



9.11 TOWNSHIP OF LIVINGSTON

This section presents the jurisdictional annex for the Township of Livingston. The annex includes a general overview of the Township; an assessment of the Township’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 hazards.

9.11.1 Hazard Mitigation Planning Team

The following individuals are the Township of Livingston’s identified HMP update primary and alternate points of contact and NFIP Floodplain Administrator.

Table 9.11-1. Hazard Mitigation Planning Team

Primary Point of Contact	Alternate Point of Contact
Name / Title: Christopher C. Mullin / Fire Chief, Fire Official, OEM Coordinator Address: Livingston Town Hall, 375 Livingston Avenue, Livingston, NJ 07039 Phone Number: 973-992-2373 Email: cmullin@livingstonnj.org	Name / Title: Rossana Mattia / Administrative assistant to the Fire Chief Address: Livingston Town Hall, 375 Livingston Avenue, Livingston, NJ 07039 Phone Number: 973-992-2373 Email: rmattia@livingstonnj.org
NFIP Floodplain Administrator	
Name / Title: Jeannette Harduby, CFM / Township Engineer, Engineering Department Address: Livingston Town Hall, 375 Livingston Avenue, Livingston, NJ 07039 Phone Number: 973-535-7949 Email: jharduby@livingstonnj.org	

9.11.2 Jurisdiction Profile

Livingston Township is located 21.9 miles west of New York City, providing easy commuting access for residents through public transportation or personal vehicle (Township of Livingston, 2014). The land area of Livingston Township encompasses 14.08 square miles with 13.77 square miles being land and 0.31 square miles being water. To the west is Florham Park, to the south is Short Hills, to the east is South and West Orange, and to the north is Roseland.

Livingston Township is named for the first Governor of New Jersey, William Livingston, who had an integral role in the formation of the United States Constitution. Seven Hamlets, Teedtown, Northfield, Morehousetown, Cheapside, Washington Place, and Squiretown, resided in the area prior to coming together to create Livingston Township (Township of Livingston, 2014). The Council-Manager form of government was started in Livingston Township in 1957. The Town Council consists of five Livingston residents. From the members of the town council, the Mayor is chosen (Township of Livingston, 2014).

According to the U.S. Census, the 2010 population for the Township of Livingston was 29,366. The estimated 2017 population was 29,955, a 2.0 percent decrease from the 2010 Census. Data from the 2017 U.S. Census American Community Survey indicate that 4.6 percent of the population is 5 years of age or younger and 18.6 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.



9.11.3 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 9.11-2 summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development. Figure 9.11-1 and 9.11-2 at the end of this annex illustrate the geographically-delineated hazard areas and the location of potential new development, where available.

Table 9.11-2. Recent and Expected Future Development

Type of Development	2015	2016	2017	2018	2019
Number of Building Permits for New Construction Issued Since the Previous HMP					
Single Family	31	42	23	Unknown	Unknown
Multi-Family	120	344	0	Unknown	Unknown
Other (commercial, mixed-use, etc.)	-	-	-	-	-
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					
New multi-family building	Residential	1 building/ 12 units	660 S. Orange Avenue	None	Completed
Post Acute Care Facility	Medical	1 building	348 E. Cedar Street	None	74 beds - Completed
Assisted Living Facility	Senior	1 building/ 124 units	346 E. Cedar Street	None	Under construction
Squiretown	Residential	5 buildings/ 220 units	Briggs Circle	None	Completed
Brandywine Senior Living	Senior	1 building/ 120 units	369 E. Mt. Pleasant Ave	None	Completed
Hillside-Northfield Partners	Residential	4 buildings/ 80 units	Murray Court	None	Completed
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years					
Sunrise Development	Assisted Living/Senior Living	105	Block 6300, Lot 30	None	Planning Board
A&M Properties	Multi-Family Housing	120	Block 107, Lot 8.01	None	Conceptual Development
Coddington Community	Family Housing	56	Block 6101, Lot 25, 26, 27, 28	None	Conceptual Development
Livingston Corporate Park	Townhomes	162	Block 6101, Lot 45	None	Conceptual Development
Mt. Pleasant Senior Development	Assisted Living/Senior Living	250-260	Block 2100, Lot 39.02, 41	None	Conceptual Development
Golan Development	Apartments	13	Block 2700, Lot 52	None	Conceptual Development
Mungiello/Bruno Project	Multi-Family Housing	26	Block 2700, Lot 9, 62	None	Conceptual Development

* Only location-specific hazard zones or vulnerabilities identified.



9.11.4 Capability Assessment

The Township of Livingston 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 Township of Livingston.

Table 9.11-3. Planning, Legal and Regulatory Capability

	Do you have this? (Yes/No)	Is this applicable Countywide or for a specific jurisdiction? If jurisdiction specify which one	Local Authority	Other Jurisdiction Authority and specify (e.g., District, State, Federal)	State Mandated	Has this been integrated? 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	Township of Livingston	Building Department	State	Yes	No	No
<i>Comment: Uniform Construction Codes, Chapter 110, 2010. State mandated on local level under NJAC 5:23-3.14. International Building Code – New Jersey Edition, 2018, NJAC 5:24-3.14 Adopted 9/3/2019 .</i>							
Zoning Code	Yes	Township of Livingston	Planning, Building & Zoning	No	Yes	Yes	N/A
<i>Comment: Land Use, Chapter 170, Adopted 2004. Updated regularly. The Planning and Zoning Board review reviews development applications to ensure growth is out of the floodplain. Lot surface drainage if increasing impervious coverage to restrict downstream impacts through BMPs.</i>							
Subdivisions	Yes	Township of Livingston	Planning, Building & Zoning	No	Yes	No	No
<i>Comment: Land Use, Chapter 170, Article IX, Subdivision Review, Site Plan Review and Site Improvements. The Livingston Building Inspector inspects all permits. P.L.1975, c.291 (C.40:55D-47): 40:55D-37. Grant of power; referral of proposed ordinance; county planning board approval. Dictated by the Municipal Land Use Law. NJ Statute 40:27-6.2The board of freeholders of any county having a county planning board shall provide for the review of all subdivisions of land within the county by said county planning board and for the approval of those subdivisions affecting county road or drainage facilities as set forth and limited hereinafter in this section.</i>							
Stormwater Management	Yes	Township of Livingston	Engineering	NJDEP	Yes	No	No
<i>Comment: Land Use, Chapter 170, Article XIII, Stormwater Management Plans.</i>							
Post-Disaster Recovery	No	-	-	-	No	-	-



	Do you have this? (Yes/No)	Is this applicable Countywide or for a specific jurisdiction? If jurisdiction specify which one	Local Authority	Other Jurisdiction Authority and specify (e.g., District, State, Federal)	State Mandated	Has this been integrated? If yes- how?	
						If yes-how? Describe in comments	If no - can it be a mitigation action? If yes, add Mitigation Action #.
Comment:							
Real Estate Disclosure	No	-	-	-	No	-	-
Comment:							
Growth Management	Yes	Township of Livingston	Planning, Building & Zoning	No	Yes	Yes	N/A
Comment: See Zoning Ordinance.							
Shoreline Development	No	-	-	-	No	-	-
Comment:							
Site Plan Review	Yes	Township of Livingston	Planning, Building & Zoning	No	Yes	Yes	N/A
Comment: Land Use, Chapter 170, Article IX, Subdivision Review, Site Plan Review and Site Improvements. Upon receipt of an application, the Planning Director shall forward the same to either the Planning Board or Board of Adjustment, depending upon who has jurisdiction. If the Planning Board has jurisdiction, the Planning Director shall forward a copy to each of the following for report and recommendation: (1) The Township Engineer. (2) The Environmental Commission, when an environmental impact statement is required. (3) Such other Township, county, state and federal officials and agencies as determined by the Planning Director.							
Environmental Protection	No	-	-	-	No	-	-
Comment:							
Flood Damage Prevention	Yes	Township of Livingston	Engineering	No	No	No	No
Comment: Land Use, Chapter 170, Article X Flood Hazard Areas, [Amended by Ord. No. 22-19939; Ord. No. 8-2001; Ord. No. 22-2001; 4-9-2007 by Ord. No. 9-2007]. The Legislature of the State of New Jersey has in N.J.S.A. 40:48-1 et seq., delegated the responsibility to local governmental units to adopt regulations designed to promote public health, safety and general welfare of its citizenry.							
Wellhead Protection	No	-	-	-	No	-	-
Comment:							
Emergency Management	No	-	-	-	No	-	-
Comment:							
Climate Change	No	-	-	-	No	-	-
Comment:							
Disaster Recovery Ordinance	No	-	-	-	No	-	-
Comment:							
Disaster Reconstruction Ordinance	No	-	-	-	No	-	-
Comment:							
Other: Open Space	Yes	Township of Livingston	Planning & Engineering	No	No	No	No
Comment: Land Use, Chapter 170, Article XX, Open Space. [Added 9-18-2006 by Ord. No. 37-2006]. Restricts development in open space districts.							



	Do you have this? (Yes/No)	Is this applicable Countywide or for a specific jurisdiction? If jurisdiction specify which one	Local Authority	Other Jurisdiction Authority and specify (e.g., District, State, Federal)	State Mandated	Has this been integrated? If yes- how?	
						If yes- how? Describe in comments	If no - can it be a mitigation action? If yes, add Mitigation Action #.
Other: Steep Slopes	Yes	Township of Livingston	Planning & Engineering	No	No	No	No
<i>Comment: Land Use, Chapter 170, Article XXIV, Steep Slopes, Added 9-8-2009 by Ord. No. 24-2009. Area 1: 0-14.9% unregulated, Area 2: 15-24.9% precautionary, Area 3: 25% or greater prohibitory and integrated in the 2018 Stormwater Management Plan. The purpose of this ordinance is to regulate the intensity of use in areas of steeply sloping terrain in order to limit soil loss, erosion, excessive stormwater runoff, the degradation of surface water and to maintain the natural topography and drainage patterns of land.</i>							
Other: Riparian Zones	Yes	Township of Livingston	Planning & Engineering	No	No	No	No
<i>Comment: Land Use, Chapter 170, Article XXV, Riparian Zones, Added 4-11-2011 by Ord. No. 8-2011</i>							
Other: Property Easement/Sump Pump Ordinance, Sidewalk Permit, Lot Surface Drainage Permit, Road Opening Permit, Soil Removal Permit, Tree Removal Permit	Yes	Township of Livingston	Planning & Engineering	No	No	No	No
<i>Comment: Required as part of Chapter 170. Ordinance 33-2011. Referenced on website https://www.livingstonnj.org/508/Permitting</i>							
Planning Documents							
Master Plan	Y	Township of Livingston	Planning	No	Yes	No	Yes
<i>Comment: Livingston Master Plan (Adopted April 2018). The plan has a section Compatibility with "Plans other than Township Plan" that could add a section that indicates compatibility with the County Hazard Mitigation Plan.</i>							
Capital Improvement Plan	Yes	Township of Livingston	CFO	No	No	No	No
<i>Comment: Updated annually by the CFO.</i>							
Disaster Debris Management Plan	No	-	-	-	No	-	-
<i>Comment:</i>							
Floodplain or Watershed Plan	No	-	-	-	No	-	-
<i>Comment:</i>							
Stormwater Management Plan	Yes	Township of Livingston	Engineering	State	Yes	No	No
<i>Comment: Provided in the Master Plan Section XIII - Stormwater Management Plan. An updated version provided on township's engineering website https://www.livingstonnj.org/1149/Stormwater-Management. Updated 2019 with 2018 Tier A permit, Steep Slopes Ordinance, and maps.</i>							
Stormwater Pollution Prevention Plan	Yes	Township of Livingston	Engineering	State	Yes	No	No
<i>Comment: Draft December 18, 2018 from township's engineering website https://www.livingstonnj.org/1149/Stormwater-Management.</i>							
Urban Water Management Plan	No	-	-	-	-	-	-
<i>Comment:</i>							



	Do you have this? (Yes/No)	Is this applicable Countywide or for a specific jurisdiction? If jurisdiction specify which one	Local Authority	Other Jurisdiction Authority and specify (e.g., District, State, Federal)	State Mandated	Has this been integrated? If yes- how?	
						If yes- how? Describe in comments	If no - can it be a mitigation action? If yes, add Mitigation Action #.
Habitat Conservation Plan	No	-	-	-	-	-	-
<i>Comment:</i>							
Economic Development Plan	No	-	-	-	-	-	-
<i>Comment:</i>							
Shoreline Management Plan	No	-	-	-	-	-	-
<i>Comment:</i>							
Community Wildfire Protection Plan	No	-	-	-	-	-	-
<i>Comment:</i>							
Community Forestry Management Plan	Yes	Township of Livingston	Public works	No	No	No	No
<i>Comment: Plan not available electronically.</i>							
Transportation Plan	Yes	Township of Livingston	DPW, Engineering	No	No	No	No
<i>Comment: Master plan has Section V Circulation Plan.</i>							
Agriculture Plan	No	-	-	-	-	-	-
<i>Comment:</i>							
Climate Action Plan	No	-	-	-	-	-	-
<i>Comment:</i>							
Tourism Plan	No	-	-	-	-	-	-
<i>Comment:</i>							
Business Development Plan	No	-	-	-	-	-	-
<i>Comment:</i>							
Other: Open Space Plan	Yes	Township of Livingston	Engineering	No	No	No	No
<i>Comment: Master plan has Section VIII - Recreation & Parks Plan.</i>							
Response/Recovery Planning							
Comprehensive Emergency Management Plan	Yes	Township of Livingston	Local Emergency Management Coordinator	County, State	Yes	Yes/No	Yes/No
<i>Comment: Copy at the fire station</i>							
Threat & Hazard Identification & Risk Assessment (THIRA)	No	-	-	-	-	-	-
<i>Comment:</i>							
Post-Disaster Recovery Plan	No	-	-	-	-	-	-



	Do you have this? (Yes/No)	Is this applicable Countywide or for a specific jurisdiction? If jurisdiction specify which one	Local Authority	Other Jurisdiction Authority and specify (e.g., District, State, Federal)	State Mandated	Has this been integrated? If yes- how?	
						If yes-how? Describe in comments	If no - can it be a mitigation action? If yes, add Mitigation Action #.
Comment:							
Continuity of Operations Plan	Yes	Township of Livingston	Local Emergency Management Coordinator, Police, Health Officer, DPW	No	No	Yes/No	Yes/No
Comment: Element of the CEMP							
Public Health Plan	Yes	Township of Livingston	Health Officer	No	No	Yes/No	Yes/No
Comment: Annex of CEMP.							
Other: Website information	Yes	Township of Livingston	Local Emergency Management Coordinator, Police, Health Officer, DPW	County, State	No	Yes/No	Yes/No
Comment: Website available at https://www.livingstonnj.org/212/Emergency-Management							

Table 9.11-4. Development and Permitting Capability

Criterion	Response
Does your jurisdiction issue development permits?	Yes
- If no, who does? If yes, which department?	Building
Does your jurisdiction have the ability to track permits by hazard area?	No
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 Town is fully built out; inventory as part of COAH obligation

ADMINISTRATIVE AND TECHNICAL CAPABILITY

The table below summarizes potential staff and personnel resources available to the Township of Livingston.

Table 9.11-5. Administrative and Technical Capabilities

Staff/Personnel Resource	Available?	Department/Agency/Position
Administrative Capability		
Planning Board	Yes	Planning and Engineering
Mitigation Planning Committee	No	-
Environmental Board / Commission	Yes	Environmental Commission
Open Space Board / Committee	Yes	Open Space Trust Committee



Staff/Personnel Resource	Available?	Department/Agency/Position
Economic Development Commission / Committee	No	-
Warning Systems / Services (reverse 911, outdoor warning signals)	Yes	SwiftReach
Maintenance program to reduce risk	Yes	DPW tree trimming, storm drain clearing
Mutual aid agreements	Yes	Fire - Formalized county aid, State e team
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	Yes	Engineering
Engineers or professionals trained in building or infrastructure construction practices	Yes	Engineering, Building
Planners or engineers with an understanding of natural hazards	Yes	Planning and Engineering
Staff with training in benefit/cost analysis	No	-
Staff with training in green infrastructure	Yes	Engineering
Staff with education/knowledge/training in low impact development	Yes	Engineering
Surveyors	No	-
Personnel skilled or trained in GIS applications	Yes	Planning and Engineering
Stormwater Engineer	Yes	Engineering
Scientist familiar with natural hazards in local area	No	-
Emergency manager	Yes	Emergency Management Coordinator
Watershed Planner	No	
Environmental Specialist	No	
Grant writers	Yes	All department heads submit grant applications
Resilience Officer	No	-
Other	No	-

FISCAL CAPABILITY

The table below summarizes financial resources available to the Township of Livingston.

Table 9.11-6. Fiscal Capabilities

Financial Resource	Accessible or Eligible to Use?
Community Development Block Grants (CDBG, CDBG-DR)	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	No
User Fees for Water, Sewer, Gas or Electric Service	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
State-Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes
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 Township of Livingston.

Table 9.11-7. Education and Outreach Capabilities

Criterion	Response
Do you have a public information officer or communications office?	Yes
Do you have personnel skilled or trained in website development?	Yes
Do you have hazard mitigation information available on your website?	Yes
• If yes, briefly describe.	Swift reach and specific website
Do you use social media for hazard mitigation education and outreach?	Yes
• If yes, briefly describe.	Facebook, twitter
Do you have any citizen boards or commissions that address issues related to hazard mitigation?	Yes
• If yes, briefly describe.	Environmental Commission
Do you have any other programs already in place that could be used to communicate hazard-related information?	Yes
• If yes, briefly describe.	Swiftreach
Do you have any established warning systems for hazard events?	Yes
• If yes, briefly describe.	Swiftreach, TV 34

COMMUNITY CLASSIFICATIONS

The table below summarizes the classifications for community programs available to the Township of Livingston.

Table 9.11-8. Community Classifications

Program	Participating?	Classification	Date Classified
Community Rating System	No	-	-
Building Code Effectiveness Grading Schedule (BCEGS)	No	-	-
Public Protection (Fire ISO Protection Class)	Yes	3	4/1/1997
Storm Ready Certification	No	-	-
Firewise Community Classification	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.



The municipality have access to resources to determine the possible impacts of climate change upon the municipality. The administration is supportive of integrating climate change in policies or actions. Climate change already being integrated into current policies/plans or actions (projects/monitoring) within the municipality.

Table 9.11-9. Adaptive Capacity of Climate Change

Hazard	Adaptive Capacity (Capabilities) - High/Medium/Low
Coastal Storms	Medium
Dam Failure	Low
Drought	High
Earthquake	Low
Extreme Temperature	High
Flood	Medium
Geological Hazards	Medium
Severe Weather	Medium
Severe Winter Weather	High
Wildfire	High
Civil Disorder	High
Cyber Attack	Medium
Disease Outbreak	Medium
Economic Collapse	Medium
Hazardous Substances	Medium
Utility Interruption	High
Terrorism	Medium
Transportation Failure	Medium

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 9.11-10. National Flood Insurance Program Compliance

Criterion	Response
What local department is responsible for floodplain management?	Engineering Department
Who is your floodplain administrator? (department/position)	Township Engineer, Engineering Department
Are any certified floodplain managers on staff in your jurisdiction?	Yes. Township Engineer
What is the date that your flood damage prevention ordinance was last amended?	2007
Does your floodplain management program meet or exceed minimum requirements?	Meets
· If exceeds, in what ways?	N/A
When was the most recent Community Assistance Visit or Community Assistance Contact?	CAC: 10/15/1993, CAV: 06/29/1993
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed?	No
· If so, state what they are.	N/A



Criterion	Response
Are any RiskMAP projects currently underway in your jurisdiction?	Yes
· If so, state what they are.	N/A
Do your flood hazard maps adequately address the flood risk within your jurisdiction?	No
· If no, state why.	N/A
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?	N/A
Does your jurisdiction participate in the Community Rating System (CRS)?	No
· If yes, is your jurisdiction interested in improving its CRS Classification?	N/A
· If no, is your jurisdiction interested in joining the CRS program?	Yes
How many flood insurance policies are in force in your jurisdiction?*	243
· What is the insurance in force?	\$80,605,400
· What is the premium in force?	\$307,341
How many total loss claims have been filed in your jurisdiction?*	243
· How many claims are still open or were closed without payment?	83
· What were the total payments for losses?	\$1,217,213.20
Do you maintain a list of properties that have been damaged by flooding?	No
Do you maintain a list of property owners interested in flood mitigation?	No

*Policies and Claims from <https://bsa.nfipstat.fema.gov/reports/1011.htm> and <https://bsa.nfipstat.fema.gov/reports/1040.htm> as of 09/30/2018.

ADDITIONAL AREAS OF EXISTING INTEGRATION

In the performance period since adoption of the 2015 HMP, the Township of Livingston made progress on integrating hazard mitigation into other initiatives. The following plans and programs currently integrate components of the HMP and strategy:

- The Township enacted the following ordinances and permit programs to limit stormwater quantities and protect water quality:
 - Riparian Zone Ordinance
 - Steep Slopes Ordinance
 - Open Space Ordinance
 - Property Easement/Sump Pump Ordinance
 - Sidewalk Permit
 - Lot Surface Drainage Permit
 - Road Opening Permit
 - Soil Removal Permit
- The Township of Livingston participated in the Sustainable Jersey program and achieved Silver certification in November 2013 with 365 points.

9.11.5 Hazard Event History Specific to the Jurisdiction

Essex 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 4.3 (Hazard Profiles) and includes a chronology of events that affected Essex County and its jurisdictions. The Township of Livingston's history of



federally-declared (as presented by FEMA) and significant hazard events (as presented in NOAA-NCEI) is consistent with that of Essex County. Table 9.11-11 provides details regarding municipal-specific loss and damages the Township experienced during hazard events from 2014 to 2019. Information provided in the table below is based on reference material or local sources.

Table 9.11-11. Hazard Event History

Date(s) of Event	Event Type (disaster declaration if applicable)	Essex County Designated?	Summary of Event	Summary of Local Damages and Losses
January 22-23, 2016	Winter Storm, Blizzard DR-4264	Yes	Low pressure moving across the deep South on January 21 and January 22 intensified and moved off the Mid Atlantic coast on January 23, bringing heavy snow and strong winds to northeast New Jersey, and blizzard conditions to the urban corridor and some nearby areas. At Newark Airport, the storm total snowfall was 24.5 inches, where winds gusted to 39 mph.	The township reported unspecified damages.
7/14/16	Thunderstorm Wind	No	A line of strong to severe storms moved across Northeast New Jersey. A large tree snapped and landed on a car on Maple Street just east of West Orange. \$7.5K in property damages were reported. A large tree snapped and fell on a fence between West Orange and Glen Ridge. \$2K in property damages were reported. A tree fell on a car along Branch Brook Drive just west of Belleville. \$6K in property damages were reported.	The township did not report any damages for this event.
3/14/17	Winter Storm	No	Rapidly deepening low pressure tracked up the eastern seaboard on March 14, bringing 8 to 13 inches of heavy snow and sleet, along with strong winds across Northeast New Jersey.	The township did not report any damages for this event.
1/4/18	Winter Storm	No	The low pressure rapidly intensified through January 4, as it moved north-northeast along the coast. The rapid intensification of the storm led to heavy snow, strong winds, and near-blizzard conditions across northeast New Jersey, with 8.4 inches of snow and winds gusts of 44 MPH reported at Newark Liberty Airport.	The township did not report any damages for this event.
3/7/18	Winter Storm	No	A strong low-pressure system tracked along the coast through late March 7 and early morning on March 8 bringing heavy wet snow, strong	The township did not report any damages for this event.



Date(s) of Event	Event Type (disaster declaration if applicable)	Essex County Designated?	Summary of Event	Summary of Local Damages and Losses
			gusty winds, and thundersnow across northeast New Jersey. Snowfall rates ranged from 1 to 3 inches per hour at times, resulting in 1 to 2 feet, which brought down trees and some power lines.	
11/15/18	Winter Storm	No	A wave of low pressure developed along the Middle Atlantic coast November 15. The heavy, wet snow significantly impacted the evening rush hour with 1-2 inch per hour snowfall rates. Hundreds of trees, tree limbs, and branches were brought down by the weight of the snow, causing many power outages. Newark Airport reported 6.4 inches of snow.	The township did not report any damages for this event.
1/30/19	Strong Wind	No	Strong winds occurred behind low pressure and cold front, with 30 mph sustained winds measured at Caldwell Airport.	The township did not report any damages for this event.
3/15/19	Thunderstorm Wind, Hail	No	A cold front moved through the region triggering strong to severe thunderstorms across northeast New Jersey.	The township did not report any damages for this event.

9.11.6 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. The following summarizes the hazards of greatest concern and risk to the Township of Livingston.

According to the preliminary 2014 FEMA Flood Insurance Study (FIS), the Livingston area is subject to frequent rainfalls of great intensity and varying origin. The rainfall may be from local thunderstorms, hurricanes, storms originating over the Atlantic Ocean, or storms coming from the mainland. High intensity, short duration storms tend to cause flooding of the smaller drainage basins of the Township. Lower intensity, longer duration storms are more troublesome to the waterways with larger tributary areas, such as Canoe Brook and the Passaic River (FEMA FIS 2014).

The Township of Livingston is highly developed with buildings and paved areas covering a significant portion of the land area and effectively reducing the amount of land available to absorb precipitation. Throughout most of the Township, the surface soil has a relatively low permeability, although there are a few local deposits of sand and gravel. In general, the slope of the terrain varies from one percent to ten percent throughout most of the Township. The low permeability of the soil, the steep slope of the terrain, and the high degree of development in Livingston all contribute to relatively high amounts of runoff, especially from the high intensity storms experienced on the east coast of the United States. The runoff is carried in open waterways to the Passaic River. The present problems due to storm water runoff are principally related to high velocity flow, channel erosion (particularly in upstream areas), and subsequent depositions of rock and silt in the downstream portions of the brooks (FEMA FIS 2014).



Local flooding in Livingston is generally due to inadequate storm sewers, high-water elevations in the streams to which the storm sewers discharge, or blockages, such as silting of the stream channel at the point of discharge from a storm sewer. In addition to causing silting and blockage of the stream channel, the erosion caused by the high velocities also undermines the embankments of the streams and affects the adjacent land area. This type of damage is caused not only by severe floods but also by the cumulative effects of lesser, but more frequent storms (FEMA FIS 2014).

The downstream portions of Canoe Brook and Slough Brook, as well as the land area bordering the Passaic River, are greatly influenced by high water levels in the Passaic River. A historic flood in Livingston in the Passaic River Basin occurred during October 1903; however, because of the low level of development at that time, damages were not too severe. The storm of October 1903 was centered over Paterson, where a total of 15.5 inches of rainfall was recorded (FEMA FIS 2014).

The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Table 9.11-12 summarizes the risk assessment results used for 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.

REPETITIVE FLOOD LOSSES

The following summarizes the repetitive and severe repetitive flood losses in the Township of Livingston.

- Number of repetitive loss (RL) properties: 11
- Number of severe repetitive loss (SRL) properties: 0
- Number of RL/SRL properties that have been mitigated: 9

Note: RL and SRL as of 03/31/2019



Table 9.11-12. Summary of Risk Assessment Results

Hazard of Concern	Hazard/ Scenario Area Evaluated	Population		Buildings		Economy (Loss)		Certainty Factor
Coastal Erosion and Sea Level Rise	Coastal Erosion: CEHA	CEHA:	0	CEHA:	0	CEHA:	\$0	High
		SLR +1ft:	0	SLR +1ft:	0	SLR +1ft:	\$0	
	Sea Level Rise: NOAA +1ft and +3ft rise	SLR +3ft:	0	SLR +3ft:	0	SLR +3ft:	\$0	
Coastal Storm	100- and 500- MRP Hurricane Wind Category 1 through Category 4 SLOSH	Category 1:	0	Category 1:	0	100-year Wind Loss:	\$3,683,983	High
		Category 2:	0	Category 2:	0			
		Category 3:	0	Category 3:	0	500-year Wind Loss:	\$25,466,370	
		Category 4:	0	Category 4:	0			
Drought	Drought event	Majority of the County is serviced by water supplies who get water from surface water.		Droughts are not expected to cause direct damage to buildings.		Losses would be limited, due to lack of major agricultural industry.		Low
Earthquake	100, 500-, 2,500-Year Mean Return Period Event	NEHRP D&E:	1,022	NEHRP D&E:	310	100-year Loss:	\$0	High
		Liquefaction Class 4:	40	Liquefaction Class 4:	12	500-year Loss:	\$5,568,549	
						2,500-year Loss:	\$92,818,762	
Extreme Temperature	Extreme temperature event (heat or cold)	Over 65 Population:	5,579	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.		Low
		Population Below Poverty Level:	698					
Flood	100- and 500-Year Mean Return Period Event	100-year	617	100-year	206	100-year Loss:	\$195,419,853	High
		500-year	669	500-year	545			
Geological	High Landslide Susceptibility Areas	Class A:	12	Class A:	4	Class A:	2322170.392	Moderate
		Class B:	25	Class B:	9	Class B:	\$7,155,578	
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.		Economic losses could be similar to those of the coastal storm (wind and surge) and flooding hazards.		Low



Hazard of Concern	Hazard/ Scenario Area Evaluated	Population		Buildings		Economy (Loss)		Certainty Factor
Severe Winter Weather	Severe Winter 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.		The cost of snow and ice removal and repair of roads can impact local operating budgets.		Low
Wildfire	Wildfire Fuel Hazard areas (High, Very High, Extreme)	Wildfire:	6	Wildfire:	2	Wildfire:	\$2,526,898	Moderate
Civil Disorder	Civil disorder event	Population in the immediate vicinity will be impacted.		Buildings in the immediate vicinity will be most impacted.		Economic assets in the immediate vicinity will be most impacted.		Low
Cyber Attack	Cyber-attack event	The degree of impact to the population depends on the scale of the incident.		Damages due to a cyber attack may be limited.		The degree of damages depends on the scale of the incident. Loss of utilities/communication would have widespread economic impacts.		Low
Disease Outbreak	One of the following: West Nile Virus, Eastern Equine Encephalitis, St. Louis Encephalitis, La Crosse Encephalitis, Lyme Disease, Influenza, Ebola Virus	Entire population exposed; The degree of impact to the population depends on the scale of the incident		Disease outbreak would not have a direct impact on buildings.		Impacts to food supply and water supply; Costs of activities and programs implemented to address outbreaks and prevent spread.		Low
Economic Collapse	Recessions, Depressions, Interruption of normal economic conditions	The degree of impact to the population depends on the scale of the incident.		Damages due to economic collapse may be limited; property owners that cannot afford to maintain the structure may become abandoned/rundown.		The degree of damages depends on the scale of the incident. Massive impacts due to loss of jobs, businesses, and tax revenue are possible.		Low



Hazard of Concern	Hazard/ Scenario Area Evaluated	Population	Buildings	Economy (Loss)	Certainty Factor
Hazardous Substances	Port Newark is in Essex County (3 rd largest port in the U.S.) Major highways/rail Pipelines 10 NPL Sites in County	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
Utility Interruption	Disruption of power or potable water caused by accident, sabotage, natural hazards, or equipment failure.	The degree of impact to the population depends on the scale of the incident.	The degree of damages to buildings depends on the scale of the incident; Physical impacts to structures may occur if utilities are keeping critical functions online (i.e. sump pumps).	The degree of damages depends on the scale of the incident.	Low
Terrorism	Terrorist Attack	The degree of impact to the population depends on the scale of the incident; Population in the immediate vicinity will be impacted.	The degree of damages to buildings depends on the scale of the incident; Buildings in the immediate vicinity will be most impacted.	The degree of damages depends on the scale of the incident.	Low
Transportation Failure	One accident on any of the following: Roadway/vehicular, Aviation, Rail	The degree of impact to the population depends on the scale of the incident; Population in the immediate vicinity will be impacted.	The degree of damages to asset depends on the scale of the incident; Assets in the immediate vicinity will be most impacted.	The degree of damages depends on the scale of the incident; Assets in the immediate vicinity will be most impacted.	Low



CRITICAL FACILITIES

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

Table 9.11-13. Potential Flood Losses to Critical Facilities

Name	Type	Exposure		Status of Mitigation
		1% Event	0.2% Event	
Atlantic Ambulance Corporation*	EMS	X	X	Do not have the jurisdiction to mitigate
Livingston Township Sewage Treatment Plant*	Wastewater Treatment Plant	-	X	

Source: Essex County, 2019; FEMA 2014/2017/2018; HAZUS-MH v4.2

*Identified lifeline

ADDITIONAL IDENTIFIED VULNERABILITIES

Additionally, the municipality has identified the following hazard problems and/or problem areas during floods and severe storms:

- Dorsa Avenue/Navlon Avenue/Navlon Place – Substantial flooding occurs during major rain events in which the Passaic River overflows its banks and floods the industrial area. This area is generally closed, and the buildings are not accessible by vehicles. This flooding, and the fact that these buildings are not accessible by fire apparatus, increase the possibility of a substantial large-scale fire loss in the industrial section of the Township.
- 235 South Livingston Avenue (Town Garage) – During periods of heavy rain, water from the brook behind the garage overfills its banks and comes into the garage, causing a hazard for equipment and personnel. The Township has lost vehicles and equipment. In an emergency, DPW is sometimes ineffective because they are dealing with an emergency in their own facility.
- Broadlawn Place – During a one inch or greater rain event, the roadway floods to impassable levels because Canoe Brook has a drainage problem in this area. During substantial periods of rain, people from adjoining houses have had to evacuate.
- Royal Avenue – During substantial rain, Royal Avenue floods, making it impassable to traffic and the road has to be closed until the water recedes.
- Falcon Road – During major storm events, Falcon Road between the path and West Oakwood Avenue becomes impassable to traffic.
- Route 10 East/West – In front of Pizzeta, during heavy rains (one inch or greater), it becomes impassable.

HAZARD AREA EXTENT AND LOCATION

Hazard area extent and location maps were generated for the Township of Livingston 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 Township of Livingston has significant exposure; Figure 9.11-1 and Figure 9.11-2. These maps also display the location of the regulatory floodplain, as well as identified critical facilities, lifelines, and RL/SRL properties within the municipality.



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 of the plan. 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 4.4 (Hazard Ranking), each plan participant may have differing degrees of risk exposure and vulnerability compared to Essex 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 hazards for the Township of Livingston. During the review of the calculated hazard ranking, the Township adjusted the calculated rankings to incorporate the perceived adaptive capacity of the community with respect to the relevant hazard and any other changes needed. The Township of Livingston has reviewed the Essex 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 calculated hazard ranking, the Township indicated the following:

- The Township changed the hazard ranking for coastal storm from low to medium.
- The Township changed the hazard ranking for flood from low to medium.
- The Township changed the hazard ranking for severe storm from high to medium.
- The Township changed the hazard ranking for wildfire from low to medium.
- The Township changed the hazard ranking for cyber attack from low to medium.
- The Township changed the hazard ranking for economic collapse from medium to low.
- The Township changed the hazard ranking for hazardous substances from low to medium.
- The Township changed the hazard ranking for terrorism from low to medium.

Table 9.11-14. Township of Livingston Hazard Ranking Input

Coastal Erosion and Sea Level Rise	Coastal Storm	Drought	Earthquake	Extreme Temperature	Flood
Low	Medium	Medium	Low	Medium	Medium

Geological Hazards	Severe Storm	Winter Storm	Wildfire	Civil Disorder	Cyber Attack
Low	Medium	High	Medium	Low	Medium

Disease Outbreak	Economic Collapse	Hazardous Substances	Utility Interruption	Terrorism	Transportation Failure
Low	Low	Medium	High	Medium	Low



9.11.7 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 9.11-15. 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 #
Livingston-1 Provide emergency backup power at critical facility locations to ensure utilities can function during power outages. Facilities identified at this time: 1. Livingston Senior Center 2. Livingston North Hillside water booster station	Township OEM	Complete	No. Emergency Services (ES) received grant for \$222,000 for 2 backup generators from mitigation grant.	-
Livingston-2 Conduct stream cleaning and restoration to reduce flooding and streambank erosion that is impacting property of private residents. Locations include Canoe Brook, Cub Brook and Slough Brook; within the limits of Livingston and the private properties that adjoin them.	Township Engineering	No development	Yes	2020-LIVINGSTON-001
Livingston-3 Relocate DPW garage which repetitively floods causing loss of function and property and vehicle damage.	Township Engineering	In progress	Yes	2020-LIVINGSTON-002
Livingston-4 Evaluate all new development to reduce stormwater runoff with every plan review. Complete a town-wide drainage study that evaluates capacity of all systems to handle today's runoff. This study and plan will identify all localized flooding outside of FEMA designated zones and devise mitigation options to eliminate these hazards.	Township Engineering	In progress.	Yes	2020-LIVINGSTON-003
Livingston-5 Develop and implement an easement and culvert cleaning plan	Township	In progress	Yes	2020-LIVINGSTON-004
Livingston-6 Restore old drainage ways to their original capacity	Township	No progress	Yes	2020-LIVINGSTON-005
Livingston-7 Develop and implement a post-event damage assessment program, including the following elements: • Conduct public outreach/education	Township Engineering, FPA	No progress	Yes	2020-LIVINGSTON-006



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 #
(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).				
Livingston-8 Support participation in the NFIP Community Rating System (CRS) program by attending CRS workshop(s) if offered within the county. Join the CRS program if adequate resources to support long term participation can be dedicated. See following related Community Assistance Visit (CAV) initiative.	FPA	No progress	No	-
Livingston-9 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 (above initiative).	FPA	No progress	No	-
Livingston-10 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).	FPA	Complete	No. Municipal Engineer is a CFM	-
Livingston-11 Enhance/expand tree maintenance program and coordination with utilities (e.g., PSEG).	Township Engineering	In progress	No. PSEG performs maintenance.	-
Livingston-12 Create/Enhance/Maintain Mutual Aid agreements with neighboring communities for continuity of operations	Township	In progress	Yes	2020-LIVINGSTON-007
Livingston-13 Support the mitigation of vulnerable structures via retrofit (e.g. elevation, flood-proofing) or acquisition/relocation to protect	Township, FPA	No progress	No. Not a priority.	-



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 #
structures from future damage, with repetitive loss and severe repetitive loss properties as a priority when applicable.				

In addition to the above progress, the Township of Livingston identified the following mitigation projects/activities that were completed but not identified in the 2015 HMP mitigation strategy:

- Drainage improvements to Hillside Terrace, Zahn Terrace, Charles Street, Grand Terrace – During periods of major storms, this entire area was impassable to traffic and required the roads to be closed. The Township of Livingston made drainage improvements to resolve the flooding.
- Bryant Drive/Madison Court – During major events, these two adjoining roads become dangerous to vehicle traffic and need to be closed down. The Township of Livingston made drainage improvements to resolve the flooding.

PROPOSED HAZARD MITIGATION INITIATIVES FOR THE PLAN UPDATE

The Township of Livingston participated in a risk assessment workshop in September 2019 in which detailed information was provided about assets exposed and vulnerable to the identified hazards of concern. The Township of Livingston participated in a mitigation action workshop in October 2019 and was provided a Mitigation Toolbox that included a mitigation catalog developed specifically for Essex 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 H (Mitigation Strategy Supplement) provide a more complete description of the Mitigation Toolbox and its resources.

Table 9.11-16 summarizes the comprehensive-range of specific mitigation initiatives the Township of Livingston 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 4 FEMA mitigation action categories and the 6 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 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 actions as *High*, *Medium*, or *Low*. The table below summarizes the evaluation of each mitigation initiative, listed by action number.

Table 9.11-17 provides a summary of the prioritization of all proposed mitigation initiatives for this HMP update and Table 9.11-18 summarizes the actions by type across hazards of concern.



Table 9.11-16. Proposed Hazard Mitigation Initiatives

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-LIVINGS TON-001	Conduct stream cleaning and restoration.	Flooding and streambank erosion is impacting property of private residents. Locations include Canoe Brook, Cub Brook and Slough Brook; within the limits of Livingston and the private properties that adjoin them.	Develop plan for stream cleaning and restoration in Canoe Brook, Cub Brook and Slough Brook.	Existing	Flood	1.2, 2.3	<u>Township Engineering</u>	Municipal Budget	High	Low	Short	High	NSP	PR, NR
2020-LIVINGS TON-002	Relocate DPW garage.	DPW garage repetitively floods causing loss of function and property and vehicle damage.	Relocate DPW garage.	Existing	Flood	1.2, 2.2, 6.1	<u>Township Engineering</u>	Municipal Budget	High	High	Medium	High	SIP	PR, PP
2020-LIVINGS TON-003	Evaluate all new development to reduce stormwater runoff with every plan review.	Stormwater runoff from development causes flooding.	Complete a town-wide drainage study that evaluates capacity of all systems to handle today's runoff. This study and plan will identify all	Existing	Flood	1.2, 1.3, 2.3	<u>Township Engineering</u>	Municipal Budget	Medium	High	Medium	High	LPR, NSP	PR, PP, PI



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
			localized flooding outside of FEMA designated zones and devise mitigation options to eliminate these hazards.											
2020-LIVINGS TON-004	Easement and culvert cleaning plan	Culverts become clogged with debris and cannot discharge stormwater effectively.	Develop and implement an easement and culvert cleaning plan	Existing	Flood	1.2, 1.3, 2.3	Township Engineering, DPW	Municipal Budget	Medium	High	Medium	High	LPR, NSP	PR, PP
2020-LIVINGS TON-005	Restore old drainage ways to their original capacity	Culverts become clogged with debris and cannot discharge stormwater effectively.	Restore old drainage ways to their original capacity	New	Flood	1.2, 2.2	Township Engineering	HMGP, PDM, Municipal Budget	High	Medium	Medium	Medium	SIP	PR, PP
2020-LIVINGS TON-006	Post-event damage assessment program.	The process for recording damages after a storm is not well defined.	Implement a post-event damage assessment program, including the following: • Conduct public outreach/education to inform property owners of the need to report property	Existing	Flood	1.2, 1.3, 2.3	Township Engineering, fpa	Municipal Budget	Medium	High	Medium	High	LPR, NSP	PR, 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
			damage and obtain required permitting when making repairs. • Organize local resources to conduct post-event damage assessments, including substantial damage determination. • Develop an inventory (file system and/or database) of losses (i.e., loss of service, property damage, economic losses).											
2020-LIVINGS TON-007	Mutual Aid agreements with neighboring communities for continuity of operations	During some events, additional resources might be needed.	Create/Enhance/Maintain Mutual Aid agreements with neighboring communities for continuity of operations	Existing	All	5.3, 6.2	Township OEM	Municipal Budget	High	Low	High	High	LPR	PR
2020-LIVINGS TON -008	Master Plan and HMP Integration	Master Plan does not integrate Essex	Include discussion of Essex County HMP	New	All	4.1, 5.4	Planning Board	Municipal Budget	Medium	Low	Long	Medium	LPR	PP, PI



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
		County HMP.	in next update.											
2020-LIVINGS TON -009	Riker Hill Art Park Hydrants	Riker Hill Park needs additional fire hydrants for firefighting.	Extend the water main to Riker Hill Park to provide proper fire protection to buildings.	New	Fire	1.2, 6.1	Township OEM	Municipal Budget	High	High	Medium	High	SIP	PR, PP

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 9.11-17. Summary of Prioritization of Actions

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-LIVINGSTON-001	Conduct stream cleaning and restoration.	1	1	1	1	0	1	1	1	1	1	0	1	1	0	11	High
2020-LIVINGSTON-002	Relocate DPW garage.	1	1	1	1	1	1	0	1	1	1	0	1	1	1	12	High
2020-LIVINGSTON-003	Evaluate all new development to reduce stormwater runoff with every plan review.	1	1	1	1	1	1	1	1	1	1	0	1	1	1	13	High
2020-LIVINGSTON-004	Easement and culvert cleaning plan	1	1	1	1	1	1	1	1	1	1	0	1	1	0	12	High
2020-LIVINGSTON-005	Restore old drainage ways to their original capacity	1	1	0	1	0	0	1	1	1	0	0	0	1	1	8	Medium
2020-LIVINGSTON-006	Post-event damage assessment program.	0	1	1	1	1	1	1	1	1	0	1	1	1	1	12	High
2020-LIVINGSTON-007	Mutual Aid agreements with neighboring communities for continuity of operations	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2020-LIVINGSTON-008	Master Plan and HMP Integration	0	1	1	1	0	1	1	0	0	0	1	0	0	0	6	Medium

Notes: Section 6 (Mitigation Strategy) conveys guidance on prioritizing mitigation actions. Low (0-4), Medium (5-8), High (9-14).



Table 9.11-18. 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
Coastal Erosion / Sea Level Rise								
Coastal Storm								x
Drought								
Earthquake								
Extreme Temperature								x
Flood	x	x	x	x	x	x	x	x
Geological hazards					x			x
Severe Weather		x	x	x	x	x	x	x
Severe Winter Weather		x	x	x	x	x	x	x
Wildfire								
Civil Disorder								
Cyber Attack								
Disease Outbreak								
Economic Collapse (new)								
Hazardous Substances					x			x
Utility Interruption					x			x
Terrorism								
Transportation Failure								x

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.

9.11.8 Staff and Local Stakeholder Involvement in Annex Development

The Township of Livingston 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. In addition, several municipal representatives were asked to review and contribute to the draft annex as documented on the annex sign-off sheets in Appendix B (Participation Documentation). 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 9.11-19. Contributors to the Annex

Entity	Title	Method of Participation
Christopher Mullen	Fire Chief/OEM Coordinator	Primary POC, Attended first and second meeting, reviewed notes, provided data, coordinated response
Jeannette Harduby, CFM	Township Engineer	Attended first and second meeting, reviewed notes, provided data
Glenn Turtletaub	Township Clerk	Attended first meeting, reviewed notes.
Michael Caetano	Building Subcode	Attended first meeting, reviewed notes, provided data



Figure 9.11-1. Township of Livingston Hazard Area Extent and Location Map

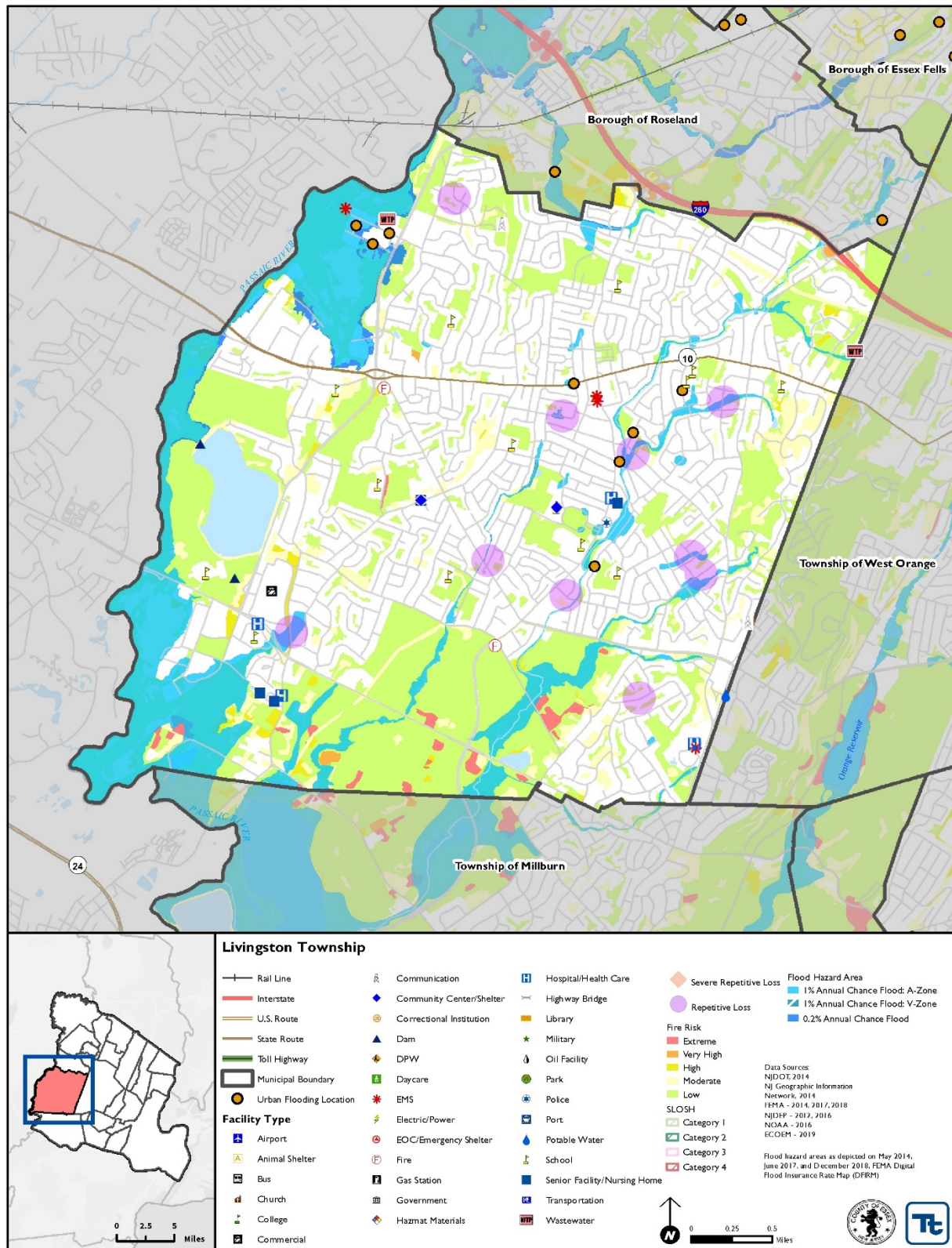
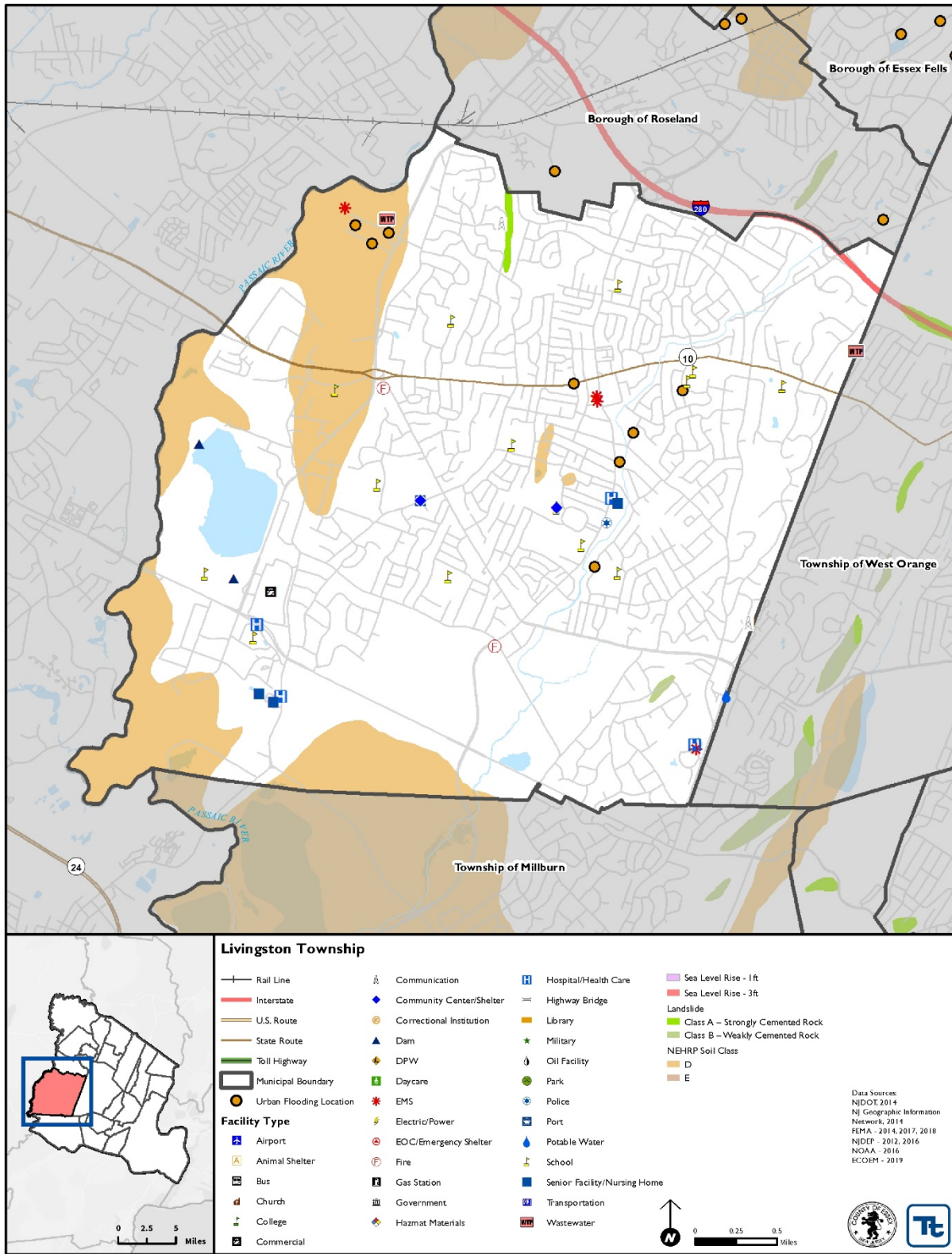




Figure 9.11-2. Township of Livingston Hazard Area Extent and Location Map 2





Name of Jurisdiction: Township of Livingston
Name and Title Completing Worksheet: Jeannette Harduby, Township Engineer

Action Worksheet			
Project Name:	Stream Cleaning		
Project Number:	2020-LIVINGSTON-001		
Risk / Vulnerability			
Hazard(s) of Concern:	Flood		
Description of the Problem:	Residences are flooding and stream banks are eroding in Canoe Brook, Cub Brook, and Slough Brook.		
Action or Project Intended for Implementation			
Description of the Solution:	Stream cleaning and restoration to reduce flooding, streambank erosion and channel sedimentation.		
Is this project related to a Critical Facility or Lifeline?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Level of Protection:	n/a	Estimated Benefits (losses avoided):	Eliminates flood damage.
Useful Life:	4 years	Goals Met:	
Estimated Cost:	High (\$1M)	Mitigation Action Type:	NSP
Plan for Implementation			
Prioritization:	High	Desired Timeframe for Implementation:	Short (1 year)
Estimated Time Required for Project Implementation:	Medium (3 years)	Potential Funding Sources:	FEMA HMGP and FMA
Responsible Organization:	Township Engineering, Public Works	Local Planning Mechanisms to be Used in Implementation if any:	n/a
Three Alternatives Considered (including No Action)			
Alternatives:	Action	Estimated Cost	Evaluation
	No Action	\$0	Current problem continues
	Relocate homes	High	Not feasible
	Concrete line all streams	High	Not feasible
Progress Report (for plan maintenance)			
Date of Status Report:			
Report of Progress:			
Update Evaluation of the Problem and/or Solution:			



Name of Jurisdiction: Township of Livingston
Name and Title Completing Worksheet: Jeannette Harduby, Township Engineer

Action Worksheet		
Project Name:	Stream Cleaning	
Project Number:	2020-LIVINGSTON-001	
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	1	
Fiscal	1	
Environmental	1	
Social	1	
Administrative	1	
Multi-Hazard	0	
Timeline	1	
Agency Champion	1	
Other Community Objectives	0	
Total	11	
Priority (High/Med/Low)	High	



Name of Jurisdiction:

Township of Livingston

Name and Title Completing Worksheet:

Jeannette Harduby, Township Engineer

Action Worksheet			
Project Name:	Drainage Study and Improvements		
Project Number:	2020-LIVINGSTON-003		
Risk / Vulnerability			
Hazard(s) of Concern:	Flood		
Description of the Problem:	Several locations throughout the Township have been identified as areas in need of study to determine what flood abatement options exist. These areas have historically flooded due to undersized drainage systems, lack of drainage structures or poorly maintained structures. The level of flooding varies by location, with most areas limited to street flooding and in some cases attached garages.		
Action or Project Intended for Implementation			
Description of the Solution:	The purpose of the Drainage Study is to perform hydrological and hydraulic studies of each area to determine drainage improvements and probable costs. The locations include Rockhill Drive, 31 Morningside Drive & Vicinity, 36 Bryant Drive & Vicinity, 59 Elmwood Drive & Vicinity, Broadlawn Culvert, Royal Avenue, Arrow Drive, 14 Borden Place & Vicinity, Hazel Avenue, Chestnut Street, Hastings Lane and Stratford Drive.		
Is this project related to a Critical Facility or Lifeline?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Level of Protection:	100-year flood	Estimated Benefits (losses avoided):	Eliminate flood damages
Useful Life:	n/a	Goals Met:	1.2, 2.2
Estimated Cost:	\$500,000	Mitigation Action Type:	LPR
Plan for Implementation			
Prioritization:	High	Desired Timeframe for Implementation:	1 year
Estimated Time Required for Project Implementation:	3 years	Potential Funding Sources:	FEMA HMGP, FMA, Township
Responsible Organization:	Township Engineering	Local Planning Mechanisms to be Used in Implementation if any:	n/a
Three Alternatives Considered (including No Action)			
Alternatives:	Action	Estimated Cost	Evaluation
	No Action	\$0	Current problem continues
	Raise Streets and Homes above Flood Elevation	High	Not Feasible
	Close Affected Streets to Traffic and Relocate Affected Residents	High	Not Feasible
Progress Report (for plan maintenance)			
Date of Status Report:			
Report of Progress:			
Update Evaluation of the Problem and/or Solution:			



Name of Jurisdiction:

Township of Livingston

Name and Title Completing Worksheet:

Jeannette Harduby, Township Engineer

Action Worksheet		
Project Name:	Drainage Study and Improvements	
Project Number:	2020-LIVINGSTON-003	
Criteria	Numeric Rank (-1, 0, 1)	Provide brief rationale for numeric rank when appropriate
Life Safety	1	
Property Protection	1	Flooding is mitigated to not cause damage.
Cost-Effectiveness	1	
Technical	1	
Political	1	There is public support.
Legal	1	
Fiscal	1	
Environmental	1	
Social	1	
Administrative	1	
Multi-Hazard	0	
Timeline	1	
Agency Champion	1	
Other Community Objectives	1	
Total	13	
Priority (High/Med/Low)	High	