9.34 BOROUGH OF RIVERDALE

This section presents the jurisdictional annex for the Borough of Riverdale. The annex includes a general overview of the Borough of Riverdale; an assessment of the Borough of Riverdale's risk, vulnerability, and mitigation capabilities; and a prioritized action plan to implement prior to a disaster to reduce future losses and achieve greater resilience to natural hazards.

9.34.1 Hazard Mitigation Planning Team

The following individuals are the Borough of Riverdale's identified HMP update primary and alternate points of contact and NFIP Floodplain Administrator.

Table 9.34-1. Hazard Mitigation Planning Team

Primary Point of Contact	Alternate Point of Contact
Name / Title: James Regeling Jr, OEM Address: 91 Newark Pompton Turnpike, Riverdale, NJ 07457 Phone Number: 973-714-5181 Email: chief@riverdalefd.net	Name / Title: Patrick Cleary, Deputy OEM Address: 91 Newark Pompton Turnpike, Riverdale, NJ 07457 Phone Number: 974-934-0361 Email: chief@riverdalefd.net
NFIP Floodplain Administrator	
Name / Title: Thomas Boorady, Borough Engineer Address: 91 Newark Pompton Turnpike, Riverdale, NJ 07457 Phone Number: 973-835-8300 x112 Email: tab@darmofalski.com	

9.34.2 Jurisdiction Profile

The Borough of Riverdale is located in the northeastern region of Morris County; it is bordered by Butler and Kinnelon to the west, Pequannock to the south and Pompton Lakes and Bloomingdale (Passaic County) to the east and north. Major waterways that flow through the Borough include the Pequannock River, which flows along its northern border, and the Pompton River, which flows along the eastern border of the Borough. According to the U.S. Census, the 2010 population for the Borough of Riverdale was 3,559, and the total area is 2.09 square miles, 2.02 square miles of land and 0.07 square miles of water. There are no unincorporated communities located within the Borough.

The Borough is also located in the New Jersey Highlands Region, one of the 88 municipalities protected by, and subject to, the provisions of the Highlands Water Protection and Planning Act. 1,319 acres of the Borough's total area (approximately 99%) are located within the Highlands Planning Area.

According to the U.S. Census, the 2010 population for the Borough of Riverdale was 3,359. The estimated 2017 population was 4,238, a 19.1 percent increase from the 2010 Census. Data from the 2017 U.S. Census American Community Survey indicate that 6.7 percent of the population is 5 years of age or younger and 17.5 percent is 65 years of age or older. Communities must deploy a support system that enables all populations to safely reach shelters or to quickly evacuate a hazard area.

9.34.3 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to understanding a jurisdiction's overall risk to its hazards of concern.

Table 9.34-2 summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development. Figures 9.34-1 and 9.34-2 at the end of this annex illustrate the geographically-delineated hazard areas and the location of potential new development.

Table 9.34-2. Recent and Expected Future Development

Type of Development	2014	2015	2016	2017	2018
Number of Building Permits for New Construction Issued Since the Previous HMP					
Single Family	0	2	2	1	0
Multi-Family	0	0	0	0	0
Other (commercial, mixed-use, etc.)	0	2	0	1 (garage)	0
Property or Development Name	**Type of Development**	**# of Units / Structures**	**Location** (address and/or block and lot)	**Known Hazard Zone(s)***	**Description / Status of Development**
Recent Major Development and Infrastructure from 2015 to Present					
None identified					
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years					
None anticipated					

** Only location-specific hazard zones or vulnerabilities identified.*

9.34.4 Capability Assessment

The Borough of Riverdale performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Section 5 (Capability Assessment) describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:

- An assessment of legal and regulatory capabilities.
- Development and permitting capabilities.
- An assessment of fiscal capabilities.
- An assessment of education and outreach capabilities.
- Information on National Flood Insurance Program (NFIP) compliance.
- Classification under various community mitigation programs.
- The community's adaptive capacity for the impacts of climate change.

Planning, Legal and Regulatory Capability

The table below summarizes the legal and regulatory tools that are available to the Borough of Riverdale.

Table 9.34-3. Planning, Legal and Regulatory Capability

	Do you have this? (Yes/No)	Authority that enforces (Federal, State, Regional, County, Local)	State Mandated / Allowed	Has the HMP been integrated in the last 5 years? If yes- how?	
				If yes- how? Describe in comments	If no - can it be a mitigation action? If yes, add Mitigation Action #.
Codes, Ordinances, & Requirements					
Building Code	Yes	Local	Yes	No	-

	Do you have this? (Yes/No)	Authority that enforces (Federal, State, Regional, County, Local)	State Mandated / Allowed	Has the HMP been integrated in the last 5 years? If yes- how?	
				If yes- how? Describe in comments	If no - can it be a mitigation action? If yes, add Mitigation Action #.
Comment: *State mandated on local level under NJAC 5:23-3.14. International Building Code – New Jersey Edition, 2018, NJAC 5:24-3.14. Chapter 149 of the municipal code. Administered by the Planning Board.*					
Zoning Code	Yes	Local	Yes	No	-
Comment: *Per State of NJ Municipal Land Use Law (MLUL) L. 1975, s. 2, eff Aug 1, 1976, 40-55D-62: 49. Power to zone, requires all jurisdictions to have current zoning and other land development ordinances after the planning board has adopted the land use element and master plan. Ordinance #12-2011, Chapter 168, updated in 2014. Administered by the Zoning Board.*					
Subdivisions	Yes	Local	Yes	No	-
Comment: *Chapter 37 of the municipal code. Administered by the Zoning Board.*					
Stormwater Management	Yes	Local	Yes	No	-
Comment: *Title 7 of the NJ Administrative Code (N.J.A.C. 7:8); Chapter 145 of the Revised General Ordinance, 2010.*					
Post-Disaster Recovery	No	-	-	-	-
Comment:					
Real Estate Disclosure	Yes	State – Division of Consumer Affairs	Yes	Yes	-
Comment: *N.J.A.C. 13:45A-29.1; Before signing a contract of sale, all purchasers must receive a New Jersey Public Offering Statement (POS) approved by the New Jersey Real Estate Commission. The POS provides information such as proximity to hospitals, schools, fire and police, as well as any hazards, risks or nuisances in or around the subdivision.*					
Growth Management	No	-	Yes	-	-
Comment: *State mandated at local level;*					
Shoreline Development	No	-	Yes	-	-
Comment: *NJ Coastal Area Facility Review Act (N.J.S.A. 13:19) or CAFRA regulates almost all development along the coast for activities including construction, relocation, and enlargement of buildings or structures, and excavation, grading, shore protection structures, and site preparation. This law is implemented through NJ's Coastal Zone Management Rules N.J.A.C. 7:7E-1 et seq.*					
Site Plan Review	Yes	Local	No	No	-
Comment: *Chapter 149, 1991. Administered by the Construction Code Official.*					
Environmental Protection	Yes	State, Local	Yes	No	-
Comment: *The rules that are utilized by the NJDEP and other environmental agencies are codified at Title 7 of the NJ Municipal Administrative Code. Steep Slope, EIS requirements, and Shade Tree ordinances.*					
Flood Damage Prevention	Yes	Local	Yes	-	-
Comment*: Chapter 104 Flood Hazard Control. It is 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.* • *Minimize expenditure of public money for costly flood control projects.* • *Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public.* • *Minimize prolonged business interruptions.* • *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.* • *Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas.* • *Ensure that potential buyers are notified that property is in an area of special flood hazard.* • *Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.*					
Wellhead Protection	No	-	-	-	-
Comment:					
Emergency Management	Yes	Local	-	Yes	-
Comment: *Ordinance No 2-2016 Emergency Management. Administered by the Emergency Management Coordinator.*					

	Do you have this? (Yes/No)	Authority that enforces (Federal, State, Regional, County, Local)	State Mandated / Allowed	Has the HMP been integrated in the last 5 years? If yes- how?	
				If yes- how? Describe in comments	If no - can it be a mitigation action? If yes, add Mitigation Action #.
Climate Change	No	-	-	-	-
Comment:					
Disaster Recovery Ordinance	No	-	-	-	-
Comment:					
Disaster Reconstruction Ordinance	No	-	-	-	-
Comment:					
Other	No	-	-	-	-
Comment:					
Planning Documents					
Comprehensive / Master Plan	Yes	Local	Yes	No	-
Comment: *The Master Plan of Riverdale, January 2008. Administered by the Planning Board. The Plan includes elements for Historic, Housing, Green, Utilities, Circulation, Demographic, Land Use, and Vision. The Plan identified the following actions: Plant trees. Trees are relatively inexpensive and keep ambient temperatures down by providing shade for buildings and surrounding areas and are a critical component to effective site design and development.; Create utility service plan showing future water supply and distribution facilities, drainage and flood control facilities, sewage and waste treatment, solid waste disposal and provision for other related utilities.; Preserve the land around the Pequannock River by discouraging inappropriate land uses and development within the river buffer areas and designated flood zones. The Plan also has a map of hazard areas and includes an element that identifies relationships to other plans.*					
Capital Improvement Plan	Yes	Local	Allowed	No	-
Comment: *Per NJSA 40:55D-29 the governing body is authorized to direct the planning board to prepare a CIP with at least a six year planning horizon. 2014. Administered by Administration.*					
Disaster Debris Management Plan	No	-	No	-	2020-Borough of Riverdale-008
Comment:					
Floodplain or Watershed Plan	Yes	County, Local	No	No	-
Comment: *Flood Acquisition Plan (with Morris County). Administered by OEM working with all departments.*					
Stormwater Management Plan	Yes	Local and State	Yes	No	-
Comment: *Per NJDEP Storm Water Management Rule (N.J.A.C. 7:8, et seq.). The Municipal Stormwater Regulation Program was developed in response to the U. S. Environmental Protection Agency's (USEPA) Phase II rules published in December 1999. The Department issued final stormwater rules on February 2, 2004 and four (4) NJPDES general permits authorizing stormwater discharges from Tier A and Tier B municipalities, as well as public complexes, and highway agencies that discharge stormwater from municipal separate storm sewers (MS4s). Administered by the Planning Department.*					
Stormwater Pollution Prevention Plan	Yes	Local	Yes	No	-
Comment: *Stormwater Pollution Prevention Plan. Administered by the Planning Department.*					
Urban Water Management Plan	No	-	No	-	-
Comment:					
Habitat Conservation Plan	No	-	No	-	-
Comment:					
Economic Development Plan	No	-	No	-	-
Comment:					
Shoreline Management Plan	No	-	No	-	-
Comment:					

	Do you have this? (Yes/No)	Authority that enforces (Federal, State, Regional, County, Local)	State Mandated / Allowed	Has the HMP been integrated in the last 5 years? If yes- how?	
				If yes- how? Describe in comments	If no - can it be a mitigation action? If yes, add Mitigation Action #.
Community Wildfire Protection Plan	No	-	No	-	-
Comment:					
Community Forest Management Plan	Yes	Local	Shade Tree Commission	No	-
Comment: *The Community Forestry Management Plan of March 2008 conducted an inventory of municipal street trees, promotes replanting of lost trees, and promotes maintenance of trees.*					
Transportation Plan	Yes	Local	OEM	No	-
Comment: *As part of the EOP. Administered by OEM.*					
Agriculture Plan	No	-	No	-	-
Comment:					
Climate Action Plan	No	-	No	-	-
Comment:					
Tourism Plan	No	-	No	-	-
Comment:					
Business Development Plan	No	-	No	-	-
Comment:					
Other	No	-	-	-	-
Comment:					
Response/Recovery Planning					
Comprehensive Emergency Management Plan (CEMP) / Emergency Operations Plan (EOP)	Yes	Local	Yes	No	No
Comment: *Per the NJ Civilian Defense and Disaster Control Act (App.A:9_43.2) Counties and municipalities must have written Emergency Operations Plans to be reviewed every 2 years. Emergency Operations Plan is administered by OEM.*					
Threat & Hazard Identification & Risk Assessment (THIRA)	Yes	Local	No	No	-
Comment: *As part of the Emergency Operations Plan, administered by OEM.*					
Post-Disaster Recovery Plan	Yes	Local	No	No	-
Comment: *As part of the Emergency Operations Plan, administered by OEM.*					
Continuity of Operations Plan	Yes	Local	No	No	-
Comment: *As part of the Emergency Operations Plan, administered by OEM.*					
Public Health Plan	Yes	Local	No	No	-
Comment: *As part of the Emergency Operations Plan, administered by OEM.*					
Other	No	-	-	-	-
Comment:					

Table 9.34-4. Development and Permitting Capability

Criterion	Response
Does your jurisdiction issue development permits? - If no, who does? If yes, which department?	Yes, Zoning Official, Construction, or Planning
Does your jurisdiction have the ability to track permits by hazard area?	Yes, GIS through the County
Does your jurisdiction have a buildable lands inventory? -If yes, please describe briefly. -If no, please quantitatively describe the level of buildout in the jurisdiction.	Yes, Fair Share Housing Element

ADMINISTRATIVE AND TECHNICAL CAPABILITY

- **Planning and Zoning Board:** The Planning and Zoning Board consists of volunteer residents appointed by the Mayor and Council who are responsible for preparing the Borough Master Plan in compliance with provisions of the New Jersey Municipal Land Use Law (MLUL) and who are responsible for reviewing zoning ordinances referred to them by the Mayor & Council. The Riverdale Planning is a joint board in that it fulfills the responsibilities of both a planning board and a zoning board of adjustment. In such cases the mayor and council representative step down and do not participate in or vote on such applications. The Zoning Board reviews applications that propose to utilize property in a manner not consistent with municipal zoning laws. They preview applications for variances that are basically non-permitted uses, and the Zoning Board is empowered to grant exceptions to the zoning ordinances in cases where the literal and rigid interpretation and enforcement of the zoning laws would cause hardship or injustice. These "non-permitted" uses are based upon the zoning ordinances established by the Borough (Riverdale 2019).
- **Shade Tree Commission:** The Shade Tree Commission maintains and protects shade trees within the Borough and is responsible for the Community Forestry Management Plan (Riverdale 2019).
- **Community Forestry Management Plan:** The Community Forestry Management Plan of March 2008 conducted an inventory of municipal street trees, promotes replanting of lost trees, and promotes maintenance of trees.
- **Communications Office:** The Communications Department was created to assist in maintaining the Borough's website (https://www.riverdalenj.gov/) and to maintain and update the Borough's social media accounts. The Department also explores new methods to communicate using online and social media tools and brainstorms how the Borough website could be better utilized and how technology and other tools could be used to improve it.

  The Borough of Riverdale uses various social media channels to reach residents and local business owners about what is going on in the Borough of Riverdale. The Borough Social Media Pages are maintained by the Borough of Riverdale Communications Department.
  - Twitter: https://twitter.com/RiverdaleNJ
  - Facebook: https://www.facebook.com/RiverdaleNewJersey/
  - Live Stream of Council Meetings: 2nd and 4th Wednesday of the Month (7:30 p.m. sharp on Facebook).
- **Flood Acquisition Plan:** The Borough has participated in the County's Flood Mitigation Program (FMP) and has an approved Flood Acquisition Plan (FLAP). The Morris County FMP is the first dedicated, county-level flood acquisition program in the State of New Jersey. The FMP allows Morris County to assist municipalities in moving people out of harm's way, lowering municipal costs due to intense flooding

episodes, and create natural flood capture and storage areas which protect the remaining homes and businesses. The FMP is funded by the Morris County Open Space tax and provides grant monies for municipalities to purchase flood-prone residential properties.

The table below summarizes potential staff and personnel resources available to the Borough of Riverdale.

Table 9.34-5. Administrative and Technical Capabilities

Staff/Personnel Resource	Available?	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	No	-
Warning Systems / Services (reverse 911, outdoor warning signals)	Yes	Nixle, CodeRED, social media, website, Sirens
Maintenance program to reduce risk	Yes	DPW
Mutual aid agreements	Yes	Neighboring Communities
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	Yes	Planning Board Professional Planner and Engineering
Engineers or professionals trained in building or infrastructure construction practices	Yes	Planning Board Professional Planner and Engineering
Planners or engineers with an understanding of natural hazards	Yes	Planning Board Professional Planner and Engineering
Staff with training in benefit/cost analysis	No	
Staff with training in green infrastructure	Yes	Borough engineer and planning
Staff with education/knowledge/training in low impact development	Yes	Borough engineer and planning
Surveyor	Yes	Outside contract
Stormwater engineer	Yes	Borough Engineer & Planning Board Engineer
Personnel skilled or trained in GIS applications	No	-
Local or state water quality professional	Yes	Borough Engineer & Planning Board Engineer
Scientist familiar with natural hazards in local area	No	-
Emergency manager	Yes	Daniel Sturm
Grant writers	No	-
Resilience Officer	No	-
Watershed planner	No	-
Environmental specialist	No	-
Other	No	-

FISCAL CAPABILITY

The table below summarizes financial resources available to the Borough of Riverdale.

Table 9.34-6. Fiscal Capabilities

Financial Resource	Accessible or Eligible to Use?
Community Development Block Grants (CDBG, CDBG-DR)	No

Financial Resource	Accessible or Eligible to Use?
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	No
User Fees for Water, Sewer, Gas or Electric Service	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
State-Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	No
Clean Water Act 319 Grants (Nonpoint Source Pollution)	No
Other	No

Education and Outreach Capability

The table below summarizes the education and outreach resources available to the Borough of Riverdale.

Table 9.34-7. Education and Outreach Capabilities

Criterion	Response
Do you have a public information officer or communications office?	Yes; Social Media Director
Do you have personnel skilled or trained in website development?	Yes
Do you have hazard mitigation information available on your website? • If yes, briefly describe.	No
Do you use social media for hazard mitigation education and outreach? • If yes, briefly describe.	Yes; Facebook, Twitter, website, and Constant Contact, newsletter
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, briefly describe.	No
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, briefly describe.	No
Do you have any established warning systems for hazard events? • If yes, briefly describe.	Yes; Nixle, CodeRED, social media, website

Community Classifications

The table below summarizes the classifications for community programs available to the Borough of Riverdale.

Table 9.34-8. Community Classifications

Program	Participating?	Classification	Date Classified
Community Rating System	Yes	Class 8	May 1, 2014
Building Code Effectiveness Grading Schedule (BCEGS)	No	-	-
Public Protection (Fire ISO Protection Class)	Yes		
Storm Ready Certification	No	-	-
Firewise Community Classification	No	-	-
Sustainable Jersey	No	-	-

Adaptive Capacity

Adaptive capacity is defined as "the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences" (IPCC 2014). In other words, it describes a jurisdiction's current ability to adjust to, protect from, or withstand a hazard event. This term is often discussed in reference to climate change; however, adaptive capacity also includes an understanding of local capacity for adapting to current and future risks and changing conditions. The table below summarizes the adaptive capacity for climate change and the jurisdiction's rating.

Table 9.34-9. Adaptive Capacity

Hazard	Adaptive Capacity (Capabilities) - High/Medium/Low
Dam Failure	Low
Disease Outbreak	Low
Drought	Low
Earthquake	Low
Extreme Temperature	Low
Flood	Medium
Geologic	Low
Harmful Algal Bloom	Low
Hazardous Substances	Medium
Infestation	Low
Severe Weather	Medium
Severe Winter Weather	Medium
Wildfire	Low

Notes:
High = Capacity exists and is in use; Medium = Capacity may exist, but is not used or could use some improvement;
Low = Capacity does not exist or could use substantial improvement; Unsure = Not enough information is known to assign a rating.

National Flood Insurance Program

This section provides specific information on the management and regulation of the regulatory floodplain.

Table 9.34-10. National Flood Insurance Program Compliance

Criterion	Response
What local department is responsible for floodplain management?	Engineering, Building
Who is your floodplain administrator? (name, department/position)	Borough Engineer
Are any certified floodplain managers on staff in your jurisdiction?	Yes
What is the date that your flood damage prevention ordinance was last amended?	December 5, 1988
Does your floodplain management program meet or exceed minimum requirements? • If exceeds, in what ways?	Exceeds, member of CRS program
When was the most recent Community Assistance Visit or Community Assistance Contact?	2018
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? • If so, state what they are.	No
Are any RiskMAP projects currently underway in your jurisdiction? • If so, state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction?	No, maps are under appeal

Criterion	Response
• If no, state why.	
Does your floodplain management staff need any assistance or training to support its floodplain management program?	No
□ If so, what type of assistance/training is needed?	-
Does your jurisdiction participate in the Community Rating System (CRS)? • If yes, is your jurisdiction interested in improving its CRS Classification? • If no, is your jurisdiction interested in joining the CRS program?	Yes, yes
How many flood insurance policies are in force in your jurisdiction?* • What is the insurance in force? • What is the premium in force?	Policies in force: 57 Insurance in force: $16,400,900 Premium in force: $119,687
How many total loss claims have been filed in your jurisdiction?* • How many claims are still open or were closed without payment? • What were the total payments for losses?	Total loss claims: 129 Claims still open or closed without payment: 27 Total payments for losses: $869,315
Do you maintain a list of properties that have been damaged by flooding?	Yes
Do you maintain a list of property owners interested in flood mitigation?	Yes

**According to FEMA statistics as of 9/30/2018*

9.34.5 Hazard Event History Specific to the Jurisdiction

Morris County has a history of hazard events, as detailed in Section 4 (Risk Assessment) of this plan. A summary of historical events is provided in each of the hazard profiles in Section 4.4 (Hazard Profiles) and includes a chronology of events that affected Morris County and its jurisdictions. The Borough of Riverdale's history of federally-declared (as presented by FEMA) and significant hazard events (as presented in NOAA-NCEI) is consistent with that of Morris County. Table 9.34-11 provides details regarding municipal-specific loss and damages the Borough experienced during hazard events. Information provided in the table below is based on reference material or local sources.

Table 9.34-11. Hazard Event History

Date(s) of Event	Event Type (disaster declaration if applicable)	Morris County Designated?	Summary of Event	Summary of Local Damages and Losses
January 21-24, 2016	Severe Winter Storm and Snowstorm (DR-4264)	Yes	An impulse from the west coast traversed the midsection of the country, then developed into a low pressure system as it tracked across the Gulf states before intensifying along the Carolina coast into a major nor'easter, producing record snowfall in parts of New Jersey on January 23rd. It then moved out to sea after passing by the mid-Atlantic coast early on January 24th. Wind gusts up to 60 MPH produced blizzard conditions as visibilities dropped to one-quarter mile or less in spots. Snow began during the evening hours on the 22nd,	The Borough incurred costs for snow removal and overtime.

Date(s) of Event	Event Type (disaster declaration if applicable)	Morris County Designated?	Summary of Event	Summary of Local Damages and Losses
			then continued, heavy at times through the 23rd before ending early on the 24th. Snowfall totals included 30.0 inches in Long Valley, 29.0 inches in Madison, 26.0 inches in Budd Lake, 25.3 inches in Green Pond, 22.5 inches in Butler, 21.0 inches in Chatham, and 18.0 inches in Marcella. At one point during the storm, up to 270,000 customers were without power.	
March 6-7, 2018	Severe Winter Storm and Snowstorm (DR-4368)	Yes	Precipitation gradually overspread the region during the overnight hours of March 6th to the 7th. 12 to 24 inches was observed across large parts of Morris County. The snow contained large amounts of liquid, making it heavy and wet. This resulted in downed trees, limbs, and wires, leading to numerous power outages across portions of New Jersey, especially where the heaviest snow was reported. Many customers were still without power from the previous storm when this storm struck. Governor Murphy estimated about 350,000 customers state-wide lost power as a result of this second storm. Governor Phil Murphy declared a state of emergency which went into effect at 8 PM Tuesday March 6th.	The Borough incurred costs for snow removal and overtime. Costs totaled $25,868.
September 7 and 10, 2018	Utility outages	N/A	Borough wide power loss.	The Borough experienced two large power outages that lasted for most of each day on September 7 and 10.

9.34.6 Jurisdiction-Specific Vulnerabilities and Hazard ranking

The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Table 9.34-12 summarizes the Borough of Riverdale's risk assessment results and data used to determine the hazard ranking.

A gradient of certainty was developed to summarize the confidence level regarding the input used to populate the hazard ranking. A certainty factor of high, medium or low was selected and assigned to each hazard to

provide a level of transparency and create increased understanding of the data used to support the resulting ranking. The following scale was used to assign a certainty factor to each hazard:

- High—Defined scenario/event to evaluate; probability calculated; evidenced-based/quantitative assessment to estimate potential impacts through hazard modeling.
- Moderate—Defined scenario/event or only a hazard area to evaluate; estimated probability; combination of quantitative (exposure analysis, no hazard modeling) and qualitative data to estimate potential impacts.
- Low—Scenario or hazard area is undefined; there is a degree of uncertainty regarding event probability; majority of potential impacts are qualitative.

Table 9.34-12. Summary of Risk Assessment Results

Hazard of Concern	Hazard/ Scenario Area Evaluated	Population		Buildings		Economy (Loss)		Certainty Factor
Dam Failure	Partial or complete failure of a dam There are 3 dams in the Borough, according to NJDEP.	Population impacted is dependent on the capacity of the dam, the extent of the dam failure inundation area and the severity of the failure.		The number of building impacted is dependent on the capacity of the dam, the extent of the dam failure inundation area and the severity of the failure.		Economic impacts include dam/building/infrastructure repairs; debris removal/disposal; utility impacts.		Low
Disease Outbreak	Disease Outbreaks which include: Mosquito-Borne Diseases, Tick-Borne Diseases, Campylobacteriosis, Influenza, Mumps, Ebola	Population impacted is dependent on the disease and severity of the outbreak; in some cases immuno-compromised persons are more vulnerable.		Structural impacts due to disease outbreak would be limited.		Economic losses can include County financial impacts to monitor/address outbreaks; lost wages or commercial interruptions; depends on the severity and type of disease outbreak. .		Low
Drought	Prolonged drought event - The County is serviced by water supplies who primarily get water from groundwater sources; some surface water sources.	Entire population exposed. Population on surface water supplies may be impacted first; water restrictions/contamination; increased wildfire risk.		Droughts are not expected to cause direct damage to buildings.		Losses include aesthetic, landscape/nursery/agricultural industry impacts.		Low
Earthquake	100, 500-, 2,500-Year Mean Return Period (MRP) Events evaluated NEHRP Soils D&E (soft soils that amplify ground shaking are present in the County	NEHRP D&E:	2,110	NEHRP D&E:	563	Earthquake	100, 500-, 2,500-Year Mean Return Period (MRP) Events evaluated NEHRP Soils D&E (soft soils that amplify ground shaking are present in the County	NEHRP D&E: Liquefaction Class 4:
		Liquefaction Class 4:	134	Liquefaction Class 4:	39	500-year Loss:	$834,734	
						2,500-year Loss:	$13,759,776	
Extreme Temperature		Over 65 Population:	740					

Hazard of Concern	Hazard/ Scenario Area Evaluated	Population		Buildings		Economy (Loss)		Certainty Factor
	Extreme temperature event (heat or cold)	Population Below Poverty Level:	314	Physical impacts due to extreme temperatures would be limited.		Loss of business function is possible due to unexpected repairs (i.e. pipes bursting) or power failures.		Extreme Temperature
Flood	100- and 500-Year Mean Return Period Event	100-year	362	100-year	93	Flood	100- and 500-Year Mean Return Period Event	100-year 500-year
		500-year	514	500-year	138			
Geological	High Landslide Susceptibility Areas and Areas developed over carbonate rock	Class A:	13	Class A:	3	Geological	High Landslide Susceptibility Areas and Areas developed over carbonate rock	Class A: Class B: Carbonate Bedrock:
		Class B:	0	Class B:	1	Class B:	$1,087,914	
		Carbonate Bedrock:	1,261	Carbonate Bedrock:	330	Carbonate Bedrock:	$171,719,149	
Harmful Algal Bloom	Any body of water or area adjacent that is susceptible to harmful algal bloom.	Population in contact (e.g., swimming) or drinking water from surface water impacted can result in a range of health effects		General building stock impacts due to harmful algal bloom are not anticipated. Critical facilities (i.e., water treatment plants) could lead to plant closures.		Economic impacts range from recreational closure of impacted waterbodies; cost to sample/monitor/remediate.		Low
Hazardous Substance	Release of a hazardous substance from a fixed site.	Population impacted will depend on the type of material and scale of the incident. May include population within small radii of site.		The degree of damages to a building depends on the scale of the incident.		The degree of damages depends on the scale of the incident.		Low
Infestation	Infestation including: Insects [e.g. Gypsy Moth, Mosquitoes, Spotted Lanternfly, Emerald Ash Borer], White-Tailed Deer, Rodents	Population impacted will depend on the type and severity of infestation and may cause an increased risk for disease outbreak.		Physical impacts will be limited to indirect impacts from invasive species which affect crops and vegetation.		Economic impact will depend on the type and severity of infestation and may cause an increased risk for disease outbreak.		Low
Severe Weather	Severe Weather Event	Entire population exposed; The degree of impact to the population depends on the scale of the incident.		Entire building stock is exposed; The degree of impact depends on the scale of the incident.		Annualized Loss:	$13,343	Severe Weather
						100 -Year Loss:	$165,906	
						500-year Loss:	$970,896	

Hazard of Concern	Hazard/ Scenario Area Evaluated	Population		Buildings		Economy (Loss)		Certainty Factor
Severe Winter Weather	Severe Winter Weather Event	All residents/commuters/visitors are exposed; socially-vulnerable populations may be at increased risk.		All buildings are exposed; the degree of impact depends on the scale of the incident.		The cost of snow and ice removal and repair of roads/infrastructure can impact operating budgets.		Low
Wildfire	Wildfire Fuel Hazard areas (High, Very High, Extreme)	Wildfire:	9	Wildfire:	4	Wildfire	Wildfire Fuel Hazard areas (High, Very High, Extreme)	Wildfire:

Repetitive Flood Losses

The following summarizes the repetitive and severe repetitive flood losses in the Borough of Riverdale.

- Number of repetitive loss (RL) properties: 21
- Number of severe repetitive loss (SRL) properties: 1
- Number of RL/SRL properties that have been mitigated: *2*

Source: FEMA BureauNet, 2019
Note: RL and SRL as of 04/26/2019; The number of SRL properties excludes RL properties and includes properties that have been verified only (SRL_Indicator = V).

Critical Facilities

The table below identifies critical facilities in the community located in the 1-percent and 0.2-percent floodplain.

Table 9.34-13. Potential Flood Losses to Critical Facilities

Name	Type	Exposure		
		1% Event	0.2% Event	Status of Mitigation
FILTRA CORP.	Hazardous Material		X	Private facility

Additional Identified Vulnerabilities

The jurisdiction has identified the following vulnerabilities within their community:

- The Borough needs additional outreach avenues.
- The Borough needs a portable generator.
- It is difficult to figure out where flooding or fire is occurring and takes resources to send emergency staff to monitor locations repeatedly during potential flood events.
- The Borough needs additional equipment to close roads during hazard events.
- Power failure shuts down traffic lights, leading to major traffic problems.
- Emergency communications systems are in need of upgrade.

Hazard Area Extent and Location

Hazard area extent and location maps were generated for the Borough of Riverdale 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 adequate for planning purposes. Maps have been generated only for those hazards that can be clearly identified using mapping techniques and technologies and for which the Borough of Riverdale has significant exposure. Refer to Figures 9.34-1 and 9.34-2.

Hazard Ranking

This section includes the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Section 5 (Risk Assessment). The ranking process involves an assessment of the likelihood of occurrence for each hazard; its potential impacts on people, property, and the economy; and community capability and changing future climate conditions. This input supports the mitigation action development to target those hazards with highest level of concern.

As discussed in Section 4.3 (Hazard Ranking), each plan participant may have differing degrees of risk exposure and vulnerability compared to Morris County as a whole. Therefore, each jurisdiction ranked the degree of risk to each hazard as it pertains to their community. The table below summarizes the hazard risk/vulnerability rankings of potential natural hazards for the Borough of Riverdale. The Borough of Riverdale has reviewed the Morris County hazard ranking table, as well as its individual results, to reflect the relative risk of the hazards of concern to the community. During the review of the hazard ranking, the Borough indicated the following:

- The Borough changed the hazard ranking of Drought from Medium to Low.
- The Borough changed the hazard ranking of Earthquake from Medium to Low.
- The Borough changed the hazard ranking of Geological Hazard from High to Low.
- The Borough changed the hazard ranking of Severe Weather from High to Medium.
- The Borough changed the hazard ranking of Severe Winter Weather from High to Medium.
- The Borough changed the hazard ranking of Hazardous Substances from High to Medium.
- The Borough changed the hazard ranking of Disease Outbreak from High to Low.
- The Borough changed the hazard ranking of Infestation from Medium to Low.

Table 9.34-14. Borough of Riverdale Hazard Ranking Input

Dam Failure	Drought	Earthquake	Extreme Temperature	Flood	Geological Hazard
Low	Low	Low	Low	Medium	Low

Harmful Algal Bloom	Severe Weather	Severe Winter Weather	Wildfire	Hazardous Substances	Disease Outbreak	Infestation
Low	Medium	Medium	Low	Medium	Low	Low

9.34.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and provides action prioritization.

Past Mitigation Initiative Status

The following table summarizes the jurisdiction's progress on their mitigation strategy identified in the 2015 HMP. 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 can also be found under 'Capability Assessment' presented previously in this annex.

Table 9.34-15. Status of Previous HMP Mitigation Actions

2015 Action Number Action Description	Responsible Party	Status (In Progress, No Progress, Ongoing Capability, or Completed)	Include in the 2020 HMP Update?	
			Check if Yes	Enter 2020 HMP Action #
RB – 1: Dredge Pequannock River to mitigate flooding on the following streets: Williams Street, Harrison Road, Stratford Place, Riverview Terrace, Fernwood Street, Crescent	Riverdale DPW	Complete; Borough completed dredging		

2015 Action Number Action Description	Responsible Party	Status (In Progress, No Progress, Ongoing Capability, or Completed)	Include in the 2020 HMP Update?	
			Check if Yes	Enter 2020 HMP Action #
Road, Hemlock Street, Linden Street, Riverdale Road, Morris Ave, and Kenner Court				
RB – 2: Elevation/acquisition of seven floodprone properties on Harrison Street	Riverdale OEM	In progress; 2 demolished, 1 in process of acquisition	X	2020-Borough of Riverdale-002
RB – 3: Engineering study to analyze risk of dike on Home Depot Site, Route 23	Riverdale Engineer	In Progress, ongoing capabilities		
RB – 4: Elevation/acquisition of two repetitive loss properties on Stratford Place	Riverdale OEM	No Progress	X	2020-Borough of Riverdale-002
RB – 5: Develop all-hazards public education and outreach program for hazard mitigation and preparedness	County OEM	In Progress; capability		
RB – 6: Elevation/acquisition of three floodprone properties on Williams Street	Riverdale OEM	No Progress	X	2020-Borough of Riverdale-002
RB – 7: Elevation/acquisition of two floodprone properties on Hamburg Tpke	Riverdale OEM	No Progress	X	2020-Borough of Riverdale-002
RB – 8: Engineering study to analyze risk of two waterways on Degraw Rd and Matthews Ave	Riverdale OEM	No Progress; County replacing Matthews Ave bridge		
RB – 9: Repair or replacement of 4 early warning sirens in the borough	Riverdale OEM	In progress	X	2020-Borough of Riverdale-007
RB – 10: Replace and expand early warning system (sirens)	Riverdale OEM	In progress	X	2020-Borough of Riverdale-007
RB – 11: Secure mountainside on Overlook Ave and Rock Creek Tr to prevent additional rock slides	Riverdale OEM	No progress, no longer a priority (private properties)		
RB – 12: 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 from FEMA and local match availability. Specifically identified are properties in the following areas: - Harrison Rd - Williams St - Riverview Tr - Hamburg Tpk (Near Bloomingdale Border)	Riverdale OEM	In progress	X - Remove all but Riverview Terrace	2020-Borough of Riverdale-002

2015 Action Number Action Description	Responsible Party	Status (In Progress, No Progress, Ongoing Capability, or Completed)	Include in the 2020 HMP Update?	
			Check if Yes	Enter 2020 HMP Action #
RB – 13: Develop and implement a post-event damage assessment program, including the following elements: - Conduct public outreach/education (see Public Education and Awareness Initiatives above) to inform property owners of the need to report property damage and obtain required permitting when making repairs. - Develop and organize local resources to conduct post-event damage assessments, including substantial damage determinations as warranted. - Develop an inventory (file system and/or database) of losses (incl. loss of service, property damage, economic losses, etc.) as reported to and/or identified by the Town/Village (e.g. building permit process).	Riverdale OEM	Complete		
RB – 14: Support participation in the NFIP Community Rating System (CRS) program by attending CRS workshop(s) if offered within the county. See following related Community Assistance Visit (CAV) initiative.	NFIP FPA	Complete, ongoing		
RB – 15: Determine if a Community Assistance Visit (CAV) or Community Assistance Contact (CAC) is needed, and schedule if needed. This is a part of the process of joining CRS	NFIP FPA	Complete, ongoing		
RB – 16: Have designated NFIP Floodplain Administrator (FPA), and other local officials who would benefit, 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).	NFIP FPA	Complete		
RB – 17: Install backup power at the following critical facilities in the Borough - Fire Headquarters - Community Center (Borough Shelter) - Water Dept. Pumping Station (Back-up)	Riverdale OEM	In progress, change to portable generator for pump stations	X	2020-Borough of Riverdale-006
RB – 18: Enhance/expand tree maintenance program	Riverdale DPW	In Progress, ongoing capability through windshield surveys		

2015 Action Number Action Description	Responsible Party	Status (In Progress, No Progress, Ongoing Capability, or Completed)	Include in the 2020 HMP Update?	
			Check if Yes	Enter 2020 HMP Action #
RB – 19: Create/Enhance/Maintain Mutual Aid agreements with neighboring communities for continuity of operations	County and Municipal OEM	Ongoing capability		

PROPOSED HAZARD MITIGATION INITIATIVES FOR THE PLAN UPDATE

The Borough of Riverdale participated in a risk assessment workshop in November 2019 in which detailed information was provided about assets exposed and vulnerable to the identified hazards of concern. The Borough of Riverdale participated in a mitigation action workshop in March 2020 and was provided a Mitigation Toolbox that included a mitigation catalog developed specifically for Morris County and its hazards of concerns; challenges and opportunities identified during the capability and risk assessments; and 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). Section 6 (Mitigation Strategy) and Appendix F (Mitigation Strategy Supplement) provide a more complete description of the Mitigation Toolbox and its resources.

Table 9.34-16 summarizes the comprehensive-range of specific mitigation initiatives the Borough of Riverdale would like to pursue in the future to reduce the effects of hazards. Some of these initiatives might be previous actions carried forward for this HMP update. Initiatives are dependent upon available funding (grants and local match availability) and can 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 (Mitigation Strategy), 14 criteria were used to evaluate each action, including an evaluation of the benefits and costs. For each new mitigation action, a numeric rank was assigned (-1, 0, or 1) for each of the 14 evaluation criteria. The results of this evaluation, in addition to input from the jurisdiction, were then used to prioritize the mitigation initiatives as 'High', 'Medium', or 'Low.' Table 9.34-17 summarizes the evaluation of each mitigation initiative and the resulting priority, listed by Action Number.

Table 9.34-16. Proposed Hazard Mitigation Initiatives and Associated Priority

Initiative Number	Mitigation Initiative Name	Description of the Problem	Description of the Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Cost	Timeline	Priority	Mitigation Category	CRS Category
2020-Borough of Riverdale-001	Flood Gate on Riverdale Road	Riverdale Road becomes impassable during major storms and flooding events. Closure of the roadway requires police staff to be posted at the road in order to prevent cars from entering the flooded area.	The Borough will work with the County to place a road closure gate that can be closed by police during times of flooding and opened when no flooding is occurring to reduce staffing needs.	Existing	Flood, Severe Storm	3	County, Office of Emergency Management	HMGP	Flood risk reduced, reduction in staffing	$2,000	Within 6 months	High	SIP	PP, ES
2020-Borough of Riverdale-002	Mitigate flood-prone properties, including RL/SRL properties	Frequent flooding events have resulted in damages, resulting in 20 repetitive loss properties. The floodprone areas are residential, and these properties have been repetitively flooded as documented by paid NFIP claims.	Conduct outreach to 30 flood-prone property owners, including RL/SRL property owners and provide information on mitigation alternatives. After preferred mitigation measures are identified, collect required property-owner information and develop a FEMA grant application and BCA to obtain funding to implement	Existing	Flood, Severe Storm	3	NFIP Floodplain Administrator, supported by homeowners	FEMA HMGP and FMA, local cost share by residents	Eliminates flood damage to homes and residents, creates open space.	$3 Million	3 years	High	SIP	PP

Initiative Number	Mitigation Initiative Name	Description of the Problem	Description of the Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Cost	Timeline	Priority	Mitigation Category	CRS Category
2020-Borough of Riverdale-003	Flood Gate on Hamburg Turnpike	Hamburg Turnpike becomes impassable during major storms and flooding events. Closure of the roadway requires police staff to be posted at the road in order to prevent cars from entering the flooded area.	The Borough will work with the County to place a road closure gate that can be closed by police during times of flooding and opened when no flooding is occurring to reduce staffing needs.	Existing	Flood, Severe Storm	3	County, Office of Emergency Management	HMGP	Flood risk reduced, reduction in staffing	$2,000	Within 6 months	High	SIP	PP, ES
2020-Borough of Riverdale-004	Electronic Message Boards	Traffic from Interstate 287 and Route 23 causes major traffic delays when flood prone roadways flood. There is currently no way to notify motorists of flooded roads.	Purchase and install four permanent electronic message boards to be posted on roadways. Signs should be able to be controlled from the EOC. Utilize signs to limit traffic from exiting the interstate and highway. The signs could be utilized for outreach when not in use.	Existing	All hazards	1	Office of Emergency Management	HMGP, FMA, BRIC	Reduction in risk to motorists.	$50,000	6 months	High	SIP, EAP	PP, ES
2020-Borough of Riverdale-005	Backup power for traffic lights	Loss of power to traffic lights of exits from Interstate 287 and 23 causes	Install battery backup on vital traffic signals in the Borough, specifically	Existing	All hazards	3	Office of Emergency Management	HMGP, BRIC	Traffic kept flowing during	$4,000 per battery back	Within 6 m	High	SIP	ES

Initiative Number	Mitigation Initiative Name	Description of the Problem	Description of the Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Cost	Timeline	Priority	Mitigation Category	CRS Category
		dangerous traffic throughout the Borough on various roadways. During certain hazard events, this congestion causes increased safety concern and keeps motorist exposed to dangerous conditions longer.	those that exist on exits from Interstate 287 and 23.						power outages	up system	onths			
2020-Borough of Riverdale-006	Portable generator	Power outages cause sewer pump and water issues	Purchase portable generator and install necessary electrical hookups	Existing	All hazards	3	Office of Emergency Management	Borough Budget	Sewer pump and water issues reduced	$40,000	Within 6 months	High	SIP	ES
2020-Borough of Riverdale-007	Repair or replacement of Early warning sirens	The early warning sirens in the Borough are not functional.	Repair or replace the 4 warning sirens.	Existing	All hazards	3	Office of Emergency Management	Borough Budget	Increased emergency capabilities	$8,000 per siren	Within 6 months	High	SIP	ES
2020-Borough of Riverdale-008	Debris Removal and Management Plan	Post-flood debris needs to be managed	Create a specific debris removal plan that includes NJDEP pre-permitting of sites chosen	Existing, Future	Flood	2, 3	Superintendent of Public Works, Engineer	Municipal Budget	Improved emergency planning and	Staff time	Within 5 years	High	LPR	ES

Initiative Number	Mitigation Initiative Name	Description of the Problem	Description of the Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Cost	Timeline	Priority	Mitigation Category	CRS Category
									response					
2020-Borough of Riverdale-009	Update Flood Hazard Control ordinance	The Flood Hazard Control ordinance does not include the state's freeboard requirement	Update the Flood Hazard Control ordinance to include the state's 1 foot freeboard requirement.	Future	Flood	3	FPA	Municipal budget	Meet state standards, improve flood resilience	Staff time	Within 6 months	High	LPR	PR

Notes:

Acronyms and Abbreviations:

CAV	*Community Assistance Visit*
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*
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:
The time required for completion of the project upon implementation

Cost:
The estimated cost for implementation.

Benefits:
A description of the estimated benefits, either quantitative and/or qualitative.

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 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. 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 preserve or restore the functions of natural systems. 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. 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 9.34-17. Summary of Evaluation and Action Priorities

Initiative Number	Mitigation Initiative Name	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
2020-Borough of Riverdale-001	Flood Gate on Riverdale Road	1	1	1	1	0	0	0	0	1	1	1	1	1	1	10	High
2020-Borough of Riverdale-002	Mitigate flood-prone properties, including RL/SRL properties	1	1	1	1	1	1	0	1	0	0	1	0	1	1	10	High
2020-Borough of Riverdale-003	Flood Gate on Hamburg Turnpike	1	1	1	1	0	0	0	0	1	1	1	1	1	1	10	High
2020-Borough of Riverdale-004	Electronic Message Boards	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2020-Borough of Riverdale-005	Backup power for traffic lights	1	0	1	1	1	1	0	1	1	1	1	1	1	1	12	High
2020-Borough of Riverdale-006	Portable generator	0	1	1	1	1	1	1	1	1	1	1	1	1	1	13	High

Initiative Number	Mitigation Initiative Name	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
2020-Borough of Riverdale-007	Repair or replacement of Early warning sirens	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2020-Borough of Riverdale-008	Debris Removal and Management Plan	1	1	1	1	1	1	1	1	1	1	1	0	1	1	13	High
2020-Borough of Riverdale-009	Update Flood Hazard Control ordinance	1	1	1	1	1	1	1	1	1	1	0	1	1	1	13	High

Notes: Section 6 (Mitigation Strategy) conveys guidance on prioritizing mitigation actions.

Table 9.34-18. Analysis of Mitigation Actions by Hazard and Category

Hazard	Prevention	Property Protection	Public Education and Awareness	Natural Resource Protection	Emergency Services	Structural Projects	Climate Resilient	Community Capacity Building
Dam Failure			2020-Borough of Riverdale-004		2020-Borough of Riverdale-004, 2020-Borough of Riverdale-005, 2020-Borough of Riverdale-006, 2020-Borough of Riverdale-007	2020-Borough of Riverdale-004		
Disease Outbreak			2020-Borough of Riverdale-004		2020-Borough of Riverdale-004, 2020-Borough of Riverdale-005, 2020-Borough of Riverdale-006, 2020-Borough of Riverdale-007	2020-Borough of Riverdale-004		
Drought			2020-Borough of Riverdale-004		2020-Borough of Riverdale-004, 2020-Borough of Riverdale-005, 2020-Borough of Riverdale-006, 2020-Borough of Riverdale-007	2020-Borough of Riverdale-004		
Earthquake			2020-Borough of Riverdale-004		2020-Borough of Riverdale-004, 2020-Borough of Riverdale-005, 2020-Borough of Riverdale-006, 2020-Borough of Riverdale-007	2020-Borough of Riverdale-004		
Extreme Temperature			2020-Borough of		2020-Borough of Riverdale-004, 2020-	2020-Borough of		

Hazard	Prevention	Property Protection	Public Education and Awareness	Natural Resource Protection	Emergency Services	Structural Projects	Climate Resilient	Community Capacity Building
			Riverdale-004		Borough of Riverdale-005, 2020-Borough of Riverdale-006, 2020-Borough of Riverdale-007	Riverdale-004		
Flood		2020-Borough of Riverdale-001, 2020-Borough of Riverdale-002, 2020-Borough of Riverdale-003	2020-Borough of Riverdale-004		2020-Borough of Riverdale-001, 2020-Borough of Riverdale-003, 2020-Borough of Riverdale-004, 2020-Borough of Riverdale-005, 2020-Borough of Riverdale-006, 2020-Borough of Riverdale-007, 2020-Borough of Riverdale-008	2020-Borough of Riverdale-004		
Geologic			2020-Borough of Riverdale-004		2020-Borough of Riverdale-004, 2020-Borough of Riverdale-005, 2020-Borough of Riverdale-006, 2020-Borough of Riverdale-007	2020-Borough of Riverdale-004		
Harmful Algal Bloom			2020-Borough of Riverdale-004		2020-Borough of Riverdale-004, 2020-Borough of Riverdale-005, 2020-Borough of Riverdale-006, 2020-Borough of Riverdale-007	2020-Borough of Riverdale-004		

Hazard	Prevention	Property Protection	Public Education and Awareness	Natural Resource Protection	Emergency Services	Structural Projects	Climate Resilient	Community Capacity Building
Hazardous Substances			2020-Borough of Riverdale-004		2020-Borough of Riverdale-004, 2020-Borough of Riverdale-005, 2020-Borough of Riverdale-006, 2020-Borough of Riverdale-007	2020-Borough of Riverdale-004		
Infestation			2020-Borough of Riverdale-004		2020-Borough of Riverdale-004, 2020-Borough of Riverdale-005, 2020-Borough of Riverdale-006, 2020-Borough of Riverdale-007	2020-Borough of Riverdale-004		
Severe Weather		2020-Borough of Riverdale-001, 2020-Borough of Riverdale-002, 2020-Borough of Riverdale-003	2020-Borough of Riverdale-004		2020-Borough of Riverdale-001, 2020-Borough of Riverdale-003, 2020-Borough of Riverdale-004, 2020-Borough of Riverdale-005, 2020-Borough of Riverdale-006, 2020-Borough of Riverdale-007	2020-Borough of Riverdale-004		
Severe Winter Weather			2020-Borough of Riverdale-004		2020-Borough of Riverdale-004, 2020-Borough of Riverdale-005, 2020-Borough of Riverdale-006, 2020-Borough of Riverdale-007	2020-Borough of Riverdale-004		

Hazard	Prevention	Property Protection	Public Education and Awareness	Natural Resource Protection	Emergency Services	Structural Projects	Climate Resilient	Community Capacity Building
Wildfire			2020-Borough of Riverdale-004		2020-Borough of Riverdale-004, 2020-Borough of Riverdale-006, 2020-Borough of Riverdale-007	2020-Borough of Riverdale-004		

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.
RED = high ranked hazard
ORANGE = medium ranked hazard
YELLOW = low ranked hazard

9.34.8 Staff and Local Stakeholder Involvement in Annex Development

The Borough of Riverdale followed the planning process described in Section 2 (Planning Process). This annex was developed over the course of several months with input from many jurisdiction representatives. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization. The following table summarizes who participated and in what capacity. Additional documentation on the municipality's planning process through Planning Partnership meetings is included in Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.34-19. Contributors to the Annex

Entity	Title	Method of Participation
Patrick Cleary	Asst. Fire Chief, Dpt. OEM Coordinator	Alternate POC, attended plan participant meetings, provided impact data, contributed to the mitigation strategy.
Steve Revis	Councilman	Attended plan participant meetings, provided impact data, contributed to the mitigation strategy.
Paul M. Carelli	Mayor	Attended plan participant meetings, provided impact data, contributed to the mitigation strategy.
Kevin Smith	Chief of Police	Attended plan participant meetings, provided impact data, contributed to the mitigation strategy.
Tom Boorady	Borough Engineer	FPA, attended plan participant meetings, provided impact data, contributed to the mitigation strategy.
James Regeling	Fire Chief/OEM	Primary POC, attended plan participant meetings, provided impact data, contributed to the mitigation strategy.

Figure 9.34-1. Borough of Riverdale Hazard Area Extent and Location Map 1

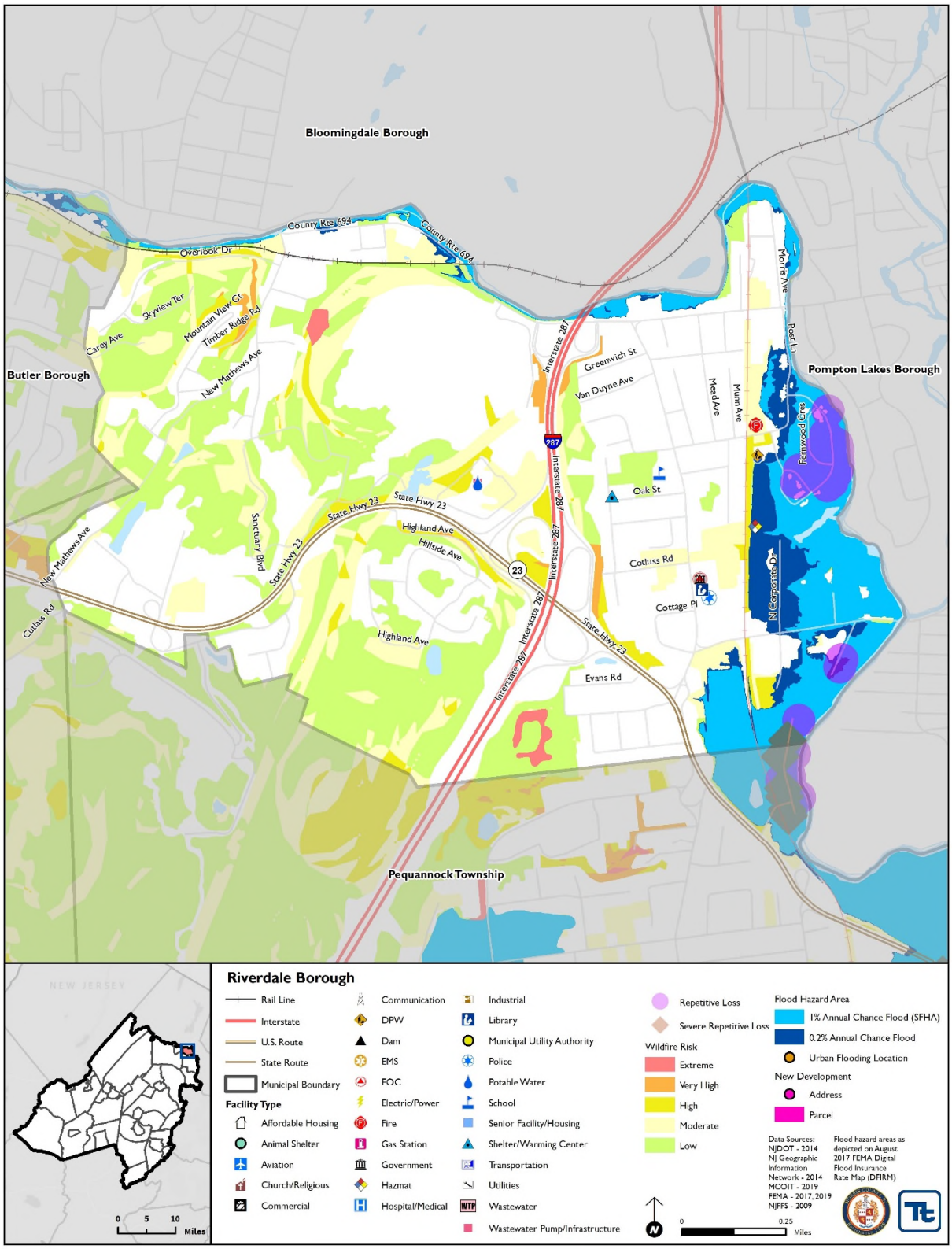
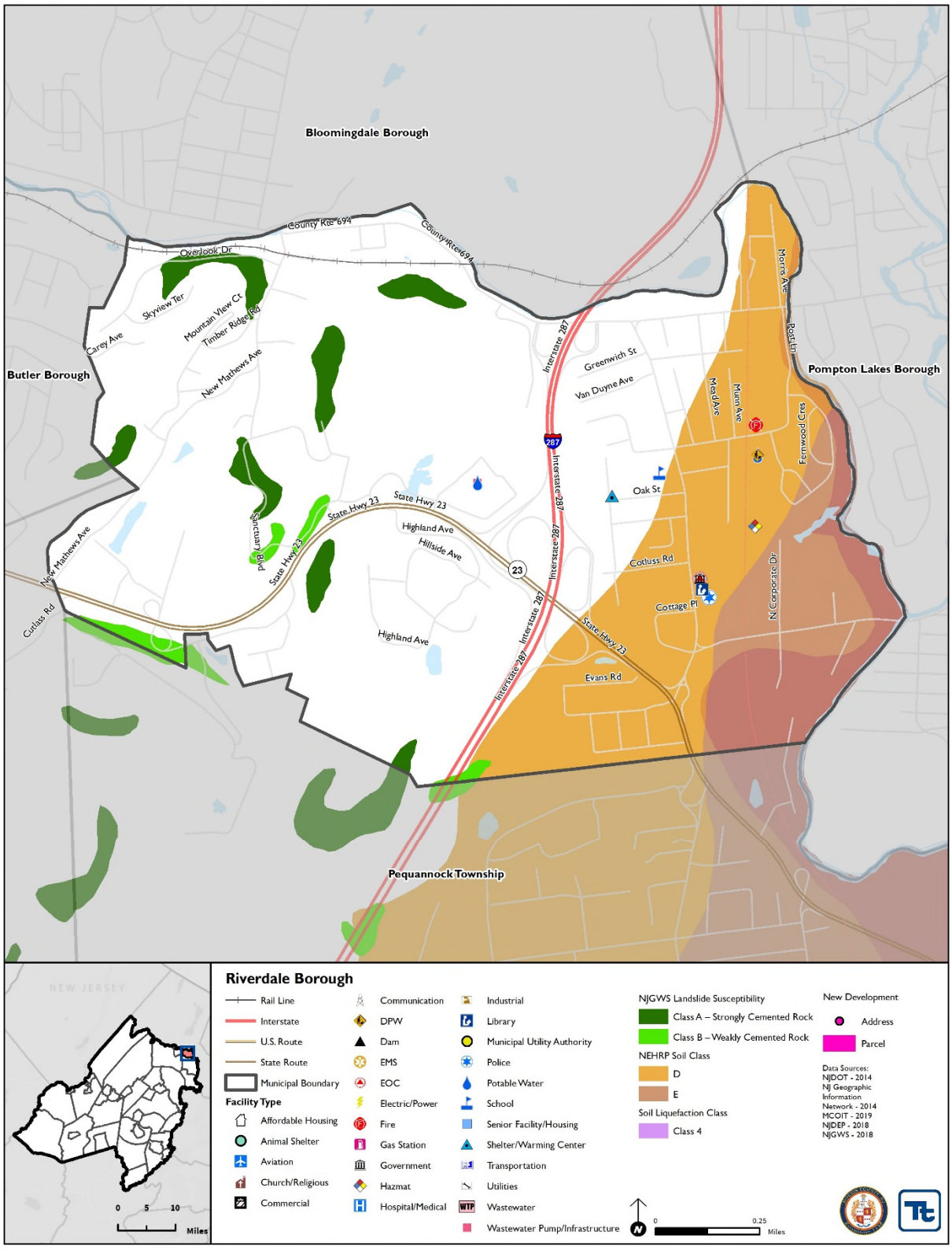


Figure 9.34-2. Borough of Riverdale Hazard Area Extent and Location Map 2



Action Worksheet			
Project Name:	Flood Gate on Riverdale Road		
Project Number:	2020-Borough of Riverdale-001		
Risk / Vulnerability			
Hazard(s) of Concern:	Flood, Severe Storm		
Description of the Problem:	Riverdale Road becomes impassable during major storms and flooding events. Closure of the roadway requires police staff to be posted at the road in order to prevent cars from entering the flooded area. This burdens police resources which are needed elsewhere during hazard events. Riverdale Road is a County Road.		
Action or Project Intended for Implementation			
Description of the Solution:	The Borough will work with the County to place a road closure gate that can be closed by police during times of flooding and opened when no flooding is occurring to reduce staffing needs.		
Is this project related to a Critical Facility or Lifeline?	Yes ☐	No ☒	
Level of Protection:	N/A	**Estimated Benefits (losses avoided):**	Reduction in staffing and equipment needs during flood events. Protects cars and people from flood risk.
Useful Life:	25 years	**Goals Met:**	3
Estimated Cost:	$2,000	**Mitigation Action Type:**	Structure and Infrastructure Project
Plan for Implementation			
Prioritization:	High	**Desired Timeframe for Implementation:**	Within 6 months
Estimated Time Required for Project Implementation:	1 week	**Potential Funding Sources:**	HMGP
Responsible Organization:	County, Office of Emergency Management	**Local Planning Mechanisms to be Used in Implementation if any:**	Emergency Management Planning

Three Alternatives Considered (including No Action)			
Alternatives:	**Action**	**Estimated Cost**	**Evaluation**
	No Action	$0	Current problem continues
	Establish volunteer staffing for flooded roads	$0	Puts volunteers at potential risk, still requires police to provide equipment
	Relocate roadway out of flood prone area	N/A	Relocation of the roadway is not possible

Progress Report (for plan maintenance)	
Date of Status Report:	
Report of Progress:	
Update Evaluation of the Problem and/or Solution:	

Action Worksheet		
Project Name:	Flood Gate on Riverdale Road	
Project Number:	2020-Borough of Riverdale-001	
Criteria	**Numeric Rank (-1, 0, 1)**	**Provide brief rationale for numeric rank when appropriate**
Life Safety	1	Protects lives from flood risk on flooded roadways
Property Protection	1	Protects cars from flood damage
Cost-Effectiveness	1	Reduces staffing costs
Technical	1	
Political	0	
Legal	0	Riverdale Road is a County road and requires their cooperation
Fiscal	0	Project requires funding support
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	Flood, Severe Storm
Timeline	1	Within 6 months
Agency Champion	1	OEM
Other Community Objectives	1	Improves emergency response
Total	10	
Priority (High/Med/Low)	High	

Action Worksheet

Project Name:	Mitigate flood-prone properties, including RL/SRL properties		
Project Number:	2020-Borough of Riverdale-002		
Risk / Vulnerability			
Hazard(s) of Concern:	Flood, Severe Storm		
Description of the Problem:	Frequent flooding events have resulted in damages, resulting in 20 repetitive loss properties. The floodprone areas such as Harrison Street, Williams Street, and Hamburg Turnpike are residential, and these properties have been repetitively flooded as documented by paid NFIP claims.		
Action or Project Intended for Implementation			
Description of the Solution:	Conduct outreach to 30 flood-prone property owners, including RL/SRL property owners and provide information on mitigation alternatives. After preferred mitigation measures are identified, collect required property-owner information and develop a FEMA grant application and BCA to obtain funding to implement acquisition/purchase/moving/elevating residential homes in the floodprone areas that experience frequent flooding (high risk areas).		
Is this project related to a Critical Facility or Lifeline?	Yes ☐	No ☒	
Level of Protection:	1% annual chance flood event + freeboard *(in accordance with flood ordinance)*	**Estimated Benefits (losses avoided):**	Eliminates flood damage to homes and residents, creates open space for the municipality increasing flood storage.
Useful Life:	Acquisition: Lifetime Elevation: 30 years (residential)	**Goals Met:**	3
Estimated Cost:	$3Million	**Mitigation Action Type:**	Structure and Infrastructure Project
Plan for Implementation			
Prioritization:	High	**Desired Timeframe for Implementation:**	6-12 months
Estimated Time Required for Project Implementation:	Three years	**Potential Funding Sources:**	FEMA HMGP and FMA, local cost share by residents
Responsible Organization:	NFIP Floodplain Administrator, supported by homeowners	**Local Planning Mechanisms to be Used in Implementation if any:**	Hazard Mitigation

Three Alternatives Considered (including No Action)

Alternatives:	**Action**	**Estimated Cost**	**Evaluation**
	No Action	$0	Current problem continues
	Elevate homes	$500,000	When this area floods, the entire area is impacted; elevating homes would not eliminate the problem and still lead to road closures and impassable roads
	Elevate roads	$500,000	Elevated roadways would not protect the homes from flood damages

Progress Report (for plan maintenance)	
Date of Status Report:	
Report of Progress:	
Update Evaluation of the Problem and/or Solution:	

Action Worksheet

Project Name:	Mitigate flood-prone properties, including RL/SRL properties	
Project Number:	2020-Borough of Riverdale-002	
Criteria	**Numeric Rank (-1, 0, 1)**	**Provide brief rationale for numeric rank when appropriate**
Life Safety	1	Families moved out of high-risk flood areas.
Property Protection	1	Properties removed from high-risk flood areas.
Cost-Effectiveness	1	Cost-effective project
Technical	1	Technically feasible project
Political	1	
Legal	1	The Borough has the legal authority to conduct the project.
Fiscal	0	Project will require grant funding.
Environmental	1	
Social	0	Project would remove families from floodprone areas of the Borough
Administrative	0	
Multi-Hazard	1	Flood, Severe Storm
Timeline	0	
Agency Champion	1	NFIP Floodplain Administrator, supported by homeowners
Other Community Objectives	1	
Total	10	
Priority (High/Med/Low)	High	

Action Worksheet	
Project Name:	Flood Gate on Hamburg Turnpike

Project Number:	2020-Borough of Riverdale-003		
Risk / Vulnerability			
Hazard(s) of Concern:	Flood, Severe Storm		
Description of the Problem:	Hamburg Turnpike becomes impassable during major storms and flooding events. Closure of the roadway requires police staff to be posted at the road in order to prevent cars from entering the flooded area. This burdens police resources which are needed elsewhere during hazard events. Hamburg Turnpike is a County Road.		
Action or Project Intended for Implementation			
Description of the Solution:	The Borough will work with the County to place a road closure gate that can be closed by police during times of flooding and opened when no flooding is occurring to reduce staffing needs.		
Is this project related to a Critical Facility or Lifeline?	Yes ☐	No ☒	
Level of Protection:	N/A	**Estimated Benefits (losses avoided):**	Reduction in staffing and equipment needs during flood events. Protects cars and people from flood risk.
Useful Life:	25 years	**Goals Met:**	3
Estimated Cost:	$2,000	**Mitigation Action Type:**	Structure and Infrastructure Project
Plan for Implementation			
Prioritization:	High	**Desired Timeframe for Implementation:**	Within 6 months
Estimated Time Required for Project Implementation:	1 week	**Potential Funding Sources:**	HMGP
Responsible Organization:	County, Office of Emergency Management	**Local Planning Mechanisms to be Used in Implementation if any:**	Emergency Management Planning

Three Alternatives Considered (including No Action)

Alternatives:	**Action**	**Estimated Cost**	**Evaluation**
	No Action	$0	Current problem continues
	Establish volunteer staffing for flooded roads	$0	Puts volunteers at potential risk, still requires police to provide equipment
	Relocate roadway out of flood prone area	N/A	Relocation of the roadway is not possible

Progress Report (for plan maintenance)	
Date of Status Report:	
Report of Progress:	
Update Evaluation of the Problem and/or Solution:	

Action Worksheet	
Project Name:	Flood Gate on Hamburg Turnpike

Project Number:	2020-Borough of Riverdale-003	
Criteria	**Numeric Rank (-1, 0, 1)**	**Provide brief rationale for numeric rank when appropriate**
Life Safety	1	Protects lives from flood risk on flooded roadways
Property Protection	1	Protects cars from flood damage
Cost-Effectiveness	1	Reduces staffing costs
Technical	1	
Political	0	
Legal	0	Riverdale Road is a County road and requires their cooperation
Fiscal	0	Project requires funding support
Environmental	0	
Social	1	
Administrative	1	
Multi-Hazard	1	Flood, Severe Storm
Timeline	1	Within 6 months
Agency Champion	1	OEM
Other Community Objectives	1	Improves emergency response
Total	10	
Priority (High/Med/Low)	High	

Action Worksheet	
Project Name:	Electronic Message Boards
Project Number:	2020-Borough of Riverdale-004

Risk / Vulnerability			
Hazard(s) of Concern:	All Hazards		
Description of the Problem:	Traffic from Interstate 288 and Route 23 causes major traffic delays when flood prone roadways flood. There is currently no way to notify motorists of flooded roads or other hazard events.		
Action or Project Intended for Implementation			
Description of the Solution:	Purchase and install four permanent electronic message boards to be posted on roadways. Signs should be able to be controlled from the EOC. Utilize signs to limit traffic from exiting the interstate and highway. The signs could be utilized for outreach when not in use.		
Is this project related to a Critical Facility or Lifeline?	Yes ☐	No ☒	
Level of Protection:	N/A	**Estimated Benefits (losses avoided):**	Reduction in risk to motorists.
Useful Life:	20 years	**Goals Met:**	1
Estimated Cost:	$50,000	**Mitigation Action Type:**	Structure and Infrastructure Project, Education and Awareness Program
Plan for Implementation			
Prioritization:	High	**Desired Timeframe for Implementation:**	Within 1 year
Estimated Time Required for Project Implementation:	6 months	**Potential Funding Sources:**	HMGP, FMA, BRIC
Responsible Organization:	Office of Emergency Management	**Local Planning Mechanisms to be Used in Implementation if any:**	Hazard mitigation planning, emergency operations planning

Three Alternatives Considered (including No Action)			
Alternatives:	**Action**	**Estimated Cost**	**Evaluation**
	No Action	$0	Current problem continues
	Use police on roadways	Staff time	Burden on staff and resources during hazard events.
	Encourage use of social media to stay updated	$0	Motorists would have to log on while driving, leading to unsafe and illegal driving practices

Progress Report (for plan maintenance)	
Date of Status Report:	
Report of Progress:	
Update Evaluation of the Problem and/or Solution:	

Action Worksheet	
Project Name:	Electronic Message Boards
Project Number:	2020-Borough of Riverdale-004

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protects automobiles and their drivers
Property Protection	1	Protects automobiles and their drivers
Cost-Effectiveness	1	
Technical	1	
Political	1	
Legal	1	The Borough has the legal authority to complete the project
Fiscal	0	Project requires funding support
Environmental	1	
Social	1	Signs could also be used for outreach
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	6 months
Agency Champion	1	OEM
Other Community Objectives	1	
Total	13	
Priority (High/Med/Low)	High	

Action Worksheet	
Project Name:	Backup power for traffic lights
Project Number:	2020-Borough of Riverdale-005
Risk / Vulnerability	

Hazard(s) of Concern:	All hazards		
Description of the Problem:	Loss of power to traffic lights of exits from Interstate 287 and 23 causes dangerous traffic throughout the Borough on various roadways. During certain hazard events, this congestion causes increased safety concern and keeps motorist exposed to dangerous conditions longer.		
Action or Project Intended for Implementation			
Description of the Solution:	Install battery backup on vital traffic signals in the Borough, specifically those that exist on exits from Interstate 287 and 23.		
Is this project related to a Critical Facility or Lifeline?	Yes ☐	No ☒	
Level of Protection:	Loss of power prevented	**Estimated Benefits (losses avoided):**	Traffic kept flowing during power outages
Useful Life:	25 years	**Goals Met:**	3
Estimated Cost:	$4,000 per battery backup system	**Mitigation Action Type:**	Structure and Infrastructure Project
Plan for Implementation			
Prioritization:	High	**Desired Timeframe for Implementation:**	Within 6 months
Estimated Time Required for Project Implementation:	1 week per light	**Potential Funding Sources:**	HMGP, BRIC
Responsible Organization:	OEM	**Local Planning Mechanisms to be Used in Implementation if any:**	Hazard Mitigation, Emergency Operations
Three Alternatives Considered (including No Action)			
Alternatives:	**Action**	**Estimated Cost**	**Evaluation**
	No Action	$0	Current problem continues
	Close exits during flooding and other events	N/A	Exits cannot be closed
	Position police at each exit	Staff time for police	Limited police resources
Progress Report (for plan maintenance)			
Date of Status Report:			
Report of Progress:			
Update Evaluation of the Problem and/or Solution:			

Action Worksheet	
Project Name:	Backup power for traffic lights
Project Number:	2020-Borough of Riverdale-005

Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	Protects motorists and reduces traffic to allow residents to return home quickly during hazard events
Property Protection	0	
Cost-Effectiveness	1	
Technical	1	This method has been used in other regional towns
Political	1	There is public support for the project
Legal	1	
Fiscal	0	Project requires funding support
Environmental	1	
Social	1	Protects traffic flow
Administrative	1	
Multi-Hazard	1	All hazards
Timeline	1	Within 6 months
Agency Champion	1	Office of Emergency Management
Other Community Objectives	1	
Total	12	
Priority (High/Med/Low)	High	