

## 9.11 BUSHKILL TOWNSHIP

This section presents the jurisdictional annex for Bushkill Township.

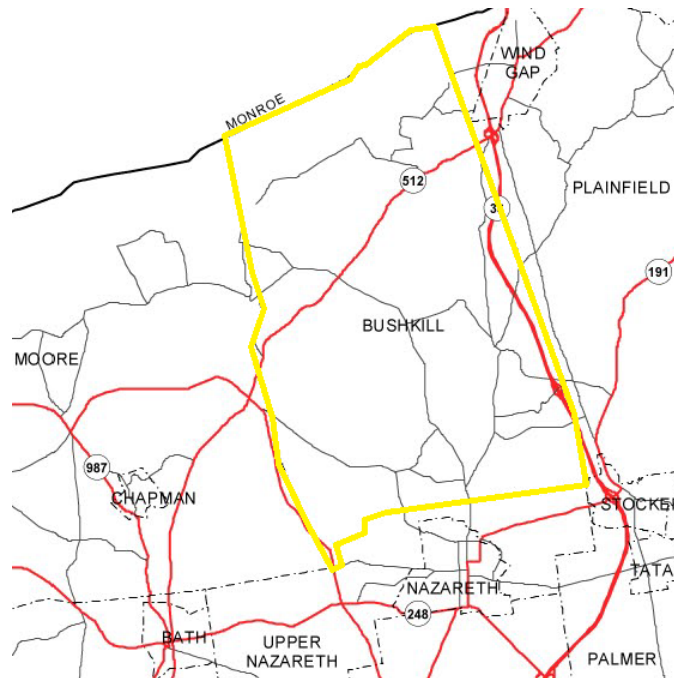
### A. HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact		Alternate Point of Contact	
<u>Name</u>	Brian Harris	<u>Name</u>	Tom Barnowski
<u>Title/</u>	Manager	<u>Title/</u>	EMC
<u>Department</u>		<u>Department</u>	
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### B. MUNICIPAL PROFILE

Bushkill Township is a rural township located in the north-central part of Northampton County. It encompasses an area of approximately 25.3 square miles, and has a population of 8,178 (2010 Census). As shown in Figure 1, the township is bordered by Moore Township to the west, Upper Nazareth Township to the south, Plainfield Township to the east, and Ross Township (Monroe County) to the north.

**Figure 1**



(Source: <http://www.lvpc.org/pdf/maps/baseMap-LehighNorthamptonCounties.pdf>)

The Bushkill Creek flows from the township's higher elevations in the north and west, to the southeast corner of the township and into Upper Nazareth Township.

PA Route 512 (Moorestown Road) travels northeast through the township, from the center of the western border with Moore Township to the northern part of the eastern border with Plainfield Township. PA Route 33 travels north-south along the township's eastern edge before bending eastward into Plainfield Township.

### B.1 Known or Anticipated Future Development

The following table summarizes major residential/commercial development and major infrastructure development that are identified for the next five (5) to ten (10) years in the municipality. Refer to the map at the end of this annex which illustrates the hazard areas within the municipality.

Property Name	Type (Residential or Commercial)	Number of Structures	Location	Known Hazard Zone*	Description / Status
Orsinger Tract	Res	15	Cherry Hill	None	
Barlieb Tract	Res	13	Jacobsburg Rd	None	
MAB Tract	Res	50	Kromer Road	None	
Erhardt Tract	Com		State Route 512	None	

\* Only location-specific hazard zones or vulnerabilities identified. With the exception of flood, wildfire, landslides, and land subsidence/sinkholes, all locations within the Lehigh Valley are exposed to the natural hazards addressed in this plan.

### C. NATURAL HAZARD EVENT HISTORY SPECIFIC TO BUSHKILL TOWNSHIP

Type of Event and Date	FEMA Disaster # (if applicable)	Local Damage and Losses
Keller Road Bridge - Flood		Bridge Lost - \$200,000
Knauss Road Gabion Failure-Flood		Gabion Failure - \$20,000
Penny Hole Gabion Failure - Flood		Gabion Failure - \$20,000

**D. NATURAL HAZARD RISK/VULNERABILITY RISK RANKING**

The following relative ranking of natural and non-natural hazard risks in this municipality was developed using PEMA's Risk Factor methodology described in Section 4, "Risk Assessment"

HAZARD RISK	NATURAL HAZARDS	RISK ASSESSMENT CATEGORY					RISK FACTOR (RF)
		PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
<b>HIGH</b>	Winter Storm	3	2	4	1	3	2.7
	Flood	3	2	2	3	3	2.5
<b>MODERATE</b>	Radon Exposure	4	1	2	1	4	2.4
	Extreme Temperatures	4	1	2	1	3	2.3
	Drought	2	1	4	1	4	2.2
	Wildfire	3	1	2	3	3	2.2
	Hailstorm	3	1	3	2	1	2.1
	Wind, incl. Tornado	1	3	2	4	1	2.1
	Lightning	4	1	1	2	1	2
	Earthquake	1	1	4	4	1	1.9
<b>LOW</b>	Landslide	1	1	2	4	1	1.5
	Subsidence / Sinkholes	2	1	1	2	1	1.4

HAZARD RISK	MAN-MADE HAZARDS	RISK ASSESSMENT CATEGORY					RISK FACTOR (RF)
		PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
<b>HIGH</b>	Fire (Urban/Structural)	4	2	1	4	2	2.6
	Env. Hazard and Explosion	3	2	2	4	3	2.6
	Utility Interruption	3	1	3	4	3	2.5
<b>MOD - ERATE</b>	Transportation Accident	4	1	1	4	1	2.2
	Mass Gathering and Civil Disturbance	3	1	1	4	2	2
<b>LOW</b>	Terrorism	1	3	1	4	1	1.9
	Building Collapse	1	3	1	4	1	1.9
	Dam Failure	1	2	2	4	2	1.9
	Nuclear Incident	1	1	1	4	2	1.4
	Levee Failure	0	0	0	0	0	0

### **E. CAPABILITY ASSESSMENT**

This section identifies the following capabilities of the local jurisdiction:

- Planning and Regulatory capability
- Administrative and Technical capability
- Fiscal capability
- Community classifications

## E.1 Planning and Regulatory Capability

Tool / Program	Status			Dept./Agency Responsible	Effect on Loss Reduction: + Support ○ Neutral - Hinder	Change Since Last Plan: + Positive - Negative	Comments
	In Place	Date Adopted or Updated	Under Development				
Hazard Mitigation Plan	X	2006			+		Updating 2012
Emergency Operations Plan							
Disaster Recovery Plan							
Evacuation Plan							
Continuity of Operations Plan							
NFIP							
NFIP – Community Rating System							
Floodplain Regulations (spec. NFIP Flood Damage Prevention Ordinance)							
Floodplain Management Plan							
Zoning Regulations	X	1994					
Subdivision Regulations	X	1994					
Comprehensive Land Use Plan (or General, Master or Growth Mgt. Plan)	X	2006					
Open Space Management Plan (or Parks/Rec or Greenways Plan)	X	2005					
Stormwater Management Plan / Ordinance	X	2006					
Natural Resource Protection Plan							

Tool / Program	Status			Dept./Agency Responsible	Effect on Loss Reduction: + Support O Neutral - Hinder	Change Since Last Plan: + Positive - Negative	Comments
	In Place	Date Adopted or Updated	Under Development				
Capital Improvement Plan							
Economic Development Plan							
Historic Preservation Plan							
Farmland Preservation							
Building Code							
Fire Code							
Other							



**E.2 Administrative and Technical Capability**

Staff/Personnel Resources	Yes	No	Department/Agency	Comments
Planners (with land use / land development knowledge)	X			
Planners or engineers (with natural and/or human caused hazards knowledge)	X			
Engineers or professionals trained in building and/or infrastructure construction practices (includes building inspectors)	X			
Emergency Manager	X			
NFIP Floodplain Administrator				
Land Surveyors	X			
Scientists or staff familiar with the hazards of the community	X			
Personnel skilled in Geographic Information Systems (GIS) and/or FEMA's HAZUS program	X			
Grant writers or fiscal staff to handle large/complex grants	X			
Staff with expertise or training in Benefit-Cost Analysis	X			
Other				



**E.3 Fiscal Capability**

Financial Resources	Yes	No	Department/Agency	Comments
Capital Improvement Programming		X		
Community Development Block Grants (CDBG)				
Special Purpose Taxes		X		
Gas / Electric Utility Fees		X		
Water / Sewer Fees		X		
Stormwater Utility Fees		X		
Development Impact Fees		X		
General Obligation, Revenue, and/or Special Tax Bonds		X		
Partnering Arrangements or Intergovernmental Agreements				
Other				



## E.4 Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	N/A
Building Code Effectiveness Grading Schedule (BCEGS)	TBD	TBD
Public Protection	TBD	TBD
Storm Ready	NP	N/A
Firewise	NP	N/A

N/A = Not applicable. NP = Not participating. TBD = To Be Determined

The classifications listed above relate to the community's effectiveness in providing services that may impact its vulnerability to the natural hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The CRS class applies to flood insurance while the BCEGS and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class one (1) being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1000 feet of a creditable fire hydrant and is within 5 road miles of a recognized Fire Station. StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education and awareness.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

## F. MITIGATION STRATEGY

### F.1 Past Mitigation Activities/Efforts

The following table summarizes progress on the mitigation strategy identified by the Township in the 2006 plan.

2006 Initiative		Status	Review Comments
Description	Location		
Repair retaining wall along Bushkill Creek to alleviate flooding conditions	Douglasville Rd. at Bushkill Creek.	Completed	
Install/replace/repair culvert	Keller Rd. at Sober's Run	In progress	Bid received; to be completed Summer 2013.

Repair streambank along Monocacy Creek to alleviate flooding conditions	Knaus Rd. at Monocacy Creek	Completed	
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Further details on mitigation activities completed in the Township include:

- Gabion basket replacements.
- Penny Hole mitigation project.

## F.2 Hazard Vulnerabilities Identified

It is estimated that in Bushkill Township, 61 residents live within the 1% annual chance flood area (NFIP Special Flood Hazard Area). Of the municipality's total land area, 3.9% is located within the 1% annual chance flood area. \$9,073,207 (0.7%) of the municipality's general building stock replacement cost value (structure and contents) is located within the 1% annual chance flood area.

There are 15 NFIP policies in the community. While there are 24 structures located within the 1% annual chance flood area, there are only 4 policies issued to property owners in the 1% annual chance flood area. FEMA has identified no Repetitive Loss (RL) or Severe Repetitive Loss (SRL) properties in the municipality.

HAZUS-MH estimates that for a 1% annual chance flood, \$2,519,746 (0.2%) of the municipality's general building stock replacement cost value (structure and contents) will be damaged, 181 people may be displaced, 22 people may seek short-term sheltering, and an estimated 176 tons of debris could be generated.

HAZUS-MH estimates the following damage and loss of use to critical facilities in the community as a result of a 1% annual chance flood event:

The following vulnerabilities have been identified by the community, within the risk assessment, or in other plan, reports and documents (e.g. FEMA Flood Insurance Studies, Act 167 Stormwater Management Plans):

- Roads along Bushkill Creek
- Bridges along/over Bushkill Creek
- Structures along streambeds

Please refer to the Hazard Profiles in the Risk Assessment section for additional vulnerability information relevant to this jurisdiction.

### F.3 Hazard Mitigation Strategy

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Action No.	Action	Mitigation Technique Category	Hazard(s) Addressed	Priority (H/M/L)	Estimated Cost	Potential Funding Sources	Lead Agency / Department	Implementation Schedule	Applies to New and/or Existing Structures*
1	Keller Rd. Bridge Replacement (near intersection of Belfast Road) – Remove culvert and install precast concrete bridge. Bridge was damaged by flooding.	Structural Projects	Flood	High	\$200,000	Local Funding	Bushkill Township Engineering and Public Works	Summer 2013	Existing
2	Retrofit structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority.  Phase 1: Identify appropriate candidates for retrofitting based on cost-effectiveness versus relocation.  Phase 2: Where retrofitting is determined to be a viable option, work with property owners toward implementation of that action based on available funding from FEMA and local match availability.	Property Protection	Flood	Medium-High*	High	FEMA Mitigation Grant Programs and local budget (or property owner) for cost share	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from PEMA, FEMA	Long Term DOF	Existing
3	Purchase, or relocate structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss	Property Protection	Flood	Medium-High*	High	FEMA Mitigation Grant Programs and municipal	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support	Long Term DOF	Existing

Action No.	Action	Mitigation Technique Category	Hazard(s) Addressed	Priority (H/M/L)	Estimated Cost	Potential Funding Sources	Lead Agency / Department	Implementation Schedule	Applies to New and/or Existing Structures*
	<p>properties as priority.</p> <p>Phase 1: Identify appropriate candidates for relocation based on cost-effectiveness versus retrofitting.</p> <p>Phase 2: Where relocation is determined to be a viable option, work with property owners toward implementation of that action based on available funding from FEMA and local match availability.</p>					budget (or property owner) for cost share	from PEMA, FEMA		
4	<p>Maintain compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.</p> <p>Further, continue to meet and/or exceed the minimum NFIP standards and criteria through the following NFIP-related continued compliance actions identified below.</p>	Property Protection	Flood, Severe Storms	High	Low - Medium	Municipal Budget	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from PEMA, ISO FEMA	On-going	New & Existing
5	<p>Conduct and facilitate community and public education and outreach for residents and businesses to include, but not be limited to, the following to promote and effect natural hazard risk reduction:</p> <ul style="list-style-type: none"> <li>• Provide and maintain links to the HMP website, and regularly post notices on the County/municipal homepage(s) referencing the HMP webpages.</li> <li>• Prepare and distribute informational letters to flood vulnerable property owners and neighborhood associations, explaining the availability of</li> </ul>								



Action No.	Action	Mitigation Technique Category	Hazard(s) Addressed	Priority (H/M/L)	Estimated Cost	Potential Funding Sources	Lead Agency / Department	Implementation Schedule	Applies to New and/or Existing Structures*
	<p>mitigation grant funding to mitigate their properties, and instructing them on how they can learn more and implement mitigation.</p> <ul style="list-style-type: none"> <li>Use email notification systems and newsletters to better educate the public on flood insurance, the availability of mitigation grant funding, and personal natural hazard risk reduction measures.</li> <li>Work with neighborhood associations, civic and business groups to disseminate information on flood insurance and the availability of mitigation grant funding.</li> </ul>								
	See above.	Public Education and Awareness	All Hazards	High	Low-Medium	Municipal Budget	Municipality with support from Planning Partners, PEMA, FEMA	Short Term	N/A
6	Begin the process to adopt higher regulatory standards to manage flood risk (i.e. increased freeboard, cumulative substantial damage/improvements) and sinkhole risk (e.g. carbonate bedrock standards).	Prevention	Flood; Subsidence / Sinkholes	High	Low	Municipal Budget	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from PEMA, FEMA	Short Term	New & Existing
7	Determine if a Community Assistance Visit (CAV) or Community Assistance Contact (CAC) is needed, and schedule if needed.	Prevention, Property Protection	Flood, Severe Storms	Medium	Low	Municipal Budget	NFIP Floodplain Administrator with support from PADEP, PEMA, FEMA	Short Term (1 year)	N/A
8	Have designated NFIP Floodplain Administrator (FPA) become a Certified Floodplain Manager through the ASFPM, and pursue relevant continuing education training such as FEMA Benefit-Cost Analysis.	Public Education and Awareness	Flood, Severe Storms	High	Low	Municipal Budget	NFIP Floodplain Administrator	Short Term (DOF)	N/A
9	Participate in the Community Rating System (CRS) to further manage flood risk and reduce flood insurance premiums for NFIP policyholders. This shall start with the submission to	Prevention, Property Protection, Public Education and Awareness	Flood, Severe Storms	Medium	Low	Municipal Budget	NFIP Floodplain Administrator with support from PADEP, PEMA, FEMA	Short Term (year 1)	N/A

Action No.	Action	Mitigation Technique Category	Hazard(s) Addressed	Priority (H/M/L)	Estimated Cost	Potential Funding Sources	Lead Agency / Department	Implementation Schedule	Applies to New and/or Existing Structures*
	FEMA-DHS of a Letter of Intent to join CRS, followed by the completion and submission of an application to the program once the community's current compliance with the NFIP is established.								
10	Archive elevation certificates	Public Education and Awareness	Flood, Severe Storm	High	Low	Municipal Budget	NFIP Floodplain Administrator	On-going	N/A
11	Continue to support the implementation, monitoring, maintenance, and updating of this Plan, as defined in Section 7.0	All Categories	All Hazards	High	Low – High (for 5-year update)	Municipal Budget, possibly FEMA Mitigation Grant Funding for 5-year update	Municipality (via mitigation planning point of contacts) with support from Planning Partners (through their Points of Contact), PEMA	On-going	New & Existing
12	Complete the ongoing updates of the Comprehensive Emergency Management Plans	Emergency Services	All Hazards	High	Low	Municipal Budget	Municipality with support from PEMA	On-going	New & Existing
13	Create/enhance/ maintain mutual aid agreements with neighboring communities for continuity of operations.	Emergency Services	All Hazards	High	Low	Municipal Budget	Municipality with support from Surrounding municipalities and County	On-going	New & Existing
14	Identify and develop agreements with entities that can provide support with FEMA/PEMA paperwork after disasters; qualified damage assessment personnel –	Public Education and Awareness, Emergency Services	All Hazards	Medium	Medium	Municipal budget	Municipality with support from County, PEMA, FEMA	Short Term	N/A

Action No.	Action	Mitigation Technique Category	Hazard(s) Addressed	Priority (H/M/L)	Estimated Cost	Potential Funding Sources	Lead Agency / Department	Implementation Schedule	Applies to New and/or Existing Structures*
	Improve post-disaster capabilities – damage assessment; FEMA/PEMA paperwork compilation, submissions, record-keeping								
15	Work with regional agencies (i.e. County and PEMA) to help develop damage assessment capabilities at the local level through such things as training programs, certification of qualified individuals (e.g. code officials, floodplain managers, engineers).	Public Education and Awareness, Emergency Services	All Hazards	Medium	Medium	Municipal budget, FEMA HMA and HLS grant programs	Municipality with support from County, PEMA	Short – Long Term DOF	N/A

Notes:

\*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.

**Costs:**

Where actual project costs cannot reasonably be established at this time:

Low = < \$10,000

Medium = \$10,000 to \$100,000

High = > \$100,000

**Potential FEMA HMA Funding Sources:**

PDM = Pre-Disaster Mitigation Grant Program

FMA = Flood Mitigation Assistance Grant Program

RFC = Repetitive Flood Claims Grant Program

SRL = Severe Repetitive Loss Grant Program

HMGP = Hazard Mitigation Grant Program

**Timeline:**

Short = 1 to 5 years. Long Term = 5 years or greater. OG = On-going program.

DOF = Depending on funding.





**G. ANALYSIS OF MITIGATION ACTIONS**

Municipal mitigation actions were evaluated and prioritized primarily using the PA STEEL methodology discussed in Section 6 of this plan. Per the cost-benefit weighted PA STEEL methodology, those actions receiving 20 or more favorable ratings were generally considered high-priority actions. However, other factors beyond the PA STEEL numeric ranking may have been considered by the municipality during project prioritization. For example, a project might be assigned a medium priority because of the uncertainty of a funding source, and could be changed to high once a funding source has been identified such as a grant.

Mitigation Action		PA STEEL CRITERIA CONSIDERATIONS																				Results				
		(+) Favorable					(-) Less favorable					(N) Not Applicable														
		P Political			A Administrative			S Social		T Technical		E Economic			E Environmental				L Legal			SUMMARY (EQUAL WEIGHTING)	SUMMARY (BENEFITS & COSTS PRIORITIZED)			
Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Benefit of Action (x3)	Cost of Action (x3)	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste Site	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority			Potential Legal Challenge		
1	Keller Rd. Bridge Replacement	+	+	+	+	+	+	+	-	+	+	+	+	+	-	+	+	-	N	+	+	+	+	-	18 (+) 4 (-) 1 (N)	22 (+) 4 (-) 1 (N)
2	Retrofit Vulnerable Properties	+	+	+	-	-	+	+	+	+	+	+	+	+	-	+	+	+	N	+	N	+	+	18 (+) 3 (-) 2 (N)	22 (+) 3 (-) 2 (N)	
4	Acquire Vulnerable Properties	+	+	+	-	-	-	+	-	+	+	+	+	+	-	+	+	+	+	+	N	+	+	17 (+) 5 (-) 1 (N)	21 (+) 5 (-) 1 (N)	
5	Maintain NFIP compliance	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	N	+	+	N	+	-	19 (+) 2 (-) 2 (N)	23 (+) 2 (-) 2 (-)





	Disaster Capabilities																							4 (-) 4 (N)	(+) 6 (-) 4 (N)
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## H. FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

A more detailed flood loss analysis could be conducted on a structural level (versus the Census block analysis conducted for the HMP). The location of each building, details regarding the building (see additional data needed below) and the assessed or fair market value could be included in HAZUS-MH. The FEMA DFIRM boundaries, FEMA Flood Insurance Study detailed studies, base flood elevations and available Light Detection and Ranging (LiDAR) data or digital elevation models (DEM) could be used to generate a more accurate flood depth grid and then integrated into the HAZUS model. The flood depth-damage functions could be updated using the U.S. Army Corps of Engineer damage functions for residential building stock to better correlate HAZUS-MH results with FEMA benefit-cost analysis models. HAZUS-MH would then estimate more accurate potential losses per structure.

Additional data needed to perform the analysis described above:

- Specific building information – first-floor elevation (elevation certificates), number of stories, foundation type, basement, square footage, occupancy type, year built, type of construction etc.
- Assessed or fair market value of structure
- LiDAR or high resolution DEM

## I. HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for Bushkill Township to illustrate the probable areas impacted within Bushkill Township. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which Bushkill Township has significant exposure. Regional risk maps are provided in the hazard profiles within Section 4, Volume I of this Plan.

## J. ADDITIONAL COMMENTS

No additional comments at this time.

