jersey Highlands Region and is part of both the Highlands Planning and Preservation Areas. As such, the Township is one of 88 municipalities protected by and subject to the provisions of the Highlands Water Protection and Planning Act that protects, enhances and restores Highland's natural resources. The Highlands Act requires that future land use in the Highlands Region be guided by the Regional Master Plan's Land Use Capability Map (LUCM) Series which includes tools to identify and protect the natural, scenic and other resources of the region. In supporting and complying with the Highlands Act, the Township enacted amendments and updates to local zoning and development ordinances that ensure the protection of important resources and areas. The Highland Act creates three primary zones: a Protection Zone, a Conservation Zone and an Existing community Zone. Protection Zones are areas with the highest quality



resources with extreme limitations on allowable development while Conservation Zones have significant agricultural lands and associated woodlands and environmental features with allowable development consisting primarily of agricultural uses. Existing Community Zones consist of areas of concentrated development with limited environmental constraints. These zones are overlayed with existing local zoning maps to identify and address issues of public interest including watershed management, open space preservation, historic preservation, flood protection among others.

Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement.

Chapter 275: Flood Damage Prevention

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects;
- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter 330-78: Stormwater Management

The purpose of the Stormwater Control Chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of the Townships' citizens and businesses.

Chapter 330-85: Environmentally Impact Statement

Except in connection with applications classified as minor, the effect of every development proposal on the natural and built (or otherwise man-made) environment shall be studied by a qualified expert or experts engaged by the applicant, who shall prepare a report of findings, analysis and conclusions to be known as an "environmental impact statement" (hereinafter "EIS") for submission to the Planning Board and the Environmental Commission. The Environmental Commission shall have 30 days in which to review the same, make a report thereon and submit its report to the Planning Board, with a copy to be supplied simultaneously to the applicant. The Commission's report shall consider the sufficiency of the EIS with particularity and advise the Planning Board as to which elements of the EIS, if any, are deficient in information and/or proposed mitigation. The Planning Board shall consider such report when deciding which elements of an EIS, if any, should be waived at the request of the applicant, or which elements should be further studied and explained.

Highlands: In addition, the Highlands Water Protection and Planning Act provides additional regulatory control over development within the Township. While Major Highlands Development projects, as defined by the Highlands Act, still require local approvals, they must first receive a Highlands Resource Applicability



Determination and be evaluated for consistency with the provisions of the Highlands Act. Major Highlands Development projects include a variety of projects such as any non-residential development, any residential development that disturbs one or more acres of land, and any development that disturbs ¼ acres or more of forest, among others. This process identifies any potential Highlands Resources on the site and if found requires adherence to relevant development standards and restrictions.

Operational and Administration

The Township has established a Joint Land Use Board and an Environmental Committee, that aid in planning decisions to support the conservation and preservation of the Township's critical environmental features. Beyond that the Township employs and Planning Board Secretary and contracts out for professional legal, planning, and engineering services for development review.

Funding

Operating Budget: The Township's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

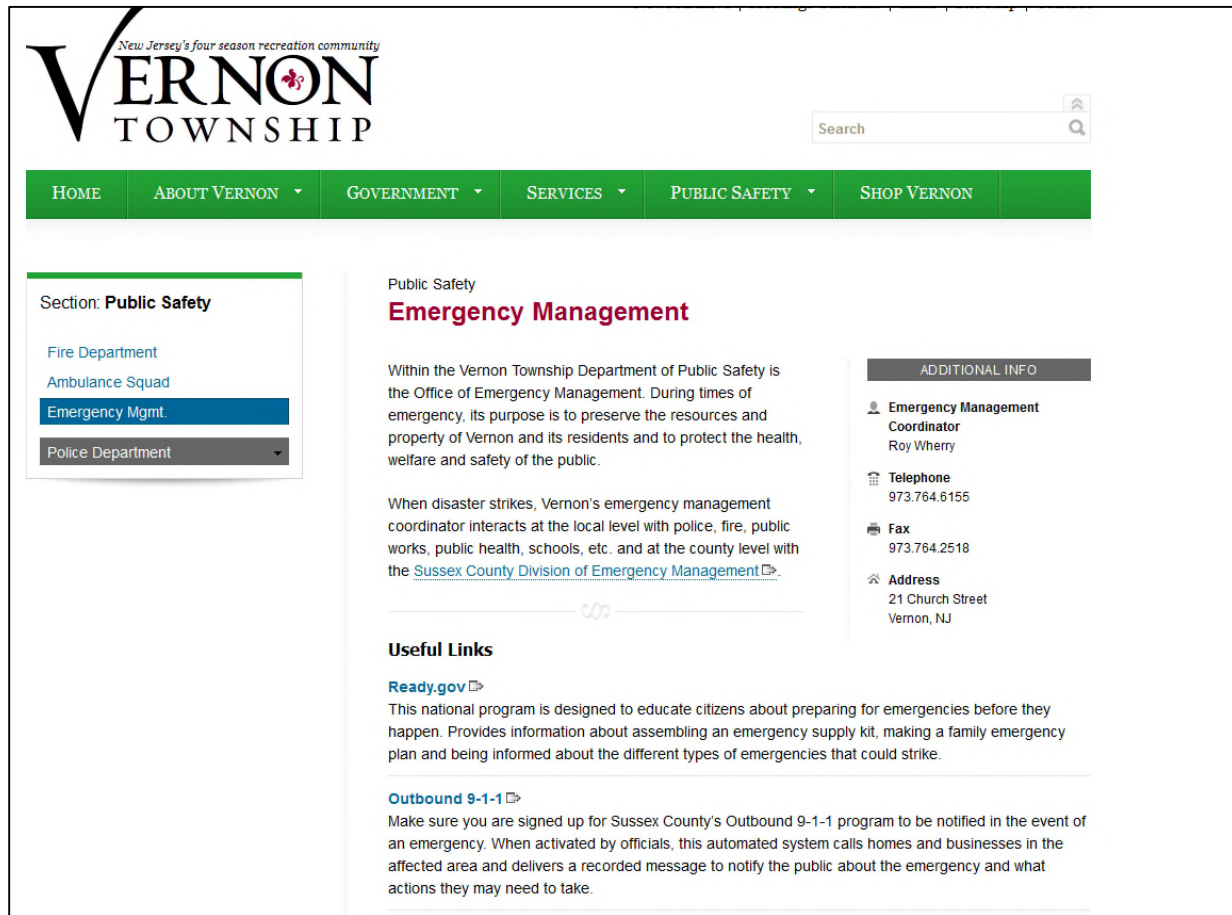
Grants: The Township has received funding from the NJDOT and The Garden State Preservation Trust Fund grant programs. The Township's 2014 Capital Budget includes line items for improvements to the Municipal Building, as well as a number of drainage and roadway improvements.

Education and Outreach

The Township's website posts information regarding upcoming community events and important municipal decisions on the home page.



Figure 9.23-1. Screenshot of Township Website with Examples of their Emergency Information



9.23.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.23-11. Past Mitigation Initiative Status

Initiative Number	2011 Mitigation Action	Responsible Party	Status (In progress, No progress, Complete)	Describe Status 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	Next Step (Include in 2015 HMP? or Discontinue)	Describe Next Step 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Vernon Township 1	Retrofit roof to meet current snow load standards on Highland Lakes Volunteer Fire Department building located on Canistear Road.	Station Commander	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.
Vernon Township 2	Retrofit roof to meet current snow load standards on Vernon Valley Police Department building located on Church Street.	Police Chief	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.
Vernon Township 3	Retrofit roof to meet current snow load standards on Lounsberry Hollow School located on Sammis Road.	School Board Administrator	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.
Vernon Township 4	Retrofit roof to meet current snow load standards on High School located on Route 565.	School Board Administrator	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.
Vernon Township 5	Implement the Fire Wise Program throughout the township.	OEM Coordinator	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.
Vernon Township 6	Retrofit roof to meet current snow load standards on Glen Meadows School located on Sammis Road.	School Board Administrator	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.
Vernon Township 7	Retrofit roof to meet current high wind standards on Cedar Mountain School located on Sammis Road.	School Board Administrator	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.



Initiative Number	2011 Mitigation Action	Responsible Party	Status (In progress, No progress, Complete)	Describe Status 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	Next Step (Include in 2015 HMP? or Discontinue)	Describe Next Step 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Vernon Township 8	Retrofit roof to meet current snow load standards on Rolling Hill School located on Sammis Road.	School Board Administrator	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.
Vernon Township 9	Retrofit roof to meet current snow load standards on Walnut Ridge School located on route 517.	School Board Administrator	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.
Vernon Township 10	Stormwater management system upgrade and improvement along Maple Grange Road and Vernon Crossing Road.	DPW Administrator	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.
Vernon Township 11	Embankment stabilization for Mountain Creek Water Park located on route 94.	Facility Administrator	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.
Vernon Township 12	Stormwater management system along Tenneco Pipeline.	DPW Administrator	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.
Vernon Township 13	Harden SES Americom building located on route 517 and Edsel Drive to FEMA 361 Standards.	Facility Administrator	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.
Vernon Township 14	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	Choose an item.	1. 2. 3. 4.	Choose an item.	1. 2.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Township has not identified any additional mitigation projects/activities that have been completed since approval of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

The Township participated in a mitigation action workshop in April 2015 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013). In May 2015, the Township participated in a second workshop led by FEMA Region 2 and NJOEM and was provided the results to the risk assessment to further assist with the identification of mitigation actions.

Table 9.23-12 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High,' 'Medium,' or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.23-13 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.23-12. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
	Utilize the Hazard Mitigation Plan (HMP) when updating the Comprehensive Master Plan; consider including hazard identification, hazard zones risk assessment information, and hazard mitigation goals as identified in the HMP. Further, the findings and recommendation of the HMP will be considered during any future site plan review processes.	Both	All	All	Planning	High	Low	Municipal	Short	High	LPR	PR

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS	Community Rating System
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
PDM	Pre-Disaster Mitigation Grant Program
RFC	Repetitive Flood Claims Grant Program (discontinued)
SRL	Severe Repetitive Loss Grant Program (discontinued)

Timeline:

Short	1 to 5 years
Long Term	5 years or greater
OG	On-going program
DOF	Depending on funding

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
------	------------



Costs:

High > \$100,000

Where actual project costs cannot reasonably be established at this time:

- Low Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
- Medium Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
- High Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Medium \$10,000 to \$100,000

High > \$100,000

Where numerical project benefits cannot reasonably be established at this time:

- Low Long-term benefits of the project are difficult to quantify in the short term.
- Medium Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
- High Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)- These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR) - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP) - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI) - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR) - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP) - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES) - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.23-13. Summary of Prioritization of Actions

Mitigation Action/Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost- Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community	Total	High / Medium / Low

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.

DRAFT



9.23.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.23.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Vernon that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Vernon has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.23.9 Additional Comments

None at this time.

DRAFT



Figure 9.23-2. Township of Vernon Hazard Area Extent and Location Map 1

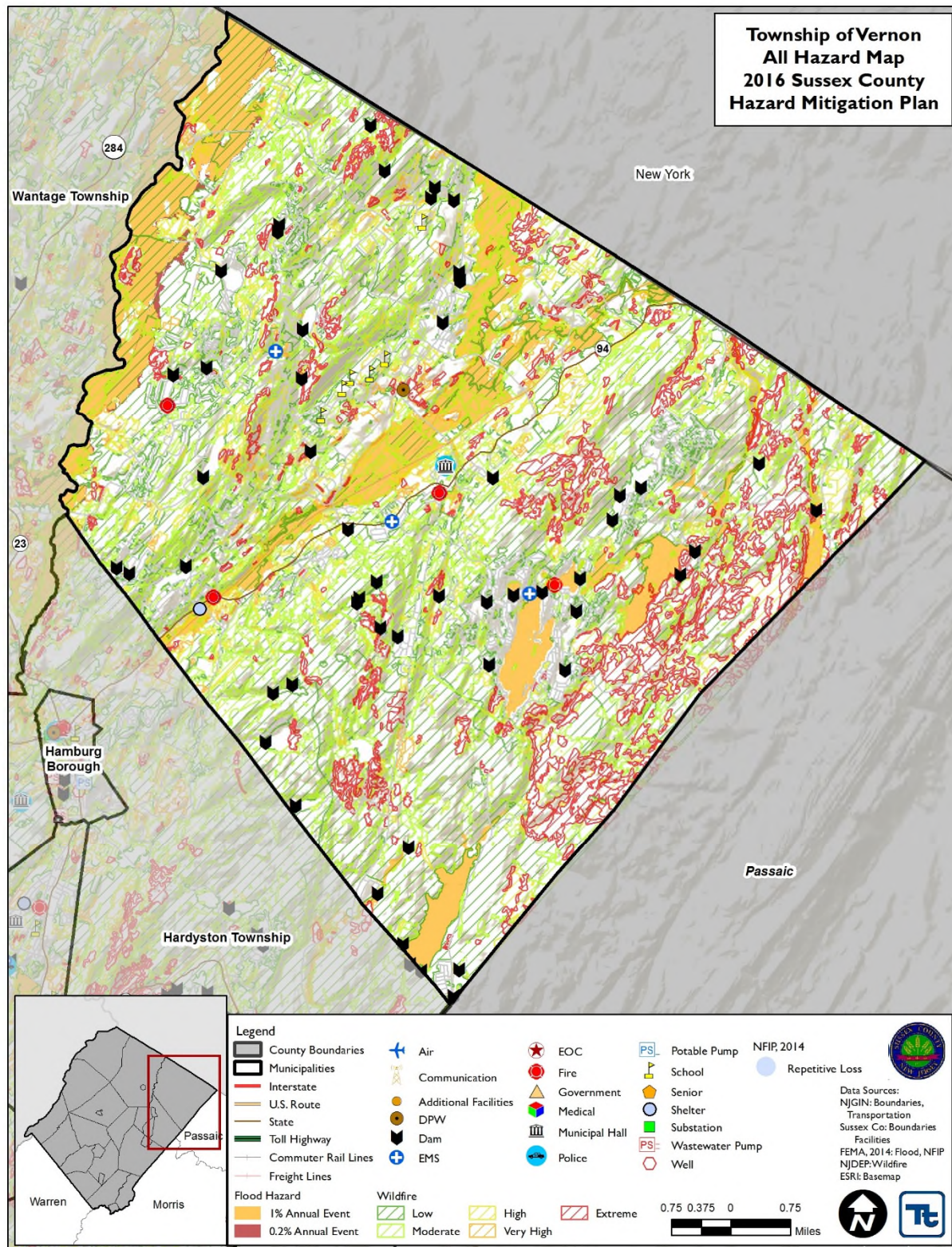
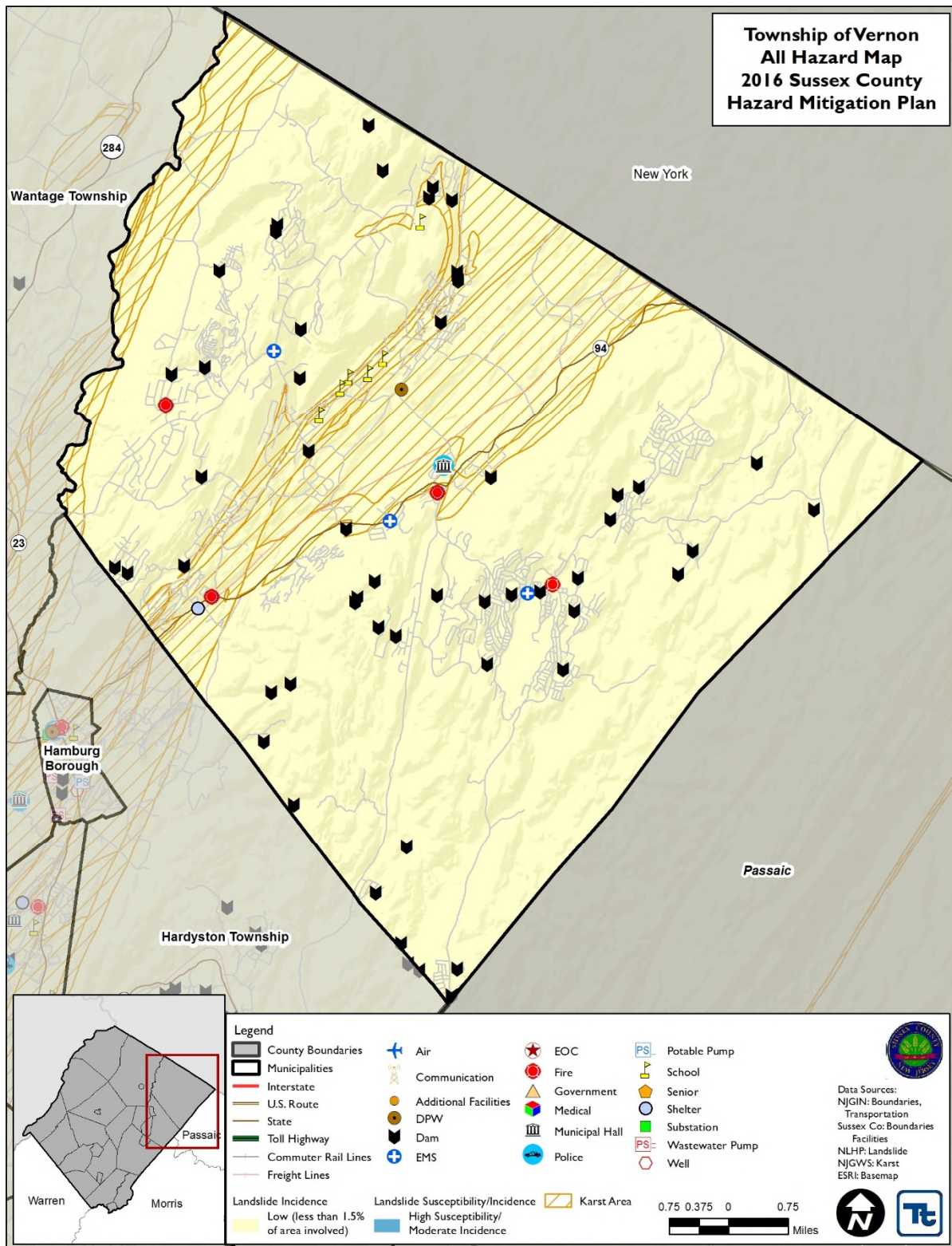




Figure 9.23-3. Township of Vernon Hazard Area Extent and Location Map 2





Action Number: _____

Mitigation Action/Initiative: _____

Assessing the Risk	
Hazard(s) addressed:	
Specific problem being mitigated:	
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1.
	2.
	3.
Action/Project Intended for Implementation	
Description of Selected Action/Project	
Action/Project Category	
Goals/Objectives Met	
Applies to existing and/or new development; or not applicable	
Benefits (losses avoided)	
Estimated Cost	
Priority*	
Plan for Implementation	
Responsible/Lead Agency/Department	
Local Planning Mechanism	
Potential Funding Sources	
Timeline for Completion	
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number: _____

Mitigation Action/Initiative: _____

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety		
Property Protection		
Cost-Effectiveness		
Technical		
Political		
Legal		
Fiscal		
Environmental		
Social		
Administrative		
Multi-Hazard		
Timeline		
Local Champion		
Other Community Objectives		
Total		
Priority (High/Med/Low)		



9.25 Township of Wantage

This section presents the jurisdictional annex for the Township of Wantage.

9.25.1 Hazard Mitigation Plan Point of Contact

The following individuals have been identified as the hazard mitigation plan's primary and alternate points of contact.

Primary Point of Contact	Alternate Point of Contact
Jim Doherty, Clerk/Administrator 888 State Route 23, Wantage, NJ 07461 Phone: (973) 875-7192 Email: administrator@wantagewp-nj.org	Joseph Konopinski, OEM Coordinator 888 State Route 23, Wantage, NJ 07461 Phone: (973) 222-7269 Email: jkonopin@embarqmail.com

9.25.2 Municipal Profile

Wantage Township is located in northern Sussex County. The Township fully surrounds the Borough of Sussex. New York State is located to the north, the Townships of Lafayette and Hardyston are located to the south, Vernon Township is located to the east and Montague and Frankford Townships are located to the west. It has a total area of 67.5 square miles and according to the U.S. Census, the 2010 population for the Township of Wantage was 11,358. The following unincorporated communities are located within the Township: Mount Salem, Rockport, Hanford, Colesville, Van Syckles, Quarryville, Libertyville, Plumbsock, Beemerville, Woodbourne, McCoys Corner, Lewisburg, Martins, Papakating, and Roys. The Wallkill River forms the eastern border of the Township and its tributaries flow through the Township as well. Other streams, ponds and lakes in the Township include, but not limited to: Hanford Brook, Clove Brook, West Branch Papakating Creek and its tributaries, Papakating Creek, Clove Acres Lake, Lake Windsor, Lake Neepaulin, Herzenberg Lake, and Lake Rutherford.

Growth/Development Trends

The following table summarizes recent residential/commercial development since 2010 to present and any known or anticipated major residential/commercial development and major infrastructure development that has been identified in the next five years within the municipality. Refer to the maps later in this annex which illustrate the hazard areas along with the location of potential new development.

Table 9.25-1. Growth and Development

Property or Development Name	Type (e.g. Res., Comm.)	# of Units / Structures	Address	Block / Lot	Known Hazard Zone(s)	Description/Status of Development
Recent Development from 2010 to Present						
Jared Builders	Res	40	Libertyville Road	Bl 132 L 3.20	Could not locate	Approved; partially developed
Bicsak Site	Mixed		Blair Road	Bl 11 L 5	Carbonate Hazard	conceptual
Lang	Res	4	Ramsey Road	Bl 152 L 9	None at this time	approved
LGR Enterprises	Res	11	Sherman Ridge Rd	Bl 135 L 6.01	Flood: 1% Chance	approved
Toll	Res	38	Sterling Drive; Flagstone Hill Road	Bl 21 L 33-34	Wildfire: Very High	Developed



Property or Development Name	Type (e.g. Res., Comm.)	# of Units / Structures	Address	Block / Lot	Known Hazard Zone(s)	Description/Status of Development
Christian Leone	Res	15		Bl 117 L 32.01	None at this time	approved
Known or Anticipated Development in the Next Five (5) Years						
Town Center At Wantage	Mixed	43	Route 23	Bl 4 L 1.05	Carbonate Hazard	Approved; phased development

* Only location-specific hazard zones or vulnerabilities identified.

9.25.3 Natural Hazard Event History Specific to the Municipality

Sussex County has a history of natural and non-natural hazard events as detailed in Volume I, Section 5.0 of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities. For the purpose of this plan update, events that have occurred in the County from 2008 to present were summarized to indicate the range and impact of hazard events in the community. Information regarding specific damages is included, if available, based on reference material or local sources. This information is presented in the table below. For details of these and additional events, refer to Volume I, Section 5.0 of this plan.

Table 9.25-2. Hazard Event History

Date(s) of Event	Event Type	FEMA Declaration # (If Applicable)	County Designated?	Summary of Damages/Losses
August 26 – September 5, 2011	Hurricane Irene	DR-4021	Yes	Hurricane Irene caused power outages and flooding within the Township. There was major debris cleanup and many roads washed out. Infrastructure damage included Brink, Central school, File, Gorge, Layton, Lewisburg, Lowe, Nielson, Old Clove, and Quarry Roads. Public assistance was requested and handled directly by FEMA. Total costs/damages to the Township was over \$331,000.
September 28 – October 6, 2011	Remnants of Tropical Storm Lee	DR-4039	Yes	The remnants of Tropical Storm Lee led to moderate debris cleanup in the Township. There were utility outages and debris blocked road access. Public assistance was requested and handled by FEMA directly. Total costs/damages to the Township was over \$44,000.
October 29, 2011	Severe Storm	DR-4048	Yes	This storm led to utility outages and excessive use of materials and overtime to clear roadways. Total cleanup, overtime and salt/sand costs to the Township was over \$45,000.
October 26 – November 8, 2012	Hurricane Sandy	DR-4086	Yes	Hurricane led to extensive debris cleanup in the Township. There were utility outages and debris blocked road access. Public assistance was requested and handled by FEMA directly. Total costs/damages to the Township was over \$66,000.

9.25.4 Hazard Vulnerabilities and Ranking

The hazard profiles in Section 5.0 of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The risk ranking methodology is presented in Section 5.3. However, each municipality had the opportunity to adjust the final ranking based on municipal feedback. The following summarizes the hazard vulnerabilities and their ranking in the Township of Wantage. For additional vulnerability information relevant to this jurisdiction, refer to Section 5.0.



Hazard Risk/Vulnerability Risk Ranking

The table below summarizes the hazard risk/vulnerability rankings of potential hazards for the Township of Wantage.

Table 9.25-3. Hazard Risk/Vulnerability Risk Ranking

Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
Dam Failure	Damage estimate not available	Occasional	24	Medium
Drought	Damage estimate not available	Frequent	30	Medium
Earthquake	100-Year GBS: \$0 500-Year GBS: \$235,819 2,500-Year GBS: \$3,436,620	Occasional	28	Medium
Flood	1% Annual Chance: \$51,682,498	Frequent	18	Medium
Geologic	RCV Exposed to Carbonate Rock Areas: \$118,027,239	Occasional	12	Low
Hurricane	100-year MRP: \$368,225 500-year MRP: \$3,780,791 Annualized: \$25,409	Frequent	48	High
Nor'Easter	Damage estimate not available	Frequent	48	High
Severe Weather	100-Year MRP: \$368,225 500-year MRP: \$3,780,791 Annualized: \$25,409	Frequent	48	High
Severe Winter Weather	1% GBS: \$13,962,721 5% GBS: \$69,813,604	Frequent	51	High
Wildfire	Estimated Value in the Extreme, Very High, and High Hazard Areas: \$143,771,815	Frequent	24	Medium
Hazardous Materials	Damage estimate not available	Frequent	36	High

Notes:

GBS = General building stock; MRP = Mean return period.

- The general building stock valuation is based on the custom inventory generated for the municipality and based on improved value.
- High = Total hazard priority risk ranking score of 31 and above
Medium = Total hazard priority risk ranking of 15-30+
Low = Total hazard risk ranking below 15
- Loss estimates for the severe storm and severe winter storm hazards are structural values only and do not include the estimated value of contents. Loss estimates for the flood and earthquake hazards represent both structure and contents. Potential flood loss estimates were generated using Hazus-MH 3.0 and the 2011 FEMA DFIRM for the 1-percent annual chance event. For the geologic and wildfire hazards, the improved value and estimated contents of buildings located within the identified hazard zones is provided.

National Flood Insurance Program (NFIP) Summary

The following table summarizes the NFIP statistics for the Township of Wantage.



Table 9.25-4. NFIP Summary

Municipality	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 1% Flood Boundary (3)
Township of Wantage	32	7	\$182,463	0	0	13

Source: FEMA, 2014

Note (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA and are current as of November 31, 2014 and are summarized by Community Name. Please note the total number of repetitive loss properties excludes the severe repetitive loss properties. The number of claims represents claims closed by 11/31/2014.

Note (2) Total building and content losses from the claims file provided by FEMA Region 2.

Note (3) The policies inside and outside of the flood zones is based on the latitude and longitude provided by FEMA Region 2 in the policy file.

Note (4) FEMA noted that where there is more than one entry for a property, there may be more than one policy in force or more than one GIS possibility.

Critical Facilities

There are no critical facilities located in the FEMA 1% or 0.2% annual chance flood boundary.

Other Vulnerabilities Identified by Municipality

The hazard profiles in Section 5.0 have detailed information regarding each plan participant's vulnerability to the identified hazards. Further, mitigation projects have been identified that may more specifically detail vulnerabilities in the community. There are no additional vulnerabilities identified at this time.

9.25.5 Capability Assessment

This section identifies the following capabilities of the local jurisdiction:

- Planning and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Education/Outreach and Community classification
- Self-Assessment of Capability
- National Flood Insurance Program
- Community Rating System
- Integration of Mitigation Planning into Existing and Future Planning Mechanisms

Planning and Regulatory Capability

The table below summarizes the regulatory tools that are available to the Township of Wantage.

Table 9.25-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No)	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Planning Capability				
Master Plan	Yes 8/25/14	Local	Land Use Board	Wantage Township Master Plan
Capital Improvements Plan	Yes 4/30/15	Local	Governing Body	2015 Municipal Budget
Floodplain Management/Basin Plan	Yes 9/8/11	Local	Governing Body	Ordinance 2011-08



Table 9.25-5. Planning and Regulatory Tools

Tool/Program (code, ordinance, plan)	Do you have this? (Yes/No)	Authority (local, county, state, federal)	Dept./Agency Responsible	Code Citation and Comments (Code Chapter, name of plan, explanation of authority, etc.)
Stormwater Management Plan	Yes 3/8/05	Local	Governing Body	Stormwater Management Plan
Open Space Plan	Yes 3/2008	Local	Governing Body	Open Space Plan
Stream Corridor Management Plan	No			
Watershed Management or Protection Plan	No			
Economic Development Plan	No			
Comprehensive Emergency Management Plan	Yes 2014	Local	Emergency Management	Emergency Management Plan
Emergency Response Plan	Yes 2014	Local	Emergency Management	Emergency Management Plan
Post-Disaster Recovery Plan	Yes 2014	Local	Emergency Management	Emergency Management Plan
Transportation Plan	Yes 2014	Local	Land Use Board	Master Plan
Strategic Recovery Planning Report	No			
Other Plans:	No			
Regulatory Capability				
Building Code	Yes	State & Local		State Uniform Construction Code Act (N.J.S. 52:27D-119 Et Seq.)
Zoning Ordinance	Yes 1979	Local	Governing Body	Chapter 8 – Zoning
Subdivision Ordinance	Yes 1977	Local	Governing Body	Chapter 7 – Land Subdivision
NFIP Flood Damage Prevention Ordinance	Yes	Federal, State, Local	Township Engineer	Chapter 18 – Flood Damage Prevention
NFIP: Cumulative Substantial Damages	No			
NFIP: Freeboard	Yes	State, Local		
Growth Management Ordinances	Yes 1979	Local	Governing Body	Zoning Ordinance
Site Plan Review Requirements	Yes	Local	Land Use Board	
Stormwater Management Ordinance	Yes 3/30/06	Local	Governing Body	Ordinance 2008-08
Municipal Separate Storm Sewer System (MS4)	No			
Natural Hazard Ordinance	No			
Post-Disaster Recovery Ordinance	No			
Real Estate Disclosure Requirement	No	State	Division Of Consumer Affairs	N.J.A.C. 13:45A-29.1
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	No			



Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the Township of Wantage.

Table 9.25-6. Administrative and Technical Capabilities

Resources	Is this in place? (Yes or No)	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	PLANNER
Mitigation Planning Committee	No	
Environmental Board/Commission	No	
Open Space Board/Committee	Yes	Administration
Economic Development Commission/Committee	No	
Maintenance Programs to Reduce Risk	No	
Mutual Aid Agreements	Yes	Public Safety
Technical/Staffing Capability		
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Planning Board
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Planning Board
Planners or engineers with an understanding of natural hazards	Yes	Planning Board
NFIP Floodplain Administrator	Yes	Planning Board
Surveyor(s)	No	
Personnel skilled or trained in GIS and/or Hazus-MH applications	No	
Scientist familiar with natural hazards	No	
Emergency Manager	Yes	Emergency Management
Grant Writer(s)	No	
Staff with expertise or training in benefit/cost analysis	Yes	Finance
Professionals trained in conducting damage assessments	Yes	Administration

Fiscal Capability

The table below summarizes financial resources available to the Township of Wantage.

Table 9.25-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Community Development Block Grants (CDBG, CDBG-DR)	Yes Administrator
Capital Improvements Project Funding	Yes, Engineer, CFO
Authority to levy taxes for specific purposes	No
User fees for water, sewer, gas, or electric service	No
Impact Fees for homebuyers or developers of new development/homes	No
Stormwater Utility Fee	No
Incur debt through general obligation bonds	Yes, Governing Body
Incur debt through special tax bonds	Yes, Governing Body
Incur debt through private activity bonds	No



Table 9.25-7. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use (Yes/No/Don't Know)
Withhold public expenditures in hazard-prone areas	No
Other Federal or State Funding Programs	Don't Know
Open Space Acquisition Funding Programs	Yes, Governing Body
Other	No

Education/Outreach and Community Classifications

The table below summarizes education/outreach programs the community participates in and the classifications for community program available to the Township of Wantage.

Table 9.25-8. Education/Outreach and Community Classifications

Program	Do you have/participate in this? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		
Building Code Effectiveness Grading Schedule (BCEGS)	No		
Public Protection (ISO Fire Protection Classes 1 to 10)	No		
Storm Ready	No		
Firewise	No		
Disaster/Safety Programs in/for Schools	No		
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	Yes		
Public-Private Partnerships	No		

The classifications listed above relate to the community's ability to provide effective services to lessen its vulnerability to the hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery, and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The Community Rating System (CRS) class applies to flood insurance while the Building Code Effectiveness Grading Schedule (BCEGS) and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class 1 being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1,000 feet of a creditable fire hydrant and is within five road miles of a recognized fire station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>



- The National Firewise Communities website at <http://firewise.org/>

Self-Assessment of Capability

The table below provides an approximate measure of the Township of Wantage's capability to work in a hazard-mitigation capacity and/or effectively implement hazard mitigation strategies to reduce hazard vulnerabilities.

Table 9.25-9. Self-Assessment of Capability

Area	Degree of Hazard Mitigation Capability		
	Limited (If limited, what are your obstacles?)	Moderate	High
Planning and Regulatory Capability		X	
Administrative and Technical Capability		X	
Fiscal Capability	X		
Community Political Capability			
Community Resiliency Capability		X	
Capability to Integrate Mitigation into Municipal Processes and Activities		X	

National Flood Insurance Program

NFIP Floodplain Administrator (FPA)

Harold Pellow, Engineer

Flood Vulnerability Summary

The municipality has not had flood damages in the past; therefore, they do not keep records of damaged properties. However, the FPA stated that if any flood damages occur, they would maintain lists/inventories. The FPA makes Substantial Damage estimates; however, none were declared for the recent events that impacted the Township. There is currently no interest in mitigation (acquisition/elevation) within the community.

Resources

When needed, the FPA can request the assistance of other staff to assist with the responsibilities of floodplain administration. NFIP administration services and functions the FPA provides include permit review, inspections and damage assessments. The Township provides education and outreach to the community regarding flood hazards/risk and flood risk reduction through Township newsletters and the municipal calendar. The FPA indicated that there are currently no barriers to running an effective floodplain program within the Township and that he feels adequately supported and trained to fulfill his role as the FPA. He would consider attending continuing education and/or certification trainings on floodplain management if it were offered in the County.

Compliance History

The Township is currently in good standing with the NFIP; however, it is unknown of the most recent compliance audit.



Regulatory

The Township's floodplain management regulations meet the minimum FEMA and state requirements. Additionally, the Land Use Board consider efforts to reduce risk when reviewing variances and height restrictions within the Township. The Township has not considered joining the CRS program.

Community Rating System

The Township of Wantage does not participate in the Community Rating System (CRS) program.

Integration of Hazard Mitigation into Existing and Future Planning Mechanisms

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of this planning effort, each community was surveyed to obtain a better understanding of their community's progress in plan integration. A summary is provided below. In addition, the community identified specific integration activities that will be incorporated into municipal procedures.

Planning

Land Use Planning: The Township has a Joint Land Use Board which reviews all applications for development and consider natural hazard risk areas in their review.

Wantage Township Master Plan Reexamination 2009: This plan included the reevaluation of the goals and objectives outlined in the 2003 Master Plan. It included the following applicable recommendation.

Update the Conservation/Environmental Element concerning Category One Waters, wildlife habitat, endangered species, forest management and wetlands and other environmental issues as required.

Prior to land use, zoning changes, or development permitting, the Township reviews the current hazard mitigation plan and other hazard analysis to ensure consistent and compatible land use within the community. The Township encourages consideration of low occupancy, low-density zoning in hazard areas, where practical.

The Township has identified several integration actions (refer to Table 9.25-12). For example, the Township will review the HMP update during the next Master Plan update.

Regulatory and Enforcement (Ordinances)

The Township has multiple chapters pertaining to the mitigation of hazards. These ordinances include the Flood Damage Prevention Chapter, Stormwater Control Chapter, and an Environmental Impact Statement requirement. When updating ordinances, the Township makes hazard mitigation a priority.

Chapter XVII: Flood Damage Prevention

The purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- To protect human life and health;
- To minimize expenditure of public money for costly flood control projects;
- To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- To minimize prolonged business interruptions;



- To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- To help maintain a stable tax base by providing for the alternate use and development of areas of special flood hazard so as to minimize future flood blight areas;
- To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Chapter XIV-A: Stormwater Control

The purposed of the Stormwater Control Chapter is to implement best management practices for stormwater management designed to promote the public health, safety and general welfare of the Townships' citizens and businesses.

Operational and Administration

The Township has established a Joint Land Use Board and an Environmental Committee, that aid in planning decisions to support the conservation and preservation of the Township's critical environmental features. Beyond that the Township employs and Planning Board Secretary and contracts out for professional legal, planning, and engineering services for development review.

Funding

Operating Budget: The Township's operating budget contains minimal provisions for expected repairs like snow removal and infrastructure repair after a storm or natural disaster.

Grants: The Township has received funding from the NJDOT and The Garden State Preservation Trust Fund grant programs. The Township's 2014 Capital Budget includes line items for improvements to the Municipal Building, as well as a number or drainage and roadway improvements.

Education and Outreach

The Township's website posts information regarding upcoming community events and important municipal decisions on the home page.



Figure 9.25-1. Screenshot of Township Website with Examples of their Emergency Information

The screenshot shows the Wantage Township website. At the top is a header with the township name and a background image of a field. On the left is a navigation menu with links to Municipal, Community, Sports, Schools, Contact Us, and Front Page. The main content area is titled 'Wantage Government Emergency Management Committee' and lists the '2015 Committee' members in a table. To the right of the table is a sidebar with 'Municipal Offices' information, including address, hours, phone, fax, and email. At the bottom of the page is a copyright notice and a disclaimer.

Wantage Government Emergency Management Committee		
2015 Committee.		
Emergency Management Coordinator	Joseph Konopinski	thru 12/31/17
Deputy Coordinator #1	Edward Vander Berg	thru 12/31/15
Deputy Coordinator #2	Thomas Madsen	thru 12/31/15
F.A.S., EMC member	Bill Deboer	thru 12/31/15
F.A.S., EMC Alternate	Rich Stickle	thru 12/31/15
Damage Assessment	Patrick Stefanelli	thru 12/31/15
Fire Chief, EMC member	Larry Bono	thru 12/31/15
Facilities, EMC Member	Amy Heater	thru 12/31/15
Communications, EMC Member	William Gebhard	thru 12/31/15
Communications, EMC Member	Michael Puskas, Sr.	thru 12/31/15
DPW Supt., EMC Member	Claude Wagner	thru 12/31/15
Sanitarian, EMC Member	Mike Plaza	thru 12/31/15
Finance/Resource Mgt., EMC Member	Michelle LaStarza	thru 12/31/15
Resource Management	Jon Morris	thru 12/31/15
Mayor, EMC Member	Bill Gaechter	thru 12/31/15
Public Information Officer	Jim Doherty	thru 12/31/15
Media	New Jersey Herald	thru 12/31/15
Evacuation	Leroy Little	thru 12/31/15
Operations, EMC Member	Donald R. Slate	thru 12/31/15
Operations, EMC Member	John Du Pont	thru 12/31/15
Operations, EMC Member	Leo Kinney	thru 12/31/15

Municipal Offices
888 State Highway 23
Wantage, NJ 07461

Hours:
8:30 a.m to 4:30 p.m.
Mon-Fri

phone: 973-875-7192
fax: 973-875-0801

e-mail:
administrator@wantagetwp-nj.org

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9.25.6 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2011 Plan. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and may also be found under 'Capability Assessment' presented previously in this annex.



Table 9.25-10. Past Mitigation Initiative Status

<u>Initiative Number</u>	<u>2011 Mitigation Action</u>	<u>Responsible Party</u>	<u>Status</u> (In progress, No progress, Complete)	<u>Describe Status</u> 1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	<u>Next Step</u> (Include in 2016 HMP? or Discontinue)	<u>Describe Next Step</u> 1. If including action in the 2015 HMP, revise/reword to be more specific (as appropriate). 2. If discontinue, explain why.
Wantage Township 1	Storm-water drainage improvement and road elevation on Mudtown Road between Route 23 and Skytop Road.	Municipal Engineer	In Progress	This project is 90% completed and funded by the local budget.	Discontinue	This project is almost complete and there is nothing more to be done; therefore, this action will not be included in the Township's mitigation initiatives.
Wantage Township 2	Implement Fire Wise Program throughout the Township.	OEM Coordinator	In Progress	This project is 10% completed and funded by the local budget.	Include in 2016 HMP	The Township wishes to continue this process and will include this action in the Township's mitigation initiatives.
Wantage Township 3	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	OEM Coordinator, in coordination with SCDEM	In Progress	This project is 10% completed and funded by the local budget.	Include in 2016 HMP	The Township wishes to continue this planning process and will include this action in the Township's mitigation initiatives.



Completed Mitigation Initiatives not Identified in the Previous Mitigation Strategy

The Township has not identified any additional mitigation projects/activities that have been completed since approval of the 2011 Plan.

Proposed Hazard Mitigation Initiatives for the Plan Update

Sussex County held a mitigation action workshop in April 2015 and municipalities were provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013). In May 2015, a second workshop was held and led by FEMA Region 2 and NJOEM where municipalities were provided the results to the risk assessment to further assist with the identification of mitigation actions. In addition, the Township attended a meeting in September 2015 to discuss mitigation strategies for their community.

Table 9.25-11 summarizes the comprehensive-range of specific mitigation initiatives the Township would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6, 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High,’ ‘Medium,’ or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.25-12 provides a summary of the prioritization of all proposed mitigation initiatives for the Plan update.



Table 9.25-11. Proposed Hazard Mitigation Initiatives

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category	CRS Category
Wantage-1	Ensure continuity of operations through back up power at critical facilities: purchase and install generator	Existing	All	1, 2, 3, 6	Township OEM	High	Medium	HMGP with local cost share	Short Term / DOF	High	SIP	PP
Wantage-2	Implement Fire Wise Program throughout the Township.	New and Existing	Wildfire	All	Township OEM	Medium	Low to Medium	Municipal Budget	Ongoing	Medium	LPR, EAP	PR, PI
Wantage-3	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness. Place an article in the Municipal newsletter and update the municipal website linking to the County HMP page	New and Existing	All	All	Township OEM with support from County OEM	High	Low	Municipal Budget	Short Term	High	EAP	PI
Wantage-4	Develop specific design guidelines and development review procedures for new construction, replacement, relocation and substantial improvement in hazard areas within the Township.	New and Existing	All	All	Township Administrator	High	Low	Municipal Budget	Ongoing	High	LPR	PR
Wantage-5	When updating the Zoning Ordinance, the Township will recognize hazard areas as limits on changes to zoning within the municipality.	N/A	All	All	Township Administrator	High	Low	Municipal Budget	Ongoing	High	LPR	PR
Wantage-6	Review the county HMP during the next update of the Township Master Plan.	N/A	All	All	Township Administrator	High	Low	Municipal Budget	Ongoing	High	LPR	PR
Wantage-7	Incorporate risk assessment and hazard mitigation principles into comprehensive planning efforts and day-to-day operations of the Township.	N/A	All	All	Township Administrator	High	Low	Municipal Budget	Ongoing	High	LPR	PR

Notes:

Not all acronyms and abbreviations defined below are included in the table.

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

Acronyms and Abbreviations:

CRS Community Rating System
 DPW Department of Public Works
 FEMA Federal Emergency Management Agency

Potential FEMA HMA Funding Sources:

FMA Flood Mitigation Assistance Grant Program
 HMGP Hazard Mitigation Grant Program
 PDM Pre-Disaster Mitigation Grant Program

Timeline:

Short 1 to 5 years
 Long Term 5 years or greater
 OG On-going program





FPA	Floodplain Administrator	RFC	Repetitive Flood Claims Grant Program (discontinued)	DOF	Depending on funding
HMA	Hazard Mitigation Assistance	SRL	Severe Repetitive Loss Grant Program (discontinued)		
N/A	Not applicable				
NFIP	National Flood Insurance Program				
NJDEP	New Jersey Department of Environmental Protection				
NJOEM	New Jersey Office of Emergency Management				
OEM	Office of Emergency Management				

Costs:

Where actual project costs have been reasonably estimated:

Low	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where actual project costs cannot reasonably be established at this time:

Low	Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
Medium	Could budget for under existing work plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
High	Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where possible, an estimate of project benefits (per FEMA's benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low=	< \$10,000
Medium	\$10,000 to \$100,000
High	> \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low	Long-term benefits of the project are difficult to quantify in the short term.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
High	Project will have an immediate impact on the reduction of risk exposure to life and property.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP)-These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities

CRS Category:

- Preventative Measures (PR)-Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP)-These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI)-Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR)-Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP)-Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES)-Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities



Table 9.25-12. Summary of Prioritization of Actions

Mitigation Action / Project Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
Wantage-1	For continuity of operations through back up power - Generator	1	1	1	1	1	1	0	1	1	1	1	0	1	1	12	High
Wantage-2	Implement Fire Wise Program throughout the Township.	1	1	1	1	1	0	0	1	0	1	0	0	0	0	7	Medium
Wantage-3	Conduct all-hazards public education and outreach program for hazard mitigation and preparedness. Place an article in the Municipal newsletter and update the municipal website linking to the County HMP page	1	1	1	1	1	1	1	0	1	1	1	1	0	0	11	High
Wantage-4	Develop specific design guidelines and development review procedures for new construction, replacement, relocation and substantial improvement in hazard areas within the Township.	1	1	1	1	1	1	1	0	0	1	1	0	0	0	9	High
Wantage-5	When updating the Zoning Ordinance, the Township will recognize hazard areas as limits on changes to zoning within the municipality.	1	1	1	1	1	1	1	0	0	1	1	0	0	0	9	High
Wantage-6	Review the county HMP during the next update of the Township Master Plan.	1	1	1	1	1	1	1	0	0	1	1	0	0	0	9	High
Wantage-7	Incorporate risk assessment and hazard mitigation principles into comprehensive planning efforts and day-to-day operations of the Township.	1	1	1	1	1	1	1	0	0	1	1	0	0	0	9	High

Note: Refer to Section 6 which contains the guidance on conducting the prioritization of mitigation actions.



9.25.7 Future Needs To Better Understand Risk/Vulnerability

None at this time.

9.25.8 Hazard Area Extent and Location

Hazard area extent and location maps have been generated for the Township of Wantage that illustrate the probable areas impacted within the municipality. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which the Township of Wantage has significant exposure. These maps are illustrated in the hazard profiles within Section 5.4, Volume I of this Plan.

9.25.9 Additional Comments

None at this time.



Figure 9.25-2. Township of Wantage Hazard Area Extent and Location Map 1

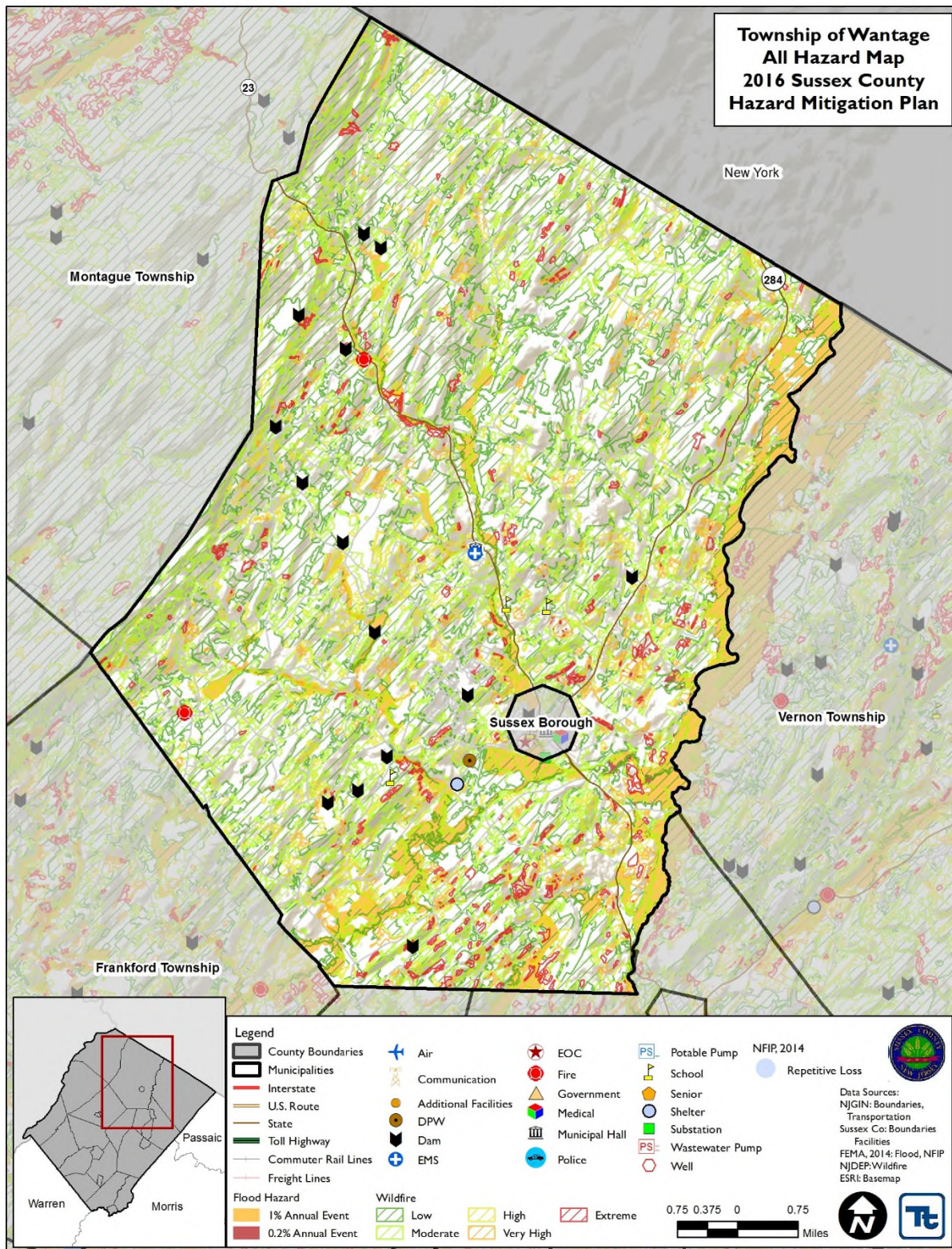
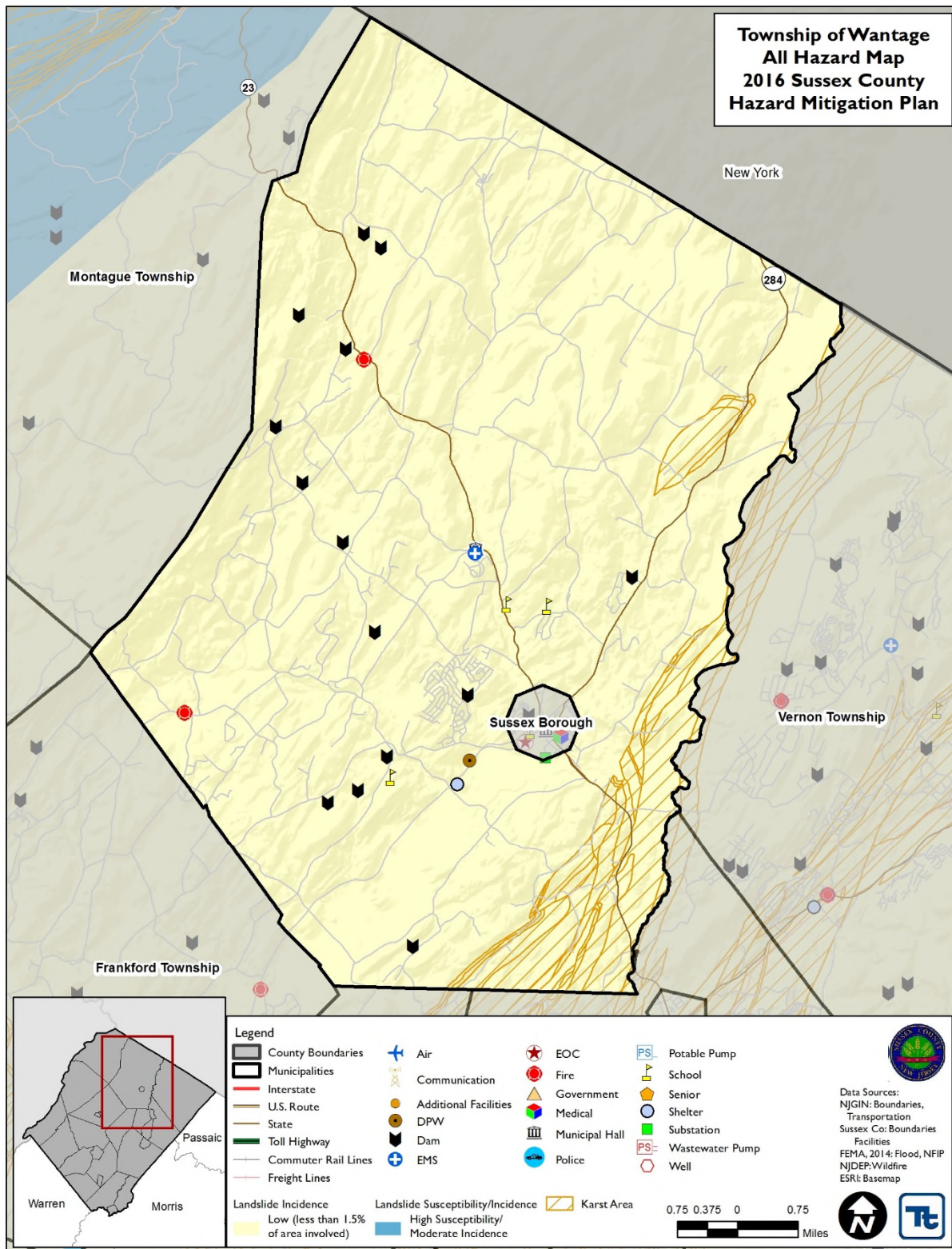




Figure 9.25-3. Township of Wantage Hazard Area Extent and Location Map 2





Action Number:

Wantage-1

Mitigation Action/Initiative:

For continuity of operations through back up power - Generator

Assessing the Risk	
Hazard(s) addressed:	All hazards
Specific problem being mitigated:	No back up power at Fire house which serves as a shelter in time of emergency
Evaluation of Potential Actions/Projects	
Actions/Projects Considered (name of project and reason for not selecting):	1. Purchase and install Generator
	2. Build a new EOC
	3. Build a Co-generation facility
Action/Project Intended for Implementation	
Description of Selected Action/Project	Purchase and install a new generator at firehouse
Action/Project Category	Structure and Infrastructure Project (SIP)
Goals Met	1. Protect Life 2. Protect Property 6. Support continuity of operations pre-, during, and post-hazard events
Applies to existing and or new development, or not applicable	Existing
Benefits (losses avoided)	High
Estimated Cost	medium
Priority	high
Plan for Implementation	
Responsible Organization	Wantage Township Fire Department Chief
Local Planning Mechanism	Budget planning
Potential Funding Sources	FEMA HMGP with local cost share
Timeline for Completion	short
Reporting on Progress	
Date of Status Report/ Report of Progress	Date: Progress on Action/Project:



Action Number:

Wantage-1

Mitigation Action/Initiative:

For continuity of operations through back up power - Generator

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Police/fire/emc/public information dissemination
Property Protection	1	Will keep firehouse running and operational
Cost-Effectiveness	1	Funding through hmgp program and matching funds
Technical	1	In house staff
Political	1	Supported by governing body
Legal	1	Legal authority to install a generator
Fiscal	0	Without grant, funds do not exist to complete the project
Environmental	1	Supports environment
Social	1	Supported by general public
Administrative	1	Administration supports the project
Multi-Hazard	1	Addresses any and all hazards that could occur
Timeline	0	Estimated short term
Agency Champion	1	Fire Department Chief
Other Community Objectives	1	Continuity of operations
Total	12	
Priority (High/Med/Low)	High	