

Montgomery County Hazard Mitigation Plan 2017



Montgomery County

Hazard Mitigation Plan

2017

Montgomery County Board of Commissioners

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Montgomery County 2017 Hazard Mitigation Plan

Certification of Annual Review Meetings

YEAR	DATE OF MEETING	PUBLIC OUTREACH ADDRESSED?*	SIGNATURE

*Confirm yes here annually and describe on record of changes page.

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Record of Changes

DATE	DESCRIPTION OF CHANGE MADE, MITIGATION ACTION COMPLETED, OR PUBLIC OUTREACH PERFORMED	CHANGE MADE BY (PRINT NAME)	CHANGE MADE BY (SIGNATURE)

REMINDER: *Please attach all associated meeting agendas, sign-in sheets, handouts, and minutes.*

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Executive Summary

Purpose of the Plan

This plan is intended to provide the county and each of the municipalities with a strategy for mitigation of natural, human and technological disasters that could occur in Montgomery County at any time. It addresses the local government planning responsibilities established by the Stafford Act, (P.L. 106-390, the Disaster Mitigation Act of 2000) which requires state and local governments to develop and adopt an approved mitigation plan as a condition for receiving certain federal disaster grants and loans. This plan revises and updates the Montgomery County Hazard Mitigation Plan prepared in 2012 and adopted by 61 of the 62 municipalities in the county. The first Montgomery County Hazard Mitigation plan approved in 2007 was adopted by all 62 municipalities.

The plan follows the same structure as the 2012 plan. Revisions in the plan reflect the changes and events that have taken place in Montgomery County over the last 5 years that could impact future hazard vulnerability in the county. Recent hazard events provide information about potential vulnerability in our community and likely changes in hazard occurrences. In addition to hazard events over the past 5 years, revisions in the plan address other key changes or trends that could impact future hazards. Other revisions in the plan account for a variety of activities undertaken in the county to implement recommendations made in the 2012 Hazard Mitigation Plan.

Recent Hazard Events



Damaged Tree in Souderton Borough

Superstorm Sandy – Hurricane and Tropical Storm Sandy, which later was referred to as Superstorm Sandy, was a large hurricane system that caused extensive coastal damage in New Jersey and New York, ultimately resulting in a Presidential Disaster declaration in Pennsylvania counties, including Montgomery. The damage in Montgomery County caused through the storm on October 28 and 29, 2012 resulted from some flooding and wind damage, causing uprooted and sheared trees. Tree damage from generally easterly winds was particularly strong in

isolated areas of the county. In some of these areas, large stands of evergreen trees were over-turned.

Severe Winter Storm (Blizzard-Winter Storm Jonas) on January 22-23, 2016 –

A Presidential Declaration was declared for various Pennsylvania counties, including Montgomery, due to a severe blizzard that occurred on January 22 and 23. The storm was generally well forecasted several days in advance by most large-scale prediction models used by the National Weather Service. The storm developed near the Gulf Coast, with cold Canadian air already in place over the mid-Atlantic and Appalachian region, and moved up into the

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southern Appalachians, and then re-formed closer to the coast, strengthening rapidly while very slowly moving northeast up the coast. This track was conducive to pulling in abundant Gulf and Atlantic moisture into the region, along with the lift and duration necessary for significant amounts of snow.



January blizzard in Royersford Borough

Most areas in Montgomery County reported over 20 inches of snow, with King of Prussia reporting 26 inches. The windy conditions also caused snow drifting that resulted in areas of deeper snow conditions. With the advanced warning and the fact that most people remained off the roads during the snow event, hardworking municipal public works crews were able to remove most of the snow from local roads soon after it fell.

Winter Storm on February 3-4, 2014 – A Presidential Declaration for the winter storm on February 3-4 was made for Pennsylvania counties, including Montgomery County, due to the icy condition of the storm that caused service disruptions to 57 percent of PECO's Montgomery County and Bucks County electric customers and resulted in extremely icy roadway conditions and damage due to downed trees and branches throughout the county. Many power outages in Montgomery County lasted for several days due to amount of tree damage and limited access to damage areas. Communities in the eastern portion of the county with large trees along streets that fell on power lines had the worst impact from the storm.



Winter storm in Norristown

Other rain storm and flooding events – Since December 2012, other disaster events have occurred, even though they did not rise to Presidential Declaration status. Events such as the April 30, 2014 flood that impacted several communities along the Schuylkill River caused property damage and required evacuation in various locations, including West Norriton Township and Norristown.

Major localized landslide occurred in West Conshohocken Borough on June 27, 2015, resulting in the long-term closure of Balligomingo Road between Route 23 (Front Street) and Portland Road for mud removal and slope stabilization. The mudslide resulted from heavy rains along a very steeply sloped area. As part of the landslide, large trees fell over, further destabilizing the slope. Balligomingo Road remains



Landslide above Balligomingo Road

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closed in the vicinity of the landslide due to unstable upslope conditions. West Conshohocken Borough has been working with the landowner to stabilize the slope.

Plymouth Road Bridge Sinkhole – Plymouth Road near the Plymouth Meeting interchange of Interstate 276 and 476 was closed suddenly in March 2015 due to severe structural and foundation damage at the bridge over Plymouth Creek that was caused by undermining from sinkholes. In August 2015, PennDOT reopened the new two-lane bridge which carries about 15,600 cars a day over Plymouth Creek between Butler and Germantown pikes in August.

Cheltenham Township Sinkhole – A 25-35 foot deep sinkhole opened suddenly overnight on January 25, 2017 in front of two homes on Brooke Road in Cheltenham, extending into the street and consuming the sidewalk and portions of the lawns and driveway. The sinkhole, located in the Conestoga Limestone formation, was grouted and filled with gravel to stabilize the site. The home at 720 Brooke Road was declared habitable based on a report submitted by the owner's structural engineer. A home located at 724 Brooke Road is still not habitable and may have to be razed.



Sinkhole at 720 and 724 Brooke Road

New or Potential Hazard Conditions or Events



Bakken crude train in Pottstown

Bakken Crude oil shipments by rail from North Dakota have been routed through Montgomery County over the past few years. These oil trains have greatly increased the quantity of petroleum products shipped through the county on rail lines. Bakken crude shipments are generally being made along the Norfolk Southern freight line from Pottstown to Lower Merion Township. Large petroleum trains in excess of 100 cars typically stop and wait at various locations in Pottstown Borough, Upper Merion Township and Lower Merion Township on their way to

the refinery in Delaware County below Philadelphia. Other shipments through the county utilize CSX tracks in Cheltenham Township. A total of 17 Montgomery County municipalities are impacted by these shipments. On a typical day, as many as 3 to 5 unit trains with 100 or more cars each cross Montgomery County on route to Philadelphia area refineries.



Limerick Nuclear Power Station

Extension of the Limerick Nuclear Power Plant's Operating License. In October 2014, the Nuclear Regulatory Commission (NRC) renewed the operating license at the Limerick Generating Station for another 20 years. This action took place a full ten years before the first of the original 40-year licenses on the two nuclear reactors was scheduled to expire. The previous expiration dates for the two reactors were Oct. 26, 2024 and June 22, 2029. As a result the NRC's extension, the new licenses will expire on Oct. 26, 2044 for Unit One and June 22, 2049 for Unit Two.

The new **Phoenix State Correctional Institute in Graterford** has been under construction since 2012 to replace the existing State Correction Institute (SCI) that has been located nearby since 1929. The SCI Phoenix is scheduled to open in 2018 with the capacity for 4,000 prisoners. Once the inmates are transferred to the new prison, the existing prison will be decommissioned, although the state could continue to use the older site.



New Phoenix Prison

Formal closure of the **Willow Grove Naval Air Station** occurred in 2011. Currently a handful of National Guard and Army Reserve soldiers remain at the site, and the Air Force maintains administrative offices on the property. Horsham Township Base Closure and Relocation Committee worked with the United States Department of Defense (DoD) to develop a plan for the base's redevelopment. That plan, which envisions the removal of the large landing strip and all structures on site for the development of a large mixed use development, was evaluated through an environmental impact study, which was approved by the DoD in March of 2015. In September 2015, the Horsham Land Redevelopment Authority submitted an "economic development conveyance" (EDC) application to acquire the base. Currently the base redevelopment process is being delayed due to groundwater contamination caused by perfluorooctane sulfonate, which was commonly used in firefighting foams at Willow Grove and other air stations. The future master plan for the site includes nearly 1,500 residential units, commercial space, and a town center for Horsham.



Aircraft at the former Willow Grove Naval Air Station

Domestic Terrorism: Increases in domestic terrorism have occurred in many parts of the world. Though the Philadelphia area has not experienced any significant episodes of terrorism, the threat from radicalized terrorists is still possible. Groups such as ISIL [ISIS] in Iraq and other terrorist organizations have inspired attacks in Europe and Asia and have been able to radicalize US residents to perform various acts of terrorism.

Climate Change: The global climate has experienced significant changes over the last few decades due to increased temperatures that are caused by elevated levels of greenhouse gases in the troposphere. The increased temperatures have also created more variability in the occurrence of storms as well as the severity of individual storm events.



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Development in Lower Merion Township

Changing Demographics in the County: Montgomery County has continued to grow between 2012 and 2017. Generally between 2010 and 2016, the county experienced an increase of about 3,642 residents per year. Most of that net increase can be attributed to immigration. International immigration represents an important part of that population change, making the county more culturally and racially diverse. At the end of 2015, the county contained 334,759 housing units. Nearly 9,000 units were added in the county between 2010 and 2015. Over the past few years, the attached housing rental market has been very strong in the county with several new apartment complexes being built in the county. Proposed housing and recently completed attached unit residential projects are being located along the Schuylkill River in or near areas subject to flooding.

Decrease in Public Safety Service Volunteers: In Pennsylvania, more than 90% of the local firefighters are volunteers. Unfortunately, local fire companies and emergency service providers have had a more difficult time recruiting and retaining volunteers to provide various services. All local emergency service providers, along with the Montgomery County Department of Public Safety (MC DPS) and the Montgomery County Health Department (MCHD) are seeking volunteers to assist in all types of emergencies. If the county was confronted with a large-scale public health or other emergency, there would be a critical need to draw upon volunteers for various functions. To address some of the shortfall of volunteers, local municipalities have hired additional personnel to perform emergency services. Other outreach efforts such as youth camps and recruiting events have been undertaken by the county, local municipalities and emergency service providers to attract new volunteers.



Young firefighters

Implementation Activities

Goal #1: Develop a better understanding of the potential disasters that could occur in Montgomery County.

In an effort to better integrate data used by county departments for vital decision making, Montgomery County has launched an effort to develop a Geographic Information Systems (GIS) Strategic Management Plan for the entire county.

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Montgomery County has acquired impervious coverage data from the Delaware Valley Regional Planning Commission (DVRPC) based on recent aerial imagery. These files include building footprint information that can be maintained and updated as newer imagery is acquired.

Montgomery County was able to secure a forest canopy GIS layer. The data, based on Pennsylvania LiDAR, was compiled by the Northern Research Station of the United States Department of Agriculture (USDA) Forest Service. The GIS layer enables enhanced analytics of forested areas of the county.

In 2012, the Southeastern Pennsylvania Regional Task Force (SEPA RTF) initiated a regional Threat and Hazard Identification and Risk Assessment (THIRA) as required by the federal Department of Homeland Security (DHS). As one of the members of the SEPA RTF, in 2014, Montgomery County completed an update to its high-priority Critical Infrastructure and Key Resource data along with the development of the Montgomery County Threat and Hazard Identification and Risk Assessment. In 2017, Montgomery County completed an update of their risk management program. In this effort, the county will complete a risk assessment, capability assessment, and a risk-based capability/gap analysis.

Goal #2. Ensure that the public understands potential hazards and is aware of which actions to be taken to minimize their risks.

MC DPS has prepared and disseminated an Emergency Management Guide.

MC DPS and MCHD provided various types of topically important outreach activities and literature to help residents and visitors better understand various risks.

Goal #3. Significantly reduce the risk of loss of life, injuries, economic costs, and destruction of natural and cultural resources that result from all hazards.

Infrastructure Upgrades

Loch Alsh Reservoir Dam and Spillway Repair: The large dam along Loch Alsh Avenue in Upper Dublin is owned by the Ambler Water Authority. The dam was already undergoing renovations, including a reinforced and expanded spillway, embankment armoring, retooling of the outlet drain and spillway seepage mitigation, when Tropical Storm Lee hit the area in September 2011, necessitating increased concern and additional structural work. Due to the



Loch Alsh Dam spillway

damage that the dam sustained as a result of the torrential downpours from Tropical Storm Lee, the Pennsylvania Department of Environmental Protection (PA DEP) required new enhancements, including a larger drawdown pipe, an upstream slide gate control structure, upgrading the downstream control valve, improved drainage and spillway improvements. This work has been completed by the Ambler Water Authority.

Trenton Cut-Off Freight Line Upgrade: Norfolk Southern Railroad Company recently completed the upgrade of various structures along the Trenton Cutoff Rail line which is a very active rail freight corridor. The construction work involved substantial bridge work.

Montgomery County Emergency Radio System Upgrade and Expansion: In 2012 Montgomery County initiated an important upgrade of the countywide 911 communication system, which is used by all the various emergency responders throughout the county, including local fire companies, emergency medical services and police, among others. As part of this more than \$36 million effort, the county added 10 new communications facilities to the current system by installing new antennas and communication equipment to enhance radio system coverage and capacity. All equipment at the existing 20 communications sites was totally replaced and upgraded as part of the new system as well. All radio equipment used by local public safety and first responder personnel was also upgraded as part of this project. The new system is proposed for activation in 2018.



*Emergency Communications site
in Upper Frederick*

Text 911: In July 2015, Montgomery County launched a new Text-to-911 service that provides county residents the ability to text brief messages to 9-1-1 in the event of an emergency.

Training

Montgomery County Code Officer Association Training: Building code professionals in the county have been working together through the Montgomery County Association of Building Code Officers to ensure that they are up to date on various technical issues associated with their work. This organization has continued to hold meetings since 2012.

First Responder training at the Public Safety Academy: The Montgomery County Public Safety Campus in Plymouth Township provides classrooms, training and other support facilities for the Fire Academy, Emergency Medical Services Training Institute, Law Enforcement Division, Hazardous Materials Response Team, and the Sheriff Department's Bomb Disposal Unit.

The Montgomery County Community College also uses the training campus for its Municipal Police Academy, Police In-Service training program and Fire Science classes.

Limerick Nuclear Power Station: The Montgomery County Public Safety Department staffed up its Emergency Operations Center (EOC) in November 2017 to conduct a successful full-scale exercise simulating a disaster at the Limerick Nuclear Generating Station. Other full scale drills were conducted in 2015 and 2013.

Bakken Crude Information Meeting and Exercise: During 2015, the Montgomery County Public Safety Department held several events to improve preparations for potential emergencies involving the shipment of crude oil through the county. These included a daylong seminar for first responders and local officials; a workshop with impacted municipalities to develop response plans, a three-day training session on containing oil spills, a tabletop exercise for local, county, state and federal officials, and strike team training and exercises.

Power Line Disruption and Tree Hazard Training: PECO has conducted various types of tree hazard training for municipal officials throughout Montgomery County. They conducted a tree hazard seminar for Montgomery County Planning Commission staff on July 16, 2013. During the seminar, planting guidelines and tree selection were discussed for roadway tree planting projects. This information has been incorporated into model guidelines used by the county planning commission.

Public Outreach



Household Hazardous Waste Collection Event

Household Hazardous Waste Collection Events: Since December 2012, Montgomery County has sponsored 24 household hazardous waste collection events. Each event is typically well-attended, with usually over 1,000 carloads of material safely managed. Montgomery County works with the City of Philadelphia and the surrounding suburban counties to coordinate regional collection efforts, which results in approximately 30 events held annually in the Philadelphia Area. Montgomery County hosted six collection events in 2017.

Heat and Cold Weather Warnings: Over the last several years, Montgomery County issued warnings to alert the public about heat and cold weather emergencies that included information about personal safety protection during extreme cold conditions.

Planning and Policy

Natural Resource Protection Ordinances: Through community planning assistance work, MCPC's professional staff has established ordinances that lessen the impact of development on environmentally-sensitive resources, such as floodplains, riparian corridors and steep slopes. These ordinances mitigate future disasters that could result from an event associated with those resources. For example during the last five years Plymouth Township adopted code changes to better sinkhole protections for new development.

Montgomery County Comprehensive Plan: *Montco 2040: A Shared Vision* was adopted by the Montgomery County Commissioners in January 2015. The comprehensive plan provides an overall framework for local municipal plans and provides guidance on issues that transcend local boundaries, such as highways, public transportation, flooding, trails, growth trends, redevelopment trends, shopping needs, public safety, and impact of large developments, overall housing needs, natural systems, and economic growth.



The most crucial element in creating the plan was public input. *Montco 2040: A Shared Vision*, which took approximately two years to complete, involved extensive outreach to citizens, businesses, organizations, community leaders, and municipal officials. These efforts included eight public meetings, presentations to interested groups, a survey completed by over 2,500 residents, a dynamic website, videos, a webinar for municipal officials, a photo contest, wide distribution of draft plan versions, and a public hearing on the final draft plan.

Several goals in the plan further the county's resilience to future hazards including:

- Encourage collaboration and partnerships among governments, businesses, institutions, schools, higher education, and other stakeholders.
- Support a modern, resilient, green, and energy efficient infrastructure network.
- Improve stormwater management and reduce the impact of flooding.
- Conserve natural resources, environmentally sensitive areas and farmland.
- Enhance community character and protect neighborhoods.

Montgomery County Debris Management Plan: The debris management plan prepared in 2014 to further debris management planning efforts in Montgomery County through the identification, assessment, and cooperation of debris management resources that would be required in the event of a major disaster which would cause significant property damage and destruction of vegetation. Working with a consultant, the Public Safety Department and a steering committee composed of representatives from Montgomery County Planning Commission, Montgomery County Public Works Association, the Waste System Authority of East Montgomery, and private contractors developed the Debris Management Plan. The plan contains debris forecasting, debris collection strategy, debris management site analysis,

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cooperative planning with disposal and waste processing site owners, various public works resources, sample contract documents and checklists and appropriate debris management training and exercises. Montgomery County is working with the SEPA RTF to coordinate a regional debris management system to ensure that all the counties could manage debris in the event a debris-forming disaster impacted the entire region. This plan would address the allocation of assets and the overall processing and management of emergency debris.

PA Transportation Funding: On November 25, 2013, House Bill 1060 was signed into law, creating Pennsylvania's most comprehensive piece of state transportation legislation in decades. This legislation invests an additional \$2.3 billion to \$2.4 billion into transportation by the fifth year of the plan. Partial funding for the new transportation package is being derived from the elimination of the flat 12-cent gas tax and modernizing an outdated transportation financing structure through the uncapping of the wholesale Oil Company Franchise Tax. The act also increased resources for [transit and created a dedicated Multimodal Fund](#) (PDF) for non-highway modes' capital needs.

This funding package (link: [Transportation Funding Plan Summary](#)) was created when the law was passed. To see projects made possible or in development because of the plan, visit the department's [Projects website](#). These projects improve transportation safety. Several of the projects involve the repair or replacement of bridges. When bridges are replaced, improvements are made to the overall hydraulic capacity of the bridge's opening, which in some cases, lessens local flood impacts. Also through some bridge replacements, the roadway over the bridge is elevated to prevent flooding over the roadway.

Goal #4. Encourage and promote actions to minimize the impact of floods within the county.

Planning and Training

Floodplain Map and Municipal Ordinance Updates: The [FEMA Flood Insurance Rate Maps for Montgomery County](#) were updated by the US Department of Homeland Security's Federal Emergency Management Agency (FEMA) and became effective on March 2, 2016. All Montgomery County municipalities that participate in the National Flood Insurance Program were required to update their floodplain regulations in their zoning code in accordance with federal requirements. MCPC assisted all 62 municipalities in fulfilling these requirements. The model floodplain ordinance prepared by MCPC was used for this task.

Ambler Flood Study: After the impacts in Ambler Borough caused by Hurricane Irene and Tropical Storm Lee in 2011, the borough received \$177,000 in grants from the United States Environmental Protection Agency (EPA) and the United States Army Corps of Engineers (USACE) to enable Temple University's Center for Sustainable Communities (CSC) to prepare a stormwater management plan for three urban watersheds — Rose Valley, Honey Run/Stuart Creek and Tannery Run in Ambler Borough and Upper Dublin, Lower Gwynedd and Whitpain Townships.

The CSC's plan, completed in December 2014, identified and prioritized stormwater improvements to mitigate water quality and flooding issues that the municipalities have faced for many years. These measures include: the use of stormwater Best Management Practices (BMPs) to achieve improved water quality and flood-loss reduction through groundwater recharge and retention, stream bank protection, and volume control in upstream areas; and retrofitting existing stormwater facilities in other built-out sections of the study area.

Tookany Creek Flood Study in Cheltenham: A study conducted by USACE initiated in 2013 focused on flooding issues within Cheltenham Township, relying on the development of a watershed-based hydrologic analysis. This included evaluating the contributing flows from Jenkintown and Rockledge Boroughs and Abington and Springfield Townships. Cheltenham is part of the first ring of suburban development outside of the City of Philadelphia and is largely built out. Tookany Creek itself is an urbanized tributary of Tacony Creek in the Tacony-Frankford watershed and ultimately part of the Delaware River drainage system. In Cheltenham Township, Tookany Creek is 98% open channel flowing through residential and park lands for more than 95% of its length.



Stormwater pump station on the Tookany Creek

Major flooding in this area may occur during any season of the year. Spring floods are generally the results of a combination of heavy rains on frozen ground augmented by melting snow. During the summer and fall, floods are usually associated with widespread heavy rainfall from tropical storms moving up the Atlantic coastline. For smaller tributaries, heavy rainfalls of short duration, particularly summer thunderstorms, cause most of the flooding problems by inundating

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low-lying areas. This type of flash flooding is characterized by floodwaters that rise and fall very quickly and usually have high flow velocities.

The feasibility study is the first phase of the Corps' two-phased planning process. The purpose of the feasibility study is two-fold – to evaluate all reasonable solutions to the water resource problems identified in Cheltenham Township as part of the study area, and to provide the basis for a decision on project construction. The final Tookany Creek Watershed Flood Reduction Plan, approved by the Assistant Secretary of the United States Army in 2017, recommends the construction of 6 dry detention basins located within Cheltenham Township that will function as a system. This project is estimated to cost \$9.2 million.

Nonstructural/ Flood Proofing Workshops in West Ambler/ Rose Valley Creek Watershed:

In June 2017, USACE's National Nonstructural Flood Proofing Committee hosted two workshops to promote the use of non-structural risk adaptive measures for reducing flood risk to residential, commercial, and public property. The sessions contained information from USACE, FEMA, EPA, the Pennsylvania Emergency Management Agency (PEMA), and Montgomery County. The sessions were held in West Ambler within Whitpain Township,, a community that has been subject to past flooding from the Wissahickon Creek and tributaries of the creek that flow through the Ambler area.

Members of the USACE Committee conducted assessments on 15 to 20 residential and commercial buildings and facilities for nonstructural flood proofing options. Committee members will write a report on possible solutions based on the assessments. The solutions proposed in the report could be applied to similar facilities within the region.

Acquisition and Removal of Floodprone Properties



Demolition of repetitive loss flood properties on Hemlock Road in Springfield Township. In May 2013, Springfield Township performed a comprehensive stormwater analysis. Included in that study were several homes located along Hemlock Road that had regularly been inundated with flooding from the Sunnybrook Creek, which flowed through the properties' backyards. During large storms the flood waters reached heights of 4-5 feet within the lower levels of the homes. Springfield Township was able to acquire and remove 12 homes on Hemlock Road in 2013 and 2014. Now the property is maintained as a riparian buffer area. This project was funded in part through a \$4.3 million hazard mitigation grant from FEMA and PEMA.

Demolition of homes on Hemlock Road

Cheltenham Township Flood Property Acquisition: Cheltenham Township acquired and removed four twin homes adjacent to the Tookany Creek on Bickley Road in Glenside. They also purchased and removed a home at 110 Rice's Mill Road near the Tookany Creek. These five houses had been flooded on several occasions.



Flood prone house removal site

Whitemarsh Township Flood Property Acquisition: Whitemarsh Township acquired 6 properties to remove flood-prone structures in areas along the Wissahickon Creek at 607 Stenton Avenue, 6005 West Valley Green Road, 4134 Christie Circle, 7008 and 7004 Mathers Lane and 4130 Butler Pike. Two other properties with structures in the floodplain along Stenton Avenue and West Valley Green Road were purchased by adjacent property owners who removed the structures.

Abington Township Flood Property Acquisition: Abington Township has purchased and will remove a house at 1004 Irvin Road.

Hatboro Borough Flood Property Acquisition: Hatboro acquired 24 townhouses on Drummers Lane adjacent to a tributary of the Pennypack Creek. These properties sustained several flood losses over a short period of time during the last decade. All six buildings containing the townhouses were removed and the property has been restored as open space along the creek with a paved trail connecting an existing trail to Crooked Billet Elementary School. FEMA funding enabled this removal project.

Infrastructure Upgrades

SEPTA Regional Rail Resiliency Work: On September 22, 2014, the Southeastern Regional Transportation Authority (SEPTA) was selected to receive an \$86.8 million grant from the Federal Transit Administration to harden infrastructure that has become increasingly vulnerable to extreme weather. This grant was a result of a Vulnerability and Risk Assessment of SEPTA's Regional Rail that the agency performed in August 2013 after Superstorm Sandy. The study detailed significant flooding along the rail line west of Conshohocken, near the Conshohocken station, and in the vicinity of the Spring Mill station. The study also documented several areas of runoff and riverside embankment loss along the rail line on either side of Conshohocken. Part of the FTA grant funding enabled SEPTA to perform several important tasks to reduce the impact of flooding, including the following projects in Montgomery County: stabilize the Schuylkill River banks to protect the high-ridership Manayunk/Norristown commuter rail line between Spring Mill and the Miquon Station; establish flood protections at the Jenkintown

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commuter rail facility; stabilize the slopes of several commuter railroad embankments to reduce the risk of rockfall or landslides after severe rainfall.

Prior to the grant, SEPTA performed other work to improve resiliency along the Norristown Regional Rail Line, including the raising of the signal house near Miquon and the construction of a new rail interlock near the Miquon Station to allow SEPTA to serve some areas of the Norristown Line while sections of Spring Mill and Conshohocken experienced flooding.

Flood Warning Gate Installations: Most of the municipalities in the eastern portion of the county, including most of Springfield, Whitemarsh, Upper Dublin, Cheltenham, Whitpain, and Plymouth Townships, have added gate systems that can easily be deployed at key road locations where flood conditions are likely. Public safety or public works crews can easily unlock and deploy the gates.

Flood control structures in Upper Dublin Township: Upper Dublin Township constructed two large flood control dry basin dams in the headwaters of Pine Run and Rapp Run above the 536-acre Fort Washington Business Park, which has been subject to repeated episodes of flooding. The Pine Run structure is 834 feet in length and Rapp Run dam is 720 feet long. Both have innovative 12-foot-high labyrinth weir concrete spillway walls. The two dams provide a combined storage of 122 million gallons of water. They were designed to slowly release runoff to allow infiltration into the ground and streams,



Flood warning gates in Whitemarsh Township



Flood control structure in Upper Dublin Township

limiting the frequency, intensity, and duration of flooding. The upstream basins above each dam were planted with extensive landscaping including wetland plantings and more than 750 new trees to provide a natural park setting. A flood monitoring and warning system was also developed for each structure. Pedestrian bridges over the spillways and trails at each facility enable them to serve as recreation sites when not in use for flood control. The township received an \$11.83 million H2O PA grant from the Pennsylvania Department of Community and Economic Development

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(DCED) for the design and construction of the structures—the largest non-state agency grant in the H2O PA Program. The project received national recognition when Storm Water Solutions magazine named the project a 2013 Top Storm Water and Erosion Control Project.

Upper Dublin Township is also considering implementing zoning that will diversify uses within the business park and promote a distribution of uses to add value to an emerging neighborhood structure of the former Office Park. Additionally, the township is redeveloping key transportation infrastructure in the business park to reduce flooding and potential public safety problems that result from key flooded roads.

New County Bridge at Arcola Road: Montgomery County replaced an often flooded bridge over the Perkiomen Creek at Arcola Road in Upper Providence and Lower Providence Townships. The old bridge was subject to flooding at both approaches and had been the scene of a former motorist fatality during a flooding event. The new bridge reduces the flooding hazards on either side of it.

Flood Safety Hazard Signs: Many municipalities in the county have erected flood area warning signs to alert motorists about potential flooding conditions.



Flood warning sign in Upper Frederick Township

Plan Contents

The introduction in Chapter 1 provides the basis for this plan and scope of the plan. Chapter 2 includes an update of the Community Profile of the county and 62 municipalities that comprise it. The planning process used for the plan is described in Chapter 3. Chapter 4 provides a Risk Assessment based upon information from all municipalities and various other sources, and addresses 24 different types of potential natural and human caused threats to the county. The revised Capability Assessment in Chapter 5 examines the current capacity of county and municipal government to address the potential needs associated with potential threats identified in the Risk Assessment. Mitigation Strategy, described in Chapter 6, includes specific recommendations based upon plan goals that pertain to all of the potential risks. Future plan maintenance requirements and the process for plan adoption are described in Chapters 7 and 8.

1. Introduction

1.1. Background

Hazard mitigation describes actions that are taken to eliminate or reduce risks to life and property from various forms of hazards in our world. By anticipating hazards and taking mitigation steps in advance of the onset of various types of threatening events, communities can break the disaster cycle of damage, emergency response, reconstruction, and repeated damage. Though it is impossible to predict the future with certainty or to be prepared for every situation, effective mitigation measures can make a community more resilient and reduce exposure to the impact of the hazards that the county will likely face. To be effective, emergency management strategy must involve a full cycle of planning including: mitigation, preparedness, response, and recovery.

Planning to avoid the consequences of any form of disaster is a shared responsibility at all levels of local government, businesses, and residents. Everyone has to be involved in mitigation. Responsibility for land use planning and regulating development such that the public health and safety is preserved and impacts of disasters are avoided can be exercised through the authority granted to municipal officials under the Municipal Planning Code (MPC) and various federally and state funded initiatives. Plans for community development, infrastructure, and emergency management are developed at the local level. Powers to enact or enforce construction, property maintenance, and fire prevention standards are derived from the individual codes that convey powers to all forms of local government, including townships of the first class, townships of the second class, boroughs, and home rule charter communities. The Pennsylvania Uniform Construction Code (UCC) is a fundamental law that guides all forms of construction. County government coordinates many initiatives that span municipal boundaries. Municipal and county government relies upon state and federal resources to implement various initiatives undertaken to mitigate local hazards. The cooperation of the private sector and each resident of the county will also be essential to ensure that mitigation actions addressed in this plan are effective.

In the past several decades, the impact of various hazards on the nation has resulted in deaths, injuries, property damage and the interruption of business and government services. The resources required to recover from disasters caused by human, technological, and natural hazards have increased to the point where it is placing a strain on other government services. Since 1955, there have been 50 emergency declarations proclaimed in Pennsylvania that have impacted Montgomery County. Sixteen of these also resulted in Presidential Declarations. A full list of all of the declarations can be found in Appendix J.

1.2. Purpose

This plan is intended to provide the county and each of the municipalities with a strategy for mitigation of natural, human and technological disasters that could occur in Montgomery County at any time. It addresses the local government planning responsibilities established by the

Stafford Act, as amended, which requires state and local governments to develop and adopt an approved mitigation plan as a condition for receiving federal disaster grants and loans. This plan revises and updates the Montgomery County Hazard Mitigation Plan prepared in 2012 and adopted by nearly all 62 municipalities in the county.

The hazard mitigation plan provides a single source of information about the threat from various natural and human-caused hazards to Montgomery County and various strategies to take to reduce the threat. It also complements other emergency management planning documents used regularly by county and state officials. Prior to the development of the original plan in 2007, no single source of information about floods and other natural and human-caused hazards was available for reference. Instead, information was scattered about in municipal and county departments. With subsequent revisions, this plan has become the source of comprehensive information about hazards in the county. With clear goals about future mitigation approaches and defined mitigation projects, this plan provides a framework for future action at all levels of government and private business to reduce the impact of future disaster conditions.

1.3. Scope

The plan follows a structure used in the 2012 Montgomery County Plan and most recent state plan based on the Standard Operating Guide (SOG) developed for county plan updates in Pennsylvania. By using this structure, the information in the plan will be found in similar sections as the state plan and plans prepared for other counties in the Commonwealth, thereby enabling the sharing of information and cross-referencing other plans as appropriate. Generally the plan contains several chapters which describe relevant information about hazards in the county, the planning process, recommendations for mitigating hazards and future plan maintenance responsibilities. The Community Profile Chapter of the plan provides an overview of the county and the 62 municipalities that comprise it. More detailed information about the physical and demographic features of the county are contained in Appendix H. The planning process used for this plan is documented in Chapter 3. Risk Assessment is a significant part of the plan outlined in Chapter 4. This chapter contains updated information from the 2012 Plan describing and evaluating each potential hazard. The county and study advisory committee relied upon historic information, best available research information, and predictive models to undertake this risk assessment for the county. As part of the process to evaluate hazard threats, attempts are made at estimating future losses and evaluating future trends that could change the vulnerability of the county to any of the threats. Chapter 5 describes the current capability of the county and municipal organizations to address all hazards. Chapter 6 itemizes the mitigation strategies needed to address potential threats based on community goals. Attempts are made to determine the economic, social, and environmental costs and benefits associated with each potential action given the limitations of available data. Also the county and local governmental capacities are taken into account in the development of appropriate strategies. The remainder of this chapter identifies action strategies with cost-effective and technically-feasible disaster loss reduction measures. Chapter 7 of the plan discusses the future plan maintenance procedures that the county will undertake with the help of each of the 62 municipalities and other key

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partners. Chapter 8 discusses plan adoption process. Appendices containing important data and summaries of the planning process steps are also included.

1.4. Authority and Reference

Authority for this plan originates from the following federal sources:

[Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C., as amended](#)

[National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001 et seq.](#)

Authority for this plan originates from the following Commonwealth of Pennsylvania sources:

Pennsylvania Emergency Management Services Code. Title 35, Pa C.S. Section 101 (currently under revision)

[Pennsylvania Municipalities Planning Code of 1968, P.L. 805, No. 247, as amended December 21, 1988, P.L. 1329, No. 170](#)

[Pennsylvania Stormwater Management Act of October 4, 1978. P.L. 864, No. 167](#)

The following Federal Emergency Management Agency (FEMA) guides and reference documents were used to prepare this document:

- [FEMA 386-1: *Getting Started: Building Support for Mitigation Planning.* September 2002](#)
- [FEMA 386-2: *Understanding Your Risks: Identifying Hazards and Estimating Losses.* August 2001](#)
- [FEMA 386-3: *Developing the Mitigation Plan.* April 2003](#)
- [FEMA 386-4: *Bringing the Plan to Life: Implementing the Hazard Mitigation Plan.* August 2003](#)
- [FEMA 386-5: *Using Benefit-Cost Review in Mitigation Planning.* May 2007](#)
- [FEMA 386-6: *Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning.* May 2005](#)
- [FEMA 386-7: *Integrating Manmade Hazards into Mitigation Planning.* September 2003](#)
- [FEMA 386-8: *Multijurisdictional Mitigation Planning.* August 2006](#)
- [FEMA 386-9: *Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects.* August 2008](#)
- [FEMA Local Multi-Hazard Mitigation Planning Guidance. July 1, 2008](#)
- [FEMA National Fire Incident Reporting System 5.0: Complete Reference Guide. January 2008](#)

The following Pennsylvania Emergency Management Agency (PEMA) guides and reference documents were used to prepare this document:

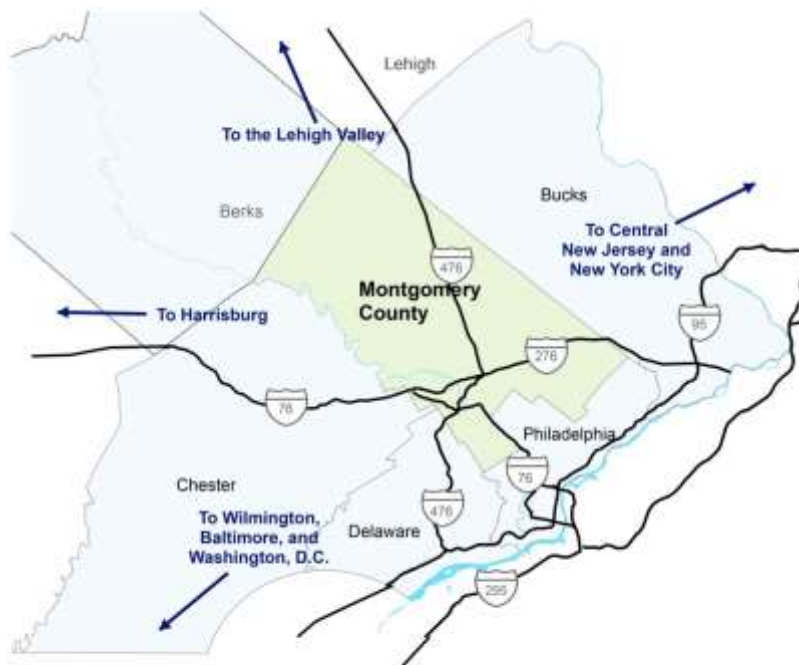
- PEMA: *Hazard Mitigation Planning Made Easy!*
- PEMA Mitigation Ideas: *Potential Mitigation Measures by Hazard Type: A Mitigation Planning Tool for Communities.* March 6, 2009

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- [PEMA Mitigation Ideas: *Potential Mitigation Measures by Hazard Type: A Mitigation Planning Tool for Communities.* January 2013](#)
- [PEMA Standard Operating Guide. October 9, 2013](#)

2. Community Profile

2.1. Geography and the Environment



Montgomery County is the third most populous county in Pennsylvania, consisting of 62 townships and boroughs, with an estimated 2016 population of more than 821,725 persons. Montgomery County, encompassing 483 square miles, is situated in southeastern Pennsylvania northwest of Philadelphia and surrounded by the counties of Bucks, Lehigh, Berks, Chester, and Delaware. The county is a diverse and historically rich community with moderately-sized towns and suburban areas near the city and large expanses of rolling hills supporting farms and woodlands in the northwestern portion of the county. Originally, the county grew as a suburb to Philadelphia with towns located along the Schuylkill River and major rail lines emanating from the city. Over the past four decades, the vast employment base in the county has spurred rapid development throughout much of the county. The county continues to grow due to local births and substantial in-migration. Since the last plan was prepared in 2012, the county has grown by an average of over 3,500 persons per year.

The county contains geological formations associated with the Triassic Lowlands found to the west of the Pennsylvania Turnpike and the Piedmont Uplands south and east of the Turnpike. The Piedmont Uplands comprise metamorphic and igneous rock (granite and schist), although it also contains a band of carbonate rock that stretches from Willow Grove to King of Prussia. Wissahickon Schist/ Granite Gneiss/ Horne-blende Gneiss/ Chickies Quartzite, and Ledger Dolomite/ Elbrook/ Conestoga Limestone are formations found in the Piedmont Uplands. The Triassic Lowlands are primarily red shales and sandstones with intrusions of diabase. Four formations: the Stockton Sandstone/ Conglomerate/ Shale, Lockatong Argillite/ Shale,

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Brunswick Shale/ Sandstone, and diabase, make up the Triassic Lowlands. Detailed descriptions of these formations can be found in the Pennsylvania Geologic Survey Publication #EG 1.

The Schuylkill River flows through the county from Pottstown Borough through Lower Merion Township--a total of 42 miles. Approximately 83% of the county's land area contributes to the Schuylkill River. Major streams draining into the Schuylkill River in Montgomery County include the Manatawny Creek, Sproegels Run, Sanatoga Creek, Mingo Creek, Perkiomen Creek, Stony Creek, Valley Creek, Plymouth Creek, and Mill Creek. The Wissahickon Creek, which includes a watershed of 53.4 square miles in the county, drains into the Schuylkill River in Philadelphia. The Sandy Run is a major tributary of the Wissahickon Creek. The Perkiomen Creek drains about half of the total area of the county and includes the tributaries of the Swamp Creek, Macoby Run, Unami Creek, the East Branch of the Perkiomen Creek, and Skippack Creek. The Neshaminy Creek, Pennypack Creek, and Tookany Creek all flow into the Delaware River after leaving Montgomery County. The county does not contain any large natural lakes, though the 814-acre Green Lane Reservoir is located near the headwaters of the Perkiomen Creek. Other smaller lakes used for water supply and recreation are located throughout the county. The county contains over 999 miles of streams.

Warm summers and mild winters characterize the climate of Montgomery County. Daily temperatures reach 90°F or above on an average of 24 days during the summer season, and the county occasionally experiences uncomfortable warm periods of light winds and high relative humidity (U.S. National Oceanic and Atmospheric Administration (NOAA)).

During the winter months, there are normally about 116 days that have minimum temperatures at or below the freezing point. Minimum temperatures of 0°F or lower generally occur one or two times per year. The July high is around 86 degrees. The January low is 21. The freeze-free season averages 170 to 200 days (NOAA).

Montgomery County averages 47 inches of rain per year. The US average is 39 inches. Measurable precipitation occurs in the county on about 78 days evenly distributed throughout the year, with maximum amounts of precipitation occurring during the late summer months. The mean seasonal snowfall is 28 inches, the lowest for the state. In 2011, over 63 inches of precipitation fell on the county, establishing a new record.

2.2. Community Facts

The county offers a mixture of land uses and natural settings. Approximately half of the county land area is residential with concentrations of retail, manufacturing, and other businesses, while large areas in the western part of the county remain in agriculture and woodlands. The greatest concentrations of population are found in the area east of the Pennsylvania Turnpike, in the Main Line primarily within Lower Merion, in the North Penn Area around Lansdale, along Old York Road in the eastern portion of the county, and around Norristown. Major employment centers are found in the City Line portion of Lower Merion, King of Prussia, Willow Grove, Fort Washington, Montgomeryville, and Plymouth Meeting.

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Montgomery County has played a vital role as a center of commerce and transportation in Southeastern Pennsylvania. With nearly half a million jobs, the County is an economic powerhouse, leading the state in manufacturing and high-tech jobs. As a result of this job wealth, large numbers of workers commute into Montgomery County each day. Even during the Great Recession, the county's economy remained strong due to the diverse nature of the businesses that comprise it. Major employment sectors include pharmaceuticals, education, mutual funds, insurance, health care, and food processing.

Montgomery County is located at the crossroads of the several major highways, including I-76 (the Schuylkill Expressway), I-476 (the Blue Route), and the main line and Northeast Extension of the Pennsylvania Turnpike. Other major highways in Montgomery County include US Routes 1, 30, 202, and 422 and Pennsylvania Routes 100, 309, and 611. Roads throughout the county are maintained by the state, county, and local municipalities. Major freight rail lines operated by Norfolk Southern Railway cross the county from east to west. Local freight yards at Abrams, Lansdale, and Stowe, and several spur lines and sidings provide rail access to many Montgomery County businesses. In addition, East Penn Rail Road runs short line rail service in central Montgomery County and the Upper Perkiomen Valley, and Eastern Berks Gateway Railroad operates short line rail service between Pottstown Borough and Boyertown in Berks County. The Southeastern Pennsylvania Transportation Authority (SEPTA) provides various forms of mass transit services in the county. SEPTA also operates the multimodal transportation center in Norristown. Philadelphia International Airport, located in Delaware County and Philadelphia, is easily accessible from the county and provides passenger and freight service to all parts of the United States plus international service. Other airports in Montgomery County include Wings Field near Plymouth Meeting, the Pottstown Airport, Perkiomen Valley Airport, Butter Valley Golf Port, and Heritage Field (former Limerick-Pottstown Airport).

PECO Energy, PPL, and Met-Ed provide electric service to county homes and businesses. Lansdale Borough and Hatfield Borough provide municipal electric service within their municipal borders. PECO Energy and UGI Corporation provide gas service.

Verizon manages most of the wired communication system in the county. Windstream Communications manages the wired communication system for a small area around Gilbertsville in the western part of the county. Numerous companies provide communication services through these systems. Additionally, wired cable systems operate throughout the county within established franchise areas. Several companies provide wireless communications service throughout the county with ever-expanding wireless communication infrastructure. Many households in Montgomery County no longer have landline-based phone service; rather, residents rely upon wireless phone service.

Nearly 85% of the developed areas in the county are serviced by public water and sewer systems. The county contains a large a waste-to-energy facility in Plymouth Township used for a majority of the solid waste disposal needs of the county. Much of the remaining waste is either recycled through robust local recycling initiatives, or is taken to nearby landfills located outside the county, as there are no operating landfills within Montgomery County.

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As one of the richest counties in Pennsylvania, Montgomery County's residents enjoy a high quality of life, served by graceful housing, good schools, quality health care facilities, extensive parks, accessible public libraries, over 141 shopping centers – including the second largest mall in the country – and excellent colleges and universities.

The county is well known throughout the Commonwealth for its fine education system. Public education is provided by the 22 active school districts in the county and nearly 100 private and parochial schools. The county's colleges and universities include: Bryn Mawr College, Ursinus College, Haverford College, Arcadia University, Ambler Campus of Temple University, Abington Campus of Penn State University, Gwynedd Mercy University, and the Montgomery County Community College, which has campuses in Blue Bell and Pottstown. County residents are served by nine general hospitals and several specialty medical facilities.

The county offers numerous open space, trails, and park facilities to support all forms of outdoor recreation. There are 54 golf courses and several other private recreation facilities located in the county. The county maintains five historic sites in addition to the various historic and cultural facilities maintained by the state and local organizations.

The county's 62 municipalities range in size from less than 500 to nearly 60,000 residents. Twenty-two operate as borough governments. Twelve municipalities are townships of the first class and 22 operate as townships of the second class. The remaining six municipalities operate under home rule charters, although two are essentially boroughs and four are townships. A listing of the municipalities and their government characteristics is included in Appendix H.

Figure 2.2.1 Montgomery County Municipalities



2.3. Population and Demographics

The population of the county has more than doubled since 1950. At that time, the county was a bedroom suburb of Philadelphia with a population of 353,068. Over the past 67 years the county has grown in many ways and now supports a population of over 821,725 (2016 estimate, US Census Bureau). Based upon projections developed by the Delaware Valley Regional Planning Commission (DVRPC), the population growth in Montgomery County is expected to continue to grow at a rate of almost 5% each decade to reach an estimated population of over 849,690 by 2025 and level off to about 889,516 in 2040. Population growth in adjoining Bucks and Chester County has been even more robust, while less growth has occurred in Philadelphia and Delaware County.

The county population as a whole will get older and become more racially and culturally diverse over the next several decades. Family structure will also change as more people will choose to live alone or in smaller, non-traditional families.

The county contains an estimated 336,904 housing units. Since 2010, 11,169 new housing units were built in the county. Generally housing growth over the past decade was slowed due to the impact of the Great Recession, though housing growth over the past two years has averaged over 2,000 units. Much of the recent increase in housing units is attributable to rental apartment projects. Over the past few years, a significant increase in the number of proposed housing units has occurred creating the expectation that the new housing construction should remain strong over the next few years.

DVRPC estimates that there were 582,443 jobs located in the county in 2015. Economic growth will also continue creating an expected 32,026 new jobs in the county by 2025.

2.4. Land Use and Development

About 93,872 acres of the county has been developed since 1970. As seen in Figure 2.4.1, most of the developed areas of the county are in the eastern half. Currently about 60% of the county is developed. The conversion of land for development has slowed over the past several years. Yet from 2010 to 2015, an additional 3,155 acres of farmland, vacant and woodland acreage were developed.

2.5. Property Valuation

The overall county assessment of all real estate property as compiled by the Montgomery County Board of Assessments is \$67,126,862,102 as of the end of 2016. Based on recent real estate market sales, the current market value of all county property would be \$124,184,695,055, nearly \$12 billion more than the property value five years ago. Personal property and other non-real estate improvements including equipment and machinery are not part of this overall property estimate.

2.6. Data Sources and Limitations

[Delaware Valley Regional Planning Commission \(DVRPC\)](#)

[Montgomery County Comprehensive Plan 2015\), *Montco 2040: A Shared Vision*](#)

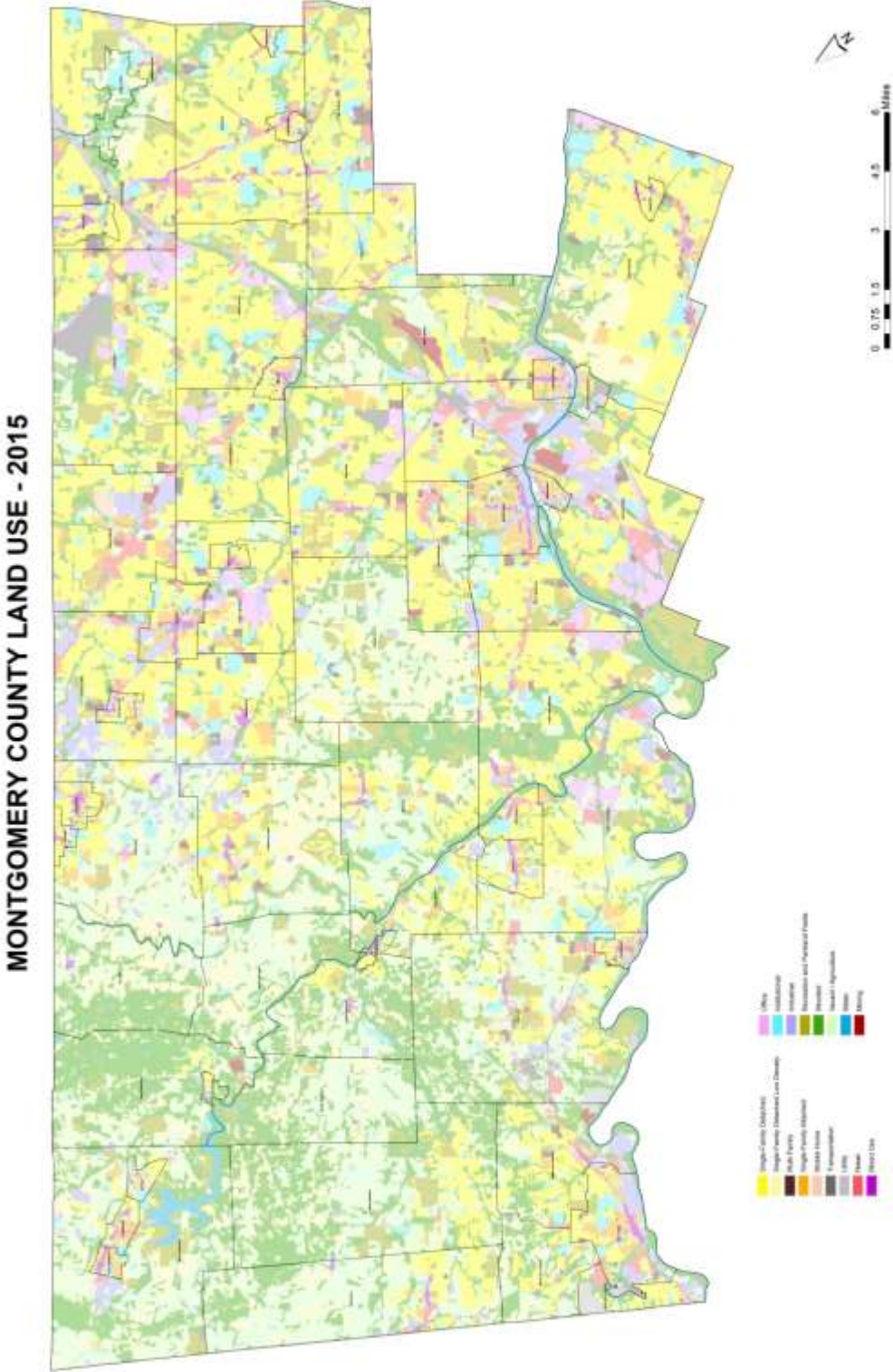
[PA Geological Survey, Department of Conservation and Natural Resources \(DCNR\)](#)

[US Bureau of Census- 2016 American Community Survey data](#)

[US National Oceanic and Atmospheric Administration \(NOAA\)](#)

[Montgomery County Board of Assessments \(BOA\)](#)

Figure 2.4.1 Existing Land Use- 2015



3. Planning Process

3.1. Update Process and Participation Summary

This chapter reviews the process employed in the development of the Montgomery County Hazard Mitigation Plan. The description includes how the plan was prepared; the people involved in drafting the plan; and the public process which guided the development of the plan. A discussion of how the plan will be maintained is included in Chapter 8 at the end of this plan.

The plan was written by various county staff and a planning committee which met periodically throughout the development of the plan. During these meetings various topics were discussed including:

- Changes in the county since 2012 (last plan)
- Meeting federal requirements
- Technical information gathering
- Identification of plan goals
- Vulnerability assessment
- Mapping
- Public involvement including meetings, workshops, and information materials
- Prioritization of mitigation measures
- Adoption strategy

While the committee preparing the plan made every attempt to comply fully with the requirements of the federal Disaster Mitigation Act (Stafford Act) and the guidelines established by FEMA for flood mitigation plan development (44 CFR 78.5), it is recognized that information was not always readily available to completely evaluate the cost effectiveness of some of the proposed projects and to accurately measure the impact of various types of hazards on the county. In the future, as more accurate information becomes available, Montgomery County will supplement and revise the plan to address these and other shortcomings.

3.2. The Planning Team

The planning team was a working group that assisted in the drafting of the plan. The planning team members attended meetings or provided comments on various draft plan materials through emails or phone calls. Key areas of the plan that the planning team focused on and made revisions to include: the hazards to be profiled, hazard vulnerability ranking, past occurrences of various hazards, the capability assessment of local and county agencies, plan goals, and mitigation action items. The insight and expertise of the planning team was important in shaping this plan. Members of the planning committee include:

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Name	Organization	Title
Lee Soltysiak	Montgomery County	Chief Operating Officer, Montgomery County
Joe Anna Haelig	MC DPS	Community Resilience Planning Specialist
Jason Wilson	MC DPS	Emergency Preparedness Director
Todd Stieritz	MC DPS	Planning Specialist
Megan Young	MCHD	Public Health Emergency Preparedness Coordinator
Kyle Schmeck	MCHD	Division of Water Quality Mgmt Director
Drew Shaw	MCPC	Environmental Planning Section Chief
Michael Stokes	MCPC	Assistant Director
Donna Fabry, CFM	MCPC	Planner II
Thomas McAneney	Abington Township	EMC
William Bradford	Limerick Township	Public Works Director
Mike DeStafano	Lower Gwynedd Township	Public Works Director
Don Sirianni	Springfield Township	Public Works Director
Dan Littley	Towamencin Township	EMC
Richard Barton	Upper Dublin Township	Community Planner Zoning Officer
Dan Supplee	Upper Dublin Township	Public Works Director
Willard Troxel	Upper Gwynedd Township	Public Works Director
John Waters	Upper Merion Township	EMC
Rich Ressel	Upper Providence Township	EMC
Scott Lynch	Whitemarsh Township	EMC

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Name	Organization	Title
Sara Schmidt	Exelon/Limerick Generating Station	Emergency Preparedness Specialist
Suzanne Ryan	PECO	Government Relations
Mike Green	Holy Redeemer Hospital	Director of HIM
Chris Wilcox	Ursinus College	Campus Safety Officer
Amy Lane	SEI Corporation	Public Relations Director
Roberta LaRocca	Merck	Associate Director, Business Resilience Center of Expertise, Global Security
Marianne Weldon	SPAFR- Bryn Mawr College	Historic Collections Manager
Phil Joel	PECO	

3.3. Meetings and Documentation

Municipal involvement was an important factor in shaping the plan to address local needs and concerns. The municipal and public involvement process is summarized below. This process included workshop meetings, an information survey, other presentations, and individual meetings with municipal officials.

Appendix G provides an overview of the public involvement including a list of workshop attendees, PowerPoint presentations, web site notices, and relevant outreach materials. Appendix N lists the participation of each municipality in the plan process.

MCPC and county Public Safety Department personnel took part with representatives from surrounding counties and the City of Philadelphia in a regional hazard mitigation workshop at DVRPC on April 25, 2016. At that time it was announced to all of the representatives from surrounding counties that Montgomery County was preparing an update of the 2012 Hazard Mitigation Plan.

The initial workshop for the plan was held on May 18, 2016, with various emergency management personnel and other key municipal and utility representatives in attendance.

The information survey contained in Appendix F, Municipal Threat Assessment, was initially made available to all municipalities in August 2016. Several email follow up requests were made after that date. Information from completed survey forms was used to develop the plan. A briefing about the information collected from the survey was provided to Montgomery County municipal managers and other municipal officials on November 18, 2016. Additionally, the completed surveys will be kept on file to assist in the implementation of this plan.

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Additional coordination with municipalities occurred through individual meetings and presentations at a training session on risk assessment held on April 18, 2017. On July 11, 2016, a presentation was made to the MCPC Board. Copies of the draft plan were also sent to the surrounding counties on November 22, 2017.

The Advisory Committee met throughout 2017 to review the draft plan. Meetings took place at the County's Emergency Operations Center on May 19, August 25, October 13, and November 3. During these meetings, committee members discussed progress within their communities in addressing hazards, and also considered additional threats for inclusion into the plan, including invasive species and cyberterrorism.

Public workshops were held November 16 and November 28 to review the draft plan. During these workshops, an overview of the plan was provided through a PowerPoint presentation. Additional copies of the plan recommendations were also made available at both meetings. Comments on the draft plan discussed during the meetings have been incorporated into the final plan.

3.4. Public and Stakeholder Participation

The public was made aware of the plan through various types of media, including social media and print media (see Appendix G for examples of outreach materials). A flyer featuring an overview about the plan update and process was featured at Montgomery County Planning Commission's table at the Montgomery County Association of Township Officials (MCATO) Annual Conference in February 2017. This flyer was also posted on the Department of Public Safety's website (<https://www.montcopa.org/132/Public-Safety>).

Workshop fliers were distributed to managers and emergency management staff at all 62 municipalities and posted in municipal buildings. Key social media used included: Facebook (<https://www.facebook.com/Montgomery-County-Planning-Commission-181442168555334/>), website (<https://www.montcopa.org/2873/Montgomery-County-Hazard-Mitigation-Plan>), and blog (<https://www.montcopa.org/Blog.aspx?IID=100>). The county planning commission website provided information about the planning process as well as the text of the draft plan.

An announcement about the draft plan, which included public meeting dates and a link to the plan online, was emailed to the emergency management coordinators at neighboring counties (Berks, Bucks, Chester, Delaware, Lehigh and Philadelphia), as well as to the Executive Director of the Delaware Valley Regional Planning Commission, which is the federally-recognized Metropolitan Planning Organization for the nine-county region that covers southeast Pennsylvania and southern New Jersey. A mass email notification about the plan was also sent out through the Mass Notification system on the Everbridge platform to 15,159 county-based subscribers in advance of the public meetings. Public comment forms were distributed to all of the attendees at each workshop.

Outreach efforts also targeted the business community and the cultural and historic resources communities through professional organizations. Montco First is an organization comprised of representatives from companies with large footprints in Montgomery County. Members include

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Merck, Pfizer, Inc., PJM (electricity wholesaler), and SEI Investments Company. The draft plan was circulated among the At-large Membership of Montco First with a request for feedback. The Suburban Philadelphia Alliance for Response aims to link the cultural heritage institutions of the Southeastern Pennsylvania region, including Montgomery County, with emergency response organizations as well as fostering communication and education while preventing and mitigating the loss of cultural and historical collections in the event of a disaster. Members of this network operating in Montgomery County include educational institutions including Bryn Mawr College and Haverford College. The draft plan was distributed to the At-Large Committee, which includes representatives from Bucks, Chester, Delaware, and Montgomery counties.

The comment period on the plan was held between November 16 and December 8, 2017. During that time the plan was available for review on the county's web site and promoted through social media. All comments received during this process were considered in the revisions to this plan.

3.5. Multi-Jurisdictional Planning

The county adopted its comprehensive plan, *Montco 2040: A Shared Vision*, on January 15, 2015. Additionally, the county public safety department and planning commission have prepared various plans and special studies in the past that addressed hazard issues such as flooding. Each municipality in the county has also prepared and updated comprehensive plans and special studies addressing local concerns, including flooding. Every attempt was made in preparing this document to incorporate key recommendations within these plans and studies. This plan builds upon those efforts to make the county more resistant to the negative impacts associated with likely hazards.

3.6 Existing Planning Mechanisms

There are several federal, state, regional, county, and municipal planning mechanisms that are consistent with and support the fulfillment of county hazard mitigation goals. A summary of these mechanisms that were consulted in the development of this plan are listed below.

Planning Mechanism	Managing Agency	Approval Date	Summary of Action
Montgomery County Comprehensive Plan	MCPC	2015	Adopted by Commissioners 1/2015
Model Land Use Ordinances	MCPC		Model Floodplain ordinance developed 2011
Stormwater Management Plans (Act 167)	MCPC	Various dates	Plans are developed by watershed

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Floodplain Ordinance Review and Approval	MCPC and Montgomery County Conservation District	Various dates (effective FIRM date is 3/2/2016)	Review all 62 ordinance updates under FIRM update process
Nuclear Radiological	PA DEP and MC DPS	Various dates	
PA Dam Safety Program	PA DEP and MC DPS		Review plans for all priority dams
PA Greenways Initiative	PA DCNR, MCPC, MC Parks and Heritage Services Division		Acquire and protect lands along the major waterways in the county.
Comprehensive Emergency Management Plan	MC DPS	Continuously updated	Addresses all phases of emergency management
Montco 2040 Implementation Grant Program	Montgomery County	2016	Montgomery County provides \$1 million in grant funding to municipalities to address specific plan implementation needs.
Impaired Waters and TMDLs	PA DEP		Water quality program to implement clean streams standards
Uniform Construction Code	PA Labor and Industry and local municipalities	Various dates	All municipalities have adopted.

Montgomery County Comprehensive Plan

[Montco 2040: A Shared Vision](#) is Montgomery County's comprehensive plan adopted in January 2015. It reflects the input of thousands of citizens, county officials, and a steering committee made up of many diverse stakeholders. The plan was prepared by the county planning commission in accordance with the PA Municipalities Planning Code and was adopted by the County Commissioners in January 2015.

The plan provides goals and implementation steps for managing the county's built environment in accordance with three themes: Connected Communities, Sustainable Places, and Vibrant Economy.

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The implementation of the Montgomery County Hazard Mitigation Plan is recognized under the Sustainable Places theme on page 58.

Model Ordinances and Design Guidebooks

Several model ordinances and guidebooks were prepared over the last 5 years addressing flood plain management, signs, townhouse development, parking lots and Model Ordinances and adaptive reuse of institutional properties. All of the model ordinances and design guidebooks prepared by the Planning Commission include:

[Accessory Homes](#)

[Small Lot Singles](#)

[Mixed Residential \(Village Residential District\)](#)

[Workforce Housing](#)

[Rural Residential District](#)

[Transfer of Development Rights \(TDRs\)](#)

[Floodplain Protection](#)

[Residential Office District](#)

[Riparian Corridor Conservation District](#)

[General Commercial District](#)

[Subdivision and Land Development](#)

[Village Mixed Use District](#)

[New Town Mixed Use](#)

[Land Preservation District](#)

[Town Center](#)

[Sustainable Green Parking Lots](#)

[Model Sign Ordinance](#)

[Building Better Townhouse Communities](#)

[Rethinking Institutional Properties](#)

The model ordinances on riparian corridors and floodplain management specifically address flooding the county's most significant natural threat. Other model ordinances contain design guidelines which further promote reduction in flooding. The concentration of development and

the promotion of infill development advocated in many of these model ordinances also can reduce vulnerability of the county to various threats.

Planning By Design

The Planning Commission also has promoted a Planning by Design Series of educational publications that feature short, informative summaries of the following topics: Green Streets, Green Parking Lots, Sustainable Paving, Stormwater Bioswales, Drainage Swales, and Basins, Traffic Calming Devices, Pedestrian Amenities, Cul-De-Sac Islands, Woodland Edge Treatments, and Street Trees. These publications address flood reduction, landscaping to avoid power system disruption, and safe transportation.

Municipal Comprehensive Plans

All municipalities with the exception of Narberth Borough have adopted comprehensive plans. During the past five years comprehensive plans were revised and updated in the following municipalities: Ambler Borough, Norristown, West Conshohocken Borough, Whitpain Township, Lower Merion Township, Pottstown Borough, Cheltenham Township, Royersford Borough, and Springfield Township. Regional plans were prepared for the Indian Valley Region (6 municipalities adopted) and Central Perkiomen Region (7 municipalities adopted). Sustainability plans addressing flooding and stormwater management among other sustainability focused issues were prepared for Pottstown and Collegeville over the past five years. Over the past five years, open space plan amendments which seek to preserve key natural areas such as stream corridors and greenways were prepared for Whitmarsh Township, Upper Frederick Township and Upper Providence Township. A plan for the Whitmarsh and Conshohocken riverfront was prepared to demonstrate various compatible recreation uses for the Schuylkill River flood plain through both municipalities. Whitpain Township prepared a Revitalization Plan for the West Ambler community which has been impacted by flooding over the past several decades. This plan addresses both the flooding vulnerability as well as the safe adaptive reuses of a large remediated asbestos waste site in the borough.

Municipal Ordinance updates.

From January 2013 through the end of December 2017, Montgomery County received 120 zoning ordinance amendments, 168 zoning map amendments, and 460 zoning text amendments. During that same period, 38 subdivision and land development ordinance amendments were submitted. Significant zoning ordinance amendments included revised floodplain regulations submitted by all 62 municipalities. Also, Plymouth Township submitted zoning regulations to address sinkhole vulnerability during that time. These ordinances are prepared, revised or updated in accordance with the PA Municipalities Planning Code. That same law requires municipalities to submit the proposed ordinance amendments to county planning commissions for review. The Montgomery County Planning Commission conducted reviews and submitted review letter reports on all submitted ordinances. As part of the review, the Montgomery County Planning Commission considered relevant plans and studies such as the 2012 Hazard Mitigation Plan.

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No new stormwater plans were completed during the past five years due to a lack of state funding.

Other important plans and studies undertaken in the past five years include:

[Tookany Creek Flood Damage Reduction Feasibility Study](#) – US Army Corps of Engineers

[Flooding and Stormwater Management Plan for the Ambler Area Watersheds](#) – Center for Sustainable Communities, Temple Ambler

[A Vulnerability and Risk Assessment of SEPTA's Regional Rail](#)- ICF International for the Federal Transit Administration

4. Risk Assessment

4.1. Update Process Summary

A listing of emergency declarations involving Montgomery County is also provided in Appendix J. From this disaster declaration data, flooding appears to be the single greatest hazard in Montgomery County. Other weather related, geologic, human caused, technological failure, and wildfire hazards that potentially threaten the county are described in this chapter. Most natural hazards occurring in the county result from both geologic and weather-based features and processes. In addition, wildfires and floods can occur due to both factors as well as human impact. Human caused hazards are a result of various incidents, individual or group actions, and errors including technological failure.

Information on potential hazards in Montgomery County is provided below based upon various sources including several local, state, and federal level agencies, university scientific research, citizen groups, and county records. Our capabilities to accurately predict when any hazard will occur and the impact of it at any time are limited. Predictions result from past information, reasonable analysis and limited modeling available to us.

In assembling the information contained in this section, tools such as the county GIS were employed. GIS, digital ortho-photography, and LIDAR enabled manipulation of spatially tied data to better analyze widely dispersed information at common scales. In Montgomery County, an interagency team, involving the public safety office, is currently creating a strategic management plan to expand the role of GIS to more fully integrate county operations and utilize various applications to improve the overall ability of the county staff to respond various needs. The county intends to utilize this tool to the extent possible in developing applications to enhance response to disaster and provide targeted warnings to potentially impacted residents. In compiling the information for this risk assessment, specific property-based information was used, particularly related to flood impact. This information has been generally characterized in the plan, but references to specific properties are not made in the plan. The address-specific information will remain confidential and be used to evaluate future hazard mitigation projects and grant priorities.

4.2. Hazard Identification

4.2.1. Summary of Hazards

The vulnerability of the county to the various hazards is summarized on Figure 4.2.1.1. This table is based upon the analysis provided in this section and was reviewed during review committee meetings. Each municipality also had the opportunity to complete a survey distributed through Survey Monkey which asked, among other things, which type of disaster they were most vulnerable to. The results of this survey are contained within the summary of vulnerability for the county as a whole. Additionally, the municipal results and survey form are

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contained in Appendix F. The individual responses illustrate the differences in perceived vulnerability among different municipalities.

Avalanche, coastal flooding, expansive soils, tsunamis, and volcanoes were not considered, since they are not hazards that could occur in Montgomery County. Based on discussion with the planning committee, pandemic/ infectious disease was added to the plan. The committee felt that the impact of invasive species should be added in future plans.

Figure 4.2.1.1: Summary of Potential Hazards

Natural Hazards	Frequency of Occurrence	Severity of Disaster	Extent of Disaster	Perceived threat
Drought	Generally occurs a few times each decade.	Drought can be particularly damaging to agriculture and other green industries.	Drought would impact the entire county though it will have a more pronounced impact in rural areas.	Moderate.
Earthquake	Unlikely, only one earthquake event reported with an epicenter in the county over the past 50 years.	No history of severe earthquakes causing damage in eastern Pennsylvania.	Major damage could occur near epicenter of an earthquake in the county, though there is no history of damaging earthquakes in Pennsylvania.	Low
Extreme Temperature	Often the county will have a few days of extreme cold during the winter months and extreme warm and humid weather in the summer months.	The extreme cold by itself will not create a significant problem unless combined with utility outages or winter storms. Though uncomfortable and unhealthy to older residents, extreme heat does not cause county disasters. If coupled with drought conditions, significant crop damage may result.	Generally extreme cold and warm conditions will affect the entire county.	Moderate

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Natural Hazards	Frequency of Occurrence	Severity of Disaster	Extent of Disaster	Perceived threat
Floods, Flash Floods and Ice Jams	Floods occur in various streams throughout the county, including the Schuylkill River in Pottstown Borough (Boro), Upper Providence Township (Twp), West Norriton Twp, Norristown, Bridgeport Boro and Lower Merion Twp; Perkiomen Creek in Collegeville Boro; Wissahickon Creek including the Sandy Run in Abington Twp, Upper Dublin Twp, Ambler Boro, and Whitemarsh Twp; Pennypack Creek in Upper Moreland Twp, Hatboro Boro, and Lower Moreland Twp; Tookany Creek in Cheltenham Twp.	Some floods have caused major disasters in parts of the county with severe property damage and loss of life. Evacuations and displacement of families for significant periods of time has occurred during floods. Floods and flash floods are common; ice jams are rare.	Approximately 2.5% of the county is located in flood prone areas. It is estimated that 2,648 buildings are located in the 1% probability flood plain area.	High
Hail	Hail storms pop up in the county several times in a year during late spring and summer.	No major problems have been reported due to hail, though localized property damage and crop damage could be significant.	Hails storms generally cover a small area and occur very briefly, yet they can occur anywhere.	Low
Hurricanes, Tropic Storms, Northeasters	The tracks of hurricanes rarely cross the county, though the impacts of hurricanes along the east coast can cause flooding and wind damage in the county.	Hurricanes can cause significant disaster, though the distance from the coast reduces the potential severity of a hurricane.	Typically hurricane impacts can occur over a wide area which could include the entire county.	Moderate
Landslide	Landslides are unlikely in most of the county due to lack of steep slopes and extreme wet and dry weather.	Severity related to extent of slope and development downhill. Generally those conditions don't exist in the county.	Localized within limited steep slope areas found in the county.	Low
Lightning	Lightning storms occur many times each year.	Lightning by itself is not likely to create a significant disaster.	The direct impact of lightning is local; power outages caused by lightning can be extensive.	Moderate

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Natural Hazards	Frequency of Occurrence	Severity of Disaster	Extent of Disaster	Perceived threat
Pandemic/ Infectious Disease	Influenza generally occurs annually to varying scales	Based on intensity and extent of illness.	Based on intensity and extent of illness. Seniors, children and people with compromised immune systems are at higher risk for infection.	Moderate
Radon	Relatively common	Long term exposure to elevated radon may cause cancer.	Long-term impact and found in specific locations.	Moderate
Land Subsidence/ Sinkholes	Possible only in areas underlain with Conestoga Limestone and Ledger Dolomite. Several sinkholes have been reported in the King of Prussia and the Plymouth Meeting area over the past 40-years.	Generally not catastrophic, but can result in property damage and need to refill sinkhole cavity.	Localized in areas with limestone/ dolomite geology.	Low countywide, moderate in Upper Merion, Whitemarsh, and Plymouth Townships
Tornado, Severe Wind	Fifteen tornadoes have been reported in last 50 years. Possible a few times a year in various locations throughout the county. Generally associated with various types of storms.	Potential exists for severe damage similar to the 1994 tornado in Limerick Township. For most severe wind events moderate property damage may result. Utility disruptions and traffic accidents may be caused by wind storms.	Tornadoes generally damage a defined corridor. Wind storms are generally short-term and localized.	Moderate
Wildfire	Approximately 47 wildfires have been reported in the county consuming less than 30 acres and causing no significant property damage.	Not likely to be a disaster due to extent of undeveloped lands.	Any wildfires would be very localized due to lack of large forests or range lands.	Low
Winter Storms	A variety of winter storms have struck the county over the last 50 years.	The severity of the disaster associated with winter storms is due to the disruption of utilities and basic services, including transportation systems.	Generally storms will affect the entire county.	High

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Human-Made Hazard	Frequency of Occurrence	Severity of Disaster	Extent of Disaster	Perceived Threat
Building or Structure Collapse	A few small structures have collapsed in the past for a variety of reasons.	The impact of structure collapse is limited to a small area.	Generally buildings are in excellent condition and comply with local codes.	Low
Civil Disturbance	A few civil disturbance events have occurred in the county.	There have been no group behavior patterns occurring in the recent past that would suggest the likelihood for civil disturbance.	A civil disturbance in the county would only impact a small area.	Low
Cyber Security Breach	Various types of cyber-attacks occur with increased frequency over the past few years.	As more common infrastructure and various services and communications depend upon internet and digital technology, cyber-attack could result in severe impacts.	Impact from a successful cyber-attack could impact the entire population directly on due to impact on the operation common infrastructure.	Moderate
Dam Failure	Dams in the county are generally maintained with no history of failure	Most dams in the county are not large with generally small populations living below them.	The potential extent of dam failure disaster varies with each dam, though for most days, the impact area would be very small.	Low
Environmental Hazard	Various chemical releases to the environment occur in the county, though most are not serious.	In most cases, environmental releases do not cause significant damage, though there is the potential for significant health and safety impacts associated with a major toxic release.	Most chemical releases or plumes are localized or contained within a defined stream corridor.	Moderate
Levee Failure	Montgomery County has only one small levee system.	Levees play such a small role in county flood protection.	A levee system serves one neighborhood in Cheltenham Township.	Low
Nuclear Incident	The Limerick Nuclear Power Plant is a significant potential	A major radioactive release from the	All of the county would be impacted	Moderate

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Human-Made Hazard	Frequency of Occurrence	Severity of Disaster	Extent of Disaster	Perceived Threat
	source of radiation due to the large amount of radioactive material both used and stored on site.	Limerick Power Plant, though extremely rare, could result in catastrophic impacts.	from a major radioactive release incident at the power plant.	
Terrorism	Incidents of terrorism could occur anywhere. The county, however, does not contain any significant terrorist targets that are unprotected.	A terrorist attack could be catastrophic involving a nuclear weapon or long term destruction of water and food supplies.	A catastrophic attack involving nuclear weapons could impact the entire county and region.	Low
Transportation Accident	A high volume of traffic flows through Montgomery County each day.	Most transportation accidents would not create a significant community disaster.	Most vehicle crashes would have very localized impacts. A train accident with a significant chemical release or a major aircraft accident could have wider reaching impact.	Moderate to High
Urban Fire and Explosion	Fires occur commonly in the county. Yet, the first responders located in the county are able to contain blazes so that most damage is relatively minor in extent.	Most fires are limited to a particular structure, though the potential always exists for a wider impact fire in developed areas of the county.	Large fires could occur in the county, though most properties are not conducive to major fire outbreak and response to fire calls is swift throughout the county.	Low to Moderate
Utility Interruption	Several major utility lines cross the county.	Utility interruption by itself may not cause a significant disaster situation unless the period of interruption is long or utility interruption occurs during periods of extreme weather.	Utility interruption could be extensive if major infrastructure elements fail, though system redundancy and quick response for repairs would limit the extent of the disruption.	Moderate to High



4.3. Hazard Profiles

4.3.1. Drought

Drought conditions occur periodically in the county during low rainfall periods. Droughts are generally defined as a period of prolonged dryness that contributes to the depletion of groundwater and surface water yields. These dry periods can occur as a result of long-term global weather patterns potentially causing droughts that last for a period of several years.

4.3.1.1. Location and Extent

During average climatic conditions, Montgomery County and the rest of the Commonwealth of Pennsylvania are water rich, when compared to many other states across the United States. (see [PA State Water Plan](#)) Since climatic conditions vary over time producing periods of dry weather conditions, Montgomery County is subject to periodic drought conditions that limit available water supplies. Droughts are regional climatic events which can impact various sized areas ranging from several counties in Pennsylvania, the entire Delaware River Basin, or the state as a whole.

4.3.1.2. Range of Magnitude

Droughts can have different effects, depending upon their timing, severity, duration, and location. Some droughts may have their greatest impact on agriculture, while others may impact water supply or other water use activities such as recreation. Most droughts cause direct impacts to aquatic resources which in turn impact human activities such as water supply use and recreation.

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Drought events are defined by rainfall amounts, vegetation conditions, soil moisture conditions, water levels in reservoirs, stream flow, groundwater recharge, agricultural productivity, or economic impacts. Hydrologic drought events result in a reduction of stream flows, reduction of lake/reservoir storage, and reduced groundwater levels. These events have a significant adverse impact on public and private water supplies for human consumption, rural water supplies for livestock consumption and agricultural operations, water quality, natural soil water, or irrigation water for agriculture, soil moisture, and water for navigation and recreation. Droughts can also create conditions conducive to wildfire events.

Pennsylvania uses the following five drought condition indicators: precipitation deficit, stream flow, lowered groundwater levels, soil moisture, and water supply reservoir storage.

Precipitation Deficits: The earliest indicators of a potential drought are precipitation deficits, since rainfall and snow resupplies ground and surface water resources. The National Weather Service compiles long-term monthly averages of precipitation for each county. These averages are updated at the end of each decade, based upon the most recent 30 years, and are considered “normal” monthly precipitation. When rainfall continues below these averages, precipitation deficits occur.

Stream Flows: After precipitation, stream flows provide the next earliest indication of a developing drought. Stream flows typically lag one to two months behind precipitation in signaling a drought. The U.S. Geological Survey (USGS) maintains a network of 12 stream gauges across the county. Across the state, the Department of Environmental Protection (DEP) currently uses 73 of these gauges, equipped with satellite communication transmitters, as its drought monitoring network.

Groundwater Levels: Groundwater is usually the third indicator of a developing drought. Groundwater typically lags two to three months behind precipitation, largely because of the storage effect. About 80 trillion gallons of groundwater are stored throughout Pennsylvania enough to cover the entire state with more than eight feet of water. Therefore, precipitation deficits can accumulate for several months before the resultant lack of groundwater recharge becomes clearly evident in groundwater levels.

The USGS also maintains a network of groundwater monitoring wells, including at least one well in each county. The Montgomery County well used by USGS is a non-producing well owned by the North Penn Water Authority in Lansdale. The USGS has continually monitored groundwater depth in this Triassic shale aquifer well since 1997. Groundwater level is used to indicate drought status in a manner similar to stream flows. The Montgomery County Health Department (MCHD) has developed a more complete groundwater monitoring network for the county. The monitoring network includes 18 wells, several of which are on public property, located in different geological settings throughout the county. Since July 2005, the MCHD has been measuring the elevation of the groundwater at each well on a monthly basis to determine changes in the water table. However, MCHD does not have data for all 18 wells back to 2005. This information is made available under the [USGS Groundwater Watch](#).

Soil Moisture – Palmer Drought Severity Index: Soil moisture information is provided by the

Montgomery County 2017 Hazard Mitigation Plan

National Oceanic and Atmospheric Administration (NOAA) in the form of the “Palmer Drought Severity Index (PDSI).” The Palmer Index is a computed value, based on a number of meteorological and hydrological factors; it is compiled weekly by the Climate Prediction Center of the National Weather Service. Palmer values of –2.00 to –2.99 indicate a watch status; values of –3.00 to –3.99 indicate warning; and values of –4.00 and less indicate emergency. The Palmer Indices are available for the 10 Palmer regions of the state. Montgomery County is located in region 3.

Water Supply Reservoir Storage: Storage in several large public water supply reservoirs is the fifth indicator used for drought monitoring in Pennsylvania. Depending on the total quantity of storage and the length of the refill period for the various reservoirs, drought stages associated with the level of drawdown have been established for key reservoirs. The Delaware River Basin Commission (DRBC) has established drought triggers based upon the water levels in key New York City Reservoirs in the headwaters of the Delaware River.

DEP and the Pennsylvania Emergency Management Agency (PEMA) manage droughts based on a three-stage process. Drought indicators are used to identify the overall water supply conditions. These indicators are used by DEP, DRBC, and PEMA to initiate various actions. While some of the indicators could be used as well to help identify meteorological, agricultural, or other types of droughts, the primary objective is to identify and manage water supply droughts.

Generally, when three or more of the indicators are signaling a *drought watch* condition for a county or group of counties, DEP will notify PEMA of the developing conditions and will ask PEMA to convene a meeting of the Commonwealth Drought Task Force. This group includes membership from most of the state agencies, particularly those whose operations or programs may be impacted either by droughts directly or by drought management operations. Based upon recommendations from the Task Force, including direction from the Governor, the Secretary of DEP may issue a drought watch on behalf of the Governor. Press releases are issued to the media and letters are sent to all public water suppliers in the affected area, notifying them of the need to monitor their own supplies and begin following their drought contingency plans and to update their plans if necessary. Citizens are requested to voluntarily reduce water usage by about five percent. DEP increases its monitoring activities from monthly to weekly and begins to monitor the status of public water suppliers in the affected area. Regular meetings of the task force are also scheduled to review developing conditions.

When the indicators signal a warning condition, the Secretary of DEP on behalf of the Governor follows a similar process, leading to a *drought warning* announcement. Press releases are issued to the media and letters are again sent to all public water suppliers in the affected area, notifying them of the developing conditions. Citizens are asked to voluntarily reduce water use by 10-15 percent. Frequency of Task Force meetings may be increased as well.

If drought conditions persist, the Governor may issue a proclamation of *drought emergency*. Upon issuance of the emergency proclamation by the Governor, Chapters 118, 119 and 120 of the Emergency Management Regulation become effective. When sufficient

data becomes available for the newly established county groundwater monitoring network, the county may issue localized drought warnings based upon the findings of MCHD working with the USGS regional office. During drought emergency conditions, the Montgomery County Drought Task Force meets regularly to coordinate various response measures and make recommendations to the state. The task force was appointed by the County Commissioners and is chaired by representatives of MC PSD and MCHD.

Local Water Rationing: Although not a drought phase, local municipalities may, with the approval of the PA Emergency Management Council, implement local water rationing to share a rapidly dwindling or severely depleted water supply in designated water supply service areas. These individual water rationing plans, authorized through provisions of the Pennsylvania Code (Chapter 120), will require specific limits on individual water consumption to achieve significant reductions in use. Under both mandatory restrictions imposed by the Commonwealth and local water rationing, procedures are provided for the granting of variances to consider individual hardships and economic dislocations.

4.3.1.3. *Past Occurrence*

From 1980 through 2011, Montgomery County has had six drought emergencies of varying lengths occurring from 11/18/80-4/20/82; 4/26/85-12/19/85; 9/20/95-11/8/95; 7/20/99-9/30/99; 2/12/02-6/14/02; and 9/5/02-11/7/02. Additionally *drought warnings* have occurred during 13 of the last 31 years, and drought watches have been called during 12 of the last 31 years. Some major droughts impacting Montgomery County before 1980 occurred between 1961-67, and 1979-81. The worst drought experienced in the county occurred in the early 1960s. For a period of nearly six years, drought conditions prevailed throughout the Mid-Atlantic Region including the entire Delaware River Basin. As a result of this drought, various water resource projects were developed to expand water supply sources. Since 2013, the county has enjoyed average and above precipitation. In November 2016 the county was placed in drought watch status due to lowered groundwater and soil moisture conditions. That watch status was lifted in May 2017.

4.3.1.4. *Future Occurrence*

It is difficult to forecast the severity and frequency of future drought events in Pennsylvania. However, work performed by Justin Sheffield and Eric Wood (2007) shows that there has been relatively little change in PDSI values over the 50-year period ending in 2004. This research is interpreted to indicate that soil moisture and drought conditions can be relatively equivalent to the average PDSI values experienced over the period 1954 to 2004. Historically, most of the Commonwealth is under a drought warning or emergency 5-10% of the time. Note that these conclusions are based on past occurrences over a relatively short record period which may not represent adequate statistical sampling.

Uncertainty regarding the future occurrence of droughts exists due to the potential impacts of climate change. The Pennsylvania Climate Impacts Assessment Report published in 2009 projected warmer and wetter conditions over the next 20 years. By late century, the median projected trend in annual precipitation is an increase by six to 10 percent. Most of this increase is expected to occur during winter, but coupled with warmer temperatures most of the

precipitation will be as rainfall. The report also concluded that it is likely that Pennsylvania's precipitation will become more extreme in the future, with longer periods of drought interspersed by an increased frequency of extreme precipitation events.

More accurate estimates of future drought events require improvements in climate modeling and increased understanding of the processes underlying drought behavior.

4.3.1.5. *Environmental Impacts*

Environmental impacts of drought include:

- Hydrologic effects – lower water levels in reservoirs, lakes, and ponds and reduced stream flow
- Loss of wetlands
- Groundwater depletion and land subsidence
- Impairment of water quality such as increased water temperature and higher concentration of dissolved solids
- Impairment to the health of animal species – lack of feed and drinking water; disease; loss of biodiversity; migration or concentration; and reduction and degradation of fish and wildlife habitat
- Damage to plant communities – loss of biodiversity; loss of trees from urban landscapes and wooded conservation areas
- Increased number and severity of wildfires
- Reduced soil quality and fertility
- Air quality effects – dust and particulates
- Loss of quality in landscape

4.3.1.6. *Vulnerability Assessment*

As a hazard, droughts primarily impact water supply and agricultural land. All areas of the county are vulnerable to the effects of water supply reductions, but some municipalities that depend upon shallow individual groundwater wells or wells in Diabase geologic formations with generally low yields are most vulnerable to drought conditions. Other areas of the county are serviced by water suppliers that have multiple water sources or are interconnected with other water suppliers. Municipalities with residents or businesses most vulnerable to ground water supply loss include: Marlborough Township, Salford Township, Upper Pottsgrove Township, and New Hanover Township. In these communities, several homeowners have experienced a disruption in water supply during past droughts. In many cases, they were able to obtain water by deepening their wells or hydro-fracking. Municipalities with large concentrations of farming include: New Hanover Township, Douglass Township, Franconia Township, Upper Frederick Township and Upper Hanover Township. In these communities agricultural yields are more likely to be affected by drought hazards. Total crop, fruit, and nursery yields are about \$18 million. A drought could reduce these crop yields significantly. A prolonged and very severe drought could completely wipe out existing crops in any given year as well as do sustained damage to pasture lands, fruit trees, and nursery stock.

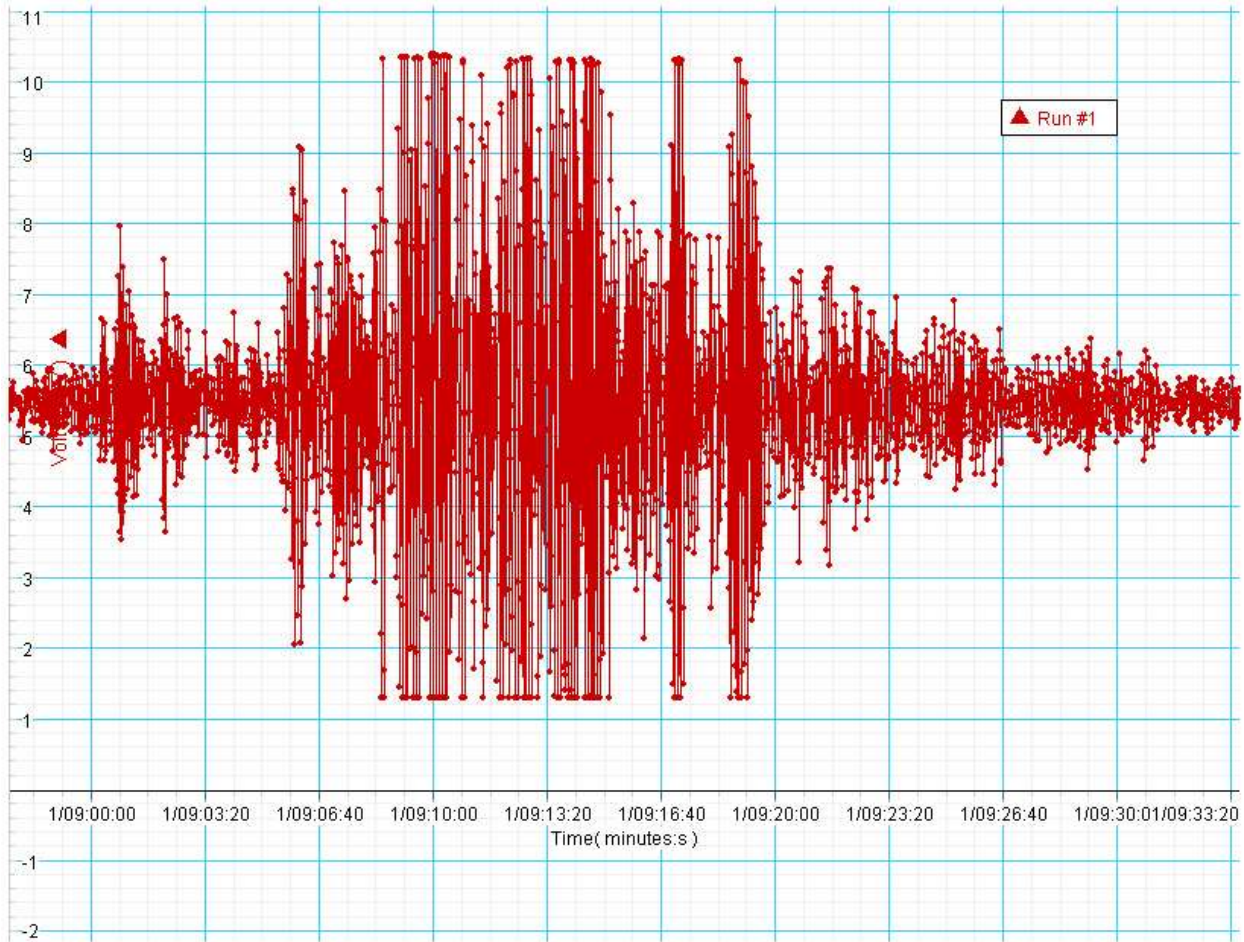
4.3.1.7 *Additional Information*

[Drought in Pennsylvania Publication](#)

[USGS](#)

[Montgomery County Health Department Groundwater Monitoring Network](#)

[PA DEP Website](#)



4.3.2. Earthquake

Earthquakes have long been feared as one of nature's most damaging geologic hazards. Earthquakes continue to remind us that nature still can strike without warning and, after only a few seconds, leave casualties and damage in its wake. Earthquakes are also a reminder that we live on a constantly changing planet. The Earth's outer surface is broken into plates which are constantly moving very slowly. As each plate moves under, over, or past another, significant forces can build up which result in a sudden movement of the land surface, known as an earthquake. Typically an earthquake may only involve the movement of the earth surface by a few millimeters, though a very large earthquake may result in movement of a meter or more.

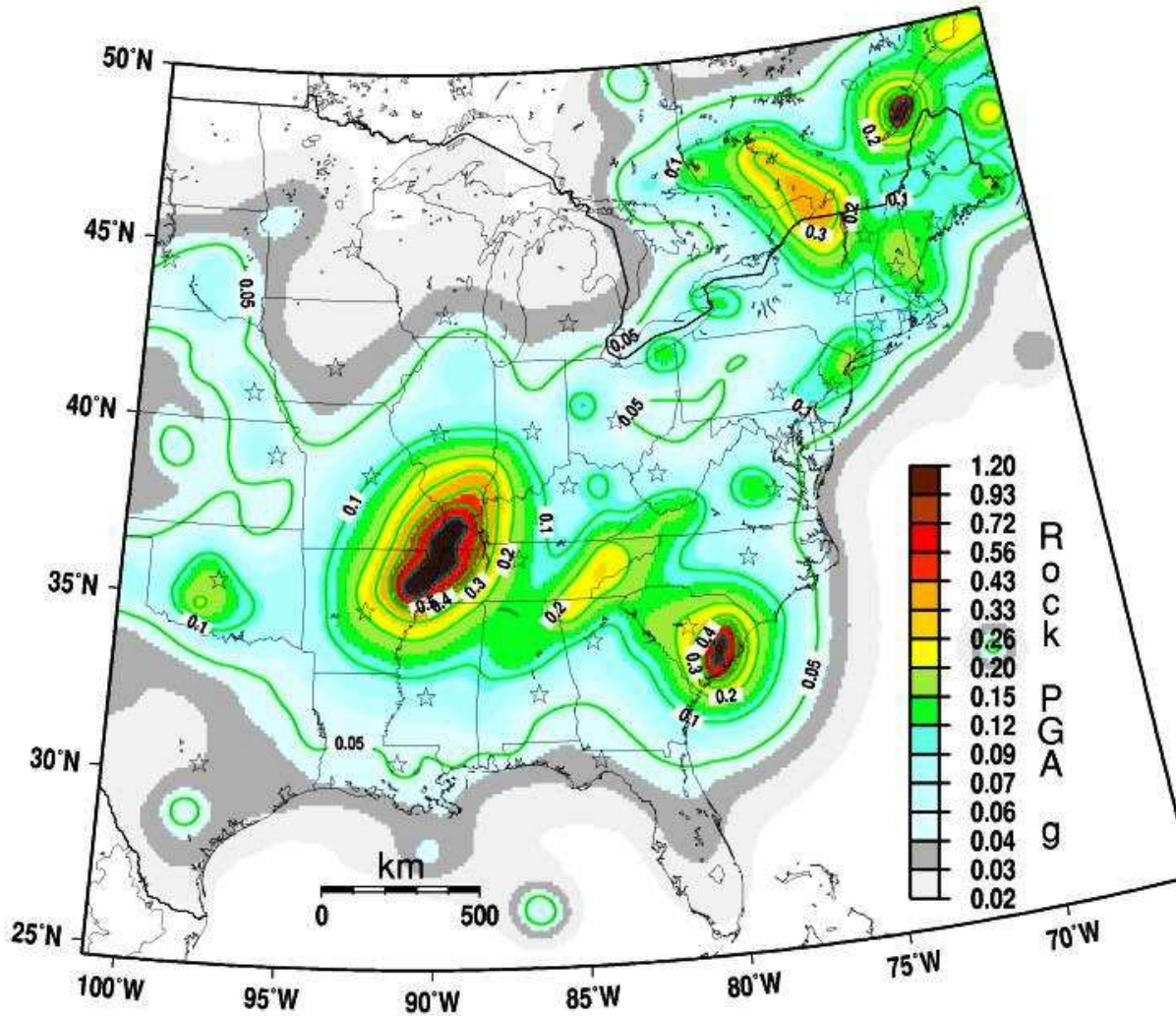
4.3.2.1. Location and Extent

Earthquake events in Pennsylvania typically have been localized around their epicenter. Pennsylvania's strongest earthquakes with in-state epicenters have persistently occurred in an area near Lancaster, PA (Armbruster and Scharnberger, 1986; Armbruster and Seeber, 1987). Earthquakes originating from outside Pennsylvania, particularly in New Jersey, New York and Virginia, can also impact the Commonwealth.

Figure 4.3.2.1.1 shows the probable levels of shaking from an earthquake event that has a 2% chance of being exceeded in any given 50-year period. The shaking hazard depends on the

magnitudes and locations of likely earthquakes, how often they occur, and the properties of the rocks and sediments that earthquake waves travel through. From this map it would appear that the county falls within an area of the eastern part of the United States with lower to moderate earth movement risk.

Figure 4.3.2.1.1. Peak Ground Acceleration Earthquake Map



GMT Apr 11 15:37 PGA 2%50yr PE. BC rock site condition

4.3.2.2. Range of Magnitude

Earthquake magnitude is often measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake. The Richter Scale ranges from 0 to 10. Generally earthquakes less than 5 on the Richter Scale would cause no damage. A 6 would be a significant earthquake with building damage; greater magnitude earthquakes will result in

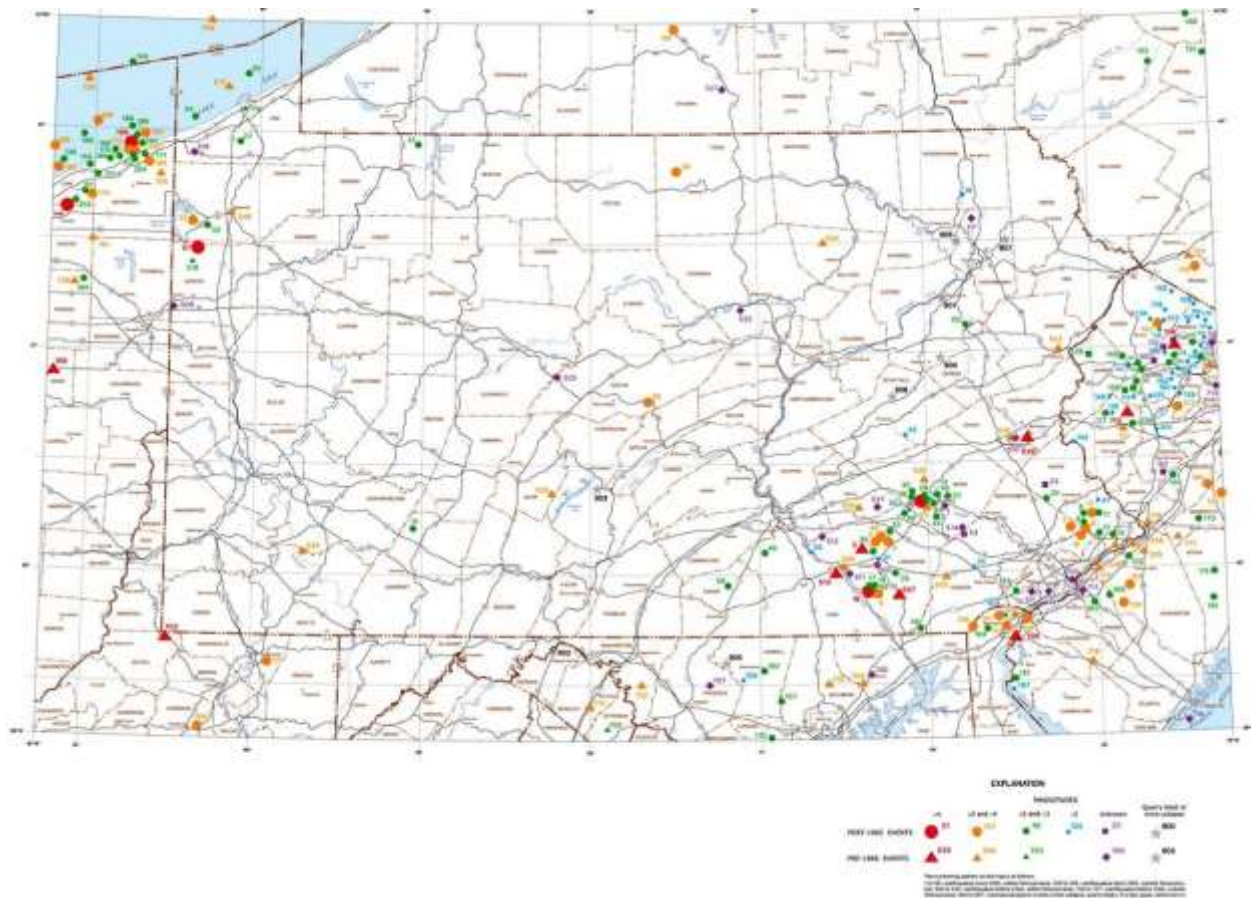
substantial damage. Based on historical events, earthquakes in eastern Pennsylvania have not occurred at magnitudes of 6.0 or greater.

4.3.2.3. Past Occurrence

About 35 earthquakes have caused light damage in Pennsylvania since the Colonial period. Occasional broken windows, cracked plaster, and glassware toppled from shelves have characterized this damage. Nearly one half of these damaging events had out-of-state epicenters. Foremost among the class of distant shocks that were felt strongly in Pennsylvania were a trio of major earthquakes near New Madrid, Mo., in 1811-12, and the Charleston, South Carolina earthquake of 1886. Most recently in 2011 an earthquake in southwestern Virginia lasting 10-15 seconds was felt throughout Montgomery County.

Most earthquakes with epicenters inside Pennsylvania have been located in southeastern areas of the Commonwealth. Figure 5.3.2.3.1 provides a map of the epicenters of earthquakes which have occurred in Pennsylvania. The one earthquake event that most recently occurred in the county was centered in the Hatboro/ Abington area. From March 5 through 11, 1980, three earthquakes measuring from 3.1 to 3.5 on the Richter Scale were reported in the Hatboro-Horsham area. No significant damage was reported as a result of these events.

Figure 4.3.2.3.1 Earthquake Epicenters in and Near Pennsylvania - DCNR 2004

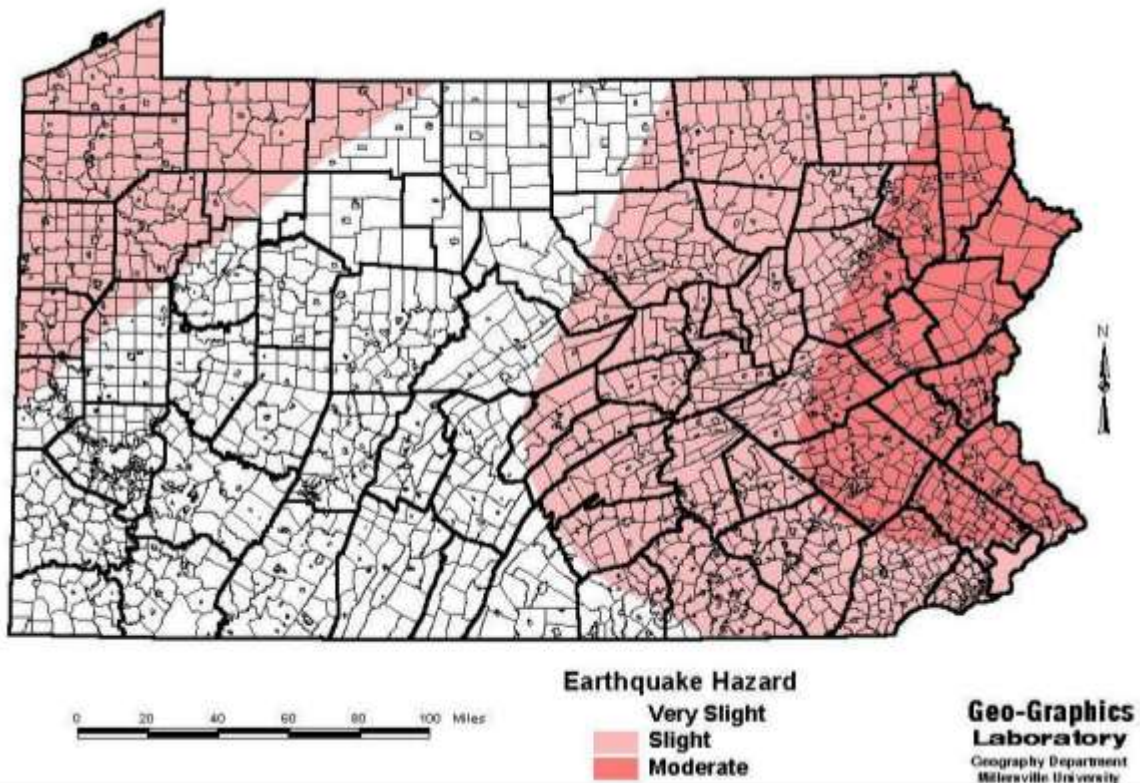


4.3.2.4. Future Occurrence

One way to express an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. Peak horizontal ground acceleration (PHGA) measures the strength of ground movements in this manner. PHGA is the percent of g (acceleration due to gravity) experienced during the earthquake or the rate in change of motion of the earth's surface during an earthquake as a percent of the established rate of acceleration due to gravity. In general, an acceleration of 10- to 15-percent of gravity is associated with structural damage to ordinary buildings not specifically designed to resist earthquakes, although soil conditions at local sites are extremely important in controlling how much damage will occur as a consequence of a given amount of ground acceleration.

Figure 4.3.2.4.1 is a probabilistic hazard map prepared by Millersville University. The map shows three potential hazard categories in the state. Most of Montgomery County is within the moderate hazard area for earthquakes.

Figure 4.3.2.4.1. Earthquake Hazard Zones- Millersville University



Source: Millersville University, PA

The Pennsylvania All Hazards Mitigation Plan indicates that the state has not experienced an earthquake of the intensity that could result in serious damage to ordinary structures, or greater in historic time. Based on the analysis of past earthquake activity impacting the state, it is

possible that an earthquake of the intensity to cause damage could occur once over the next 100- 1000 years.

4.3.2.5. *Environmental Impacts*

Environmental impacts of earthquakes can be numerous, widespread, and devastating particularly if indirect impacts are considered. Some examples are shown below, but such impacts are assumed to be very unlikely in Montgomery County:

- Induced flooding or landslides
- Poor water quality due to turbulence and increased suspended solids
- Damage to vegetation
- Breakage in sewer and utility pipe lines causing various types of groundwater contamination and loss in service
- Various releases and spillage of chemicals and fuels

4.3.2.6. *Vulnerability Assessment*

No localized earthquake vulnerabilities are known within Montgomery County. The overall risk from earthquake activity is assumed to be a low countywide risk. The vulnerability of county critical facilities is minimal. No critical facilities are located in areas with active geologic faults or other conditions that make them more vulnerable to future earthquake activity. Old, inactive faults including the Ramapo (17 miles from the Limerick Plant) and Chalfont (nine miles from the Limerick Plant) Faults exist in the vicinity of western Montgomery County. In the licensing process for the Limerick Nuclear Power Station, it was determined that these faults have not been displaced for over 500,000 years.

Property losses due to earthquakes will depend on the magnitude and intensity of the earthquake event. With higher magnitude earthquake events comes greater possibility for significant structural damage to buildings, roads, and other infrastructure. The Pennsylvania Hazard Mitigation Plan concluded Montgomery County could potentially have as much as \$132 billion in exposed buildings and contents. Yet, as indicated above, there are no records of significant damage from earthquakes in the past, and the occurrence of earthquake of the size and magnitude to induce such damage in Montgomery County is extremely unlikely.

4.3.2.7. *Additional Information*

[USGS](#)

[PA Geological Survey](#)

[Millersville University](#)



4.3.3. Extreme Temperature

Extremely warm conditions with temperatures above 95 °F and high levels of humidity that can occur during the summer months and very cold temperatures below 32 °F in the winter can be hazardous to the elderly or other residents with medical conditions. Typically elderly residents, people with other health problems, and very obese people are the most at risk during hot weather. Excessive heat can also hurt agriculture through reduced milk production and fatalities to flocks and herds. Additionally, more drowning occurs in rivers and lakes as people seek refuge from the heat. Electric power and water utilities typically have a higher demand from their customers during heat waves.

Likewise during cold conditions, elderly and populations with limited financial means are threatened. Cold conditions when combined with wind could result in very low wind chill levels causing greater danger for people exposed to it. Stress on heating fuel supplies can occur as a result of these conditions. Additional costs of heating may create significant hardships for populations with limited financial resources.

4.3.3.1. Location and Extent

The climatic information for Montgomery County based upon readings taken at the Philadelphia International Airport is provided in Section 2.1. Though the county enjoys a generally moderate climate on the whole, extreme temperatures can occur below 0°F and above 100°F. High temperatures of 90°F or above occur in the county about 24 days per year at any one location. Ranges of daily temperature from maximum to minimum are commonly around 20°F during the

summer and are a few degrees less during the winter. Freezing temperatures occur on an average of 116 or more days per year. Four of the hottest 10 days in the period between 1940 and 2012 were recorded in 2010 and 2011. Several of the coldest days between 1940 and 2012 with temperatures ranging between -7° F and -3° F occurred during January in 1982, 1984, and 1985.

4.3.3.2. Range of Magnitude

Extremely high temperatures cause heat stress which result in cramps, fainting, heat exhaustion, and heatstroke or can exacerbate other medical conditions. The impacts of high temperatures will vary from person to person based on individual age, health, and other factors.

The heat index is a measure that combines air temperature and relative humidity in an attempt to determine the human-felt equivalent temperature. For example, when the temperature is 90 °F (32 °C) with very high humidity, the heat index can be about 105 °F (41 °C). The human body normally cools itself by perspiration, or sweating, which evaporates and carries heat away from the body. However, when the relative humidity is high, the evaporation rate is reduced, so heat is removed from the body at a lower rate, causing it to retain more heat than it would in dry air.

Temperature advisories, watches, and warnings are issued by the National Weather Service relating the above impacts to the range of temperatures typically experienced in Pennsylvania. Excessive Heat Watches are issued when the heat index is expected to be 105°F or higher with the next 24-72 hours. Excessive Heat Warnings are issued when the heat index is expected to be 105°F or higher within the next 12 hours. The Montgomery County Commissioners, on the advice of MC PSD, have declared a Code Red Hot Weather Health Warning for Montgomery County based on a review of forecasts from the National Weather Service.

Cold temperatures can be extremely dangerous to humans and animals exposed to the elements. Without heat and shelter, cold temperatures can cause hypothermia, frost bite, and death. Wind chill temperatures are often used in place of raw temperature values due to the effect that wind can have in drawing heat from the body under cold temperatures. These values represent what temperatures actually feel like to humans and animals during cold, windy conditions. Similarly to high temperatures, the effects of cold temperatures are dependent upon the age and health of the individual.

In Montgomery County, Wind Chill Advisories are issued when the wind chill is expected to be between -10°F to -24°F. Wind Chill Warnings and/ or Warnings are issued when wind chill is expected to be below -25°F. Wind Chill Advisories are issued when wind chill values drop to -10°F to -24°F. The Montgomery County Commissioners, on the advice of the MC DPS, have declared a Code Red Hot Weather Health Warning for Montgomery County based on a review of forecasts from the National Weather Service. A Code Blue is called when the combination of air temperature and wind chill is anticipated to be 20° F or less. For the winter of 2013 to 2014 the threshold was raised to 32°F then lowered by to 20° F the following winter.

When either cold or hot weather persists for an extended period of time, the impact of the weather will be more dramatic. During these conditions, power or fuel needs might overwhelm

supplies, causing widespread blackout or loss of heating fuels. This kind of event could create a public health hazard for the elderly and children.

4.3.3.3. Past Occurrence

During the last 60 years, the NCDC reported over 140 extreme heat events in Pennsylvania resulting in 505 deaths and 341 injuries, as well as \$200,000 in property damage and \$50,000 in crop damage. During the winters over the last 60 years, the NCDC reported 65 extreme cold events in Pennsylvania resulting in 26 deaths and 130 injuries, as well as experiencing \$5 million dollars in property damage. Local damage to infrastructure such as highways has occurred in the county during extreme temperature event due to expansion and contraction of various structural members. In the past summers, lane closures occurred on US Route 422 in Lower Providence Township due to highway concrete sections buckling.

The Montgomery County Public Safety Department has issued Code Blue warnings during 34 days for the Fall 2012/ Winter 2013; 75 days for the Fall 2013/ Winter 2014 (with the 32° F threshold); 46 days for the Fall 2014/ Winter 2015; 46 days for the Fall 2015/ Winter 2016; and 31 days for the Fall 2016/ Winter 2017. During the same time frame they issued 24 Code Reds for unhealthy warm weather conditions between 2012 and August 2017.

4.3.3.4. Future Occurrence

It is important to note that frequency estimates based on the past may not be an accurate representation of future conditions due to the impacts of climate change. The PA Climate Impact Assessment performed in 2009 predicts a 7° F increase in average temperature by the end of the century.

4.3.3.5. Environmental Impacts

Temporary periods of extreme hot or cold temperatures typically do not cause a significant environmental impact. However, prolonged periods of hot temperatures may be associated with drought conditions (see section 5.3.1) and can damage or destroy vegetation, dry up rivers and streams, and reduce water quality. Prolonged exposure to extremely cold temperatures, particularly associated with winter storm conditions, can kill wildlife. Extremely hot weather may cause fish kills in streams and rivers. An increase of drowning may result during periods of high temperature since more people are likely to swim in the Schuylkill River and area streams.

4.3.3.6. Vulnerability Assessment

The vulnerability of the county to extreme heat and extreme cold is discussed separately below since each has a very different impact.

Extreme Heat

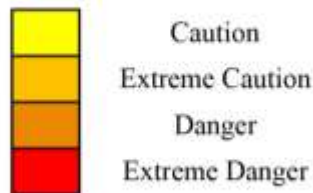
Vulnerability for extreme heat was classified as areas having a maximum average temperature over 85 degrees, according to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) study. Extreme heat does not generally impact buildings; instead, it primarily impacts people and, in some cases, equipment, roads and other forms of infrastructure. Nonetheless, key facilities need to be maintained to ensure that they can provide relief from extreme heat conditions for people.

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Nearly all critical facilities in the county are equipped with air-conditioning. Some school buildings do not have air-conditioning since they are not occupied during the warmest part of the summer. In the event of a power failure or if the air-conditioning systems malfunctioned, significant heat impacts at these facilities would occur. It's evident from past events that extreme heat is dangerous and can cause human related illnesses and death. As temperature goes up so do the number of people hospitalized for heat related illnesses. Therefore it's important to understand how many people are exposed to such conditions, and how many buildings exist where potential problems could arise should power be lost.

NOAA National Weather Service: Heat Index

		TEMPERATURE (°F)															
		80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
Relative Humidity (%)	40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
	45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
	50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
	55	81	84	86	89	93	97	101	106	112	117	124	130	137			
	60	82	84	88	91	95	100	105	110	116	123	129	137				
	65	82	85	89	93	98	103	108	114	121	128	136					
	70	83	86	90	95	100	105	112	119	126	134						
	75	84	88	92	97	103	109	116	124	132							
	80	84	89	94	100	106	113	121	129								
	85	85	90	96	102	110	117	126	135								
	90	86	91	98	105	113	122	131									
	95	86	93	100	108	117	127										
100	87	95	103	112	121	132											

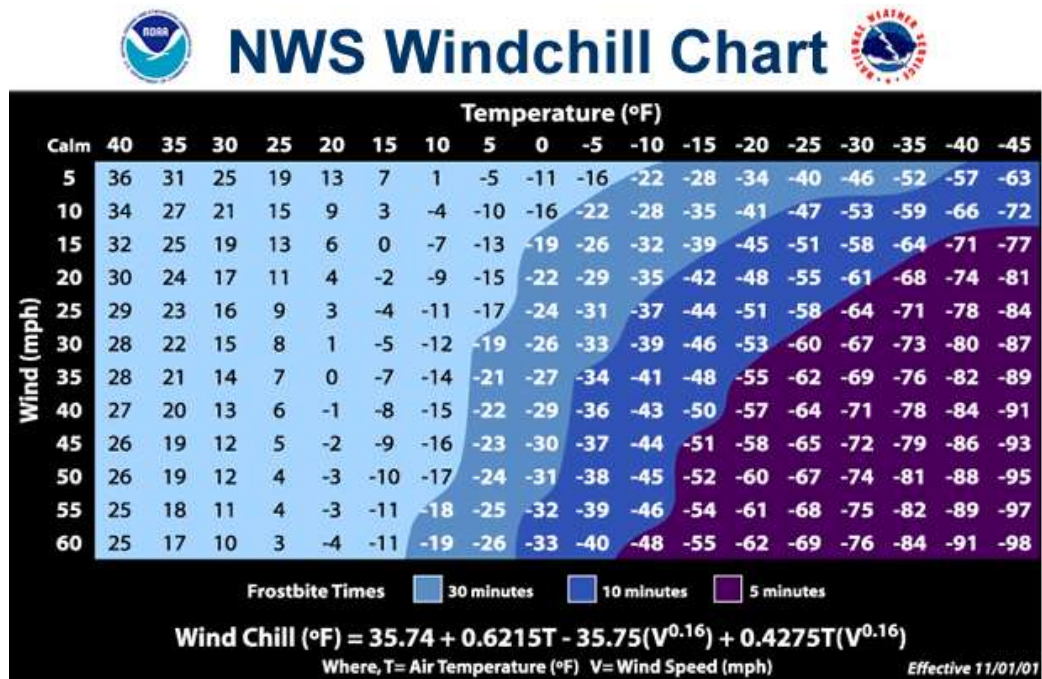


Extreme Cold

People outside of heated buildings are the most vulnerable to extreme cold conditions. In January 2014, a public-private partnership was launched called Your Way Home Montgomery County to help working and low-income families end or prevent their homelessness. Since its launch, Your Way Home has had some great successes. The keys to this success include: consumer-driven and coordinated entry into our housing crisis response system; using evidence-based strategies like rapid re-housing, critical time intervention, and diversion; aligning our resources with our private partners, including both local foundations and community service providers; and focusing all of our energy on helping our most vulnerable neighbors find and maintain permanent housing and connect to resources in their communities.

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During the 2011 point in time estimate by the Montgomery County Continuum of Care conducted in January 2011, 410 homeless people were counted residing in Montgomery County. These people would be most impacted by extreme cold, though other residents could also be impacted. Generally, damage does not occur to buildings due to extreme cold, except in the event of the loss to internal heating when utility systems such as water pipes freeze and burst. Nonetheless, facilities need to be maintained to ensure that they operate in appropriate conditions for people. Older water and gas utility lines are most prone to breakage during extreme cold due to stresses placed on them by adjacent frozen soil and fill material. It's evident from this that extreme cold is dangerous and can cause death. Therefore it's important to understand how many people are exposed to such conditions, and how many buildings exist where potential problems could arise should power be lost.



The impact of weather conditions such as extreme heat and cold can be expressed in terms of deaths and injuries. Generally based upon past history it is possible that one or more deaths each year may be directly attributable to extreme heat and cold. Further heat and cold may further stress health conditions in county residents. Extreme heat when coupled with drought may result in significant crop loss.

4.3.3.7. Additional Information

[Pennsylvania State Climatologist](#)

[North America Region Climate Change Assessment Program](#)

[NRCS/ USDA](#)

[NOAA](#)

[PA Climate Impact Assessment Report](#)

[Social Impacts of Climate Change- USDA](#)



4.3.4. Flood, Flash Flood, Ice Jam

The land use, topography, and vegetation of the watershed receiving precipitation have a great impact on the intensity of flooding. Natural factors such as soil and vegetation, as well as human-produced features such as pavement, determine the overall volume of stormwater generated and the rate at which it moves through the watershed. The shape and size of the stream channel and obstructions in it such as bridges and culverts can have a significant effect on the flow of water. Undersized bridges or bridges clogged with debris and sediment can cause backwater leading to more intense upstream flooding.

The type of precipitation events that cause floods can vary dramatically as well. Large river floods are often caused by rain storms occurring over several days and impact a vast area. Typically these originate from nor'easters, hurricanes, or tropical storms. Other types of rain events are more localized and often strike at any time. In some cases these storms can deliver intense rainfall in just one portion of the county without affecting other regions many times causing flash floods in small watersheds. Snow melt can also contribute to local flooding problems.

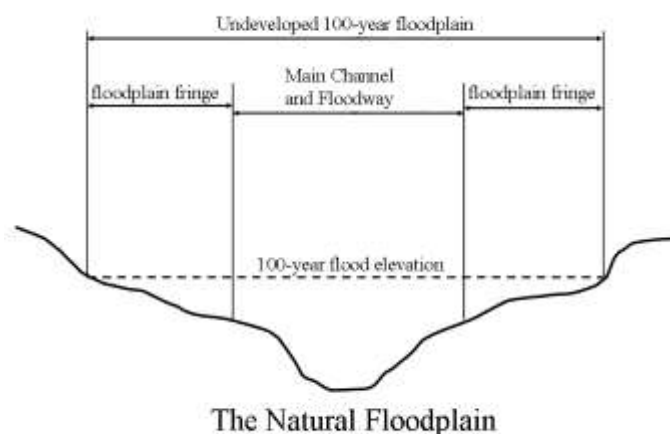
4.3.4.1. Location and Extent

Heavy rainfall events have the potential to produce localized or widespread flooding. Events such as a localized summer cloud burst can have a dramatic impact on a small watershed yet be considered insignificant regionally. Large events, such as a broad-scale tropical storm lasting

more than twenty-four hours, may affect the entire county. In either case, flood sources in Montgomery County include rivers, creeks, and even small drainage ways. Floodplains found in lowlands, adjacent to rivers, streams, and other drainage ways are subject to recurring floods. The size of the floodplain is described by the recurrence interval of a given flood. In assessing the potential spatial extent of flooding it is important to know that a floodplain associated with a flood that has a 1% chance of occurring in a given year is smaller than the floodplain associated with a flood that has a 0.2%-annual-chance of occurring. The National Flood Insurance Program (NFIP) for which Digital Flood Insurance Rate Maps (DFIRM) are published identifies the 1%-annual-chance flood which is used to delineate the Special Flood Hazard Area and identify Base Flood Elevations. These were previously referred to as 100-year floodplains.

Floods have occurred and will continue to occur in Montgomery County for a variety of reasons. Major floods in the county have occurred in nearly every month of the year. Winter floods bring the added damage caused by ice. Listings of major floods that have had significant impact on the county are shown in Appendix K.

The total floodplain area in the county with a one-percent probability of being flooded in any given year as delineated by the Federal Emergency Management Agency in the newly revised maps dated March 2, 2016 is 21,311.4 acres. The revision added 3,572.27 acres of land previous outside of the floodplain, while removing 3,940.37 acres.



Montgomery County contains approximately 999 miles of streams including a 42-mile section of the Schuylkill River. Flooding occurs along all of these watercourses and can cause damage to various structures and create safety problems. It is estimated that there are 5,497 structures that appear to be either in the Floodplain or partially within it. Of those 2,762 are completely within the Floodplain. Structures located in floodplains throughout the county can flood during a significant rainstorm. Additionally, other structures located out of the defined 1% annual exceedance probability floodplains have also been damaged during floods in the past.

Major floodprone areas in Montgomery County with significant development are shown on Figure 4.3.4.1.1. These areas were selected based upon an analysis of all structures in the county found in the floodplain. Those areas with significant numbers of total structures or houses were further analyzed and described below. Maps depicting significant flooding areas in the county are found in Appendix S. The flood prone area descriptions are arranged by the watershed as depicted in Figure 4.3.4.1.2. The descriptions provide some historic context to the flooding problems experienced by the residents and workers in these areas. In addition to these areas, smaller groups of homes and businesses are flooded in scattered locations throughout the county. More detailed information about these areas, including listing of specific properties impacted by recent floods was collected during the development of this plan. Though that

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information is not included here, for confidential reasons, it will be retained and used for future project evaluation and grant prioritization.

Figure 4.3.4.1.1. Concentration of Structures within the 1% Annual Chance Floodplain

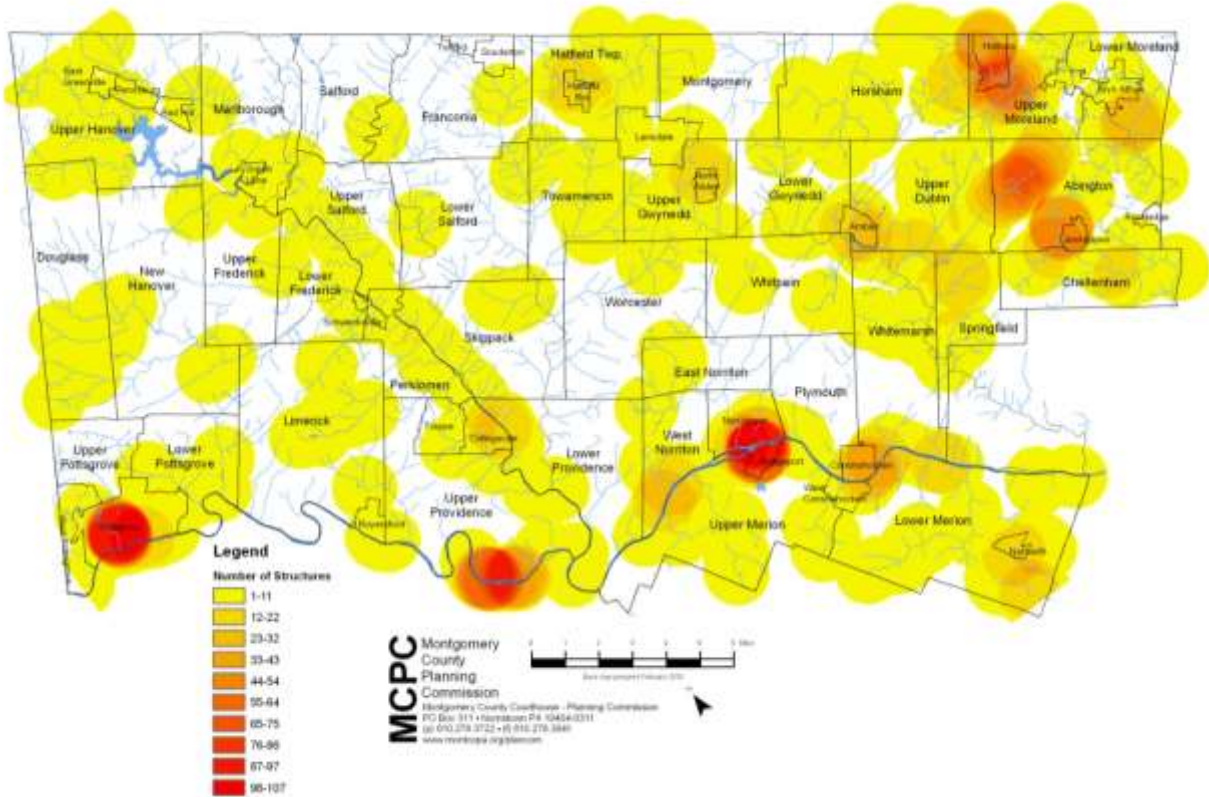


Figure 4.3.4.1.2. Montgomery County Watersheds



Schuylkill River Basin

West Pottsgrove Township: Flooding in the township occurs at Race and Quinter Streets approximately two times each year.

Upper Pottsgrove Township: Flooding occurs along Pine Ford Road.

Pottstown Borough Riverfront:

Approximate number of buildings in floodplain: 250+ (see map in Appendix S)

Several larger properties between High Street and the Schuylkill River lie within the 100-year floodplain. Among these are industries on both Industrial Highway and Keystone Blvd, as well as a new townhome structure on Industrial Highway and the Pottstown Roller Mills Apartments on College Drive, a motel and some other commercial properties along High Street are in the floodplain for the Manatawny Creek, which begins where it meets the Schuylkill River below College Drive.

Hurricane Agnes caused the most significant flood in Pottstown in 1972 creating over \$21-million dollars (1972 dollars) in flood damage. Several industries and retail stores were damaged in the flood and many residents were displaced. The Hanover Street Bridge was also destroyed by the flood. The gauging station near the bridge recorded the flows in the river in excess of 95,000 cubic feet per second (cfs) and the elevation of the flood elevation was 30 feet, nearly 17 feet above the flood stage. No other flood event has even reached more than 50% of the size of the Hurricane Agnes storm at this location. By comparison, typical summer flow in the river is about 1,000-2,000 cfs.

The Blue Marsh Reservoir, a multipurpose flood control structure, was completed in the upper reaches of the Schuylkill River in 1982. Due to the impact of this flood control structure and the flood storage capacity of Maiden Creek Reservoir, Pottstown will likely benefit from reduced flood stage levels made possible through the flood storage at each dam. Since the Blue Marsh Reservoir is both a recreation lake as well as flood control facility, the height of the dam pool and releases from the lake are managed through a predetermined plan that meets both purposes. During Hurricane Lee in 2011, the Army Corps was forced to make full releases from the dam during the storm to prevent dam over topping. Those releases raised the downstream flood elevations. Several days prior to Superstorm Sandy, the water level was lowered to winter levels providing sufficient storage for the rains resulting from that tropical storm.

The Army Corps of Engineers made an evaluation of channel improvements in the Pottstown Area after Hurricane Agnes including the dredging of portions of the river and removal of vegetation from the river islands adjacent to the borough. No action was taken on these recommendations since the costs of them outweighed their benefits.

Over the past 15 years floods have forced the closure of a portion of College Drive, particularly at the underpass of the Norfolk Southern Rail Line. The Community College's South Hall, North Hall, and the Sustainability and Innovation Hub (Schuylkill River Center) are both located along

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College Drive in the floodplain, though both facilities are flood proofed with the core facilities located above the floodplain.

Pottstown/ Manatawny Creek: Some flood damage along the Manatawny Creek has occurred in Pottstown. Several homes along Manatawny Street and connecting roads were flooded as the Manatawny Creek flow is impounded by the flood heights at the Schuylkill River. The Pottstown Memorial Park located along the floodplain of the Manatawny Creek has had a history of flooding in the past, though with the removal of the dam in the creek, re-grading of parts of the park, and replacement of the High Street Bridge, local hydraulic conditions have changed along the Manatawny Creek so that flooding could be less severe in the vicinity of the park. The King Street Bridge is now scheduled for replacement as well providing further opportunities to improve the Manatawny stream hydraulics in the area.



Structures within Regulatory Floodplain at confluence of Manatawny Creek and Schuylkill River, Pottstown Borough.

Royersford Borough: Road closures occur along 1st Avenue in the vicinity of Race Street during significant river floods. Industries along 1st Avenue have been flooded periodically with some damage. Flooding also occurs at the Royersford Sewage Treatment Plant and the 10th Avenue pump station.

Upper Providence Township – Mont Clare/ Port Providence:

Approximate number of buildings in floodplain: 150 (see map in Appendix S)

Total value of all buildings in floodplain: \$15,994,360

Mont Clare, and its neighboring village, Port Providence, are unincorporated communities located along the Schuylkill River across from Phoenixville in Chester County. Both communities have small downtown areas, as well as blocks of housing, located in the floodplain. Along Jacobs St. in Mont Clare and Walnut Street/Port Providence Road in Port Providence, many houses are subjected to flooding from the Schuylkill. Though the Schuylkill Canal lies in between the river and the villages, the river generally overwhelms the shallow bank between it

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and the canal, merging the waterways into one and creating flood conditions not unlike areas with closer river frontage.



Structures within Regulatory Floodplain in Mont Clare and Port Providence Villages.

In addition to almost all of Port Providence, and about a third of the housing in Mont Clare, several businesses lie within the floodplain. Produce Junction, a popular grocery destination, is right next to the canal, and a restaurant/bar abuts it as well. Most prominently, the Graphic Packaging International warehouse and offices are partially within the floodplain along the canal at its easternmost point. Additionally, several churches and other businesses along the main streets are at risk for flood damage.



Though Upper Providence Township and the county has purchased a few properties closest to the river over the years, many structures remain with no flood-proofing whatsoever.

Lower Providence- Gertrude Avenue: A few homes along Gertrude Avenue and Pawlings Road have been flooded by the Schuylkill River. Other lands in this location are within Valley Forge Park or are owned as county open space.

West Norriton Township – Port Indian Community:

Approximate number of buildings in floodplain: 110 (See Map in Appendix S)

The Port Indian community located along Port Indian Road has been flooded frequently over the past several decades. The community includes about 100 houses that were originally constructed as seasonal homes for vacationing along the river. These homes have become year residences which have been upgraded and expanded. The Norristown Boat Club and

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Commercial Club – a dining club – has properties along the river in this location as well. Most property owners maintain docks and have boats that they use for water skiing and fishing. Flood damage to homes along the river has been substantial. In response, approximately 80% of the property owners have raised their homes above the elevation of the floodplain, in compliance with West Norriton’s building code and floodplain requirements. In many cases this was done with hazard mitigation funding. In addition to flooding from the Schuylkill, some flood damage to Port Indian Road and properties within the Port Indian area has been caused by Indian Creek.

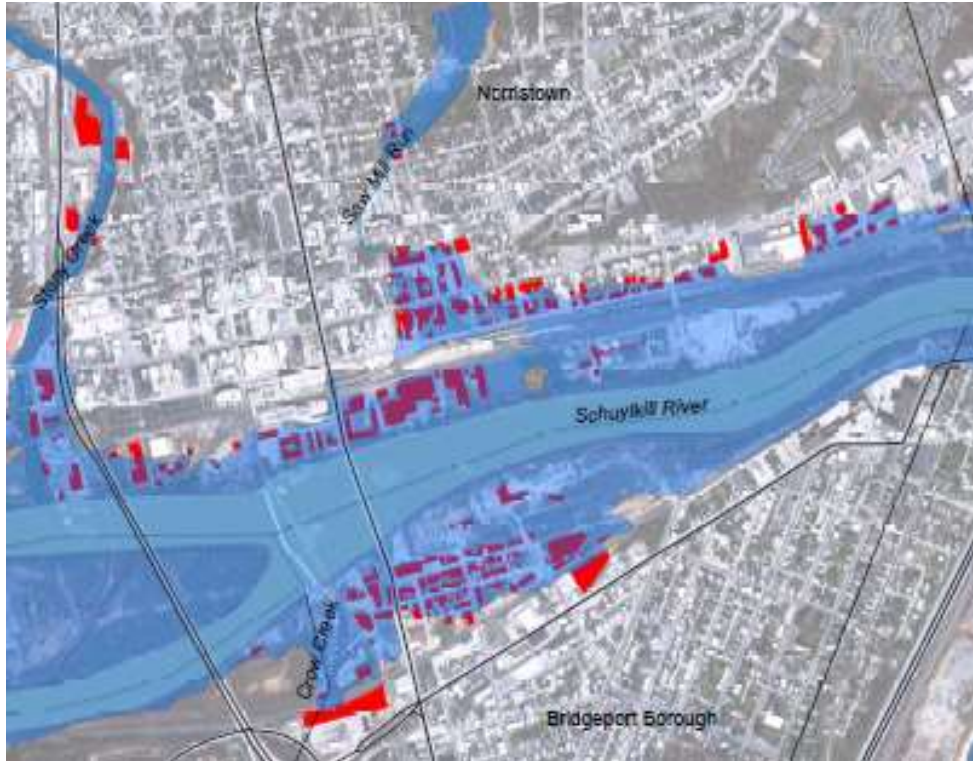
West and further upstream from the homes along Port Indian Road, an old industrial site has been redeveloped as Riverview, a residential, commercial and office use complex. Though the buildings in this development are being flood proofed and elevated above the floodplain, an evacuation route has been planned along the Schuylkill River Bike Trail. This is the same route used by the other homes on Port Indian Road since Port Indian Road typically floods within the underpass below the trail.

Norristown: Generally, the Norristown Riverfront between the river and the trail is located within the Schuylkill’s floodplain. (See Map in Appendix S) This area includes the 100 block of DeKalb Street, Water Street, and the 300-400 blocks of East Washington Street. This area contains approximately 30 structures. The only residential structures in this area are the Riverside Apartments containing 70 units located between DeKalb Street and the SEPTA Norristown High Speed Line. Occasionally, when portions of DeKalb Street get flooded on either side of the river, businesses along Washington Street including the Riverside Apartments and adjoining unnamed apartment building get cut off from the rest of the municipality.

Other uses within the riverfront floodplain include old industries, the Norristown Sewage Treatment Plant (368 East Washington Street), auto repair shop, a vacant brownfield remediation site at the confluence of the Saw Mill Run, a former trash transfer station at the confluence of the Stony Creek (now closed), and the Pennsylvania American Water Treatment Plant. The SEPTA train tracks and portions of the Stony Creek Rail Line are within the flood plain in this area as well. Norristown has adopted a revitalization plan which contains recommendations for the redevelopment of portions of the riverfront. Also, the municipality is working with the county redevelopment authority which has proposed a redevelopment plan that calls for the development of new offices, retail commercial, and recreation facilities along the riverfront.

Portions of the Stony Creek flood in the vicinity of Main Street. The potentially affected properties include several businesses along Main Street, the SEPTA Main Street Station, Crawford Park Recreation Center (elevated structure), and businesses along the creek near Marshall Street.

Flood plain exists along the Saw Mill Run, though the extent of the flood plain was significantly reduced several decades ago with various flood structure improvements. Flood and stormwater drainage problems could occur along Main Street in the vicinity of Arch Street if a significant river flood occurs when water backs up in Saw Mill Run due to the flood stage in the Schuylkill River in this area.



Structures within the Regulatory Floodplain in Norristown and Bridgeport Boroughs.

Bridgeport Borough: A residential and industrial area along the Schuylkill River and Front Street in Bridgeport is frequently flooded. (See Map in Appendix S) The floodplain area which has a one percent chance of being equaled or exceeded in any given year extends from the river to nearly the Norfolk Southern rail line. The former Continental Business Park that burned down on May 18, 2001 is a vacant 22-acre site entirely within this area. This property is currently proposed for high density residential development. In addition to other older industries, several row house style residential structures are located within the Schuylkill River floodplain in Bridgeport. A few businesses are located along DeKalb Pike in the floodplain near the river. Other larger manufacturing buildings located along 4th Street are at the edge of the floodplain. A mid-rise residential building for elderly residents in the borough is frequently flooded, requiring evacuations.

Plymouth Township/ Schuylkill River: A small tributary to the Schuylkill River floods the parts of Conshohocken Road in the 1300 block as well as a nearby business. The nearby Ross Street underpass of the SEPTA Rail line floods as well limiting access to the Plymouth/ East Norriton Sewage Treatment Plant.

Plymouth Township- Plymouth Creek Area: Portions along Plymouth Creek flood at Seven Stars and Alan Wood Road and the 1700 block of Gallagher Road flood. The 900 block of Brook Road floods as well. Flooding along Plymouth Creek has also occurred in the parking lot and office facility at 200 block of Germantown Avenue and along Chemical Avenue. A residential property in the 500 block of Launfall Road has flooded during heavy storms. The Ross Street underpass floods periodically during high water in the Schuylkill River.



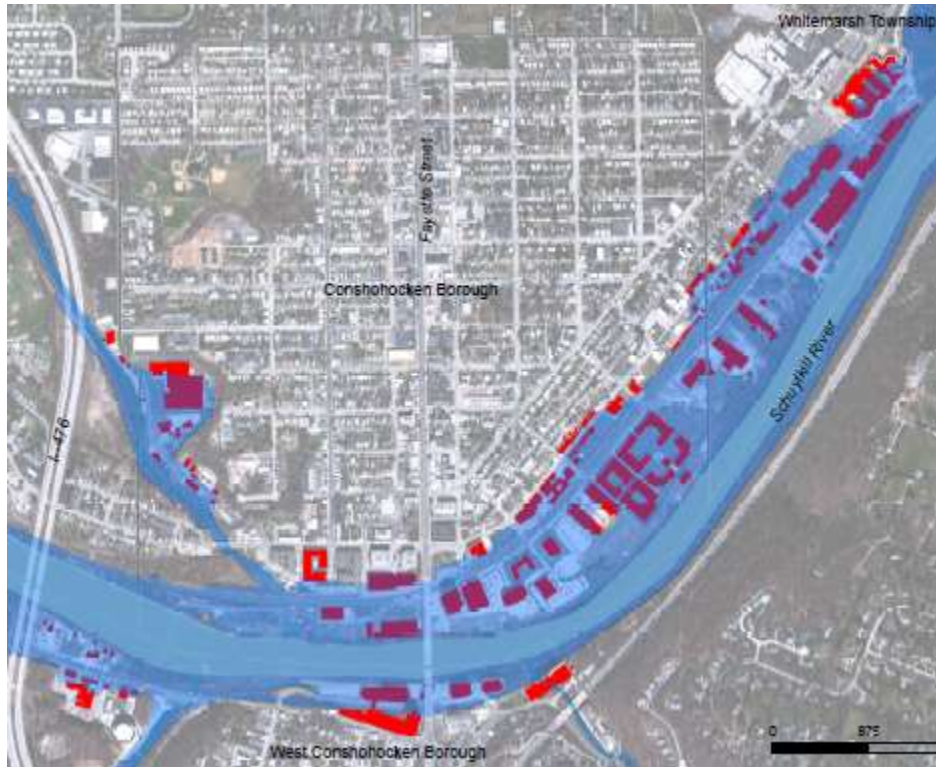
Clay-Doc Walkway pedestrian crossing over Schuylkill River between Conshohocken and West Conshohocken Boroughs.

Conshohocken and West Conshohocken Boroughs/Whitemarsh Township:

The riverfront throughout the boroughs of Conshohocken and West Conshohocken lies within a floodplain. (See Map in Appendix S) Most of the riverfront property has been redeveloped from old industries to office, hotel facilities, and mid-rise residential uses. Most of the 75 buildings in the floodplain in this area are buildings that are flood proofed with parking at the ground-level and a raised first floor one foot above the flood elevation. Access and evacuation of these properties will be an important emergency management issue to address in the future since thousands of workers are located in the Schuylkill River floodplain. On the northern side of Conshohocken Borough, the Plymouth Creek occasionally floods some small industrial buildings, as well as one large warehouse.

SEPTA's Manayunk-Norristown Regional Rail Line lies within a floodplain all the way through Conshohocken. Flooding occurs along much of the Manayunk/Norristown line, disrupting service, but the Conshohocken and Spring Mill stations are most at risk for serious floods. Signs posted at Spring Mill warn commuters that the parking lot has the potential to flood. Mitigation measures to address SEPTA track flooding have been proposed by SEPTA.

Older industrial properties in Whitemarsh Township from the borough line to the Spring Mill Creek are also flooded. Some properties along the river have been dedicated for park and open space use. The Schuylkill River Trail is also located in the Schuylkill River floodplain within the Conshohocken Borough and adjoining municipalities.



Structures within the regulatory floodplain in Whitemarsh Township and Conshohocken and West Conshohocken Boroughs along the Schuylkill River.

Some properties along the river have been dedicated for park and open space use. The Schuylkill River Trail is also located in the Schuylkill River floodplain within the Conshohocken Borough and adjoining municipalities.

Manor Road in Whitemarsh Township between Ridge Pike and Hagys Mill Road was flooded during Hurricane Irene and Tropical Lee, resulting in a 75-foot section of road being washed out.



Structures within regulatory floodplain along Yerkes Road and South Gulph Road in Upper Merion Township.

Upper Merion Township: Flooding occurs at several locations in Upper Merion Township from various small tributaries to the Schuylkill River. Flooding occurs at Abrams Road (from West Beidler to Henderson Roads); Allendale Road (from Court to Willis Rds and Keebler to Crossfield Rds.); Balligomingo Road (from Trinity to 76 Interchange and at Jones Road); Brandywine Ln. (from DeKalb to Hillview); Caley Rd. at Regimental Rd.; Church Road (between Brandenburg Way and Yerkes Road); Croton Road (Alderbrook to Sharon Drive and Kathwood to South Warner Roads); DeKalb Pike at Saulin Blvd, East Valley Forge Road (from Lower East Valley Forge Rd. to Schuylkill Parkway); First Ave. (from Park Ave to Alledale Road and Clarke Road to American Avenue); Flint Hill Rd (Summit Street to Swedeland Road); Guthrie Road (W. DeKalb Pike to N. Gulph Road); Henderson Road (from Hansen Access Road to Queen Drive); Keebler Road at Anthony Rd, at UM Middle School, and at General Knox Road; King Manor (from Crooked Ln. to dead end); Mall Boulevard (from Court Blvd to DeKalb Pike) and at Pulaski; Matson Ford Rd. (from South Gulph to

County Line Roads) North Gulph Road (from Mall Blvd. to N. Warner Road and Richards Road to First Avenue); River Road (from Center to 4th Streets, 3rd Street to Swedeland Road); River Road (from Center Street to 4th Street, 3rd Street to Swedeland Road, and Swedeland Road to West Conshohocken); South County Line Road (from Meadowcroft to Gulph Creek Roads); South Gulph Road (from West Church to Brooks Roads, Bill Smith Blvd to Long Road, and Arden to Upper Gulph Roads); Trinity Lane (from S. Gulph to Holstein Roads); Williams Road (from Walker Park to Park Lane) and Yerkes Road (from Church Road to Crooked Lane). Severe localized flooding has occurred in the common area owned by a homeowners association on May 16, 2012 tearing out portions of an 84" corrugated pipe that channels part of the Crow Creek. Flooding problems also occur at properties on Longview Road.

Lower Merion Township- River Road and Belmont Hills: There are over 40 residential properties located along River Road in Gladwyne (Lower Merion Township) that lie within the Schuylkill River floodplain. Most of these houses were constructed as seasonal dwellings with access to the river. Over the past three decades many of these homes have been rebuilt or upgraded and appear to be flood proofed. These homes all have access to the Schuylkill River and are attractive to year round residents interested in boating and water recreation. Access to the properties is along River Road which is separated from the remainder of the township by an active rail freight line. At three locations: Hollow Road, Mill Creek Road, and Waverly Road, there are underpasses that permit access to River Road. These underpasses typically flood since they are low points in the road. In addition to the houses, there is a Veteran of Foreign Wars meeting hall and township park along River Road. Both of these contain boat access facilities. The Flat Rock Dam owned by the Commonwealth of Pennsylvania is located down river from this area.

The Georgia Pacific (former Connelly Container Corp) corrugated card board plant lies within the flood plain down river from the Green Lane Bridge. Access to the plant site is gained over a private bridge across the Schuylkill River coming from Philadelphia and through Righter's Ferry Road in Lower Merion Township. This facility that sits on the old PenCoyd Iron Works site was used for the manufacture of various types of corrugated cardboard boxes. The property is proposed to be developed as 600 elevated mid-rise condominiums by O'Neill Properties.

Dramatic flooding occurred in August, 2009 along Rock Hill Run in the Belmont Hills area and several small tributaries of the Schuylkill River draining Lower Merion Township.

Stony Creek/Saw Mill Run

East Norriton Township: Road flooding occurs at Potshop and Truman Roads.

Norristown-Stony Creek Area: Several properties in Norristown along the Stony Creek have been flooded. Generally these properties are businesses along Markley Street and the Elmwood Park along Harding Boulevard and in the 300 block of Sterigere Street. This area was hard hit by two large storms in 1971 and 1972. Several storms over the past 10 years have damaged baseball fields in the Elmwood Park along Stony Creek and the PAL building at 1101 Harding Boulevard. The flood elevations in the lower section of Stony Creek are affected by the Schuylkill River. In this location flood damage occasionally impacts Crawford Park and businesses located along Main and Water Streets.

Whitpain Township- Stony Creek: In Whitpain Township, the 1700 block of Yost Road is flooded every 3 to 4 years due to an undersized culvert.

Norristown/ Saw Mill Run: Saw Mill Run flows through Norristown from Johnson Highway to the Schuylkill River. Historic flooding problems in the lower end of the Saw Mill Run Drainage area have been addressed through the development of the Saw Mill Run Flood Control Basin located north of Fornance Street. This flood control structure was constructed by the state over 35 years ago and is currently maintained by the Norristown. Also, the lower portion of the stream flows through an extensive culvert to the south side of Main Street where it is contained in a concrete channel to the Schuylkill. Flood problems have occurred in Norris Hills Apartments at the upper portion of the watershed along North Hills Drive. Flooding in this location may have resulted from a backup of water impounded behind the flood control basin. Flooding can also occur in the 300- 400 block of East Lafayette Street in the vicinity of the Saw Mill Run culvert.

Plymouth Township/ Saw Mill Run: Flooding occurs at several homes in the vicinity of Mill and Valley Roads in the upper end of the Saw Mill Run. Damage has occurred to a foot bridge connecting Bell Road to the East Plymouth Valley Park in Plymouth Township.

Perkiomen Creek

Upper Hanover Township: Flooding occurs along the Perkiomen Creek at Conner Road, Palm Hill Road and Water Street.

Marlborough Township and Green Lane Borough (Unami and Macoby Creeks): Road flooding

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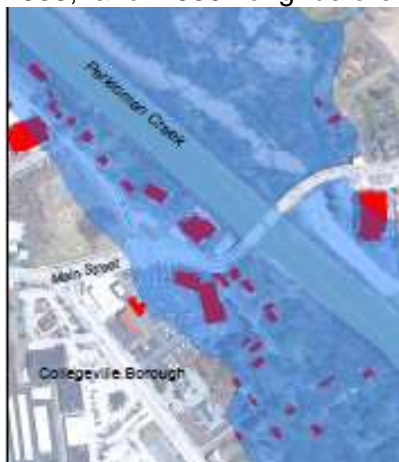
has occurred along Swamp Creek Road, Geryville Pike, Miller Road and Price Roads. The Sumneytown Pump Station owned by the Green Lane Marlborough Joint Sewer Authority is in the flood plain of the Unami Creek near Sumneytown Pike. Flooding also occurs in Green Lane along Gravel Pike.

Schwenksville: Flood damage has occurred at a house on Park Avenue and in the borough park downstream. Flooding also occurs along Centennial Road due to back up from a culvert along the creek.

Skippack and Perkiomen Township-Skipack Pike Area: About 20 homes along Route 73 Skipack Pike are located within the floodplain which has a one percent chance of being equaled or exceeded in any given year. (See Map in Appendix S) Many of these homes were originally summer cottages built along the creek. Now they are permanent residences with lower floors that get periodically flooded out. In the past, the county has purchased some properties along the creek in this area to expand the Central Perkiomen Park. The Perkiomen Watershed Conservancy headquarters and portions of Skipack Pike and Haldeman Road in Perkiomen Township were flooded in 2011. Other residences in Skipack Township along the Perkiomen Creek on Lakeside Drive and Penn Drive have also sustained flood damage in the past. Some residential structures along Route 73 in Skipack Township have been elevated.

Properties along Rahns Road (Route 113) in Perkiomen Township flood occasionally. These properties adjoin the county Perkiomen Trail.

Collegeville/ Lower Providence - Collegeville Bridge Area: The Perkiomen Creek has flooded sections of Collegeville Borough on numerous occasions. (See Map in Appendix S) From records of high-water marks on the Perkiomen Bridge Hotel, major floods occurred in 1869, 1933, and 1935 long before any significant development took place within the watershed.



Structures within regulatory floodplain near Collegeville Bridge.

Hurricanes Floyd and Irene and several other recent storms over the past 20 years have caused damage to structures along Route 29 (Gravel Pike) north of the Collegeville Bridge and along First Avenue. Houses located on Route 29 and along First Avenue are within the floodplain which has a one percent chance of being equaled or exceeded in any given year. Several businesses including an auto dealership, a restaurant, a car repair shop, and a car wash lie within the Perkiomen Creek floodplain in Collegeville Borough. On the opposite side of the creek, some homes in Lower Providence off of Pechin's Mill Road have been flooded by the Perkiomen Creek. Also, the Collegeville Inn is partially located in the floodplain and has been flood proofed during its last renovation. The Collegeville Bridge has been closed on several occasions as a result of flooding in Collegeville.

In 1999, Collegeville Borough received \$921,825 from the state for the acquisition and clearance of 12 residential properties along First Avenue. Prior to that, the borough and county acquired other properties within the flood plain in Collegeville for open space. Even still,

approximately 15 homes remain in the Perkiomen Creek floodplain within Collegeville Borough.

Collegeville Borough recently removed a small dam upstream from this area due to growing concern about the maintenance and liability burdens associated with it. It is unclear whether the removal of this dam had any significant hydraulic impact on the flood plain elevation of the creek.

Flooding also occurs at 11th Avenue in Collegeville Borough as a result of an undersized culvert, at Route 29 and Glenfarms Drive due to a small tributary that gets clogged with debris.

Several homes in the Arcola in Lower Providence Township area along the Perkiomen Creek have received flood damage. Arcola Road near the bridge over the Skippack Creek floods as well. The Arcola Road Bridge has recently been replaced.

Pinetown Road periodically floods as well as a house along the road near the Perkiomen Creek.

Trappe Borough: Flooding occurs along a tributary to the Perkiomen Township near the intersection of West Third Avenue and Clayhor Road.

Upper Frederick Township: Flooding occurs along Deep Creek at Snyder Road.

Swamp Creek

Douglass Township: Several properties along Merkel Road, Second Avenue, Smith Road, Middle Creek Road and Sassamansville Road along Swamp Creek and Middle Creek flood periodically. Flooding occurs along Middle Creek Road, Swamp Road and Kulp Road.

New Hanover Township: Localized flooding occurs at least once a year in the Minister Creek impacting a residence on Swamp Pike. Several roads near and over the Swamp Creek such as New Hanover Square and Church Road are flooded at least once a year. Flooding occurs along the Swamp Creek at Colonial Road and Fagleysville Road.

Skippack Creek

Towamencin Township: Road closures occur at several locations along the Skippack Creek in Towamencin Township including: Rittenhouse Road between Kareve and Ridgewood, Allentown Road between Forty Foot and Reinart Road, Kriebel Road between Bustard and Springer Roads, Kriebel Road between Metz and Kulp Roads, Kriebel Road between Bustard and Trumbauer Roads, Anders Road between Morning Glen and Hillside Roads, Rittenhouse Road between Bustard and Store Roads, Old Morris Road between Kulp and Springer Roads, Old Forty Foot Road between Morris Road and Sumneytown Pike, Bustard between Kriebel and Morris Roads, Keeler between Quarry and Troxel Roads, Sumneytown Pike between Valley Forge and Troxel Roads, and Rittenhouse Road Bridge at Old Forty Foot Road.

Worcester Township: Flooding occurs along the 1700 block of Green Hill Road and 3300 block of Mill Road.

Neshaminy Creek

Hatfield Borough and Hatfield Township: Properties in the Hatfield area suffered damage during storms in 1933, 1955, 1960, 1971, and 1972. The worst storm of record in Hatfield Borough was the 1971 storm, which caused substantial first floor damage in a number of residences. Recently flood damage has been significantly reduced as a result of the PA 625 flood control structure developed in headwaters of the Neshaminy Creek in Bucks County. This control structure was part of the Neshaminy Flood Control project developed in the 1960s and 70s. In 1997 Hatfield Borough purchased an important flood plain property along the Neshaminy Creek to preserve as open space. Flooding still occurs along the Neshaminy Creek in Hatfield Township and Hatfield Borough. In the borough, flooding occurs at several businesses along Broad Street along the Neshaminy Creek and a residence on Forrest Way has been flooded during major rain storms. In the Colmar area of Hatfield Township several homes on Lenhart Road, Sharon Road and Anthony Drive have received flood damage. Lower levels of the Lansdale Hospital located in Hatfield Township experienced flood damage in 2011.

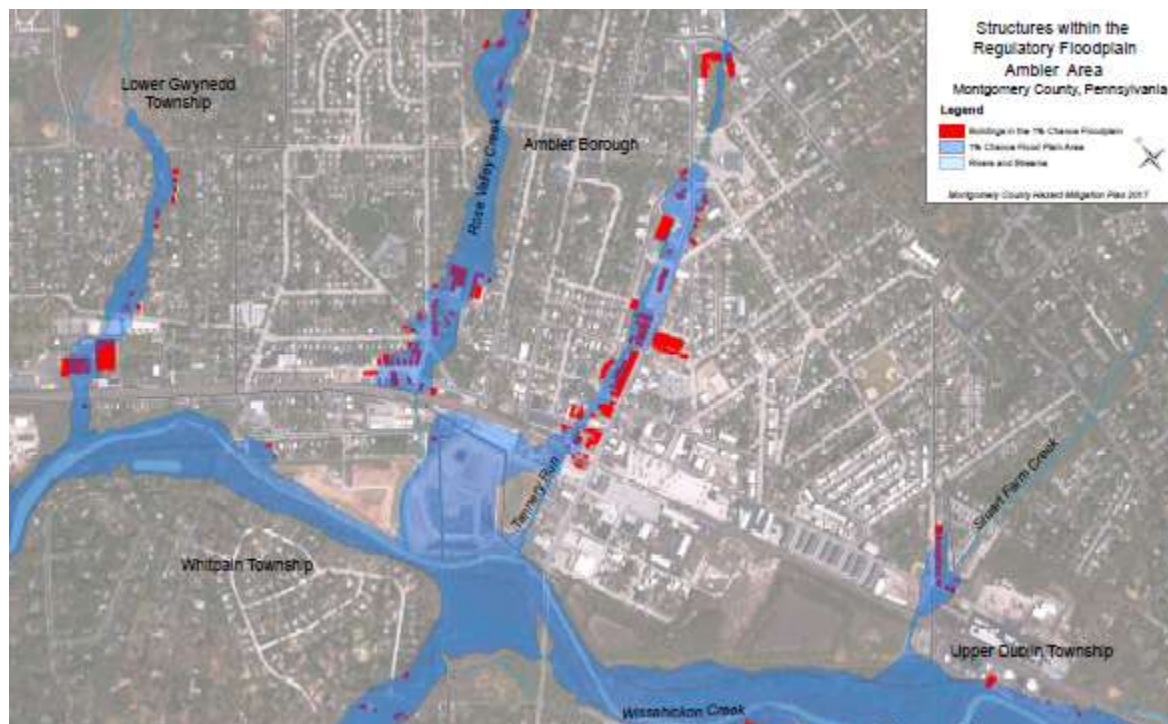
Lansdale Borough: The stream channel of the West Branch of the Neshaminy Creek in Lansdale Borough has a shallow pitch and generally gets clogged with siltation reducing its hydraulic capacity. In past, the borough removed the silt with equipment. As of 2015, the borough has discontinued this practice due to more stringent state regulation.

Horsham Township/ Park Creek Area: Flood damage occurs at properties on McKean Road near Limekiln Road along the Park Creek. The Park Creek has flooded portions of the Horsham Township Parks. Over the past 10 years the township has established an effective vegetated riparian area along the creek to reduce the flood impacts. Road flooding occurs at several locations along Park Creek, most notably along Keith Valley and Davis Grove Roads. Oak Terrace Drive has sustained minor road damage as a result of Tropical Storm Allison.

Wissahickon Creek

Ambler Borough and Whitpain Township (Rose Valley Creek, Tannery Run, and Stuart Farm Creek): Several homes and businesses within Ambler Borough have been flooded by the three tributaries of the Wissahickon Creek that flow through the borough. (See Map in Appendix S) Some of the causes of flooding are excess flow from adjoining municipalities and constricted conveyance capacity in the culverts conveying stormwater through the borough.

Three tributaries (Rose Valley Creek, Stuart Farm/Honey Runs, and Tannery Run) to the Wissahickon create flooding problems in the Ambler area, including the townships of Lower Gwynedd, Upper Dublin and Whitpain. A study on possible drainage improvements was published in 2014 by Temple University, Ambler Campus. The study found that many parts of West Ambler are not in the FEMA floodplain boundary, but they still experience flooding. The study recommended channelizing Rose Valley Creek and Tannery Run to mitigate flooding.



Structures within the regulatory floodplain in Ambler Borough.

Additionally, Ambler faces a unique flooding concern in that it contains two enormous asbestos piles. Although these piles have both been “capped” by the EPA (meaning there’s a large layer of fabric and soil on top), flooding in the area could potentially disturb the piles by eroding the cap slowly. The 2014 Temple study mentioned one of the asbestos piles, but did not go into detail about the volatility of either, simply concluding that channelization of the two tributaries could lessen the likelihood of flooding related damage to the Bo-Rit site asbestos waste soil caps.

Six properties in West Ambler in the 200 block of Maple Avenue flood due to a undersized sluiceway conveying the Rose Valley Creek under Maple Avenue. These properties are now under consideration for grant funding to acquire and remove them. In Hurricane Irene, a vehicle was clogged in the sluiceway causing even more flooding at this location. A property in this same area within the 200 block of Railroad Avenue has flooded in the past. Mount Pleasant Road floods periodically at Maple Avenue.

Springfield Township Erdenheim Area: House flooding and road closures on the unit block of Brookside Road in Erdenheim occurred three times in 2011 and typically occurs every few years. Flooding in the 400 and 500 block of Hemlock Road in Flourtown occurred three times in 2011, and typically occurs every few years. House flooding and road closure in the 800 block of Fraser Road in Erdenheim occurred three times in 2011 and has occurred once in the past 3 to 4 years. Flooding occurred at homes on Quill Lane once in 2011 and once in the past 5 years.

Flooding has occurred in several areas in Springfield Township over the past ten years. During the remnants of Hurricane Jeanne in 2004 over 7 inches of rain fell in Springfield causing wide

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spread flooding temporarily closing 20 roads. Damage in the township has been reported at approximately 15 residences on Hemlock Road and the 200 block of Paper Mill Road.

Springfield Township – Sunnybrook Creek/ Enfield Run/ Oreland Run Area Area: Housing flooding in the 8900 block of Montgomery Avenue in Wyndmoor has occurred twice in 2011 and once the previous 3 to 4 years. House flooding and street closures in the unit blocks of College, Grove, and Weiss Avenues in Flourtown has occurred twice on 2011 and once in the previous 5 years. Yard and street flooding in the 8800 block of Carlisle Road in Wyndmoor has occurred three times in 2011 and twice a year in previous years. Flooding has occurred in yards and has threatened homes in the 8300 to 8500 block of Hull Drive in Wyndmoor and 2000 block of Lantern Lane in Oreland twice in 2011 and once every five years in previous years.

Abington Township – Sandy Run/Madison Area: Homes on Madison Avenue had been flooded on numerous occasions including in particular a local summer storm in 1996. (See Fort Washington AreaMap in Appendix S) Tragically during that storm, two persons were trapped and drowned in the basement of their home near Sandy Run on Madison Ave. As a result of mitigation funding from that disaster, thirteen homes were purchased and removed. Two other homes on Madison Avenue were elevated above the elevation of the flood which has a one percent chance of being equaled or exceeded in any given year. During Tropical Storm Allison, no major damage occurred along Madison Avenue since the most at risk homes had been removed

Abington Township – Sandy Run/ Hillside Cemetery Area: Flooding from a small tributary of Sandy Run Creek has damaged homes on Maple Avenue and Meyer Avenue. Abington Township constructed two stormwater impounding basins in the Hillside Woods property (formerly part of Hillside Cemetery) upstream of the flooded homes. During Tropical Storm Allison in 2001, trash and debris clogged the discharge culvert causing overtopping of the basin at the rear of the Meyer Avenue properties.

Abington Township – Sandy Run North of Susquehanna Road: Eight homes in the 1300 and 1400 blocks of Lindberg Avenue flood approximately twice a year. Approximately 150 homes within the Thunderhead, Blue Jay, Sneak, and Norman Roads flood twice each year. Eight homes on Anzac Avenue flood at least twice a year. Abington Township is applying for funding to make drainage improvements in these areas to reduce flooding.

Whitemarsh/Upper Dublin Townships – Pennsylvania Avenue/Fort Washington Area:

Approximate number of properties in floodplain: 100 (See Map in Appendix S)

Fort Washington's floodplain includes two small tributaries, Pine Run and Sandy Run. (A smaller third, Rapp Run, splits from Pine Run above the Turnpike interchange.) A hotel and several office buildings along Pennsylvania Avenue lie within the floodplain of Pine Run. In addition, other office buildings, parking lots, and roads in the Fort Washington Business Center lie within flood prone areas.

The Fort Washington Business Center is a major employment center; however, its success is

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hindered by flooding. Several properties in the Fort Washington Business Center located along Virginia Drive and adjoining roads, which become impassible during major flooding, disrupting access to numerous businesses.

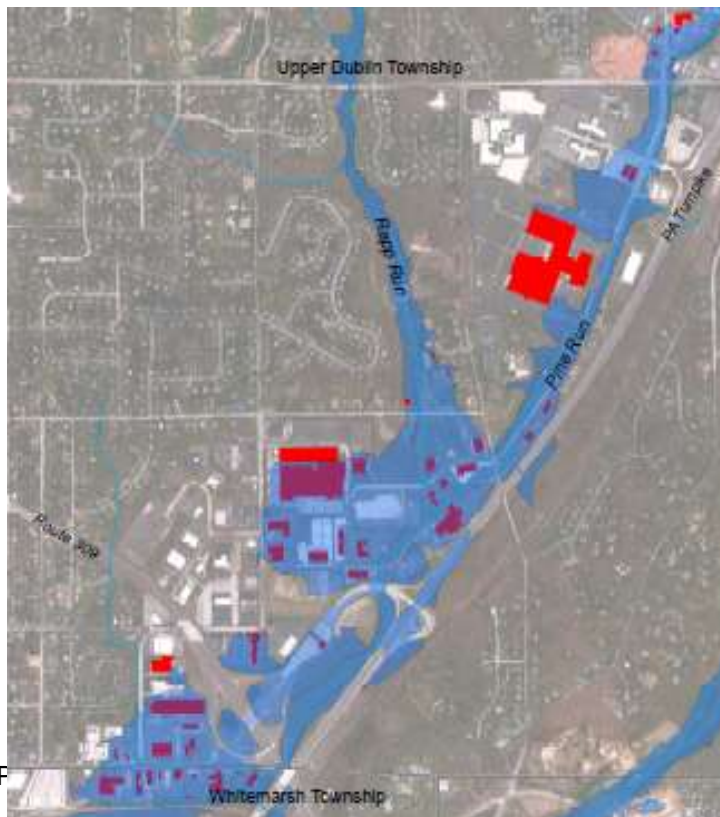
Along Sandy Run, several residential properties along Vance drive and Timber Lane lie within the floodplain. Farther up the creek, several homes off Susquehanna Road, Hall Avenue, and Anzac Avenue lie within the floodplain.

A hotel and several office buildings along Pennsylvania Avenue lie within the floodplain of Pine Run which has a one percent chance of being equaled or exceeded in any given year. Pine Run is a tributary of Sandy Run. In addition, other office buildings, parking lots, and roads in the Fort Washington Business Center lie within flood prone areas. A SEPTA train bridge on the Lansdale/ Doylestown Line was severely damaged during the 2001 flood. The bridge was reconstructed later that year and into 2002. The new bridge provides a substantially larger opening for the Sandy Run, enabling greater flow to pass through during floods and reducing flood elevations just upstream from it by a few feet.



Upper Dublin Township – Fort Washington Business Park: The Fort Washington Business Park is a major employment center in the county located at the Fort Washington interchange of the

Pennsylvania Turnpike. (See Map in Appendix S) The success of this facility as an economic growth and development center is hindered by flooding. Several properties in the Fort Washington Business Center located along Virginia Drive and other adjoining roads are flooded by Pine Run, a tributary of Sandy Run. Also, during significant floods, Virginia Drive and adjoining roads become impassible disrupting access to numerous businesses in the business center. Numerous water rescues have occurred in this area. The Upper Dublin Sewage Treatment plant on Delaware Drive routinely floods and sustains electrical damage and processing disruptions. Several cars have driven around fixed flooded road barriers within the Fort



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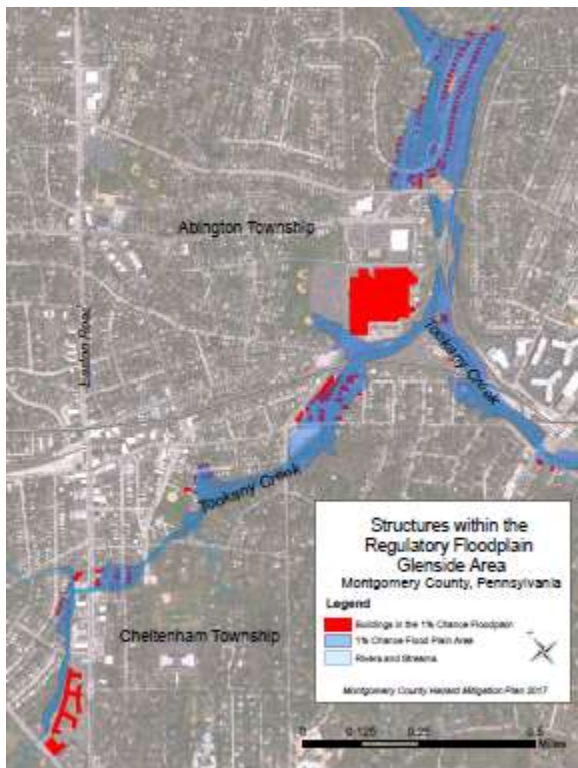
Washington Business Park along Delaware and Virginia Drives. Also vehicles have driven into flood waters along Dreshertown Road near Nicole Drive.

Whitemarsh Township – Militia Area: A few homes are located in the Wissahickon Creek floodplain between the Pennsylvania Turnpike and the Norfolk Southern train tracks. These homes are located on Militia Hill Road, Militia Way, Bethlehem Pike, and Mathers Road. Two of the homes on Militia Hill Road have been recently elevated above the floodplain of Pine Run floodplain.

Whitemarsh Township –Henry and West Green Valley Roads: Homes along the Wissahickon Creek on Henry, Stenton, and West Valley Green Road have been flooded on several occasions.

Whitpain Township: Flooding occurs along the 100 block of Morris Road. Three twin home buildings on Maple Avenue flood from a Wissahickon Tributary adjacent to them. Whitpain Township is pursuing funding to acquire and remove these structures.

Tookany Creek



Abington Township--Baeder Run Area: In 2001, Abington Township completed a flood channelization of a portion of Baeder Run in the vicinity of Wannamaker and Baeder Roads. This area has been subject of several floods including recently Hurricane Floyd and Tropical Storm Allison. Baeder Run is a small tributary of Tookany Creek and drains a largely developed watershed. Baederwood, the neighborhood that is flooded was built in the 1950s. (See Glenside Area Map in Appendix S)

Subsequent to the channeling work, Abington Township acquired and removed several homes on Baeder and Wannamaker Roads adjoining Baeder Run. Four homes still report flooding on Wannamaker Road in this area.

Homes in the 100 through 300 blocks of Keswick Avenue report flooding.

Cheltenham Township-Brookdale Avenue Area: Homes on Brookdale Avenue are normally protected from flooding by a levee along the creek and a stormwater pump station that removes stormwater from the street and discharges it into the stream behind the levee. PA DEP developed this flood control project. During Tropical Storm Allison, a number of homes on Brookdale Road were flooded when a stormwater pump could no longer pump water due to the flood stage in the creek. The Philadelphia office of the Army Corps has performed a field view

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to assess future flooding control alternatives. Homes on Rices Mill and Bickley Road in this area also flood.

Approximate number of properties in floodplain: 100 (See Glenside Map in Appendix S)

In the Glenside/Wyncote area (Cheltenham Township), the Tookany Creek is the primary floodplain. Homes in the 100- 300 block of Keswick Avenue report flooding. To the west, the Oak Summit Apartments of Arcadia University are on the edge of the floodplain. Farther east, a small complex of industrial buildings built on top of the creek has the potential to be flooded.

In Abington Township, Tookany Creek meets Baeder Run, a smaller tributary. Near this junction, a large manufacturing property (SPS Technologies) lies on the edge of the floodplain. In 2001, Abington Township completed a flood channelization of a portion of Baeder Run in the vicinity of Wannamaker and Baeder Roads. This area has been subject of several floods including recently Hurricane Floyd and Tropical Storm Allison. Baeder Run is a small tributary of Tookany Creek and drains a largely developed watershed. Baederwood, the neighborhood that is flooded, was built in the 1950s. The neighborhood still contains a few sets of twin homes. Remaining properties exist because one of the homeowners in the adjoining units refused to sell to the township as part of the hazard mitigation buyout program designed to remove properties from the flood plain in that area.

Cheltenham Township - Elkins Park Area: A portion of Elkins Park located along Church Road and Shoemaker Road experiences chronic flooding from the adjoining Tookany Creek. This area includes homes and the Cheltenham Township Public Works Building. In 1967, the township dredged the creek and erected stone walls along the creek. This seemed to prevent flooding problems until the township ceased maintenance dredging for environmental reasons. Other properties along the Tookany Creek both upstream and downstream of this area flood periodically. Portions of the Tookany Creek Parkway have sustained damage during past flood events. Homes on Rock/ Widener Road, Elkins Ave., Tyson Ave., New Second Street, and Church Road have also reported flooding problems in the past. Cheltenham Township is currently working on various riparian corridor preservation and floodway enhancement projects.

Pennypack Creek

Lower Moreland Township - Bethayres Area:

Approximate number of properties in floodplain: 110 (See Map in Appendix S)

The Pennypack and Huntingdon Valley creeks are the major sources of flood concern in the Huntingdon Valley area. Near where the two creeks converge, a neighborhood of houses between Huntingdon Pike and Philmont Ave has the potential to receive flooding. Above its confluence with the Pennypack, Huntingdon Valley Creek fronts along Philmont Avenue, as well as the SEPTA West Trenton Line, though numerous properties in Bethayres located within the floodplain which has a one percent chance of being equaled or exceeded in any given year were flooded several times in the past 10 years. These properties include a life care facility, shopping center, restaurant and a car dealership on Huntingdon Pike and Philmont Avenue. Several homes on Chestnut Street that had a long history of flooding were removed several

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years ago with federal grant assistance funding. Also, flooding occurs at the 2200 block of Huntingdon Pike.

The former 146-unit Huntingdon Valley Condominiums in Bethayres had a history of flood damage. After being severely damaged during Hurricane Floyd and Tropical Storm Allison and being vacant for several years, a developer demolished them and has constructed a 232-unit elevated condominium development at the site. The new building area is elevated above the flood which has a one percent chance of being equaled or exceeded in any given year. Site regrading was performed to improve capacity of the floodway. The remaining portion of the site is a stormwater basin and will remain open to allow the unimpeded passage of flood waters.

Though Bethayres has received major floods recently, the area has had a long history of flooding with significant floods occurring in July 1931, November 1950, August 1967, and August 1971.

The 2600 block of Philmont Avenue and the intersection of Philmont Avenue and Red Lion Road floods periodically.

The Fetters Mill Bridge owned by the county periodically floods requiring its closure. The bridge is currently being considered for replacement.

Hatboro Borough: Flooding in Hatboro has historically affected several businesses on Old York Road and Horsham Road including a restaurant and car dealership near the Pennypack Creek at Old York Road and the apartments on Horsham Road (primarily located in Upper Moreland Township). Also, a portion of the Pennypack Elementary School is located within the floodplain which has a one percent chance of being equaled or exceeded in any given year floodplain. In the past, Hatboro has received assistance from the Army Corps of Engineers in the channelization of the Pennypack Creek. An unnamed tributary of the Pennypack Creek that flows through the borough has also caused significant property damage during floods within various residential properties including several units of a condominium and apartment building. In 2015, 24 townhouse units of the Woodwinds Condominium complex were purchased and removed by the borough utilizing federal and state mitigation funding. The site has been restored as open space with a pedestrian trail.

Horsham Township: Repetitive flood damage takes place at properties on Olive Avenue, Summer Avenue, Blair Mill Road, and Colonial Drive located along the Pennypack Creek.

Upper Moreland Township - Blair Mill Road Area: Flooding from poor drainage occurs at a portion of Blair Mill Road between West Monument and Bright Road. Undersized storm sewers cause drainage problems in the Bright, Flamingo, Home, Shirley, and Norwyn Road area.

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Upper Moreland Township/ Horsham Road Area: Portions of the apartments located on Horsham Road have flooded during many occasions requiring evacuation and the repair of several apartments in the bottom or basement levels. Additionally, several vehicles parked in the parking lots at the apartments have been washed away.

Upper Moreland Township - Warminster Road/ Below Hatboro Area: Both the Pennypack Creek and a small-unnamed tributary flood several homes along Warminster Road, Lori Lane, and Surrey Lane. An apartment complex also at this location was severely flooded during Tropical Storm Allison. The flood could have been contributing factor in the fire that destroyed one of the apartment building killing several occupants. The building that was burned during that fire was not rebuilt.

Upper Moreland Township/ Bonnet Lane Area/ Old York Road Area: Significant flooding occurs in Upper Moreland Township due to the Mill and the Pennypack Creeks. The Mill Creek is a small tributary of the Pennypack Creek that parallels the Pennsylvania Turnpike and joins with the Pennypack Creek east of Old York Road. The bulk of the watershed was developed over the last 40 years as an office and industrial park and also includes the Willow Grove interchange of the Pennsylvania Turnpike. Flooding along Mill Creek from storm events in August 1993, July 1994, September 1999 and June 2001 had grown progressively worse. Damage within this area occurred in 30 homes on Bonnet Lane and adjoining streets and a small shopping center at the corner of Old York Road and West Mill Road. Additional homes along Old York Road, South Warminster Road and Lancaster Place flood periodically. Both portions of Mill Road and South York Road flood at the Mill Creek Bridge. Additionally Mill Road floods between Orchard Way and South York Road. In the past, several homes in the Bonnet Lane area were purchased and removed by Upper Moreland Township. The land is currently open space, though Bonnet Lane near Mill still has drainage issues. Yet the shopping center and several residential properties still remain in this area.

Flooding occurs at Easton and Maryland Roads; York Road and Crown Street,

Mason Mill and the Southampton Creek Area: Davisville Road floods between Pennypack Road and the PA Turnpike. Just upstream from this location, portions of the Upper Moreland Hatboro Sewage Treatment Plant flood. Portions of Byberry Road flood in the vicinity of the intersection with Pioneer Road due to the Warminster Creek. In this same general area, Mason's Mill Road floods at the Pennypack Creek Bridge. Flooding also occurs due to poor drainage at Exton and Orangeman's Road and Davisville Road south of the County Line Road. Stormwater problems exist at Masons Mill and Huntingdon Pike.

Edge Hill Road/ Mason's Mill Road Area: Roadway drainage problems exist at Evans and Frazier Roads, Edgehill Road between Quigley Avenue and Moreland Road, and



Mason's Mill and Huntingdon Road. Local plans call for drainage improvements at the first two locations and a stormwater basin at the third area.

Upper Moreland Township/ Willow Grove Area: Flooding occurs in three locations in Willow Grove. These include a shopping center at Park Avenue. Moreland Road floods between Easton Road and Park Avenue and Cherry Street floods between Moreland Road and North York Road. Drainage problems exist on Sheldon Road between Dallas and Fitzwatertown Roads. Drainage issues exist on Whitehall, Carlson, and Hideaway Drives, and Cameron Road, and Grant Avenue.

Other homes in Upper Moreland Township on Lori Lane, Broadway Ave., Moreland Road, Exton Road, Fitzwatertown Road, Exton Road, Pioneer Road, Magnolia Ave., Meyer Lane, Cherry St., Willow Ave., James Road, Overlook Ave., Orangemans Road, Davisville Road, Home Road, Round Meadow Lane, and Surrey Lane have experienced flooding. A business on Old York Road has also received flood damage.

Indian Creek

Narberth Borough: The East Branch of the Indian Creek poses some flooding problems to Narberth Borough in the vicinity of the Borough Park, fire station and public works garage. The creek begins in the borough and flows through a culvert under the Amtrak rail line. The culvert appears to cause some back up in creek flows during large storms. In August 2004, severe flooding in this area damaged properties on Windsor, Conway and Dudley Avenues. As part of this storm, all of the borough's police vehicles were damaged in the parking lot behind borough hall.

Lower Merion Township: Other portions of Indian Creek downstream of Narberth Borough in Lower Merion Township are subject to periodic flooding. A flood control dam along the Indian Creek near Remington Road was constructed several years ago to reduce flood damage experienced in that area.

4.3.4.2. Range of Magnitude

Both localized and widespread floods are considered hazards when people and property are affected. Injuries and deaths can occur when people are swept away by flood currents or bacteria and disease are spread by moving or stagnant floodwaters. Most property damage results from inundation by flood water. A large amount of rainfall over a short time span can result in flash flood conditions. Small amounts of rain can result in floods in locations where the soil is frozen or saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces such as large parking lots, paved roadways, or other impervious developed areas. Several factors determine the severity of floods, including rainfall intensity and duration, topography, ground cover, and rate of snowmelt. Water runoff is greater in areas with steep slopes and little or no vegetative ground cover. Some areas of the County have relatively steep topography which promotes quick and flashy surface water runoff. Most storms track from west to east, but some originate in the Great lakes or Atlantic Ocean. Rapidly changing weather patterns and temperatures may cause large-scale snow-melting events in which ice jams in the receiving streams may aggravate the already serious problem of large water volumes

contributed by thousands of small tributaries. Rainfall in Montgomery County is about average for the eastern United States.

While significant flood events are typically associated with very heavy and extreme rain, rainfall events of lesser intensity may also cause flooding given sufficient duration. Flood effects can be volume or force related. Major floods along larger streams having wide floodplains tend to result in large-scale inundations. This causes widespread damage through soaking and silt deposits in homes, businesses, and industrial plants. This seldom results in a major loss of life. In smaller tributaries with significant development, flash floods may be prevalent. Flash floods are short in duration and usually occur in a localized area. In these floods, the velocity rather than the volume of water causes flood damages. Torrents of water can rush down minor hillside gullies at 30-50 miles per hour, carrying trees, debris, and rocks. These floods are often unpredictable and, particularly if they occur at night, can cause major panic and loss of life. Frozen surfaces can more than double normal runoff velocities, particularly in small drainage areas. This causes flash floods which can be compounded by ice and debris jams in channels and culverts.

4.3.4.3. *Past Occurrence*

Montgomery County has a long history of floods. Most of the Presidential Disaster and Emergency Declarations in Pennsylvania have been in response to hazard events related to flooding. Additional declarations issued for hurricane, tropical storm, or nor'easter events were likely issued at least in part due to flood impacts as well. Important floods in Montgomery County between 1950 and 2009 are listed Appendix J.

A previous version of the Pennsylvania Hazard Mitigation Plan found that approximately 57% of flood events occur during the months of June, July, and August. Although most of the major historic Pennsylvania floods have occurred in the summer, occasionally flooding has been caused by a moderate warm winter rain following a deep snow pack. This type of flooding occurred in March 1936 and again in January 1996.

4.3.4.4. *Future Occurrence*

In Montgomery County, flooding occurs commonly and can take place during any season of the year. Every several years, serious flooding occurs along one or more of Montgomery County's major rivers or streams and it is not unusual for such events to happen several years in succession. Floods are described in terms of their extent (including the horizontal area affected and the vertical depth of floodwaters) and related probability of occurrence. Historical records are used to determine the probability of occurrence (percent chance) for a flood of specific extent to occur. The NFIP recognizes the 1%-annual-chance flood, also known as the base flood, as the standard for identifying properties subject to federal flood insurance purchase requirements. A 1%-annual-chance flood is a flood which has a 1% chance of occurring over a given year. DFIRMs and FIRMs published by FEMA can be used to identify areas subject to the 1%- and 0.2%-annual-chance flooding. Areas subject to 2%- and 10%-annual-chance events are not shown on maps; however, water surface elevations associated with these events are included in the flood source profiles contained in associated Flood Insurance Study Reports. The most recent Flood Insurance Study for Montgomery County is available from the FEMA Map Service Center (<http://www.msc.fema.gov>)



Flood control structure in Fort Washington Business Park

4.3.4.5. Environmental Impacts

Floods are naturally occurring events that can enrich riparian systems by enabling groundwater recharge and the introduction of nutrient rich sediment improving soil fertility. However, the destruction of riparian buffers, changes to land-use and land cover throughout a watershed, and introduction of chemical or biological contaminants resulting from development can lead to the following environmental impacts during a flood:

- Drowning of both humans and animals
- Hazardous material facilities are potential sources of contamination during flood events.
- waterborne diseases
- suffocation of tree species non-tolerant to excess water
- heavy siltation and the migration of stream substrata
- destruction and change of stream channel
- damage or loss of crops.

4.3.4.6. Vulnerability Assessment

A major concern for those involved in almost any activity in the vicinity of a stream is the area's vulnerability to flooding. While maps identify the 1%- and 0.2%- annual-chance flood hazard areas, many unmapped floodplain areas are also prone to flooding. The potential flooding depth above a streambed depends mostly (but not entirely) on the upstream drainage area. The drainage area includes that portion of the watershed that is located upstream from a point of interest, excluding areas subject to the influence of major flood-control dams.

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Detailed hydraulic and hydrologic analyses are needed to assess the impact of low-permeability soils, steep slopes, and dense urbanization on flood potential for a specific jurisdiction. The NFIP recognizes the 1%-annual-chance flood as the standard for identifying properties subject to federal flood insurance purchase requirements. Identifying these special flood hazard areas is essential when determining facilities that are vulnerable to flood. Therefore, the latest available flood information was used for GIS analysis performed as part of this plan.

The National Flood Insurance Program (NFIP) identifies repetitive loss (RL) and severe repetitive loss (SRL) properties. RL structures are those insured under the NFIP which have had at least two paid flood losses of more than \$1,000 over any 10-year period since 1978. A property is considered an SRL property either when: a) flood related damages have been incurred on four or more separate occasions with the amount of each claim exceeding \$5,000 and the cumulative amount of the total claims paid exceeding \$20,000; or b) the cumulative amount of claims exceeds the value of the property, when at least two separate claim payments have been made. In either case, at least two losses must have occurred within a ten-year time span; claims must be more than ten days apart.

FEMA's Hazard Mitigation Assistance (HMA) grant programs define Repetitive Loss as a structure covered by a contract for flood insurance made available under the NFIP that

- Has incurred flood-related damage on 2 occasions, in which the cost of the repair, on the average, equaled or exceeded 25% of the market value of the time of each such flood event;
- At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

There are currently 232 repetitive loss structures listed in Montgomery County including 157 severe repetitive loss structures. This is significantly less than the 761 repetitive loss and severe repetitive loss structures listed in the county in 2012. Several of these properties are in Upper Providence Township, Whitemarsh Township and West Norriton Township. The current number may be even less since it appears that some of the properties listed have either been removed or elevated out of the flood hazard area. A summary of the number of repetitive loss and severe repetitive loss structures by municipality is provided on the following pages.

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Municipality	Property Type					# of Severe Repetitive Loss Properties	Sum of All Repetitive Loss Properties (RL and SRL)
	Non-Residential	Single Family	2-4 Family	Condo	Other Res		
Abington Township		12				7	12
Ambler Borough	4	4	1			9	9
Bridgeport Borough	1					1	1
Bryn Athyn Borough						0	0
Cheltenham Township	4	5			1	9	10
Collegeville Borough		6				3	6
Conshohocken Borough	4					4	4
Douglass Township						0	0
East Greenville Borough						0	0
East Norriton Township						0	0
Franconia Township						0	0
Green Lane Borough						0	0
Hatboro Borough	3	2	2	1	5	12	13
Hatfield Borough	1					1	1
Hatfield Township		3				2	3
Horsham Township		1				1	1
Jenkintown Borough						0	0
Lansdale Borough						0	0
Limerick Township						0	0
Lower Frederick Township	1	1				1	2
Lower Gwynedd Township		2				1	2
Lower Merion Township	1	2			1	3	4
Lower Moreland Township	1	5			5	2	11
Lower Pottsgrove Township						0	0
Lower Providence Township		12				9	12
Lower Salford Township						0	0
Marlborough Township						0	0
Montgomery Township		2				1	2
Lower Gwynedd Township		2				1	2
Lower Merion Township	1	2			1	3	4
Lower Moreland Township	1	5			5	2	11
Lower Pottsgrove Township						0	0
Lower Providence Township		12				9	12

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Municipality	Property Type					# of Severe Repetitive Loss Properties	Sum of All Repetitive Loss Properties (RL and SRL)
	Non-Residential	Single Family	2-4 Family	Condo	Other Res		
Lower Salford Township						0	0
Marlborough Township						0	0
Montgomery Township		2				1	2
Narberth Borough						0	0
New Hanover Township		1				0	1
Norristown Borough	3	1				4	4
North Wales Borough						0	0
Pennsburg Borough						0	0
Perkiomen Township		4				3	4
Plymouth Township	1					1	1
Pottstown Borough						0	0
Red Hill Borough						0	0
Rockledge Borough						0	0
Royersford Borough						0	0
Salford Township						0	0
Schwenksville Borough		1				1	1
Skippack Township		3				1	3
Souderton Borough						0	0
Springfield Township		1				1	1
Telford Borough						0	0
Towamencin Township			1			1	1
Trappe Borough						0	0



Site grading after removal of a repetitive loss structure.

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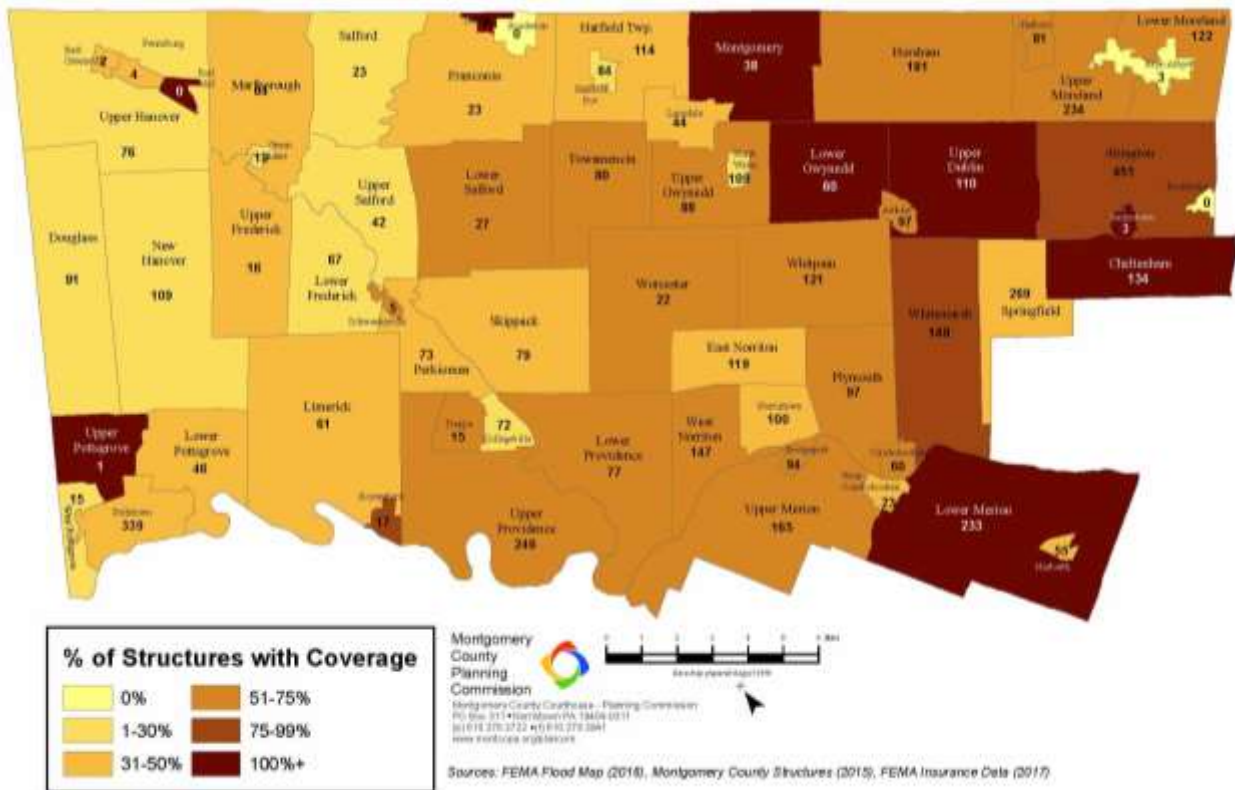
Municipality	Property Type					# of Severe Repetitive Loss Properties	Sum of All Repetitive Loss Properties (RL and SRL)
	Non-Residential	Single Family	2-4 Family	Condo	Other Res		
Upper Hanover Township						0	0
Upper Dublin Township	7	1				8	8
Upper Frederick Township						0	0
Upper Gwynedd Township						0	0
Upper Merion Township		1				1	1
Upper Moreland Township	2	2			2	4	6
Upper Pottsgrove Township						0	0
Upper Providence Township	2	26				16	28
Upper Salford Township		1				0	1
West Conshohocken Borough						0	0
West Norriton Township	1	53	3	1		37	58
West Pottsgrove Township						0	0
Whitemarsh Township	5	15	1			13	21
Whitpain Township						0	0
Worcester Township						0	0
Totals	41	167	8	2	14	157	232

Evaluations of each floodplain were performed to assess all Montgomery County properties located within the floodplain. To do this, digital building footprint data based on 2015 digital orthophotography and FEMA Federal Insurance Rate Maps to identify buildings located within the floodplain area. Each building with its footprint located in the floodplain which has a one percent chance of being equaled or exceeded in any given year was considered susceptible to flood damage. Assessed value may be substantially lower than the current replacement value. Some subjective analysis was employed in determining the flood prone potential since first floor elevations and detailed contour information was not available.

Using the new flood maps, it is estimated that there are 5,497 structures are either entirely in the floodplain or partially within it. Of those 2,762 are completely within the one-percent annual chance floodplain. Additionally, other structures located outside of the regulatory floodplain have also been damaged during floods in the past. It is estimated that approximately \$1 billion in structure value is associated with flood prone buildings. The replacement value of this property

and building content value could approach over \$2.5 billion, though it is highly unlikely that all of the properties within flood hazard areas in the county would be completely destroyed by a single flood event. Also, businesses that are damaged in floods suffer lost commerce during the flood clean up and repair period.

Figure 4.3.4.6.1. Percentage of Structures within the Regulatory Floodplain with Flood Insurance Policies in Effect



Generally sewage treatment plants and water filtration plants are vulnerable to flooding due to their locations along rivers and streams. Many of these facilities were damaged severely during Hurricane Agnes. Recent improvements installed at many of these facilities within the county have made them less susceptible to the impact of floods. Several roads within the county are located within flood plains. These roads and the bridges in floodplains will continue to sustain flood damage. As bridges are replaced, improvements are made in the new bridges that change the flow of water through them. Though in some cases, the bridges may be raised to alleviate flooding, however, the road approaches may still be subject to dangerous flooding. Public transportation including regional rail service is vulnerable to flooding in some locations in Ambler, Abington, Springfield, Bethayres, and Conshohocken.

Sewage treatment plants located in or near a floodplain are listed in Figure 4.3.4.6.2. Most of the older treatment plants in the county are located in a floodplain, though in many cases, the

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newer portions of these facilities located at these sites have been flood proofed. Each treatment plant operates under an emergency management plan that addresses the potential impacts of floods. In flood events, plant managers would also be faced with process management issues arising from the excess sewage flow created by inflow and infiltration into the municipal sewer lines.

Seventeen different large public water suppliers service the county. These suppliers use a combination of wells and surface water supply sources. Two surface water in-takes and water treatment plants along the Schuylkill River in the county are the Pottstown Borough Authority plant in Stowe and the Pennsylvania American plant in Norristown. The Pottstown plant is completely out of the floodplain, while the entire Pennsylvania American site is in the floodplain. This facility was completely reconstructed a few years ago and is entirely enclosed and flood proofed. Water filtration plants located in Spring City and Phoenixville that service portions of the county are located along the river. A small water treatment plant is operated by the East Greenville Borough Authority along the Perkiomen Creek. In a flood situation, these plants would be operating under an emergency management plan. Very likely, surface water treatment plants would curtail their operations during a flood due to water quality problems. In this event, water suppliers could utilize existing interconnections to transport groundwater supplies from other utilities to their customers.

All of the fire stations in the county appear to be located outside of flood hazard areas. In the previous Hazard Mitigation Plan, two fire stations were listed as located in flood hazard areas. The Hatfield Borough Fire Company fire station was relocated to another property outside of the flood plain, while the Mont Clare Fire Company (now Black Rock Volunteer Fire Company) was reconstructed on its original property outside of the floodplain.

Two elementary Schools, the Roslyn Elementary School in the Abington School District and the Hatboro Elementary School in the Hatboro-Horsham District have been impacted by past flooding events. The Roslyn Elementary School sustained over \$1 million dollars in flood damage during a storm on September 8, 1996. Fortunately the storm struck on a weekend. The Roslyn School has been rebuilt to completely remove it from the floodplain. The Montgomery County Community College Pottstown Branch is located within the floodplain of the Schuylkill River which has a one percent chance of being equaled or exceeded in any given year.

During the hazards survey for this plan update, several municipalities acknowledged concerns about older stream culverts that convey existing streams under developed portions of their municipalities. Over the past few years Pottstown Borough has rebuilt an old stone arch stream conveyance at great expense. Other stream culverts in several Montgomery County communities which are 50 to 100 years old or even older are in need of repair and even future replacement.

Figure 4.3.4.6.2. Montgomery County Municipal Wastewater Treatment Plants Within or Adjacent to Floodplains

Name	Location	Capacity (MGD)	Discharge Creek	Municipal Users
Abington WWTP	Upper Dublin	3.91000	Sandy Run Creek	Abington, Cheltenham, U. Moreland, Springfield
Ambler Boro STP	Upper Dublin	6.50000	Wissahickon Creek	Ambler, L. Gwynedd, U. Dublin, Whitmarsh, Whitpain
Berks-Montgomery (BMMA)	Douglass	2.10000	W. Branch Swamp Creek	Douglass, Colebrookedale (Berks), Bechtelsville (Berks)
Bridgeport Boro STP	Upper Merion	0.90000	Schuylkill River	Bridgeport Borough
Conshohocken Boro STP	Conshohocken	2.30000	Schuylkill River	Conshohocken, W. Conshohocken, Plymouth
E. Norriton/Plymouth/Whitpain (ENPW/JSA)	Plymouth	8.10000	Schuylkill River	E. Norriton, Plymouth, Whitpain
Green Lane-Mariborough STP	Green Lane	0.20000	Perkiomen Creek	Green Lane, Mariborough
Hatfield Township STP	Hatfield Twp.	6.43000	W. Branch Neshaminy Creek	Hatfield Twp., Hatfield Boro., Franconia, Montgomery Twp., Hilltown (Bucks)
Lansdale Boro. STP	Lansdale	2.60000	W. Branch Neshaminy Creek	Lansdale, Hatfield Twp., Montgomery Twp., Upper Gwynedd Twp.
Lower Moreland - Chapel Hill STP	L. Moreland	0.22000	Trib. of Southampton Creek	Lower Moreland, Upper Southampton Twp. (Bucks)
Lower Perkiomen Valley - Oaks STP	U. Providence	9.50000	Perkiomen Creek	L. Providence, Perkiomen, Skippack, U. Providence, Trappe, Collegeville
Lower Salford Twp. - Harleysville STP	L. Salford	0.70000	Trib. of Indian Creek	Lower Salford, Franconia
Norristown Boro STP	Norristown	9.75000	Schuylkill River	Norristown Borough, West Norriton Township
North Wales Boro STP	U. Gwynedd	0.83500	Wissahickon Creek	North Wales Borough, Upper Gwynedd Township
Pottstown Boro STP	Pottstown	15.60000	Schuylkill River	Pottstown, L. Pottsgrove, U. Pottsgrove, W. Pottsgrove
Royersford Boro STP	U. Providence	1.97000	Schuylkill River	Royersford, Limerick, Upper Providence
Schwenksville Boro STP	Schwenksville	0.20600	Perkiomen Creek	Schwenksville, Lower Frederick, Perkiomen
Souderton Boro STP	Franconia	2.00000	Little Skippack Creek	Souderton Borough, Franconia Township, Hilltown Township (Bucks)
Telford Boro STP	Franconia	0.95000	Indian Creek	Telford, Franconia, Hilltown (Bucks), West Rockhill (Bucks)
Upper Dublin Twp. STP	U. Dublin	1.00000	Sandy Run	Upper Dublin Township
Upper Gwynedd Twp. STP	U. Gwynedd	4.50000	Wissahickon Creek	U. Gwynedd, L. Gwynedd, Montgomery, Whitpain, Worcester
Upper Gwynedd/Towamencin STP	Towamencin	6.50000	Towamencin Creek	Franconia, Hatfield Twp., Lansdale, L. Salford, Towamencin, U. Gwynedd, Worcester
Upper Hanover Twp. - Macoby STP	U. Hanover	0.02500	Macoby Creek	Upper Hanover Township
Upper Moreland-Hatboro STP	Upper Moreland	7.00000	Pennypack Creek	Hatboro, Horsham, Upper Moreland
Worcester - Valley Green STP	Worcester	0.23000	Zacharias Creek	Worcester Township

Montgomery County 2017 Hazard Mitigation Plan

it is elevated and flood proofed. The Community College also maintains an up-to-date emergency management plan for the site.

The Leary mobile home park along the Pennypack Creek is the only mobile home park located within a floodplain in the county. Several units in this mobile home park were damaged during Tropical Storm Allison. The mobile home has been reconfigured to minimize flood damage.

Luther Woods Nursing Home at 313 County Line Road in Hatboro, Philadelphia Presbyterian Homes along the Fairway in Abington Township and Gloria Dei Towers in Bethayres are located in or partly in the floodplain of the Pennypack Creek. The Brook Glenn Behavior Hospital in Fort Washington has received flood damage.

Figure 4.3.4.6.3. Montgomery County Critical Facilities Within or Adjacent to Floodplains

Facility Name	Municipality	Type of Facility
Ambler Station	Conshohocken Borough	Commuter Rail Station
Abington Station	Abington Township	Commuter Rail Station
Conshohocken Station	Conshohocken Borough	Commuter Rail Station
Spring Mill Station	Conshohocken Borough	Commuter Rail Station
Bethayres Station	Lower Moreland Township	Commuter Rail Station
Hatboro Elementary School	Hatboro Borough	School – elementary
Montgomery County Community College West Campus	Pottstown Borough	School – 2-year college
Luther Woods Nursing Home	Hatboro Borough	Nursing home
Gloria Dei Towers	Lower Moreland Township	Nursing home
Philadelphia Presbyterian Towers	Abington Township	Nursing home
PA Route 23	West Conshohocken Borough	Major Connector
PA Route 320 at I-76 Interchange	Upper Merion Township	Highway Interchange Ramp
Sumneytown Pike near Spring House	Lower Gwynedd Township	Major Collector
North Bethlehem Pike	Lower Gwynedd Township	Minor Arterial Road
West Valley Green Road	Whitemarsh Township	Major Connector
Butler Pike	Ambler Borough	Major Connector
PA Route 29	Collegeville Borough	Major Connector
PA Route 73	Skipack Township	Minor Connector
Susquehanna Road	Upper Dublin and Abington Townships	Minor Arterial
Byberry Road	Upper Moreland Township	Major Collector

4.3.4.7 *Additional Information*

[USGS Stream Gages for PA](#)

[FEMA Maps](#)



4.3.5. Hailstorm

Hail forms when super cooled water freezes on contact with a suspended dust, insects, or ice crystals. Hail can grow into large particles if it is suspended in the atmosphere by updrafts. Once a hail stone becomes too heavy to be supported by the storm's updraft, it falls. Hail stones have been reported from the size of a pea to nearly the size of a baseball. Typically the storms are short and occur in the late spring or summer.

4.3.5.1. Location and Extent

Hailstorm events can occur in all areas of Montgomery County. Hail precipitation is often produced at the front a severe thunderstorm system during late spring or throughout the summer.

4.3.5.2. Range of Magnitude

Hailstorms can cause significant damage to crops and property. The amount of damage is dependent on the size, duration, and intensity of hail precipitation as well as the condition of the crops or property. Minor injury is possible to those unable to find shelter during a severe hail storm. Automobiles and aircraft are particularly susceptible to damage due to their exposed metal bodies. Since hail precipitation usually occurs during thunderstorm events, the impacts of other hazards associated with thunderstorms (i.e. strong winds, intense precipitation, etc.) often occur simultaneously and may cause more damage. Hail storms in late spring can cause significant crop damage, possibly resulting in complete loss of crop yields because the plants are small and more vulnerable. Typically hail storms do not cover a wide area; they are usually concentrated within a few square mile area.

4.3.5.3. Past Occurrence

Generally about one hail storm event producing hail that is $\frac{3}{4}$ inches or greater in diameter has been recorded each year in Montgomery County from 1950 through 2017. Nearly all hail storms have occurred during the months of April, May, June, July, August, and September. Typically hail storm events occurred during afternoon (noon to 5 p.m.) or evening (5 p.m. to 9 p.m.) hours.

4.3.5.4. *Future Occurrence*

Hailstorm events will continue to occur annually, primarily between April and September, in Montgomery County. Based upon past records, it would be reasonable to expect one significant hail storm each year. Because hailstorms primarily affect agricultural products, the biggest potential loss relates to food/agricultural facilities. Severe storms can cause significant automobile and roof damage.

4.3.5.5. *Environmental Impacts*

Damage to trees and various plants can result from intense hail storms. In most cases, natural plants and trees can easily recover from hail damage. Certain agriculture crops may be damaged to the extent where crop yield is diminished if hail occurs in the latter part of the spring when you plants have emerged.

4.3.5.6. *Vulnerability Assessment*

Hail does not pose a direct threat to critical facilities in the county. Damage to agricultural crops could be significant due to the timing and intensity of a hail storm. Total loss of county agricultural crops could result in up to \$18 million of damage. Based on past experience, no hail storm would be large enough to totally destroy the county crops has ever been reported. The localized damage figure from crop loss resulting from hail damage would be significantly less.

4.3.5.7. *Additional Information*

[NOAA Storm Data Base](#)



4.3.6. Hurricane, Tropical Storm, Nor'easter

Hurricanes, tropical storms and nor'easters are all closed circulation storms which develop around a low pressure center in the tropics or off the East Coast. The winds in them rotate counter clock-wise so that storms generally begin with strong winds arising out of the southeast and end with wind from the west. Even though these are primarily coastal storms, they are large and can have a significant impact on in-land areas such as Montgomery County. In some cases, though wind conditions may diminish as storms impact in land areas, the rain fall can actually become more intense as storms slow inland.

4.3.6.1. *Location and Extent*

Pennsylvania does not have any open-ocean coastline. However, the impacts of coastal storm systems such as hurricanes, tropical storms, and nor'easters can extend well inland. Tropical storm systems (i.e. hurricanes, tropical storms, tropical depressions) impacting Pennsylvania develop in tropical or sub-tropical waters of the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea. Nor'easters are extra-tropical storms which typically develop from low-pressure centers off the Atlantic Coast north of North Carolina during the winter months. In some cases, the center of circulation for these storm systems where wind and precipitation effects are often most intense can track inland and move directly through Pennsylvania. However, due to the size of these storms, the Commonwealth can be affected even when circulation centers pass at a

distance of several hundred miles to the east. In either case, these storms are regional events that can impact very large areas, anywhere from hundreds to thousands of miles in extent over the life of the storm. Montgomery County and other communities in the eastern portion of Pennsylvania are more affected by coastal storm systems than western communities in the state. However, these storms have the potential to impact all communities across Commonwealth.

4.3.6.2. Range of Magnitude

Hurricanes are large storms that can spread up to 300-400 miles wide. They combine very high winds and heavy rains and typically form in the Atlantic Ocean in the late summer to early fall. Hurricanes have caused the most damage in the Caribbean Sea and the Gulf of Mexico, though hurricanes have also caused significant damage all along the Atlantic coast and hundreds of miles inland. Hurricanes are ranked according to their maximum winds using the Saffir–Simpson Hurricane/ Wind Scale (see Figure 5.3.6.2.1). A category 1 storm will have the lowest wind speeds (74-95 miles per hour) while the extremely dangerous category 5 storm wind speeds will exceed 157 miles per hour. Generally, a category 3 or greater hurricane is a major hurricane. As hurricanes make landfall they quickly loose intensity but often times unleash torrential rains. Far away from coastal areas, the rain falls may cause more significant impacts than the diminished winds.

Figure 4.3.6.2.1. Saffir-Simpson Hurricane/ Wind Scale

Category	Winds	Summary
1	74-95 mph 64-82 kt 119-153 km/h	Very dangerous winds will produce some damage
2	96-110 mph 83-95 kt 154-177 km/h	Extremely dangerous winds will cause extensive damage
3	111-129 mph 96-112 kt 178-208 km/h	Devastating damage will occur
4	130-156 mph 113-136 kt 209-251 km/h	Catastrophic damage will occur
5	157 mph or higher 137 kt or higher 252 km/h or higher	Catastrophic damage will occur

Tropical storms that impact Montgomery County are usually the remnants of larger hurricanes that make landfall as far away as the Gulf Coast. These cyclonic storms contain winds ranging from 39 to 73 miles per hour and have the potential to provide large amounts of rainfall in a short period of time depending upon the track of the storm.

Though Nor'easters could form at any time of the year, they are most potentially damaging when they form in the winter causing blizzard conditions. For more on winter storms see Section 4.3.14.

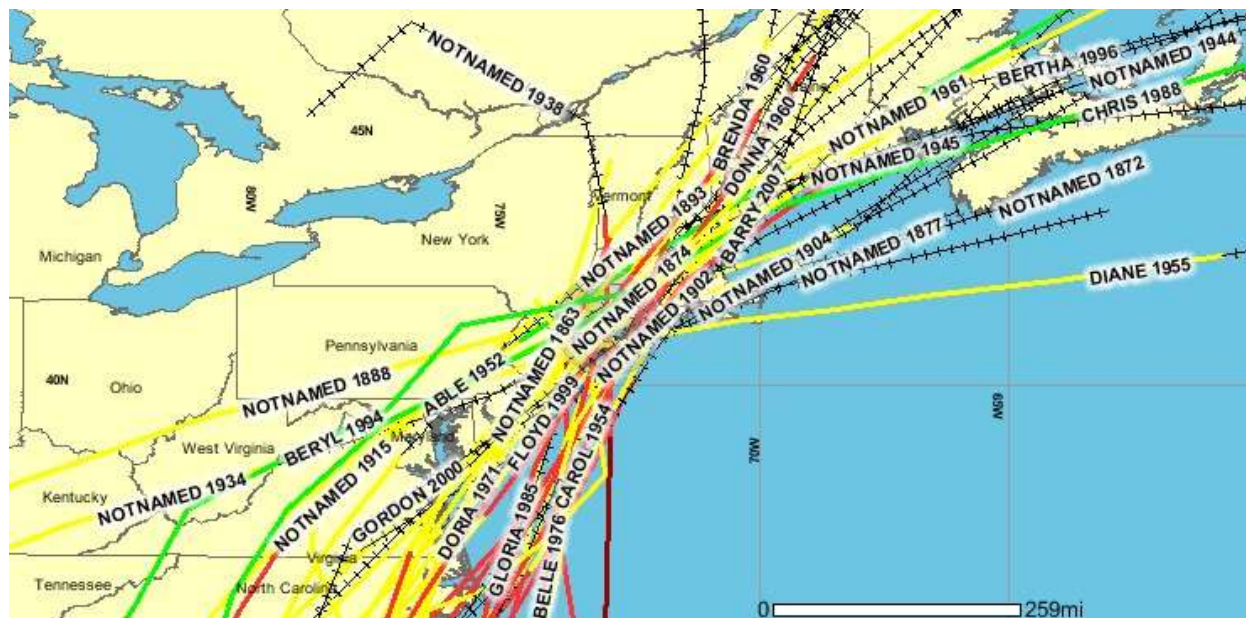
4.3.6.3. Past Occurrence

Tropical storms and hurricanes are known by their names. Up until 1979 all storms were given female names, now both male and female names are used. Most hurricanes and tropical storms that have an impact on the state did not directly hit Pennsylvania. An example of such a storm is Tropical Storm Agnes (June 21 and 22, 1972). While it has been the most significant tropical storm event to impact the Commonwealth, the storm track for Agnes remained to the east of Pennsylvania and New Jersey until making landfall near New York City and traveling into upstate New York. Other tropical cyclones which did not track through Pennsylvania, but caused significant damage to Montgomery County include Superstorm Sandy (October 28-29, 2012), Tropical Storm Lee (September 5, 2011), Hurricane Irene (August 28, 2011), Ivan (2004), Tropical Storm Allison (June 16, 2001), Hurricane Floyd (September 16, 1999) and Eloise (1975). The landfall areas of recent hurricanes impacting the northeast are shown on Figures 4.3.6.3.1 and 4.3.6.3.2.

Figure 4.3.6.3.1. Major Hurricane Landings in the Atlantic Coast



Figure 4.3.6.3.2 Major Hurricane Historical Tracks in Mid-Atlantic



NOAA

4.3.6.4. Future Occurrence

Based on historical data between 1944 and 1999, Pennsylvania has a 6-18% chance of experiencing a tropical storm or hurricane event between June and November of any given year (NOAA HRD, 2009). Note that these probabilities are the result of only a single study and may differ from other seasonal probability estimates not identified in this report. Studies investigating the probability of future occurrence of nor'easters have not been identified. However, based on historical events and recent trends, which indicate more frequent occurrence of tropical storms and hurricanes along the East Coast, it would appear that the annual occurrence of these events is considered highly likely.

4.3.6.5. Environmental Impacts

The environmental impacts associated with coastal storms in Pennsylvania are consistent with those described for flood hazards in Section 4.3.4.5 and wind hazards in Section 4.3.11.5 and for nor'easters the impacts are described as part of the winter storm hazards in Section 4.3.13.5.

4.3.6.6. Vulnerability Assessment

The vulnerability of the county to hurricanes and tropical storms is similar to the combined vulnerability of the county to flooding and high winds, both significant features in coastal storms. For nor'easters the impact would be similar to winter storms.

4.3.6.7. Additional Information

[National Oceanic and Atmospheric Administration Hurricane Research Division](#)

[American Meteorological Society](#)



4.3.7. Landslide

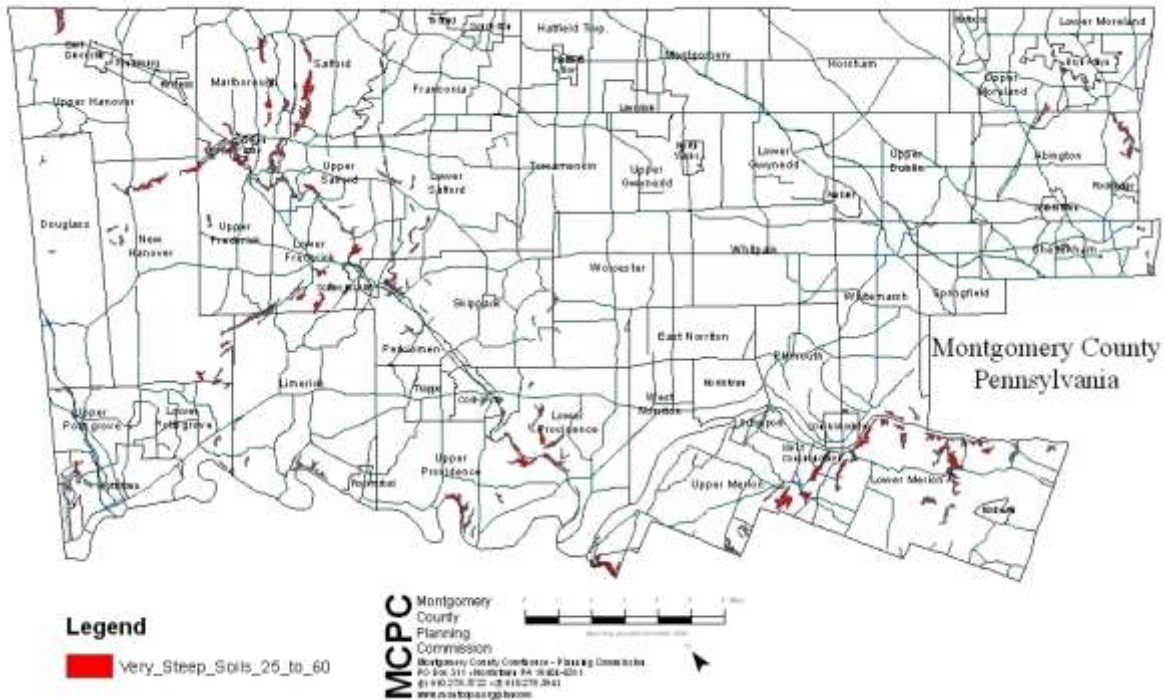
A landslide is a general term for the down slope mass movement of rock and soil. Movement may occur rapidly or may take several years. Unstable rock or soil under moist conditions can foster landslides. Generally rapid slides caused by excess moisture are referred to as mudslides or earth flow. Slow mass movement caused by water is soil or rock creep. Rock slides or slumps are terms for rapid landslides that occur under dry conditions.

4.3.7.1. Location and Extent

Landslides and other slope failures can occur in a few locations within Montgomery County that contain moderate to steep slopes (see Figure 5.3.7.1.1). Many slope failures are associated with precipitation events – periods of sustained above-average precipitation, heavy rainstorms, or snowmelt. Areas experiencing erosion, decline in vegetation cover, and earthquakes are also susceptible to landslides. Human activities that contribute to slope failure include altering the natural slope gradient, increasing soil water content, and removing vegetation cover.

Most of the steep slope areas in Montgomery County occur in sparsely developed portions of the county including land along the Perkiomen Creek and Swamp Creek north of Schwenksville, areas of the Perkiomen Creek and Skippack Creek near Arcola, portions of the Schuylkill River near Mont Clare, along Mount Joy in Valley Forge National Historical Park in Upper Merion, and areas in Lorimer Park along the Pennypack Creek in Abington Township. Populated areas with steep slopes occur in the Lower Schuylkill River corridor primarily in Lower Merion Township and West Conshohocken Borough.

Figure 4.3.7.1.1. Moderate to Steep Slope Areas in Montgomery County



4.3.7.2. Range of Magnitude

Landslides may cause damage to transportation routes, utilities and buildings. They can also create travel delays and other secondary impacts when debris from landslides clogs transportation systems. Fortunately, deaths and injuries due to landslides are rare in Pennsylvania. Many of the known deaths due to landslides have occurred when rocks fall or slide along highways causing vehicle crashes. As development increases on and near steep slopes, the potential hazard associated with these rapid events could increase.

4.3.7.3. Past Occurrence

There is very little information about past landslides in Montgomery County. A major localized landslide occurred in West Conshohocken Borough on June 27, 2015 resulting in the long term closure of Balligomingo Road between Route 23 (Front Street) and Portland Road for mud removal and slope stabilization. The mudslide was induced by heavy rains along a very steeply sloped north facing slope. As consequence of the landslide, large trees fell over further destabilizing the slope.

Another significant landslide occurred in the county in Lower Merion Township within the steep slopes near the Schuylkill River. Though only a small mudslide that occurred on January 2, 2007, it caused the derailment of a 54-car freight train. Fortunately none of the train cars carrying hazardous material leaked and there were no serious injuries. Other small soil movement has occurred in isolated areas causing the overturning of walls and very localized damage.

4.3.7.4. Future Occurrence

The probability of landslide activity in Montgomery County is quite low based on information compiled by the USGS (see Figure 5.3.7.4.1). This is because very few significant steep slope areas exist in the county and the vegetation cover in the steeply sloped areas is lush keeping soil and rocks in place. Also, the weather in the county is temperate with no overly wet or dry periods that could foster landslide activity.

Figure 4.3.7.4.1. Landslide Probability in Pennsylvania



4.3.7.5. Environmental Impacts

The impact of landslides on the environment depends on the size and specific location of the event. In general, impacts include:

- Changes to topography
- Damage or destruction of vegetation
- Stream water quality and hydraulics
- Damage to buildings and highways

4.3.7.6. Vulnerability Assessment

Municipal actions have greatly reduced the threat of landslides. Many municipalities limit the amount and types of development that can occur on steep sloped areas through various requirements in the zoning or subdivision ordinances with steep slope area restrictions. Additionally, municipalities and the Montgomery County Conservation District enforce erosion and sediment controls during all land disturbance activities. Steep sloped areas are generally priorities for preservation through acquisition with county open space funding

made available to municipalities and private non-profit organizations. Tree preservation ordinances also work to maintain vegetation coverage on slopes.

Steep slopes adjoining major train and highway systems present a significant risk. In these areas, even a small landslide can have dire consequences. Yet these areas are very limited in the county.

4.3.7.7. *Additional Information:*

[Pa Geological Survey](#)



4.3.8. Lightning Strike

Lightning is atmospheric discharge of electricity. Though there are several forms of lightning, the type of greatest concern to local emergency management responders is cloud-to-ground lightning which is a great discharge of electricity between a cumulonimbus cloud and the earth including building strikes.

4.3.8.1. Location and Extent

Lightning events occur across the entire Commonwealth of Pennsylvania. Different areas experience varying event frequencies. Lightning strikes occur primarily during the summer months, though lightning does occur occasionally during snow storms. While the impact of lightning is highly localized, strong frontal storm systems can produce numerous lightning events over a broad area in a short period of time. In addition, the impacts of an event can be serious or widespread if lightning strikes a particularly significant location such as a power station or large public venue. Montgomery County recorded 33 lightning events that resulted in injury or property damage between 1996 and 2017. Fortunately no fatalities from lightning were reported during that time. Over the past 5 years, over 100 lightning fatalities have been reported nationwide. Though significant, this number is a dramatic decrease from the 300- 400 yearly fatalities that were reported over 75 years ago.

4.3.8.2. Range of Magnitude

According to the National Weather Service (NWS), the 30-year average for reported lightning fatalities is 55 per year, with an estimated 300-400 injured. Many case histories show heart damage. Inflated lungs and brain damage have also been observed from lightning fatalities. According the NWS, only about 10% of the people who are struck by lightning actually die. That leaves 90% with a varying range of injuries. Deaths and injuries to livestock and other animals, thousands of forest and brush fires, as well as millions of dollars in damage to buildings, communications systems, sensitive technological devices, power lines, and electrical systems are also the result of lightning. The most severe lightning event would be a strike in a

large crowd or gathering of people as might be found at a large sporting event or outdoor concert. This could result in mass deaths or injuries.

In most cases, the damage and injuries from lightning are a result of fire caused by lightning strikes on buildings. In many cases, storms causing lightning damage are also responsible for wind damage and flooding. These types of storms can also result in widespread power and communications service outages.

4.3.8.3. Past Occurrence

Records from the National Climatic Data Center show that there were 42 lightning events in Montgomery County between 1950 and 2011. A lightning “event” is defined as a lightning strike which results in fatality, injury, and/or property or crop damage (NCDC, 2010). The recording of lightning events is highly subjective and therefore lightning vulnerability is clearly epistemic.

4.3.8.4. Future Occurrence

The predictability of a lightning strike is imprecise. The frequency of future lightning storms should be similar to the past. Generally one major event should be expected each year.

4.3.8.5. Environmental Impacts

The environmental impacts most often associated with lightning strikes include tree damage and ignition of wildfires.

4.3.8.6. Vulnerability Assessment

In the case of lightning strikes, population and building density has a correlation with hazard vulnerability and loss. In particular, an urban and suburban areas such as Montgomery County with significant population and structure density as well as taller buildings which can act as lightning rods is more vulnerable to damage during past lightning events than other portions of the state. Wildfires could start because of lightning strikes, but are unlikely in the county due to smaller areas of woodlands. On average, about \$100,000 per year of damage has been reported for lightning, though lightning may be causing significantly more damage to equipment, particularly sensitive control and communications systems, as well as causing structural fires. Over the past 5 years Lightning strikes have disabled key infrastructure such as water pumps, sewage pump stations and sewage treatment plants

4.3.8.7. Additional Information

[NOAA Storm Events Lightning](#)



4.3.9. Pandemic and Infection

Pandemic is the widespread occurrence of disease over a large geographical area, which affects the full spectrum of the population over a short period of time. A disease or condition is not a pandemic merely because it is widespread or kills many people; it must also be infectious..

4.3.9.1. Location and Extent

The exact size and extent of an infected population is dependent upon how easily the illness is spread, the mode of transmission and the amount of contact between infected and uninfected individuals. The transmission rates of pandemic illnesses are often higher in denser areas where there are large concentrations of people. The transmission rate of infectious disease will depend on the mode of transmission of a given illness. Pandemic events can also occur after other natural disasters, particularly floods, when there is the potential for bacteria to grow and contaminate water.

Historically, the two most likely threats of pandemic to affect Montgomery County have been West Nile Virus and influenza. West Nile Virus is a vector-borne disease that can cause headache, high fever, neck stiffness, disorientation, tremors, convulsions, muscle weakness, paralysis, and, in its most serious form, death. The virus spreads via mosquito bite and is aided by warm temperatures and wet climates conducive to mosquito breeding. Influenza (“the flu”) is a contagious disease that is caused by the influenza virus and most commonly attacks the respiratory tract in humans.

The first case of Zika Virus was reported in Montgomery County in 2016. Zika virus is primarily spread through the bite of an infected *Aedes* species mosquito; it can also be transmitted sexually, or through a blood transfusion, or from a mother to her baby during pregnancy. Common symptoms are fever, rash, joint pain, and conjunctivitis (red eyes). The illness is usually mild with symptoms lasting for several days to a week and only about one in five people infected with Zika will get sick.

4.3.9.2. Range of Magnitude

The magnitude of a pandemic or infectious disease threat in Montgomery County depends on the aggressiveness of the virus or bacteria in question and its ability to spread. Population density and the level of social interaction in any infected area can influence the overall impact of any communicable disease.

4.3.9.3. Past Occurrence

Deaths occurred in the United States as a result of the Spanish Flu, Asian flu, Hong Kong Flu, and Swine Flu outbreaks (Figure 4.3.9.3.1). The Spanish Flu claimed 500,000 lives in the United States, and there were 350,000 cases in Pennsylvania – 150,000 were in Philadelphia alone. Most deaths resulting from the Asian flu occurred between September, 1957 and March, 1958; there were about 70,000 deaths in the United States and approximately 15% of the population of Pennsylvania was affected. The first cases of the Hong Kong Flu in the U.S. were detected in September of 1968 with deaths peaking between December, 1968 and January, 1969 (Global Security, 2009). More recently, 10,940 cases of 2009 H1N1 (Swine Flu) were confirmed in Pennsylvania, resulting in 78 deaths.

Figure 4.3.9.3.1 List of significant influenza outbreaks.

Date	Virus Name/Subtype
1918-1920	Spanish Flu/H1N1
1957-1958	Asian Flu/H2N2
1968-1969	Hong Kong Flu/H3N2
2009-2010	Swine Flu/ A/H1N1

West Nile Virus arrived in the United States in 1999 and was first detected in Pennsylvania in 2000 when mosquito pools, dead birds and/ or horses in 19 counties tested positive for the virus. Since then, the number of positive counties, human cases, and West Nile deaths has fluctuated with the temperature and precipitation each year.

The first case of Zika Virus in Montgomery County was reported in April 2016.

4.3.9.4. Future Occurrence

Future occurrences of West Nile Virus are unclear. Instances of the virus have been generally decreasing due to aggressive planning and eradication efforts, but some scientists suggest that as global temperatures rise and extreme weather conditions due to climate change, the range of the virus in the United States will grow (Epstein, 2001). Also, as the population of the county

continues to grow and travel throughout the world, the potential for disease introduction into the county increases.

As with West Nile Virus, the precise timing of pandemic influenza is uncertain, but occurrences are most likely when the Influenza Type A virus makes a dramatic change, or antigenic shift, that results in a new or “novel” virus to which the population has no immunity. This emergence of a novel virus is the first step toward a pandemic.

Future pandemics may also emerge from other diseases, especially invasive pathogens that Pennsylvanians do not have natural immunity to.

4.3.9.5. Environmental Impacts

There are no true environmental impacts of pandemics and infectious disease threats, but there will be significant economic and social costs beyond the possibility of disease-related deaths. Widespread illness may increase the likelihood of shortages of personnel to perform essential community services. In addition, high rates of illness and worker absenteeism occur within the business community, and these contribute to social and economic disruption.

4.3.9.6. Vulnerability Assessment

County facilities are no more or less vulnerable to pandemic and infectious disease than the general population. There are some occupation-specific risks that may make some employees more vulnerable. For example, those working in direct patient care situations are more likely to be exposed to a pandemic disease; similarly, employees working outdoors for extended periods of time in the warm months may be more vulnerable to viruses carried by mosquitos.

4.3.9.7. Additional Information

[Montgomery County Pandemic Plan](#)

[Montgomery County Health Department Influenza Website](#)

[Montgomery County Health Department Mosquito Control Information](#)

[Center for Disease Control Zika Virus Page](#)



4.3.10. Radon Exposure

Radioactivity caused by airborne radon has been recognized for many years as an important component in the natural background radioactivity exposure of humans, but it was not until the 1980's that the wide geographic distribution of houses with high radon and the possibility of extremely high radon values in houses were recognized.

4.3.10.1. Location and Extent

Radon is a noble gas that originates by the natural radioactive decay of uranium and thorium. Like other noble gases (e.g., helium, neon, and argon), radon forms essentially no chemical compounds and tends to exist as a gas or as a dissolved atomic constituent in groundwater. Two isotopes of radon are significant in nature, ^{222}Rn and ^{220}Rn , formed in the radioactive decay series of ^{238}U and ^{232}Th , respectively. The isotope ^{220}Rn (also called thoron) has a half-life (time for decay of half of a given group of atoms) of 55 seconds, barely long enough for it to migrate from its source to the air inside a house and pose a health risk. However, ^{222}Rn ("radon"), which has a half-life of 3.8 days, is a widespread hazard.

The distribution of radon is correlated with the distribution of radium (^{226}Ra), its immediate radioactive parent, and with uranium, its original ancestor. Because of the short half-life of ^{222}Rn , the distance that radon atoms can travel from their parent before decay is generally limited to distances of feet or tens of feet. Three sources of radon in houses are now recognized: radon in soil that flows into the house, radon dissolved in water from private wells and exsolved during water usage; and radon emanating from uranium-rich building materials (e.g., concrete blocks or gypsum wallboard). The last two sources of radon are not known to be problems in Pennsylvania.

A high level of radon was initially thought to be exacerbated in houses that are tightly sealed, but it is now recognized that rates of air flow into and out of houses, plus the location of air inflow and the radon content of air in the surrounding soil, are the keys. Outflows of air from a

house, caused by a furnace, fan, thermal “chimney” effect, or wind effects, require that air be drawn into the house to compensate. If the upper part of the house is tight enough to impede influx of outdoor air (radon concentration generally <0.1 pCi/L), then an appreciable fraction of the air may be drawn in from the soil or fractured bedrock through the foundation and slab beneath the house, or through cracks and openings for pipes, sumps, and similar features. Because soil gas typically contains from a few hundred to a few thousand pCi/L of radon, even a small rate of soil gas inflow can lead to elevated radon concentrations in a house.

The radon concentration of soil gas depends upon a number of soil properties, the importance of which is still being evaluated. In general, up to half of the newly formed radon atoms escape the host mineral of their parent radium and gain access to the air-filled pore space. The radon content of soil gas clearly tends to be higher in soils containing higher levels of radium and uranium, especially if the radium occupies a site on or near the surface of a grain from which the radon can easily escape. The amount of pore space in the soil and its permeability for air flow, including cracks and channels, are important factors determining radon concentration in soil gas and its rate of flow into a house. Soil depth and moisture content, mineral host and form for radium, and other soil properties may also be important. For houses built on bedrock, fractured zones may supply air having radon concentrations similar to those in deep soil.

4.3.10.2. *Range of Magnitude*

There is a wide range in radon hazard potential throughout the Commonwealth of Pennsylvania. The average indoor radon screening level in Pennsylvania is greater than 4 pCi/L. Though Montgomery County appears to have a lower percentage of buildings above this action threshold than counties to the north and west, there still are areas of the county where radon could present a risk.

Exposure to radon is the second leading cause of lung cancer after smoking. It is the number one cause of lung cancer among non-smokers. Radon is responsible for about 21,000 lung cancer deaths every year; approximately 2,900 of which occur among people who have never smoked. Lung cancer is the only known effect on human health from exposure to radon in air and thus far, there is no evidence that children are at greater risk of lung cancer than are adults (USEPA, 2010). The main hazard is actually from the radon daughter products (^{218}Po , ^{214}Pb , ^{214}Bi), which may become attached to lung tissue and induce lung cancer by their radioactive decay.

Current data on abundance and distribution of radon in Pennsylvania houses is considered incomplete and potentially biased, but some general patterns exist. Values exceeding the EPA guideline of 4 pCi/L occur in all regions of the Commonwealth. Glaciated areas in northern Pennsylvania tend to have relatively low frequencies of elevated radon, perhaps because of thin soils and incomplete weathering. The Appalachian Plateaus province in western Pennsylvania also appears to have lower than average radon, as does the Atlantic Coastal Plain near Philadelphia and other areas having a shallow water table. The highest proportion of elevated values is in a zone extending from central Pennsylvania to southeastern Pennsylvania, and in the Reading Prong. High values in the latter area are attributed to known uranium-rich granitic gneisses (Gunderson et al., 1988), accentuated by local factors such as shear zones, and

include a surprising number of extremely high radon values (>200 pCi/L). Elevated radon values in the larger, northwest-southeast-trending zone (Centre through York Counties) are not understood, but may represent some combination of black shale (Martinsburg Formation), limestone soil, and deep weathering. Some houses (0.6-percent in Cumberland and Dauphin Counties) exceed an extremely hazardous 200 pCi/L. Information on average radon levels by zip code in Pennsylvania can be obtained from PA DEP.

4.3.10.3. *Past Occurrence*

In 1984, routine monitoring of employees leaving the Limerick nuclear power plant in Montgomery County showed that readings on Stanley Watras, a PECO employee, frequently exceeded the expected radiation levels, yet only natural, nonfission-product radioactivity was detected on him. Radon levels in his home in Berks County were found to be about 2,500 pCi/L (picocuries per liter), much higher than the 4 pCi/L guideline of the Environmental Protection Agency (EPA) or even the 67 pCi/L limit for uranium miners. As a result of this event, the Reading Prong geological section of the New England province where Watras lived became the focus of the first large-scale radon investigation in the world.

4.3.10.4. *Future Occurrence*

Radon exposure is inevitable given present soil, geologic, and geomorphic factors across Pennsylvania. Development in areas where previous radon levels have been significantly high will continue to be more susceptible to exposure. However, new incidents of concentrated exposure may occur with future development or deterioration of older structures. Exposure can be limited with proper testing for both past and future development and appropriate mitigation measures.

4.3.10.5. *Environmental Impacts*

Radon exposure has minimal environmental impacts. Due to the relatively short half-life of radon, it tends to only affect living and breathing organisms such as humans or pets which are routinely in contained areas (i.e. basement or house) where the gas is released.

4.3.10.6. *Vulnerability Assessment*

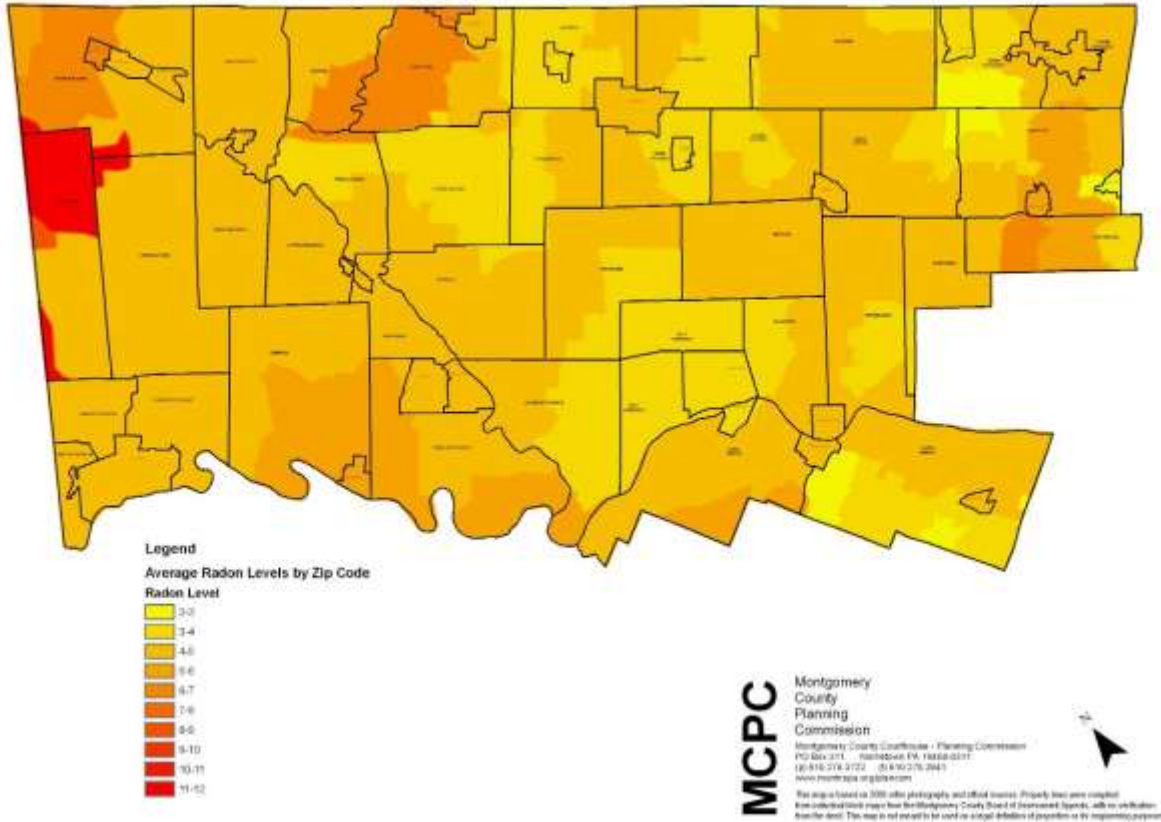
As seen on Figure 4.3.10.6.1, average recorded radon levels of 4.0 pCi/L, the concentration of radon at which the federal Environmental Protection Agency (EPA) determines is the threshold for action, are found in many locations of the county.

Home owner awareness of radon levels has increased the amount of radon testing and installation of radon venting systems throughout the county. Radon testing is typically performed during home inspections for most house sales in the county. Also, testing has been performed on various public buildings particularly ones utilizing basement facilities. Mitigation measures involving air vents and fans have been installed in buildings with high levels of radon.

The damage from radon can be best expressed in human terms, though no information is currently available to use in making an estimate of future damage from radon. Generally, the radon levels in many buildings throughout the county are about 2 to 10 pico-curies per liter. This

level of exposure would be comparable to the risk of smoking from one to 20 cigarettes each day.

Figure 4.3.10.6.1. Radon Levels in Montgomery County by Zip Code



4.3.10.7. Additional Information

[PADEP](#)

[EPA](#)



4.3.11. Subsidence, Sinkhole

Subsidence is the downward movement of surface material; it involves little or no horizontal movement. Natural subsidence is most pronounced where bedrock consists of limestone or dolomite and is related to solution of these two types of rock, which based on their chemical composition, are referred to as carbonate rocks. Natural surface subsidence is considered a geologic hazard, but it is often triggered by extremely wet weather.

4.3.11.1. Location and Extent

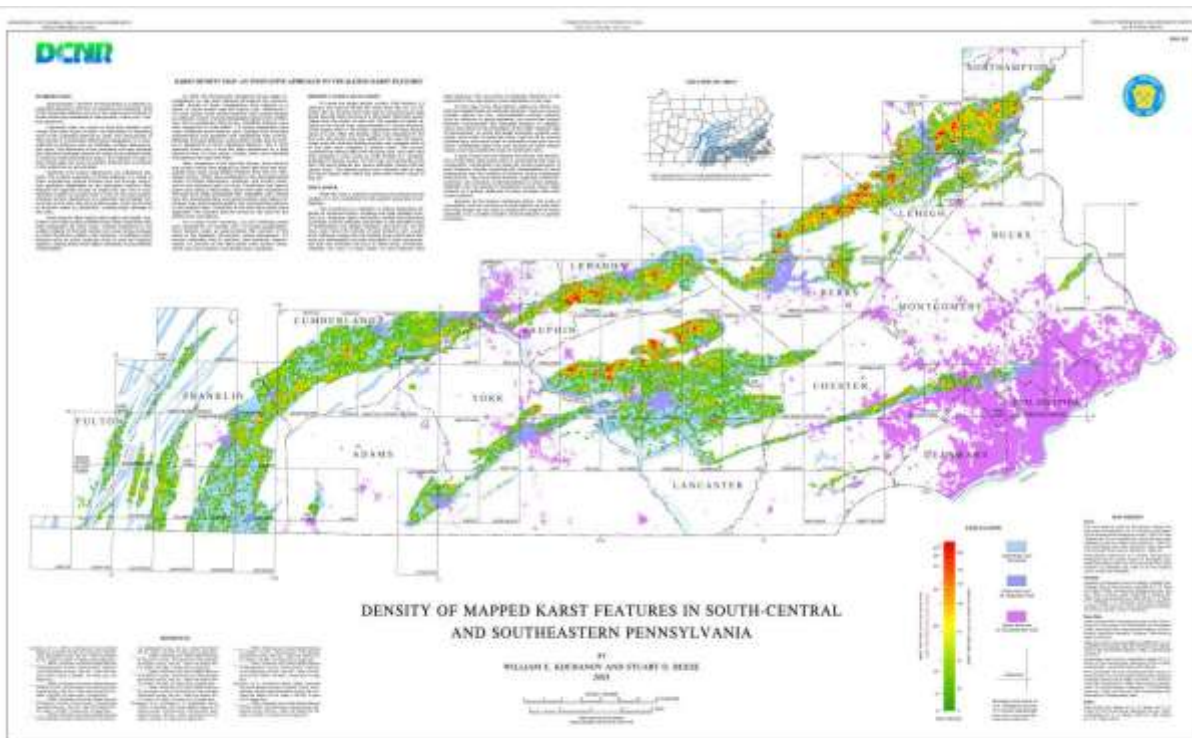
There are two common causes of subsidence in Pennsylvania: 1) dissolution of carbonate rock such as limestone or dolomite and 2) underground mining activity. Subsidence from underground mines is not an issue in the county since only very little mining took place in the county. The only known underground mines occur in the vicinity of the John James Audubon Center property in Lower Providence Township. Natural subsidence is expressed at the surface through the formation of sinkholes. Generally, sinkholes can form rapidly due to the collapse of the roof of an underground cavity or from the subsidence of surface materials into a subsurface opening caused by the solution of carbonate bedrock.

In the first case, water passing through naturally occurring fractures and bedding planes dissolves bedrock leaving voids below the surface. Eventually, overburden on top of the voids collapses, leaving surface depressions resulting in karst topography. Characteristic structures

associated with karst topography include sinkholes, linear depressions and caves. Often, subsurface solution of limestone will not result in the immediate formation of karst features. Collapse sometimes occurs only after a large amount of activity, or when a heavy burden is placed on the overlying material. Thick sequences of structurally deformed carbonates comprise the surface bedrock of a sizable area in central, south-central and southeastern Pennsylvania. The carbonate rock formations, which are Cambrian through Devonian in age, have developed karst landforms, resulting in significant land subsidence problems. In Montgomery County sink holes have formed in the Conestoga, Elkbrook and Ledger formations.

DCNR created a series of maps showing the density of identified karst features across south-central and eastern Pennsylvania (see Figure 4.3.11.1.1). Density of karst features ranges from 0 to 600 per square mile with wide variations in size. Fewer karst features have been mapped in existing urban areas; however, this is likely a result of development activities that disguise, cover, or fill existing features rather than an absence of the features themselves (DCNR, 2003).

Figure 4.3.11.1.1. Density of Mapped Karst Features in South-Central and Southeastern Pennsylvania



Human activity can also initiate subsidence or sinkhole events. Leaking sewer or water pipes or structures that convey storm-water runoff may also cause subsidence as the leaking water dissolves substantial amounts of rock over time. Subsidence or sinkhole events may occur in the presence of mining or quarrying activity, even in areas where bedrock is not necessarily

conducive to their formation. Subsurface extraction of materials in limestone quarries pumping large amounts of groundwater may result in slow moving or abrupt shifts in the ground surface.

4.3.11.2. *Range of Magnitude*

No two subsidence areas or sinkholes are exactly alike. Variations in size and shape, time period under which they occur (i.e. gradually or abruptly), and their proximity to development ultimately determines the magnitude of damage incurred. Events could result in minor elevation changes or deep, gaping holes in the ground surface. Subsidence and sinkhole events can cause severe damage in urban environments, although gradual events can be addressed before significant damage occurs. Primarily, problems related to subsidence include the disruption of utility services and damages to private and public property.

4.3.11.3. *Past Occurrence*

Over the last several decades, sinkholes have formed in Montgomery County within the Ledger Dolomite and Conestoga Limestone formations.

Sinkholes opened up in the past 5 years which resulted in property damage have occurred in Upper Merion Township, Plymouth Township and Cheltenham Township.

A 25-35 foot deep sinkhole opened suddenly overnight on January 25, 2017 in front of two homes on Brooke Road in Cheltenham, extending into the street and consuming the sidewalk and portions of the lawns and driveway. The sinkhole located in the Conestoga Limestone formation was grouted and filled gravel to stabilize the site. The one home at 720 Brooke Road was declared habitable based on a report submitted by the owner's structural engineer, while the other one located at 724 Brooke Road is still not habitable and may have to be torn down eventually.

Plymouth Road near the Plymouth Meeting interchange of Interstate 276 and 476 was closed suddenly in March 2015 due to severe structural and foundation damage at the bridge over Plymouth Creek that was caused by undermining from sinkholes. In August 2015, PennDOT reopened the new two-lane bridge which carries about 15,600 cars a day over Plymouth Creek between Butler and Germantown pikes in August. Other sinkholes have recently occurred nearby along Butler Pike.

In Upper Merion a sink hole formed on Route 23/River Road near where the new Fed Ex facility was being constructed. Sinkhole activity has occurred along Route 23 south of this site.

These formations generally parallel the Pennsylvania Turnpike with most of the sinkholes being located in the King of Prussia and Plymouth Meeting area. More than 60 sinkholes have been identified in Upper Merion Township, six in Whitmarsh Township, and 16 in Plymouth Township. Major sinkhole activity has occurred in the area near the King of Prussia Mall and along Route 202 between King of Prussia and Bridgeport. Several decades ago, Route 202 collapsed into a sinkhole near the McCoy Quarry. In rebuilding the road, engineering work was done to bridge the sinkhole prone area. Most recently, sinkholes were encountered in the reconstruction of the Schuylkill Expressway and Route 202 interchange. Work to repair the

sinkholes resulted in additional costs of over \$17 million. The repairs required over 1.4 million cubic feet of pressure injected grout.

4.3.11.4. Future Occurrence

Based on the location of limestone geological conditions, sinkhole formation is likely in parts of Upper Merion, Plymouth, and Whitemarsh Townships.

4.3.11.5. Environmental Impacts

The presence of sinkholes can result in increased potential for groundwater contamination. Due to their porous nature, sinkholes are sometimes used as instruments for enhancing groundwater recharge. However, if hazardous materials are spilled at a recharge point, groundwater can quickly be contaminated due to the lack of soil substrate which normally would slow or entrap migrating contaminants.

4.3.11.6. Vulnerability Assessment

Upper Merion, Plymouth and Whitemarsh Townships have developed zoning and land development standards that address the unique risks associated with construction in high-subsidence areas. If a sinkhole occurs on private property, it is normally the responsibility of the property owner to initiate repairs. Typical homeowners' insurance often does not cover damages attributed to sinkholes. Since 1987, sinkhole insurance has been available within Pennsylvania and may serve to eliminate the financial burdens placed on the homeowner. Careful planning is the least-costly and most effective method for reducing vulnerability to subsidence hazards. The three municipalities that contain sink hole prone areas and the utility companies that operate in them have taken steps to reduce the potential for sinkhole formation through proper maintenance and updating of utility lines and stormwater management systems. Zoning and subdivision and land development codes in those municipalities also can work to reduce vulnerability. Yet even still, sinkholes will form periodically in the county. The potential damage from any sink hole may vary from a few thousand dollars to \$10 million or more where large structural damage results or where expensive sinkhole repair is required.

Subsidence would impact a very distinct area in the county. Generally the value of structures and various improvements in sinkhole prone municipalities is from \$600,000 to \$800,000 per acre. Assuming a sinkhole would form in a given year that would impact about one acre, the total damage estimate could approach \$800,000. Other costs of damage to utilities and infrastructure could increase that estimate.

4.3.11.7. Additional Information

[PA Geological Survey](#)



4.3.12. Tornado, Wind Storm

Severe wind arises under different conditions. Specific types of severe wind occur from rotational wind storms such as tornadoes or as part of hurricanes or through straight line wind. However, severe wind with speeds in excess of 100 mph can cause significant damage and arise very quickly. Often severe wind conditions are associated with large weather fronts and can form powerful straight line winds. A tornado is a rapidly rotating vortex or funnel of air extending ground ward from a cumulonimbus cloud. The wind associated with a tornado can result in some of the most destructive forces on Earth with rotational wind speeds that can range from 100 mph to more than 250 mph.

4.3.12.1. Location and Extent

Both tornado and other windstorm events can occur in Montgomery County. Tornadoes with extreme winds over 200 miles per hour will damage nearly all type of structures that they come into contact with. Tornadoes usually form during the warmest periods of the day and only last a few minutes. They can impact very small areas, but are capable of creating a swath of damage as wide as a mile. Tornado events are usually localized and can occur at any time during the day or night. Tornado movement is characterized in two ways: direction and speed of spinning winds and forward movement of the tornado, also known as the storm track. Most tornadoes have wind speeds of 110 mph or less, are approximately 500 feet across, and travel a few miles before dissipating. Some attain wind speeds of more than 300 mph stretching more than a mile across, and stay on the ground for dozens of miles. Some tornadoes never touch the ground and are short-lived, while others may touch the ground several times.

Straight-line winds, wind shear, and various types of windstorms are experienced on a region-wide scale. While such winds may accompany tornadoes, straight-lined winds are caused by the movement of air from areas of higher pressure to areas of lower pressure. The greater the differential in pressure, the stronger the winds become. Large-scale synoptic wind events often associated with major warm or cold fronts generally move over the county from west to east.

4.3.12.2. Range of Magnitude

Each year, tornadoes throughout the United States account for over a billion dollars in damages and cause several fatalities. 2011 was an especially bad year for tornadoes nationally. While the extent of tornado damage is usually localized, wind damage can occur away from the path of the tornado. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris. During tornado events it is not uncommon to also have lightning or large hail. The most violent tornadoes have rotating winds of up to 250 miles per hour or more and are capable of causing extreme destruction and turning normally harmless objects into deadly missiles.

Significant damages and even fatalities can result when tornadoes move through populated areas. Tornadoes cause the greatest damages to structures of light construction such as mobile homes or various out buildings. The Enhanced Fujita Scale, also known as the “EF-Scale,” measures tornado strength and associated damages (See Figure 4.3.12.2.1). The EF-Scale is an update to the earlier Fujita Scale, also known as the “F-Scale,” which was published in 1971. The EF-Scale provides engineered wind estimates and better damage descriptions. It classifies United States tornadoes into six intensity categories, as shown below, based upon the estimated maximum winds occurring within the wind vortex. Since its implementation by the National Weather Service in 2007, the EF-Scale has become the definitive metric for estimating wind speeds within tornadoes based upon damage to buildings and structures.

Figure 4.3.12.2.1: E-Fujita Scale

E-Fujita Scale	Wind Speeds (mph)	Tornado Type
E- 0	65- 85	Weak
E- 1	86- 110	Weak
E- 2	110- 135	Strong
E- 3	136- 165	Strong
E- 4	166-200	Violent
E- 5	>200	Violent

Many wind fatalities and injuries are a result of falling trees or debris from buildings striking people. Downed electric wires can cause human hazards as well. Most property damage is to

building roofs and structures hit by falling trees. The county is susceptible to wind storms resulting from hurricanes along the Atlantic Ocean as well as wind associated with frontal systems and nor'easters occurring at various time of the year. Additionally, wind storms can cause significant power outages that disrupt businesses and cause inconveniences for local residents. Though much structural damage from wind occurs as a result of trees or tree limbs striking a building, damage can also occur as wind pulls apart building structural elements. Vulnerable parts of a structure include roof areas facing the direction of the wind and building openings.

4.3.12.3. *Past Occurrence*

From 1950-2017, Montgomery County has experienced 37 severe wind events that caused damage or contained winds exceeding 50 knots and 15 tornadoes. Fatalities, injuries and property damage have been associated with severe wind events. The total damage from tornadoes during this period is estimated at over \$55 million and has resulted in 3 fatalities and 39 injuries.

Of the 15 recorded tornadoes in the county, the most powerful and destructive one occurred in Limerick Township during the summer of 1994. The funnel cloud apparently formed over parts of Royersford Borough and touched ground north-east of Linfield-Trappe Road at 10:45 pm on July 27. It intensified into a strong tornado (F3 on the Fujita Scale) as it moved through a partially constructed residential development known as the Hamlet (later renamed Waterford Greene) destroying 21 of the 30 homes built at this site. This resulted in three deaths (the same family) and 25 injuries. The family members who lost their lives were asleep in their house. Another man was blown through the second story window of his house about 50 feet into the family room of his neighbor's house and survived. Equally miraculous, a 5-month-old infant sailed out of his crib onto the front lawn of his home and survived. As tragic as the devastation was at the Hamlet, it was not the only place in Limerick Township to sustain damage. As the tornado traveled toward the intersection of Swamp Pike and Ridge Pike, it leveled most of the Hide and Seek Storage Sheds (damage estimated at \$1 million). It peeled part of the roof off the Limerick Diner. None of the 30 patrons inside were injured. Two gas stations at the intersection also sustained damage. In addition to Limerick, that storm caused property damage in Royersford Borough and Marlborough Township.

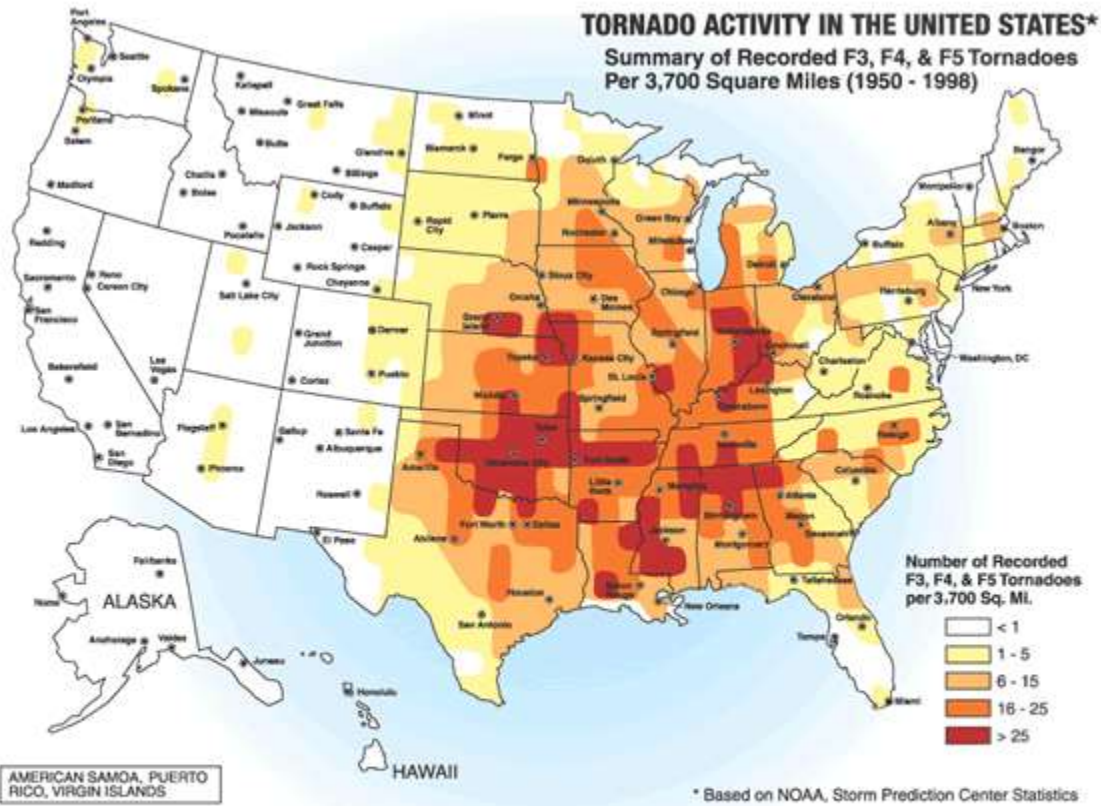
The most recent tornado in Montgomery County occurred in 2003 in Narberth Borough causing about \$1 million in damage. This F1 tornado touched down along the Lower Merion Township side of the Narberth Borough/Lower Merion Township line then proceeded east into Narberth Borough and remained on the ground for three-quarters of a mile. Wind damage to approximately 100 whole trees and several wires was caused by the storm. Dozens of homes were damaged by fallen trees.

4.3.12.4. *Future Occurrence*

Figure 4.3.12.4.1 shows the tornado activity in the United States. As seen on this figure, tornado activity is not too likely in eastern Montgomery County with from 1 to 5 tornadoes reported within a 3,700 square mile region. In the western portion of the county, tornado activity is greater with from 6-15 tornados within a 3,700 square mile region. The county contains about 483 square

miles. Therefore it is reasonable to expect that a tornado may strike the county as much as once every two to three years.

Figure 4.4.12.4.1: Tornado Activity in the United States



Tornado Activity in the United States
 Summary of Recorded F3, F4 & F5 Tornadoes per 3,700 Square Miles (1950 - 1998)
 Based on NOAA, Storm Prediction Center Statistics

4.3.12.5. Environmental Impacts

Since tornado events are typically localized, environmental impacts are rarely widespread. The primary impact is damage to trees including uprooting and shearing of tree trunks and branches. Other non-rotational wind storm events may be wider spread, but less destructive. Indirect environmental impacts could result from the release hazardous materials and fuels caused by destruction of storage tanks and vehicles. Utility disruption caused by wind and other forces is discussed further in Section 4.3.25.

4.3.12.6. Vulnerability Assessment

Typically the worst wind events are associated with powerful tornadoes. Significant damage from a tornado will likely occur in a localized area, generally a pathway about 500 feet wide and about 5 miles in length. The potential destruction of a powerful hurricane in a highly developed area of the county could exceed \$100 million in damage and result in serious injuries and death.

Such an event, however, is unlikely. The estimated damage from a hypothetical tornado striking a lower density suburban part of New Hanover Township tornado damage is approximately \$3.6 million. Other types of non-rotational wind, particularly associated with summer thunder-storms occurring in July, can cause significant damage over a wide-spread area. Since most construction in the county was conducted in accordance with appropriate building codes, the impact from most wind events should be relatively minor. Wind in the winter when combined with snow and ice can be extremely damaging to communication and electric wires, and can cause snow drifts making some roads impassable.

Severe storms such as winter storms, tornadoes, hail and lightning may cause significant property damage. Some historical records exist for these types of storms, though the reporting seems to be very sporadic. The average damage from tornadoes based upon the past 50 years is about \$1 million per year. The damage average from wind storms over that same period would be about \$700,000. It is recognized that averaging cost data over time will greatly underestimate the true cost due to the change in the value of money over time. It is unclear what impact climate change will have on the occurrence of these types of storms. Most experts predict an increase of violent weather associated with global warming.

4.3.12.7. Additional Information

[NOAA Storm Events](#)

[FEMA](#)



4.3.13. Wildfire

A wildfire is a raging, uncontrolled fire that spreads through vegetation, particularly woodlands, ultimately endangering property and local residents. Wildfires can begin through natural means from lightning or can be a result of human activity such as a spark from a machine or carelessly discarded cigarette. In remote areas, wildfires can go unnoticed for some time as they build. Dry periods in the early spring and late summer/ early autumn are the most conducive times for wildfires. Once ignited, wildfires can spread rapidly especially during windy conditions.

4.3.13.1. Location and Extent

Open fields, grass, dense brush and forest-covered areas are typical sites for wildfire events. Under dry conditions or droughts, wildfires have the potential to burn forests as well as croplands. The greatest potential for wildfires occurs in the spring months of March, April and May, and the autumn months of October and November. In the spring, bare trees allow sunlight to reach the forest floor, drying fallen leaves and other ground debris. In the fall, dried leaves are also fuel for fires. Most wildfires in Pennsylvania are caused by people, often by debris burns. Several fires have started in a person's backyard and traveled through dead grasses and weeds into bordering woodlands. Ninety-two percent of Pennsylvania wildfires burn less than ten acres and are suppressed within the first burning period.

4.3.13.2. Range of Magnitude

Wildfire events can range from small fires that can be managed by local firefighters to large fires impacting many acres of land. Large events may require evacuation from one or more

communities and necessitate regional or national firefighting support. The impact of a severe wildfire can be devastating to local property and the natural environment. They often destroy property, valuable timber, forage and recreational and scenic values. Pennsylvania landowners occasionally lose their lives to wildfires and several structures have been lost to wildfire events annually. In addition to the risk wildfires pose to the general public and property owners, the safety of firefighters is always a concern.

4.3.13.3. Past Occurrence

In 2015, 817 wildfires were reported in Pennsylvania at an average size of 5.10 acres. In 2015, only 75 forest fires involving 153 acres was reported in PA Forestry District 17 covering Montgomery County and 8 other counties in Southeastern Pennsylvania. Generally wildfires in the county have been small and quickly extinguished. From 2002 to 2013 only 19 wildfires involving 15 acres were reported in Montgomery County. The largest wildfire near Montgomery County occurred during a dry spring in 2012 in Northern Chester County in the vicinity of the French Creek State Park. Small wildfires can have tragic consequences. In 2015 a 72-year-old man died in Lower Salford Township when a brush fire burned out of control. The fire spread to his home and out buildings and consumed about two acres of timber.

Percentage of Wildfires occurring each month.



4.3.13.4. Future Occurrence

Since most fires are caused by human activity, small brush fires are often swiftly reported to one of the numerous fire departments or companies servicing the county before they can grow into large wildfires. Also, since the county does not have large expanses of forests or field areas where wildfires could grow without being detected, the potential for a significant future wildfire is low. As seen in Figure 2.4.1, about 40 percent of the county is in woodlands and farmlands,

though most of the area in each use exists on modest sized parcels which are generally monitored by the property owners and are easily accessible from roads.

4.3.13.5. Environmental Impacts

Vegetation loss is often a concern, but it may not be a serious impact since vegetation re-growth occurs naturally over time. The most significant environmental impact is the potential for severe erosion, silting of stream beds and reservoirs and flooding due to ground-cover loss following a fire. During a fire, heavy particulates and smoke result and could cause air quality problems in the immediate vicinity.

4.3.13.6. Vulnerability Assessment

The Pennsylvania Department of Conservation of Natural Resources (DCNR), Bureau of Forestry conducts jurisdictional assessments of wildfire hazard throughout the Commonwealth. Hazard is defined by fuel, topography, and local weather that impact wildfire ignition and/or behavior. Through this analysis the county appeared to have a high vulnerability. Another component of jurisdictional vulnerability involves examining the number of past wildfire occurrences and their respective acres burned. The acreage burned in the past is very low and would suggest that the overall impact and vulnerability is low. As discussed above, the county does not have any large expanses of forests and is very well served by local fire companies who can readily access any local fires.

4.3.13.7. Additional Information

[DCNR](#)



4.3.14. Winter Storm

During an average year, Montgomery County will receive over 43 inches of precipitation. Precipitation can occur rapidly during summer storms or as part of hurricanes or tropical storms. These storms create flooding problems throughout the county which are discussed in Section 5.3.4 of this plan. Two other forms of precipitation that can cause damage in the county are winter storms and hail (addressed in Section 4.3.5). Winter storms include snow, blizzards, ice storms, and frozen rain.

4.3.14.1. Location and Extent

Winter storms are regional events impacting more than the county alone. An event most often covers a large portion or all of Pennsylvania. In many cases, surrounding states and even the greater northeastern U.S. region are affected.

4.3.14.2. Range of Magnitude

Various types of winter storms can occur with a mixture of cold weather, precipitation and sometimes high winds. Blizzards combine heavy snow fall with high winds. Though these storms create deep snow and drifts, some of the most dangerous winter storms involve a mixture of snow, sleet, or frozen rain. During these events, excessive tree damage and power line disruption often occurs. Also, ice storms can create extremely dangerous driving conditions. Loss of electric power and disruptions to transportation are often the biggest winter storm impacts. These disruptions in electricity and energy supply that may create dangerously cold conditions for county residents and difficulties in transporting people to warm locations. Winter storms can cause significant damage to structures and result in death and injuries from

automobile crashes and exposure. Heart attacks and other personal injuries can occur more readily during these storms due to the additional stress to area residents. Seventy percent of the fatalities during winter storms are related to traffic crashes. Common victims of winter storms are males over 40 years of age, who often die from heart attacks brought about due to over-exertion occurring during snow shoveling and other activities.

Winter storms consist of cold temperatures, heavy snow or ice and sometimes strong winds. They begin as low-pressure systems that move through Pennsylvania either following the jet stream or developing as extra-tropical cyclonic weather systems over the Atlantic Ocean called nor'easters. Due to their regular occurrence, these storms are considered hazards only when they result in damage to specific structures or cause disruption to traffic, communications, electric power, or other utilities.

A winter storm can adversely affect roadways, utilities, and business activities and can cause loss of life, frostbite, and freezing conditions. They can result in the closing of secondary roads, particularly in rural locations, loss of utility services and depletion of oil heating supplies. Some of the worst traffic disruption due to heavy snowfall is within developed portions of the county where snow removal is difficult due to the lack of locations to place the snow. These storms typically fall into one of the following categories:

- **Heavy Snowstorm:** Accumulations of four inches or more in a six-hour period, or six inches or more in a twelve-hour period.
- **Sleet Storm:** Significant accumulations of solid pellets which form from the freezing of raindrops or partially melted snowflakes causing slippery surfaces posing hazards to pedestrians and motorists.
- **Ice Storm:** Significant accumulations of rain or drizzle freezing on objects (trees, power lines, roadways, etc.) as it strikes them, causing slippery surfaces and damage from the sheer weight of ice accumulation.
- **Blizzard:** Wind velocity of 35 miles per hour or more, temperatures below freezing, considerable blowing snow with visibility frequently below one-quarter mile prevailing over an extended period of time.
- **Severe Blizzard:** Wind velocity of 45 miles per hour, temperatures of 10° F or lower, a high density of blowing snow with visibility frequently measured in feet prevailing over an extended period time.

Storms tracking up the east coast tap into Atlantic moisture; whereas the Great Lakes supply the moisture and instability for heavy snow squalls in the northwest. The greatest monthly snowfalls occur in March as moisture supply begins to increase with rising temperatures. Wet snow storms during this time period can cause significant building damage.

4.3.14.3. *Past Occurrence*

Over the past twenty years, the county has faced brief periods of the severe winter storms. Though total snow fall in Montgomery County from 2013 to 2017 was about normal, two major snow falls caused considerable damage and expense resulting in presidential declarations. The February 3-4 2014 winter storm created dangerously icy conditions resulting in service disruptions to 57 percent of PECO's Montgomery County and Bucks County electric customers. Also the extremely icy roadway conditions and damage due to downed trees and branches throughout the county, impeded traffic and service response. The January 22- 23, 2016 Blizzard dropped over 20 inches of snow on much of the county with King of Prussia reporting 26 inches. The windy conditions also caused snow drifting resulting in areas of deeper snow conditions. With the advanced warning and the fact that most people remained off the roads during the snow event, hardworking municipal public works crews were able remove most the snow from local roads soon after it fell.

4.3.14.4. Future Occurrence

Winter storms occur annually in Pennsylvania and should be considered highly likely in the future. Snow fall can be sporadic. In the past few years the Philadelphia area has experienced the second highest snowfall in recorded history with 68" during the 2013- 2014 winter whereas in 2012- 2013 only 8.3 inches was recorded one of the lowest on record. Snow fall during the 2014- 2015 winter was 27" near the typical yearly average.

4.3.14.5. Environmental Impacts

Environmental impacts from winter storms often include damage to shrubbery and trees due to heavy snow loading, ice build-up, and/or high winds which can break limbs or even bring down large trees. An indirect effect of winter storms is the treatment of roadway surfaces with salt, chemicals and other de-icing materials which can impair adjacent surface and ground waters. This is particularly a concern in highly urban areas. Another important secondary impact for winter storms is building or structure collapses. Winter storms have a positive environmental impact as well; gradual melting of snow and ice can provide excellent groundwater recharge if soils are not completely frozen. Otherwise, sudden melt off can create significant flooding conditions. Snow melt flooding is made worse due to drains clogged by snow and ice.

4.3.14.6. Vulnerability Assessment

Montgomery County will experience snowfall annually. Major storms may occur periodically during the next decade and may combine with wind or result from powerfully nor'easters. The best estimate of potential damage would be based on past storm damage. In addition to damage costs, municipal governments have typically incurred significant expenses to perform snow plowing and deicing of roads. Winter storms can also contribute to a loss in business productivity and reduction in commerce and shipping.

4.3.14.7. Additional Information

[NOAA](#)



4.3.15. Building or Structure Collapse

Buildings and various types of engineered structures may collapse for a variety of reasons including loss of structure integrity due to poor construction and maintenance, accidents and various environmental forces such as wind, snow and heavy rainfall. The impact of structural failure can be death or injury of building occupants and people near buildings. Structural collapse can also impact surrounding buildings and structures.

4.3.15.1. Location and Extent

About 50% of all of the housing units in Montgomery County were constructed since 1961 and generally were built under existing modern building codes. In some municipalities, over 80% of the housing was built within the past 50 years. Most non-residential buildings are much newer. Generally older buildings in the county are well maintained and not a threat for structural collapse. The building vacancy rate is low throughout the county, and total abandonment is rare due to relatively high real estate values in the county. Less than 2% of the residential structures in the county are vacant and not available for sale or rent. While in urban areas such as Philadelphia over 5.4% of units are vacant and not available for use.

4.3.15.2. Range of Magnitude

In urban areas, buildings that are generally unmaintained or abandoned can potentially collapse due to a number of structural defects and the influence of high wind, heavy rain, or snow. The collapse of unoccupied structures is not likely to cause death or injury unless the building falls on sidewalks or roadways. Though occupied buildings are less likely to collapse since they

would generally be maintained, more risk of death or injury would be likely with the sudden collapse of an occupied building.

4.3.15.3. Past Occurrence

Minor structure failure has occurred in the county generally involving small non-residential and agriculture buildings such as barns. There are no recent records of significant structural collapse in the county. In cases where structural hazards occur, municipal action is initiated to force the property owner to either repair or raze the structure. For example in 2016, a leaning steeple that created a safety hazard at the First Baptist Church at 301 King St in caused the closure off a portion of adjoining roads and sidewalks. After significant fundraising efforts, the church was able perform significant reconstruction work to stabilize the steeple.

4.3.15.4. Future Occurrence

With the vigilance of local building code enforcement and overall real estate market conditions, the occurrence of structural collapse in the county is not likely. Very few structures are abandoned or vacant in the county. Other problems have occurred within the few vacant buildings in the county including vandalism.

4.3.15.5. Environmental Impacts

The primary impact would be the destruction of the building. Other impacts on surrounding buildings or property could occur if the building is located near other structures.

4.3.15.6. Vulnerability Assessment

The potential for future building collapse in the county is low due to the current status of existing structures and the enforcement of building and property maintenance codes.

4.3.15.7. Additional Information

[US Census](#)



4.3.16. Civil Disturbance

Civil disturbance is a broad term that is typically used by law enforcement personnel to describe one or more forms of disturbance caused by a group of people. Civil disturbance can be a symptom or a form of protest against major socio-political problems which can be initiated by various types of group activities or for a variety of reasons. Typically the severity of the action coincides with the level of public outrage or size of the crowd.

4.3.16.1. Location and Extent

The scale and scope of civil disturbance events varies widely. However, government facilities, landmarks, prisons, and universities are common sites where crowds and mobs may gather. The two prisons in Montgomery County can be targets for civil unrest. Other portions of the county that attract crowds such as large parks, main street areas with bars, college campuses, and event facilities may also serve as a potential location for civil disturbance. The extent of the civil disturbance is dependent on the level of unrest or support for a particular cause.

4.3.16.2. Range of Magnitude

Civil disturbances can take the form of small gatherings or large groups blocking or impeding access to a building, or disrupting normal activities of a community by generating noise and intimidating people. They can range from a peaceful sit-in to a full scale riot, in which a mob burns or otherwise destroys property and terrorizes individuals. Even in its more passive forms, a group that blocks roadways, sidewalks, or buildings interferes with public order. A peaceful protest can escalate into general chaos. This is particularly true when other opposition groups become involved. With strong political positions, groups with rival views may clash during protests which could lead to larger civil unrest events. During a civil disturbance, a variety of things can occur including: minor injuries to first responders or participants from physical confrontations and vandalism to property, facilities, and infrastructure. Adequate law enforcement at planned civil disturbance events and around likely target locations like the offices of state agencies minimizes the chances of an assembly of individuals turning into a significant disturbance.

There are two types of large gatherings typically associated with civil disturbances: a crowd and a mob. A crowd may be defined as a casual, temporary collection of people without a strong,

cohesive relationship. A mob can be defined as a large and disorderly crowd. Crowds and mobs can be classified in the following ways (Blumer):

- Casual Crowd: A casual crowd is merely a group of people who happen to be in the same place at the same time. Violent conduct does not occur.
- Cohesive Crowd: A cohesive crowd consists of members who are involved in some type of unified behavior. Members of this group are involved in some type of common activity, such as worshipping, dancing, or watching a sporting event. Although they may have intense internal discipline, they require substantial provocation to arouse to action.
- Expressive Crowd: An expressive crowd is one held together by a common commitment or purpose. Although they may not be formally organized, they are assembled as an expression of common sentiment or frustration. Members wish to be seen as a formidable influence. An example of this is the Occupy Movement which set up residence in various public spaces around the country.
- Aggressive Crowd: An aggressive crowd is comprised of individuals who have assembled for a specific purpose. This crowd often has leaders who attempt to arouse the members or motivate them to action. Members are noisy and threatening and will taunt authorities. They may be more impulsive and emotional, and require only minimal stimulation to arouse violence. Examples of this type of crowd could include demonstrators and strikers, though not all demonstrators and strikers are aggressive.

A mob can be defined as a large disorderly crowd or throng. Mobs are usually emotional, loud, tumultuous, violent and lawless. Similar to crowds, mobs have different levels of commitment and can be classified into four categories (Alvarez and Bachman):

- Aggressive Mob: An aggressive mob is one that attacks, riots and terrorizes. The object of violence may be a person, property, or both. An aggressive mob is distinguished from an aggressive crowd only by lawless activity. Examples of aggressive mobs are the inmate mobs in prisons and jails, mobs that act out their frustrations after political defeat, or violent mobs at political protests or rallies.
- Escape Mob: An escape mob is attempting to flee from something such as a fire, bomb, flood, or other catastrophe. Though each member of escape mob may be a reasonable person, the mob as a whole may be difficult to control can be characterized by unreasonable terror.
- Acquisitive Mob: An acquisitive mob is one motivated by a desire to acquire something. Riots caused by other factors often turn into looting sprees. This mob exploits a lack of control by authorities in safeguarding property.

- Expressive Mob: An expressive mob is one that expresses fervor or revelry following some sporting event, religious activity, or celebration. Members experience a release of pent up emotions in highly charged situations. This behavior has occurred after many national sports championships and during celebration parades for sports teams. Often alcohol is a contributing factor in the behavior of this type of mob.

4.3.16.3. Past Occurrence

Over the past three centuries Pennsylvania has experienced various types of civil disorders. Most of these events were not catastrophic or widespread. Minor civil disturbance events of some kind occur every day with minimal impact on the Commonwealth or the county. Most local civil disturbance events in the county has been a result of racial tensions, labor strikes, politics (particularly anti-war movements) or general revelry from sports team celebrations.

Racial unrest resulted in civil disturbance in the late 1960s. On mischief night in 1969, race riots resulted in several cases of arson in Abington Township. Unrest due to racial tensions occurred in other parts of the county at that time including Norristown.

In the past decades several civil disturbances have arisen over union strikes. One of the most contentious strikes occurred among the Teamsters representing public works employees in Cheltenham Township during the 1975 trash collection strike. This bitter four-month strike evolved into civil disturbance requiring 250 Montgomery County area policemen in riot gear to keep the peace and allow the collection of trash.

Another large union protest involved Leon Altemose, a local builder, who sparked a brief riot in Upper Merion Township in 1972 due to the construction of the Valley Forge Convention Center with non-union workers. In response 1,000 hardhat wearing men firebombed the site damaging construction equipment resulting in about \$300,000 to \$400,000 in damage and leading to 16 criminal convictions. Two weeks later, a protest march near the Montgomery County Court House in Norristown drew roughly 20,000 protesters, leading to the closure of area bars.

Other forms of civil disturbance have occurred over the past two decades when local sport fan celebrations grew out of control in towns within eastern Montgomery County.

In the 1970s and early 1980s, non-violent political activism occurred at the former General Electric Aero Space facility in King of Prussia since it was involved in the manufacture of defense missile systems. On September 9 1980, activist Phillip Berrigan and seven other members of the newly formed Plowshares movement (known in this incident as the Plowshares 8) poured blood and hammered on warheads at the General Electric plant as an act of civil disobedience. Father Berrigan was convicted and imprisoned for this action. During his trial, protests occurred at the Montgomery County Court House. The county has recently hosted several very high profile trials attracting large crowds without incident.

In 1981 a major hostage incident occurred at the Graterford Prison over five days.

No recent civil disruption events have occurred in the county.

4.3.16.4. *Future Occurrence*

Civil disturbance is always a possibility as long as discrimination or other perceived social or economic inequities and injustices exist. In many cases it may be possible to recognize the potential for the outbreak of civil disturbance. For example, an upcoming significant public event at one of the colleges or universities in the Commonwealth may result in gathering of large crowds. Local law enforcement should anticipate these types of events and be prepared to handle a crowd appropriately so that peaceful gatherings are prevented from turning into unruly public disturbances. Civil disturbances responding to shortages of fuel, power, or other commodities are always possible if a major disruption occurs that impacts essential goods and services. Likewise, civil disturbances from unruly crowds celebrating various events, particularly the success of local sports teams is possible.

Certainly the location of the large Pennsylvania Corrections facility as well as the County Correctional Facility in Eagleville presents a potential civil disturbance threat to the county. PEMA working with county and local emergency response officials, state police, SCI officials and National Guard representatives, annually review, update and exercise the support plan at each State Correctional Institution to address civil disturbance. The new State Correctional Institution, SCI Phoenix, at Graterford employs state of the art protection systems to lessen the impact of potential civil unrest events. Montgomery County is in the process of designing a new county justice center and will be redeveloping other components of the county office campus in Norristown. Safety and security are important topics being discussed in the design process.

4.3.16.5. *Environmental Impacts*

The impacts of civil disturbance events are contingent upon the targets of destruction. With destruction of pipelines, fuel storage and other facilities containing liquids and various hazardous materials could be released into the environment causing significant health and pollution impacts. Various forms of arson and vandalism can occur during civil disturbance events. Public safety responders are often put in a perilous situation in their efforts to control the civil disturbance.

4.3.16.6. *Vulnerability Assessment*

The vulnerability of the county to civil disturbance is difficult to determine because it is generally tied to the current political and economic climate. Locations that are very vulnerable one month may be less vulnerable the next. Overall it appears that Montgomery County has a lower potential for civil disturbances than Philadelphia, Harrisburg, Dauphin County, Pittsburgh, Allegheny County, and Centre County due to a lower concentration of local, state, and federal facilities and large universities. The sites most vulnerable to civil disturbances include: federal state, or county judicial and government facilities, universities and colleges, correctional facilities, and other government owned property. Furthermore, the municipalities in the county have large public safety departments which when combined with the county sheriff's department and other law enforcement resources could provide significant force to address a major civil disobedience event. Security is a key design element being planned into the county's newly proposed justice center.

Montgomery County has hosted major events involving visits from such important persons as the Pope without an incident. It is likely that other key visits and events will occur in the county in the future.

4.3.16.7. *Additional Information*

[Herbert Blumer](#). 1951. "Collective Behavior," in A. M. Lee, ed., *Principles of Sociology*, New York, Barnes & Noble



4.3.17. Cyber Security Disruption

Significant damage to any computer systems with access to the internet can be initiated by remote sources that intrude operating systems to erase data, extract data, manipulate data, implant malicious software codes that further control operating system functions, or destroy the operating system and associated software. Attacks come in various forms and can originate from anywhere in the world. Even attacks that do not penetrate a computer operating system can cause disruptions if multiple service requests sent to a victim's computer overwhelms the system causing it to freeze, reboot, and ultimately not be able to carry out regular tasks. Other forms of attacks involve various deceptive schemes (referred to as social engineering) which induce people to do things they would not (and should not) ordinarily do for someone they do not know (such as giving someone their password). These deceptions include posing as a new employee seeking help, a friend, or as a vendor or employee of a partner company. Common targets of social engineers are receptionists and administrative assistants because they are predisposed to being helpful. In other schemes, messages use the guise of a friend or victim asking for assistance or some foreigner with money to invest. Recent attacks have work to capture and ransom critical data in a target system.

4.3.17.1. Location and Extent

Cyber security attacks respect no boundaries. Victims and perpetrators can be anywhere on the globe so long as they are both connected to the internet. Though many of the cyber-attacks are initiated by criminals seeking to make money through some scheme, hackers with no criminal intent may create attacks for the intellectual thrill of it. Also, attacks to cyber security

may be initiated as part of a terrorist action or other form of protest. In all cases they are criminal acts that can result in significant damage or theft of money or identity.

4.3.17.2. *Range of Magnitude*

As more business is transacted through the internet and more people rely on internet access, the potential for cyber disruption becomes more of a concern for society. The county has a higher percentage in broadband internet subscribers than Pennsylvania or the United States. Business, government, and various non-profit organizations rely on the internet.

Cyber security incidents may include, but are not limited to, the following events (regardless of platform or computing environment):

- Unauthorized access to a network, system, and/or data
- Repeated attempts at unauthorized access (from either internal or external sources)
- System changes not authorized by nor known to the system owner
- Denial of Service (DoS) attack or other disruptions to service
- Evidence of tampering with, removal of, or loss of data
- Web site defacement
- Social engineering incidents
- Theft of, or non-accidental physical damage to, information systems
- Malware attacks adversely affecting servers or workstations

The National Institute of Standards and Technology (NIST) Special Publication 800-61: Computer Security Incident Handling Guide, list several common malicious actions that would be considered cyber security incidents and the possible indicators of such actions. Users need to be familiar with these indicators. Successful cyber hacking of either the power grid system or communications system (particular wireless communication) could have significant impact on society and business. Loss of either vital power or communication system would prevent public safety response as well.

4.3.17.3. *Past Occurrences*

Since the development of the internet, various forms of disruptive attacks have been made for a variety of reasons. Initially, many of the attacks appear to result from an odd sense of intellectual curiosity in which hackers were trying to outwit new forms of technology for the sheer thrill of it. Latter, as the economic power of the internet became evident; more attacks were initiated to steal money and information. Today, internet crime is a billion dollar enterprise operating at all points of the globe.

4.3.17.4. *Future Occurrences*

With the high value of the internet as a communication and commerce tool, it would be hard to imagine any abatement in future cyber-attacks. Even with better efforts to thwart attacks and arrest attackers, new and different sources of attack will continually arise. In some cases cyber attacks will be part of a larger terrorist action or be part of geo-global warfare.

4.3.17.5. *Environmental Impacts*

Large-scale cyber incidents may overwhelm government and private-sector resources by disrupting the Internet and/or taxing critical infrastructure information systems. In most cases, temporary disruption and inconvenience may be the result.

Yet significant attacks may threaten lives, property, the economy, and national security. For example the loss of computer control on various mechanical and environmental systems could lead to system failures and potential pollution threat. More critically, the loss of computer support for critical security, defense, or medical systems could result in injury or death.

4.3.17.6. *Vulnerability Analysis*

All systems with internet access used in the county are exposed to potential attack. Many system users and internet service providers utilize various protection strategies to shield local systems from various forms of attack. These strategies involve different forms of hardware, software, and user protocols. Even still, some attacks will penetrate even the best shields and cause disruption from time to time. Disruptions should not cause serious damage to large system users who have backup systems, emergency operating plans, and the ability to restart swiftly after a successful attack without loss of data.

4.3.17.7. *Additional Information*

[Standards and Technology \(NIST\) Special Publication 800-61: Computer Security Incident Handling Guide](#)

[United State Computer Emergency Readiness Team](#)



4.3.18. Dam Failure

Dam failure refers to the breaching of a dam so that impounded water is suddenly released. The resulting water surge from a breached dam could cause damage far in excess of any flood. Additionally, since dam failure is most likely during heavy rains, the impact of the dam failure would compound existing flood conditions.

4.3.18.1. Location and Extent

There are approximately 3,200 dams located throughout Pennsylvania, some of which are large water resources dams for flood control, water supply storage and recreation, while others service electric generating facilities. In Montgomery County there are over 50 dams, though many of the dams are small and do not present any significant potential hazards. Several dams in the Schuylkill River, Wissahickon Creek, and Pennypack Creek have been removed for a variety of reasons including water quality and improving stream flow capacity.

Dams present hazards due to failures that most often occur during or after a massive rainfall, flooding, or spring thaws, sometimes with little to no warning. Depending on the size of the water body where the dam is constructed, water contributions may come from distant upstream locations. Dams can also provide safety hazards to recreational users due to hydraulic conditions that occur within areas below the dam breast.

Dams in Pennsylvania are regulated in two distinct ways to address their inherent risks. The hazard caused by dam failure is addressed through PA Dam Safety Act under the Department of Environmental Protection's Regulations, Chapter 105, Dam Safety and Waterway Management regulations. These regulations define a hazard potential category 1 dam as a dam where its failure could result in significant loss of life, excessive economic losses, and significant public inconvenience. A hazard potential category 2 dam is a dam where its failure could result in loss of a few lives, appreciable property damage, and short duration public inconvenience. The extent of downstream inundation areas vary based on hazard classification. Twenty-six dams impacting the county (21 located in the county) are considered category 1 or 2 dams and are listed in the Appendix L.

Under another law, (P.L. 702, No. 91), the Fish and Boat Commission regulates run-of-the-river dams to ensure that they are properly marked above and below the dams and along the banks immediately adjacent to the dams with signs and buoys to warn the swimming, fishing and boating public of the hazards posed by the dam.

4.3.18.2. Range of Magnitude

Dam failures can pose a serious threat to communities located downstream from major dams. The impact of a dam failure is dependent on the volume of water impounded by the dam and the development located downstream. Catastrophic failures are characterized by the sudden, rapid and uncontrolled release of impounded water from a water body.

Dam failures may not leave enough time for evacuation of people and property if dams deteriorate abruptly. Seepages in earth dams may develop gradually, and, if the embankment damage is detected early, downhill residents have at least a few hours or days to evacuate. Failures of concrete or masonry dams, though very rare, would occur suddenly, sending a wall of water and debris down a stream valley at great speeds. Survival would be a matter of having the good fortune not to be in the flood path at the time of the break. Dam failures due to overtopping of a dam may give sufficient lead time for evacuation if the rising waters and deteriorating conditions are monitored.

4.3.18.3. Past Occurrence

Fortunately no dam failure disasters have occurred in Montgomery County in the past 100 years. In early part of the 20th Century, several minor dam failures occurred in Montgomery County along the Perkiomen Creek which was a significant source of ice used for refrigeration up until the late 1930s. At that time, the entire upper end of the creek contained ice dams and ice storage barns. The most significant ice dam failure involved the Palm Dam located along the Perkiomen Creek above Route 29. The rupture of the dam during floods in 1902 caused damage to a downstream rail line trestle, highway toll house, and several county bridges. Most of the other ice dams were washed out during the 1935 and 1936 floods. In addition to the ice dams, old Schuylkill Navigation system dams on the Schuylkill River at Plymouth Township above Conshohocken and the Linfield Dam at Limerick Township were breached during flood conditions. Since both dams were run of the river type of dams, the breaching had no impact on the downstream flood elevation levels at the time that they were breached. Since being initially breached, both dams have been completely removed by the Commonwealth of Pennsylvania.

During Hurricane Irene and Tropical Storm Lee, the Whites Mill Dam, an earthen dam along the Ridge Valley Creek in Salford Township, was damaged due to overtopping. Salford Township, the owner of the dam, has repaired the dam. Loch Alsh Reservoir in Upper Dublin Township received some dam erosion during Tropical Storm Lee in September 2011 requiring street closures below. The dam was already undergoing renovations at that time including a reinforced and expanded spillway, embankment armoring, retooling of the outlet drain and spillway seepage mitigation. Due to the damage that the dam sustained during the torrential downpours of Tropical Storm Lee, the Department of Environmental Protection required new enhanced improvements including a larger drawdown pipe, an upstream slide gate control structure, upgrading the downstream control valve, improved drainage and spillway improvements. This work was also completed by the Ambler Water Authority.

4.3.18.4. *Future Occurrence*

Provided that adequate engineering and maintenance measures are in place, dam failures are unlikely in Montgomery County due to the overall conditions of the dams and the inspection efforts undertaken by the state. Currently, the PA Department of Environmental Protection (DEP) inventories and regulates all dams that meet or exceed the following criteria:

- Impound water from a drainage area of greater than 100 acres;
- Have a maximum water depth greater than 15 feet;
- Have a maximum storage capacity of 50 acre-feet or greater.

The construction, operation, maintenance, modification, and abandonment of dams is reviewed and monitored by the DEP's Division of Dam Safety. Dams are evaluated based on categories such as slope stability, undermining seepage, and spillway adequacy. The presence of structural integrity and inspection programs significantly reduces the potential for major dam failure events to occur. Additionally, an Emergency Action Plan (EAP) is required for these dams. The EAP is a formal document that identifies potential emergency conditions at a dam and specifies preplanned actions to be followed to minimize property damage and loss of life. It contains procedures and information to assist the dam owner in issuing early warning and notification messages to responsible downstream emergency management authorities of the emergency situation. It also contains inundation maps to show the emergency management authorities the critical areas for action in case of an emergency.

Minor dam failures are more common since low hazard structures are minimally regulated, but the impact of these events should pose no threat to lives or property. Even though these low head dams are not a threat due to dam break, they can present hazards to boaters and fisherman. Areas below even very small dams could present unique currents that can cause drowning. As such, dam owners are required to post warning signs above and below these dam structures in accordance to the state law described earlier.

4.3.18.5. *Environmental Impacts*

The environmental impacts of dam failures can be devastating. Depending on the size of the event and number or type structures located in the inundation area, water contamination from hazardous material facilities could occur. Water velocities could result in total destruction of trees and other vegetation. Severe erosion can occur both during and after the failure event.

4.3.18.6. *Vulnerability Assessment*

EAPs have been approved for 22 significant dams impacting Montgomery County which meet the criteria as a Category 1 or 2 dam established by the Commonwealth of Pennsylvania. The largest of these dams is the Green Lane Reservoir Dam located along the Perkiomen Creek upstream from the borough of Green Lane. This dam constructed in 1959 is an 87-foot high concrete dam with a 424 foot long spillway and is maintained by Aqua PA Corporation. In the unlikely event of dam failure, communities along the Perkiomen Creek, particularly Green Lane, Schwenksville and Collegeville boroughs would be impacted in addition to other creek side houses in Upper Salford, Lower Frederick, Perkiomen, Skippack, Upper Providence, and Lower Providence townships. Other dams which are required to develop EAPs are relatively small and would not present a significant hazard during a dam failure.

4.3.18.7. *Additional Information*

[PA DEP Division of Dam Safety](#)

[PA Fish and Boat Commission](#)



4.3.19 Environmental Hazard

Environmental hazards in Montgomery County can involve the release hazardous material that is used, stored, or transported through the county, located at Superfund or uncontrolled brownfield sites, or may come from other types of products that are defective or contaminated. These hazards result from human activities and industries and may cause injury and death to humans and damage to property and the environment. Montgomery County contains 17 sites listed on the National Priority List under Superfund. Generally these sites involve soil and groundwater contamination. One site, the Bo-Rit property in Ambler Borough, Whitpain Township, and Upper Dublin Township, is currently undergoing emergency stabilization action. Construction of all remediation facilities has occurred on nine of the other sites. The remaining sites are actively being remediated under Superfund Program requirements. In addition to the NPL sites, there are properties in the county that may contain hazardous waste or have some form of soil or ground water contamination. No information on deaths, serious injury, or property damage could be found for Superfund sites or product defect or contamination; therefore these types of environmental hazards were not profiled in this plan.

4.3.19.1. Location and Extent

Hazardous Materials Release

Hazardous material releases pose threats to the natural environment, the built environment and public safety through the diffusion of harmful substances, materials, or products. Hazardous materials can include toxic chemicals, infectious substances, bio-hazardous waste, or any

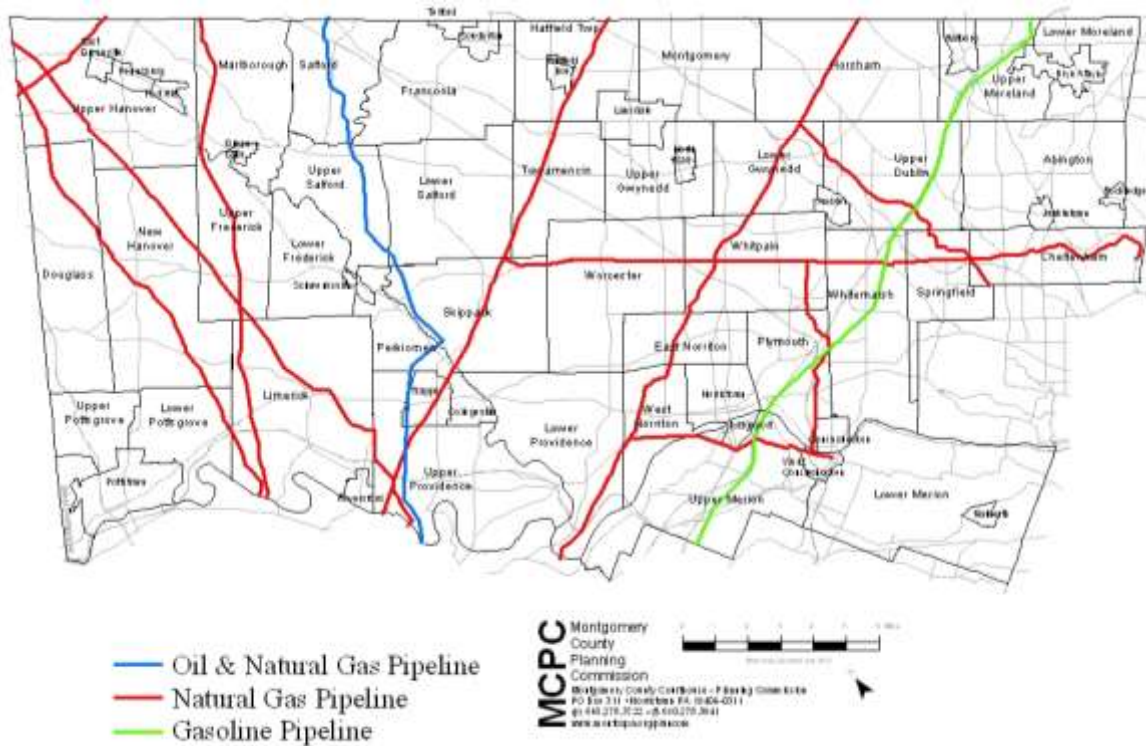
materials that are explosive, corrosive, flammable, or radioactive (PL 1990-165, §207(e)). Hazardous material releases can occur wherever hazardous materials are manufactured, used, stored, or transported. Such releases can occur along transportation routes or at fixed-site facilities. Hazardous material releases can result in human and wildlife injury, property damage, and contamination of air, water, and soils.

Transportation of hazardous materials on highways involves tanker trucks or trailers which are responsible for the greatest number of hazard material release incidents. There are over 3,668 miles of highway in the county and many of those are used to transport hazardous materials. In addition sections of the Pennsylvania turnpike and other major expressways through the county support the largest volumes of traffic in the state. These roads also cross rivers and streams at many points where a hazardous material spill could have the potential to pollute watersheds that serve as domestic water supplies. Potential also exists for hazardous material releases to occur along rail lines as collisions and derailments of train cars can result in large spills.

Pipelines can also transport hazardous liquids and flammable substances such as natural gas or liquid petroleum. Incidents can occur due to pipe corrosion, damage to pipes during excavation, incorrect operations, weld point failures or pipe damage from other forces. Montgomery County contains several miles of gas and liquid pipelines transporting large volumes of natural gas and petroleum (see Figure 4.3.19.1.1).

Fixed-site facilities that use, manufacture, or store hazardous materials in Pennsylvania pose risk and must comply with both Title III of the federal Superfund Amendments and Reauthorization Act (SARA), also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), and the Commonwealth's reporting requirements under the Hazardous Materials Emergency Planning and Response Act (1990-165), as amended. These laws require that all owners or operators of facilities that manufacture, produce, use, import, export, store, supply, or distribute any extremely hazardous substance, as defined by the EPA, at or above the threshold planning quantity, as established by EPA, shall report to the county where the facility is located and the Commonwealth that the facility is subject to the requirement to assist the Local Emergency Planning Committee (LEPC) in the development of an Off-site Emergency Response Plan. The community right-to-know reporting requirements keep communities abreast of the presence and release of chemicals at individual facilities. Currently, there are nearly 300 SARA Title III facilities located in Montgomery County.

Figure 4.3.19.1.1 Major Pipelines in Montgomery County



The EPA tracks key information about the chemicals handled by manufacturing or processing facilities through its Toxic Release Inventory (TRI) database. Facilities which employ ten or more full-time employees and which manufacture or process 25,000 pounds or more, or otherwise use 10,000 pounds or more, of any SARA Section 313-listed toxic chemical in the course of a calendar year are required to report TRI information to the EPA, the federal enforcement agency for SARA Title III, and PEMA. Additional hazardous materials were contained at the now closed Willow Grove Naval Air Station in Horsham Township.

Nuclear facilities are another type of fixed-facility that poses risk of hazard material release. For more information about radiological release incidents, reference Section 4.3.21.

4.3.19.2. Range of Magnitude
Hazardous Materials Release

Hazardous material releases can contaminate air, water and soils, possibly resulting in death and/or injuries. Dispersion can take place rapidly when transported by water and wind. While often accidental, releases can occur as a result of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary events. Hazardous materials can include toxic chemicals, radioactive materials, infectious substances and hazardous wastes. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas. With a hazardous material release, whether accidental or intentional, there are several potentially exacerbating or mitigating circumstances that will affect its severity or impact. Mitigating conditions are precautionary

measures taken in advance to reduce the impact of a release on the surrounding environment. Primary and secondary containment or shielding by sheltering-in-place protects people and property from the harmful effects of a hazardous material release. Exacerbating conditions, characteristics that can enhance or magnify the effects of a hazardous material release include:

- **Weather conditions:** affects how the hazard occurs and develops
- **Micro-meteorological effects of buildings and terrain:** alters dispersion of hazardous materials
- **Non-compliance with applicable codes (e.g. building or fire codes) and maintenance failures (e.g. fire protection and containment features):** can substantially increase the damage to the facility itself and to surrounding buildings

The severity of the incident is dependent not only on the circumstances described above, but also with the type of material released and the distance and related response time for emergency response teams. The areas within closest proximity to the releases are generally at greatest risk, yet depending on the agent, a release can travel great distances or remain present in the environment for a long period of time (e.g. centuries to millennia for radioactive materials), resulting in extensive impacts on people and the environment. A worst case scenario event of a hazardous material release occurred in March 2009 when a tractor trailer overturned spilling 33,000 pounds of toxic hydrofluoric acid near Wind Gap, Pennsylvania resulting in the evacuation of 5,000 people. Residents were evacuated because contact with concentrated solutions of the acid can cause severe burns and inhaling the gas can cause respiratory irritation, severe eye damage, and pulmonary edema.

4.3.19.3. Past Occurrence

Hazardous Materials Release

Since the enactment of SARA Title III requirements, facilities which produce, use, or store hazardous chemicals must notify the public through their county's emergency dispatch center and PEMA if an accidental release of a hazardous substance meets or exceeds a designated reportable quantity, and affects or has the potential to affect persons and/or the environment outside the plant. SARA Title III and Pennsylvania Hazardous Material Emergency Planning and Response Act (Act 165) also require a written follow-up report to PEMA and the county where the facility is located. These written follow-up reports include any known or anticipated health risks associated with the release and actions to be taken to mitigate potential future incidents. In addition, Section 204(a)(10) of Act 165 requires PEMA to staff and operate a 24-hour State Emergency Operations Center (EOC) to provide effective emergency response coordination. The number of hazardous material release incidents in Pennsylvania has increased from 665 incidents in 2006 to 950 incidents in 2008. Transportation-related hazardous material release incidents are also tracked by the federal government. The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) maintain information on highway-related hazardous material release incidents. The PHMSA reports that between 2003 and 2012, there were over 8,000 highway related release incidents resulting 10 hospitalized injuries, and only one fatality.

Pipeline releases can also result in fatality, injury, property damage, the release highly volatile liquids, or liquid releases that result in unintentional fire or explosion. Unfortunately, three major pipeline incidents have already occurred in the county.

On November 24 1950, a newly built 30-inch natural gas pipeline in Upper Merion Township ruptured for nearly 3,000 feet, causing a fire that destroyed two nearby homes that were under construction nearby.

On October 7, 1986 a 14-inch petroleum pipeline, also in Upper Merion Township, ruptured spilling thousands of barrels of gasoline. This emergency resulted in the closure of several major roadways and the evacuation of area homes and the King of Prussia Mall.

The most disastrous pipeline accident in Montgomery County occurred on the evening of January 27, 1971 in West Conshohocken Borough when gas line exploded on Front Street completely destroying 15 homes and damaging 25 others. Fifty people were injured and taken to nearby hospitals. Five people were killed, including a nineteen-year-old fireman.

4.3.19.4. Future Occurrence

Hazardous Materials Release

While many hazardous material release incidents have occurred in Pennsylvania in the past, they are generally considered difficult to predict. An occurrence is largely dependent upon the accidental or intentional actions of a person or group. Intentional acts are addressed under Section 4.3.22., Terrorism. Risk associated with hazardous materials release is expected to remain moderate. Hazardous materials release incidents occur annually in Montgomery County so a 100 percent annual probability is anticipated. Yet, most releases expected in the future will not likely cause a significant impact on the environment or result in deaths or injuries.

4.3.19.5. Environmental Impacts

Hazardous Materials Release

The environmental impacts of hazardous material releases include:

- Hydrologic effects – surface and groundwater contamination
- Other effects on water quality such as changes in water temperature
- Damage to streams, lakes, ponds, estuaries, and wetland ecosystems
- Air quality effects – pollutants, smoke, and dust
- Loss of quality in landscape
- Reduced soil quality
- Damage to plant communities – loss of biodiversity; damage to vegetation
- Damage to animal species – animal fatalities; degradation of wildlife and aquatic habitat;
- Pollution of drinking water for wildlife; loss of biodiversity; disease

4.3.19.6. Vulnerability Assessment

The vulnerability of Montgomery County to environmental hazards differs based on the type of environmental hazard being examined. For typical hazardous material releases, vulnerability is defined as jurisdictions and/or critical facilities located within 1.5 miles of gas or oil pipelines. Generally 187,293 land parcels are within this range containing buildings with a

Montgomery County 2017 Hazard Mitigation Plan

\$25,688,850,720 assessed value. Five hospitals, 11 colleges, 147 schools and 34 nursing homes appear within this area.

4.3.19.7. *Additional Information*

[EPA Superfund NPL Status](#)

[Sara Title III](#)



4.3.20. Levee Failure

A levee is an elongated built embankment or wall parallel to a stream or water course which prevents the lateral expansion of floodwater perpendicular to the flow of the water course. It is usually earthen and located along river banks in broad flood plain areas.

4.3.20.1. Location and Extent

FEMA completed an inventory of all known levees across Pennsylvania in 2009. A total of 186 levees have been identified throughout Pennsylvania. The distribution of these systems is relatively scattered throughout the Commonwealth with most having been constructed in more populated areas to protect property and structures from flood events. Particularly extensive levee systems have been built along the Susquehanna River in the Scranton-Wilkes Barre area in Luzerne and Lackawanna Counties. This inventory lists four levees in Montgomery County: two along the Schuylkill River, one along the Neshaminy Creek and one along the Tookany Creek. It appears that the two listed along the Schuylkill River are remnants of old desilting basins and do not provide flood protection to any properties. The one located on the Neshaminy Creek appears to be from a previous flood control effort. The most significant levee in the county is located along Brookdale Avenue in Cheltenham Township. It is more fully described in Section 4.3.4.1.

In the event of a levee failure, the extent of inundated area depends primarily on the size of the water body and amount of water being contained by the levee, the amount of water released as a result of the levee breach or overtopping, and the ground topography landward of the levee.

Levees are built in certain areas of the Commonwealth along narrow river valleys. While levee failures in such areas would certainly be serious events, the extent of inundation as a result of the event would not be as significant as similar events in flat, lowland areas.

4.3.20.2. Range of Magnitude

A levee failure causes flooding in landward areas adjacent to the levee system. The failure of a levee or other flood protection structure could be devastating depending on the level of flooding for which the structure is designed and the amount of landward development present. In some instances, the magnitude of flooding could be more severe under a levee failure event compared to a normal flooding event. If an abrupt failure occurs, water depths and velocities could change dramatically resulting in catastrophic losses. Properties located in the area of reduced-risk landward of a levee system are not subject to the mandatory flood insurance purchase requirement of the National Flood Insurance Program. Thus, regardless of whether a levee is accredited, there is concern that property in these areas lack flood insurance. In the event of a failure, it is likely that inundated properties will not be insured.

4.3.20.3. Past Occurrence

There are no known significant historic levee failures in Montgomery County.

4.3.20.4. Future Occurrence

Similarly to dam failures, given certain circumstances, a levee failure can occur at any time. However, the probability of future occurrence can be reduced through proper design, construction and maintenance measures. Most levees are designed to meet a specified level of flooding. While FEMA focuses on mapping levees that will reduce the risk of a 1% annual chance flood, other levees may be designed to protect against smaller or larger floods. Design specifications provide information on the percent-annual-chance flood that a structure is expected to withstand, provided that it has been adequately constructed and maintained.

4.3.20.5. Environmental Impacts

The environmental impacts of a levee failure are more significant than those associated with a typical flood event. Large volumes of water may be moving at high velocities, potentially causing severe damage to buildings, infrastructure, trees and other large objects. Hazardous materials may be released and distributed widely across the floodplain. In addition, severe erosion is likely to occur during levee failure events.

4.3.20.6. Vulnerability Assessment

The potential hazard of levee failure is low; however, the levee system on Brookdale Avenue appears to be inadequate for some recent flood events since the height of the water in the stream have apparently exceeded the design levels.

4.3.20.7. Additional Information



4.3.21. Radiological Release Incidents

Radiological release incidents refer to events involving the release of significant levels of radioactivity or exposure of workers or the general public to radioactivity. The Limerick Nuclear Power Station located in Limerick Township is the largest potential source of radiological exposure, yet there are other facilities in the county including medical and research facilities that possess potentially radioactive materials.

4.3.21.1. Location and Extent

The Nuclear Regulatory Commission encourages the use of Probabilistic Risk Assessments (PRA) to estimate quantitatively the potential risk to public health and safety considering the design, operations and maintenance practices at nuclear power plants. PRAs typically focus on accidents that can severely damage the core and that may challenge containment. FEMA, PEMA and county governments have formulated Radiological Emergency Response Plans that include a Plume Exposure Pathway Emergency Planning Zone (EPZ) with a radius of about ten miles from each nuclear power facility and an Ingestion Exposure Pathway EPZ with a radius of about fifty miles from each facility. The exact size and configuration of the EPZ may vary in relation to local emergency response capabilities, topography, road networks, and political boundaries.

The Montgomery County Department of Public Safety, Office of Emergency Management assists the 21 municipalities that comprise the 10-mile Emergency Planning Zone (EPZ) with emergency planning concerning the Limerick Generating Station. As governed by Title 35, each

municipality is required to have an Emergency Operations Plan (EOP). Those municipalities that are included in the EPZ of a nuclear power plant must also have a Radiological Emergency Response Plan (RERP) as an annex to their EOP. The RERP is continually updated and all responding agencies receive training yearly and exercise the plan biannually to ensure readiness.

There are 181,163 Montgomery County residents and 258,633 including Chester County (2010 Census population) located in the Plume Exposure Pathway EPZ which is essentially a 10-mile radius from the Limerick Generating Station. It is the second most populous EPZ in nation. The entire county is located in the 50-mile Ingestion Pathway EPZs from the Limerick Plant. There are over 60,000 properties in the EPZ in Montgomery County with a total appraised value of \$18,154,121,000. The building appraised value alone is about \$12,850,702,000. The duration of primary exposures could range in length from hours to days. The Ingestion Exposure Pathway refers to exposure primarily from ingestion of water or foods such as milk and fresh vegetables that have been contaminated with radiation.

4.3.21.2. *Range of Magnitude*

Nuclear accidents themselves are classified into three categories:

- **Criticality accidents:** Involves loss of control of nuclear assemblies or power reactors.
- **Loss-of-coolant accidents:** Occurs whenever a reactor coolant system experiences a break or opening large enough so that the coolant inventory in the system cannot be maintained by the normally operating make-up system.
- **Loss-of-containment accidents:** Involves the release of radioactivity from materials such as tritium, fission products, plutonium, and natural, depleted, or enriched uranium. Points of release have been containment vessels at fixed facilities or damaged packages during transportation accidents. Nuclear facilities must notify the appropriate authorities in the event of an accident.

The Nuclear Regulatory Commission uses four classification levels for nuclear incidents (Nuclear Regulatory Commission):

- **UNUSUAL EVENT** – Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection. No releases of radioactive material requiring off-site response or monitoring are expected unless further degradation of safety system occurs.
- **ALERT** – Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of intentional malicious dedicated efforts of a hostile act. Any releases are

expected to be limited to small fractions of the Environmental Protection Agency (EPA) Protective Action Guideline exposure levels.

- SITE AREA EMERGENCY – Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or security events that result in intentional damage or malicious acts: (1) toward site personnel or equipment that could lead to the likely failure of or; (2) prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guide exposure levels beyond the site boundary.
- GENERAL EMERGENCY – Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or security events that result in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guide exposure levels offsite for more than the immediate site area.

The accident at the Three Mile Island Generating Station in March 1979 remains the nation's only nuclear incident above the Alert level and is the worst nuclear incident on record in the Commonwealth and the nation. During this incident, equipment malfunctions, design-related problems, and worker errors led to a partial meltdown of the TMI Unit 2 reactor core. The nuclear industry has since adopted pre-determined, site-specific Emergency Action Levels (EALs). The EALs provide the framework and guidance to observe, address, and classify the severity of site-specific events and conditions that are communicated to off-site emergency response organizations. There are additional EALs that specifically deal with issues of security, such as threats of airborne attack, hostile action within the facility, or facility attack. These EALs ensure that appropriate notifications for the security threat are made in a timely manner. Each facility is also equipped with a public alerting system, which includes a number of sirens to alert the public located in the Plume Ingestion Pathway EPZ. This alerting system is activated by the counties of each specific EPZ. Emergency notifications and instructions are communicated to the public via the Emergency Alert System as activated by the Commonwealth of Pennsylvania Emergency Operations Center. State officials also have the capability to send emergency messages as text messages to mobile devices. The Limerick Power Plant siren system has been recently upgraded.

In addition to the Limerick Power Station, there are other facilities including medical facilities within the county that contain radioactive materials. The use and storage of the radioactive materials at these locations are controlled by the Nuclear Regulatory Commission and the Pennsylvania Department of Environmental Protection.

4.3.21.3. *Past Occurrence*

Nuclear incidents rarely occur, but the incidents at TMI, Chernobyl and Fukushima Dai-Ichi are reminders of the potential dangers from accidents. The resulting contamination and state of the reactor core at TMI led to the development of a fourteen-year cleanup and scientific effort.

Additionally, the President's Commission on the Accident at TMI examined the costs of the accident, concluding, "The accident at Three Mile Island on March 28, 1979, generated considerable economic disturbance. Some of the impacts were short term, occurring during the first days of the accident. Many of the impacts were experienced by the local community; others will be felt at the regional and national levels." The report concluded: "It appears clear that the major costs of the TMI Unit 2 accident are associated with the emergency management replacement power and the plant refurbishment or replacement. The minimum cost estimate of nearly \$1 billion supports the argument that considerable additional resources can be cost effective if spent to guard against future accidents."

Other foreign nuclear accidents, the fire at the Chernobyl reactor in the Ukraine and most recently the Tsunami that crippled the Fukushima Dai-Ichi power plant have informed the nuclear industry about the potential vulnerability of nuclear power systems in extreme conditions. As a result of Fukushima, several measures have already been undertaken to provide additional backup power supply and portable equipment at the Limerick Plant.

4.3.21.4. Future Occurrence

Nuclear power plant accidents are always possible. The calculated probable frequency of degraded core or core meltdown set by the US Nuclear Regulatory Commission for modern nuclear power plants is set at 1: 100,000 years, though some operating plants in the nation exceed that standard. Nuclear incident occurrences may also occur as a result of intentional actions; these acts are addressed under Section 5.3.22, Terrorism.

Across the United States, a number of Unusual Event and Alert classification level events occur each year at the 100+ nuclear facilities that warrant notification of local emergency managers. Of these, Alert emergencies occur less frequently. For example, in 1997, there were forty notifications of Unusual Events and three Alert events nationwide. Based on historical events, Site Area Emergency and General Emergency incidents are very rare.

Though the Limerick Power Plant operating licenses were each extended 20 years by the Nuclear Regulatory Commission so they are now set to expire on October 26, 2044 (unit 1) and June 22, 2049 (unit 2).

4.3.21.5. Environmental Impacts

Potential environmental impacts include the long-term effects of radioactive contamination in the environment and, particularly in Pennsylvania, in agricultural products. Spills and releases of radioactive active materials from accidents can result in the contamination of soil and water. Areas underlain by limestone and some types of glacial sediments are particularly susceptible to contamination. After a nuclear incident, another significant impact is the effect of radiation on the health of the population near the incident. The duration of primary exposure could range in length from hours to months depending on the proximity to the point of radioactive release. External radiation and inhalation and ingestion of radioactive isotopes can cause acute health effects (e.g. death, severe health impairment), chronic health effects (e.g. cancers) and psychological effects. These impacts are addressed in the Environmental Impact statement developed for the Limerick Nuclear Power Station and will be further reviewed by the NRC through the relicensing process.

4.3.21.6. *Vulnerability Assessment*

In Montgomery County, 21 municipalities and 9 school districts are located in the 10-mile Plume Exposure Pathway EPZ of the Limerick Plant. A total of 45 schools and 5 nursing homes are within the EPZ. The Pottstown Memorial Medical Facility is also within this area. The entire county is located within the 50-mile Ingestion Pathway Exposure EPZ.

4.3.21.7. *Additional Information*

[Limerick Nuclear Power Station](#)

[Limerick Nuclear Power Plan Emergency Plan Summary](#)

The Philadelphia Inquirer

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50 CENTS

U.S. ATTACKED

Hijacked Planes Destroy Trade Towers, Hit Pentagon; Thousands Feared Dead



Bush vows justice will be sweeping

By Ralph Viguera
PHILADELPHIA

A series of near-precision assaults shattered two symbols of America's military and financial power yesterday, killing untold numbers of people, halting Americans' daily routines, and forever destroying a nation's feeling that it can't happen here.

Within minutes at the start of the workday, unidentified terrorists hijacked two commercial jets and plunged them into the twin towers of New York's World Trade Center — reducing the 110-story landmarks to rubble and sending some workers leaping out windows — then crashed a third jet into the Pentagon outside Washington. A fourth hijacked plane, possibly also diverted toward the Washington area, crashed in Somerset County in Western Pennsylvania.

The terrorists' audacity was matched by the stunning coordination of their operation — all four planes had left their airports within 12 minutes of one another — and experts scrambled to start investigating how they had bypassed security and pulled it off. U.S. officials said they had had no reports that the attacks were imminent and can expect questions about the breakdown in intelligence.

The carnage seemed destined to stand as the worst attack on civilians in U.S. history. The death toll — which could take days, even weeks, to emerge — was likely to be far more catastrophic than the 2,800 killed nearly 60 years ago in the surprise bombing at Pearl Harbor.

Emergency workers at the World

4.3.22. Terrorism

Terrorism is the use of force or violence against persons or property with the intent to intimidate, demoralize or coerce populations and leadership for various reasons. Acts or threats of terrorism could include assassination, kidnappings, bombs or bomb scares, cyber-attacks and the use of chemical, biological, nuclear or radiological weapons.

4.3.22.1. Location and Extent

Terrorism is a threat everywhere, but there are a number of important considerations in evaluating terrorism hazards, such as the existence of facilities, landmarks or other buildings of international, national or regional importance. High-risk targets for acts of terrorism include military and civilian government facilities, international airports, large cities and high-profile landmarks. Terrorists might also target large public gatherings such as festivals and parades, water and food supplies, gas and electric utilities, financial institutions, and corporate centers. Furthermore, terrorists are capable of spreading fear by shipping explosives or chemical and biological agents through the mail or other systems. Nonetheless, terrorism can take many forms and terrorists have a wide range of personal, political or cultural agendas. Therefore, there may be no location that is not a potential terrorist target.

The most prominent targets in the county may include the large shopping malls, national, state and local parks, power generation and distribution facilities, government buildings and various utility and water supply locations. There are many other facilities that could be of concern for terrorism in Montgomery County including police stations, hospitals, fire stations, schools, wastewater treatment plants and major highway and rail bridges. Damage to these facilities and infrastructure could cripple transportation routes and commerce. Additionally, there are major corporations in the county and nearly 300 SARA Title III facilities storing various chemicals that could be targets. The threat from hazard material release is addressed in full in Section 5.3.19.

4.3.22.2. *Range of Magnitude*

The term “terrorism” refers to intentional, criminal and malicious acts, but the functional definition of terrorism can be interpreted in many ways. Officially, terrorism is defined in the Code of Federal Regulations as “...the unlawful use of force and violence against persons or property to try to convince citizens of the powerlessness of their government, and/or to get publicity for their cause.”

Terrorist attacks can take many forms, including agri-terrorism, arson/incendiary attack, armed attack, assassination, biological agent, chemical agent, cyber-terrorism, conventional bomb, hijackings, intentional hazardous material release, kidnapping, nuclear bomb and radiological agent (FEMA). Explosives have been the traditional method of conducting terrorism, but intelligence suggests that the possibility of biological or chemical terrorism is increasing. The severity of terrorist incidents depends upon the method of attack, the proximity of the attack to people, animals or other assets and the duration of exposure to the incident or attack device. For example, chemical agents are poisonous gases, liquids or solids that have toxic effects on people, animals or plants. Many chemical agents can cause serious injuries or death. In this case, severity of injuries depends on the type and amount of the chemical agent used and the duration of exposure.

Biological agents are organisms or toxins that have illness-producing effects on people, livestock and crops. Some biological agents cannot be easily detected and may take time to develop. Therefore, it can be difficult to know that a biological attack has occurred until victims display symptoms. In other cases, the effects are immediate. Those affected by a biological agent require the immediate attention of professional medical personnel. Some agents are contagious which may result in the need for victims to be quarantined.

As predominately a suburban county, there are not many areas of the county with typically large congregations of people at any one time. No major sporting events or cultural arts venues exist with several thousand people in attendance. Several shopping centers and malls have large numbers of employees and shoppers which could serve as a target. Various parades, running races, festivals and other types of events in the county may at any given time attract several persons with crowds as large as 12,000- 20,000 people for an event such as the Philadelphia Folk Festival. These events could be targeted by a lone wolf type of terrorist acting alone. Of particular concern in these types of outdoor events along closed roadways and within properties near roads is an attack through a motor vehicle particularly a large truck.

The worst-case scenario for a terrorism event in Montgomery County would be if a radioactivity dispersion device or “dirty bomb” combining radioactive material with conventional explosives were to be detonated in populated area. Not only would there be immediate impact from the explosion damaging buildings and killing people nearby, but the remaining radioactivity could pose a long term health threat. A successful terrorist attack on critical facilities in the county could have catastrophic impacts.

4.3.22.3. *Past Occurrence*

Fortunately Montgomery County has not experienced an act of terrorism. No documented terrorist act has occurred in the Commonwealth of Pennsylvania either. Though a few horrific terrorist acts have been performed in the United States, the resulting fatalities and injuries from these senseless acts is significant less than the lives lost and persons injured during other hazard events such as urban fires, transportation crashes and various natural disasters. Based upon past occurrences the rates of fatality from terrorism are very low compared to other safety threats. For example the average person faces the following odds of fatality from sources other than terrorism:

- 260 times more likely to be struck and killed by lightning
- 4,700 times more likely to die in an airplane or spaceship accident
- 129,000 times more likely to die in a gun assault
- 407,000 times more likely to die in a motor vehicle incident
- 6.9 million times more likely to die from cancer or heart disease

4.3.22.4. *Future Occurrence*

There has been a high consciousness of terrorist activity in the press since the events of September 11, 2001. Prediction of terrorist attacks is almost impossible because terrorism is a result of human factors. As long as fringe groups maintain radically different ideas than that of the government or general population, acts of terror are possible. Yet it appears that more lucrative targets for terrorism are located outside of the county.

Increased security has taken place around the Limerick Nuclear Power station and at other potential sites for terrorism. No serious terrorist activity has occurred in the county to date.

4.3.22.5. *Environmental Impacts*

The impacts of terrorism can vary in severity from nominal to catastrophic and are contingent upon the method of the attack, the volume of force applied and the population density of the attack site. There may be significant fatalities as well as economic losses associated with an act of terrorism. Additionally, acts of terrorism could ignite urban fires, destroy critical infrastructure, damage dams or cause the release of radioactivity or toxic chemicals all of which would create a range of potential environmental impacts addressed in other areas of this report.

4.3.22.6. *Vulnerability Assessment*

Like other counties in the Commonwealth, Montgomery County is potentially vulnerable to direct or indirect terrorist attack. Philadelphia could be the most vulnerable to terrorist attacks in the Pennsylvania due to its size, density of the population; concentration of critical infrastructure located there and number of other cultural and symbolic targets. Some locations in Montgomery County may be targets of a terrorist attack such as the shopping malls, power generating and distribution facilities, fuel pipelines and other similar facilities.

4.3.22.7 *Additional Information*

[FEMA](#)



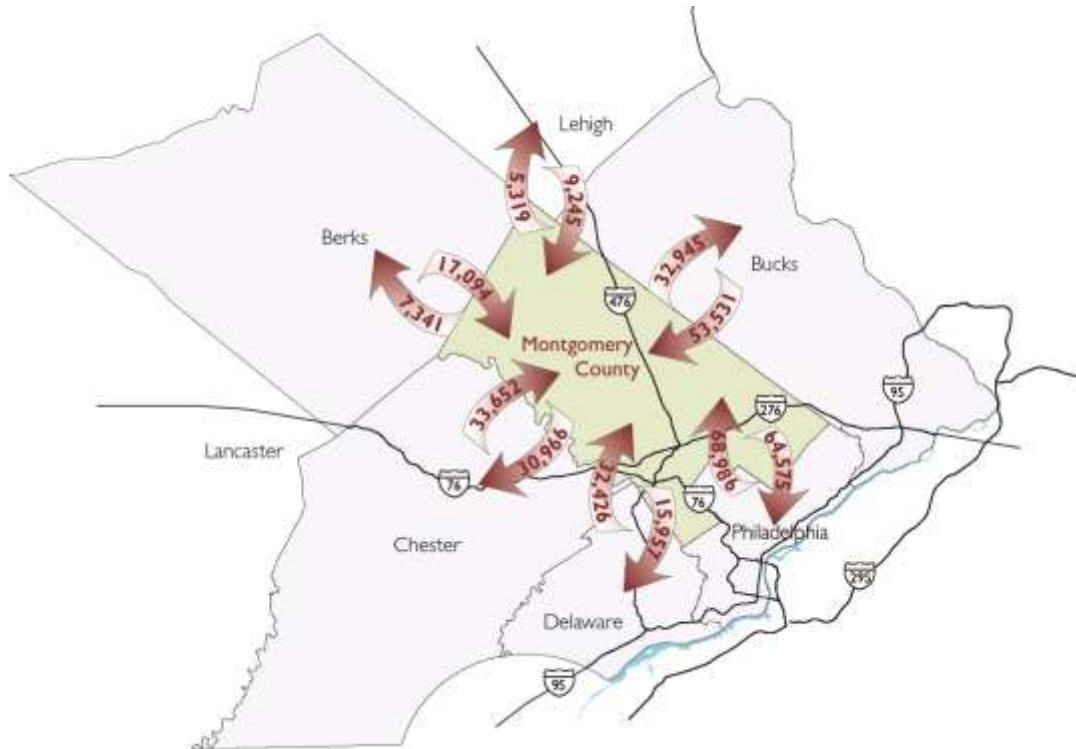
4.3.23. Transportation Crashes

Transportation crashes can result from any form of air, rail, water or road passenger or freight travel. Though most crashes are small and do not impact the community at large except for temporary traffic congestion, larger crashes involving trucks or several vehicles, can result in the release of hazardous materials, long term traffic congestion, and the destruction of key pieces of transportation infrastructure.

4.3.23.1. Location and Extent

Transportation vehicle crashes are defined as crashes involving highway, air and rail travel. Taken as a whole, these incidents are collectively the most costly of all hazards in the Commonwealth in terms of lives lost, injuries and economic losses. As the keystone state, Pennsylvania has one of the largest transportation systems in the nation. Montgomery County likewise has an extensive highway system as well covering over 3,668 miles. In 2016, there were 693,191 registered vehicles in the county. As Figure 4.3.23.1.1 shows, on a typical work day about 214,934 workers commute into the county, while 157,103 commute out of the county for work in neighboring counties. Overall in 2010, 85,536 more people commuted into the county than out. The county also contains several interstate highways including I-476, I-76 and I-276. In fact, sections of the Pennsylvania Turnpike in the county carry over 120,000 vehicles per day, more than twice the average traffic on areas of the turnpike outside of the county. The sheer amount of roadways coupled with the high volume of traffic creates the potential for serious crashes along the county's roads and bridges.

Figure 4.3.23.1.1: Commuting Patterns Into and Out of Montgomery County



With the five airports servicing the county and the number of commercial air traffic flyovers that occur every day, the potential extent of air transportation crashes is countywide. Yet the recent closure of the Willow Grove Naval Air Station greatly reduces air traffic over portions of the county and lowers the potential for aviation crashes.

Rail crashes can occur anywhere along the 51.93 miles of rail lines providing passenger rail service and 91.04 linear miles of track providing exclusively freight rail service in Montgomery County or the three rail freight yards. Rail transportation accident impacts have different characteristics depending upon whether it is freight or passenger service.

4.3.23.2. Range of Magnitude

Significant passenger vehicle, air, and rail transportation crashes can result in a wide range of outcomes from damage solely to property to serious injury or death. Some air incidents are nonfatal and cause minor injuries or property damage. Yet past air crashes in the vicinity of Willow Grove Naval air station had involved multiple fatalities and the destruction of several structures. The majority of motor vehicle crashes in Montgomery County are non-fatal, but vehicle accidents are a daily occurrence in many locations throughout the county. Railway and roadway crashes in particular have the potential to result in hazardous material releases since many chemicals and flammable liquids are transported through the county. Transportation accidents can also result in broader infrastructure damage. The worst type of transportation

crashes generally involves large quantities of flammable materials and hazardous materials. Not only can these accidents result in fatalities, but they could result in the destruction of key transportation infrastructure and surrounding buildings as well as causing off-site pollution and exposure to toxic releases. Fortunately the county has not encountered one of these worst case transportation crash scenarios.

4.3.23.3. Past Occurrence

Vehicular transportation crashes are a daily occurrence in the Commonwealth. According to PennDOT, there were 124,092 crashes in Pennsylvania in 2012 rising slightly to 129,395 in 2016.

Since Montgomery County is the third most populous county in the state (6.3% of the state) with an extensive road network and significant expressways, it is no surprise that the county accounted for 6.8 % of all Pennsylvania traffic crashes in 2016. In 2012, 8,385 crashes occurred representing 6.8% of all crashes in Pennsylvania. Crashes rose in Montgomery County to 8,799, but remained at about 6.8%. Fatalities in the county declined from 44 persons in 2012 to 32 in 2016. The Montgomery County fatalities in 2016 represented 2.6% of the total in the state.

The general decline in total accidents and fatalities is a reflection of the significant investment made by federal, state, county and municipal government to improve motor vehicle safety. Steps such as installing cable median barriers along highways such as US Route 422, rumble strips along road edges and center lines throughout the county, and the removal of hazardous obstacles near roadways have contributed to improved safety conditions in the county. On the other hand, with improved economic conditions and lowered costs of gasoline, people are driving more miles which create opportunities for more crashes. Distracted driving from mobile devices also creates opportunities for crashes.

Aviation accidents are the least frequent type of transportation accident, yet can be the most deadly. The National Transportation Safety Board, the federal agency responsible for aviation accident information, indicates that from 2001-2011, there were 351 air transportation crashes in Pennsylvania. Sixty-eight of these accidents were fatal. Most of these crashes involved small aircraft and many resulted in only minimal injuries.

Montgomery County contains five airports. Prior to its closure in 2011, the Willow Grove Naval Air Station was the most active airport supporting various naval aircraft and a variety of training missions. Due to its active use, most of the significant aviation accidents occurring in the county were associated with the Willow Grove Naval Air Station. Since 1950, 17 people died through air crashes at the Willow Grove Naval Air Station.

Two non-fatal aviation crashes occurred at the Pottstown Airport between 2001 and 2011, three non-fatal airplane crashes occurred at the Perkiomen Valley Airport between 2001- 2011 and three non-fatal airplane crashes occurred at Wings Field Airport between 2001- 2011.

One of the most horrific air crashes occurred shortly after noon on April 4, 1991 above Lower Merion Township. A plane containing Senator John Heinz and a helicopter which was checking

the landing gear on the plane collided. The debris from the collision landed on the playground at the Merion Elementary School killing two children and injuring three other children and two school employees. Five passengers in the plane and helicopter, including Senator Heinz were killed as well.

According to the Federal Railroad Administration, there have been 610 incidents/ accidents involving railroads in the county from 2002- 2011. Eighteen fatalities were reported, most of these involved pedestrians crossing tracks at unauthorized points and being struck by passenger trains. Most of the train incidents in the county involved SEPTA trains. Norfolk Southern Corporation and Amtrak were involved in a few cases. No train crashes occurred in that 10 year period were reported where there was a release of hazardous materials.

4.3.23.4. Future Occurrence

With the volume of goods and people moving through Montgomery County, transportation accidents will continue to occur routinely, especially passenger vehicle crashes. At the same time, though, five year trends indicate that rail and motor vehicle transportation crashes have been decreasing. Highway traffic crash reduction may be a result of various safety programs, vehicle code enforcement, and highway improvements made by Penn DOT, the PA Turnpike Commission, Montgomery County, and local municipalities. Also, improvements to vehicle safety equipment have contributed to reductions in fatalities and injuries. The use of cell phones, particularly texting while driving, is a source of distraction that could lead to increased vehicle accidents in the future.

The number of rail crashes nationally has been stable or declining over the past several years. This is a result of safety initiatives and infrastructure improvements by the rail providers, particularly SEPTA.

With the closure of Willow Grove Naval Air Station, aviation crashes in the county will likely be low. The existing airports serving the county support very little air traffic comprised of small planes only.

4.3.23.5. Environmental Impacts

Due to the range of magnitude, the environmental impacts of transportation crashes can vary greatly. In the case of a simple motor vehicle crash, train derailment, or aviation accident, the environmental impact may be minimal. However, if the crash involves any type of vehicle moving chemicals or other hazardous materials, the impact will be considerably larger and may include an explosion or the release of potentially hazardous material. For a complete discussion of the environmental impacts of hazardous materials releases, see Section 4.3.17.5.

4.3.23.6. Vulnerability Assessment

Vulnerability for transportation crashes is different for each of the three major modes of transportation in Montgomery County. For this analysis, vulnerability for highway accidents was defined as jurisdictions falling within a ¼ mile of Interstate and limited access highways likely to yield deadly crashes. The estimated county population residing within a quarter mile of limited access highways is 64,870. The total value of real estate property in this area is

Montgomery County 2017 Hazard Mitigation Plan

\$12,942,144,000, while the value of buildings alone accounts for \$9,421,556,400. There are 13 schools within this zone and 3 nursing homes.

Vulnerability for air traffic accidents is defined as jurisdictions falling within five miles of both public and private airports and heliports with at least one runway.

Since most aviation incidents occur during take-off and landing, jurisdictions located within 5 miles of airports are more vulnerable to air transportation crashes. Jurisdictional vulnerability for air transportation accidents is most significant within the five-mile hazard zone around each airport. In order to combat the hazards of aviation incidents, the Pennsylvania Legislature enacted Act 164 of 1984 which requires municipalities to place land use restrictions in areas around an airport to restrict development that could interfere with airport regulations and navigation. This restriction on development 10,000 feet around airports is designed to prevent the creation of airport hazard areas. It appears that municipalities in the county have complied with these requirements.

Critical areas for rail incidents are based on the location and activity of various rail lines. Three class I railroads operate in the county. These are Norfolk Southern, Canadian Pacific and CSX. Norfolk Southern owns the significant Harrisburg Line along the Schuylkill River, the Morrisville Line paralleling the Pennsylvania Turnpike, and the Abrams Yard in Upper Merion Township. Freight rail providers also have operating rights on some SEPTA commuter rail lines in the county. Amtrak operates high speed regional rail service on the Main Line through Lower Merion Township. SEPTA operates commuter rail service along seven lines through Montgomery County. These include:

→ Airport Line	Glenside to the Phila. International Airport
→ Warminster Line	Central Phila to Warminster
→ Lansdale/ Doylestown Line	Central Phila to Doylestown
→ Paoli Line	Central Phila to Thorndale
→ Norristown Line	Central Phila to Norristown
→ Cynwyd Line	Central Phila to Cynwyd
→ Fox Chase Line	Central Phila to Fox Chase

Similar to highway crashes, jurisdictions that are vulnerable to rail crashes are those located within ¼ mile of rail lines. There are over 82,182 county residents living within a quarter mile of rail lines servicing freight traffic. The total property value of land within this area is \$9,667,959,800 and the value of buildings and structures alone is \$6,970,224,300. Seven schools and three nursing homes are also located within a quarter mile of freight rail lines.

Growing concern has arisen in the county about the safety of crude oil shipments from various oil reserves in Western Pennsylvania and North Dakota among other locations.

4.3.23.7. *Additional Information*

[PA DOT Traffic Accident Statistics](#)

Montgomery County 2017 Hazard Mitigation Plan

[Montgomery County Comprehensive Plan- Transportation Plan Aviation Chapter](#)

[Montgomery County Comprehensive Plan- Transportation Plan Public Transit and Highways Chapters](#)



4.3.24. Urban Fire and Explosion

Urban fire and explosion involves fires taking place within structures or impacted development areas and facilities. Generally, from a hazard mitigation planning perspective, fires considered in this section are those that involve very large structures or multiple structures.

4.3.24.1. Location and Extent

Urban fire and explosion hazards incorporate vehicle and building/structure fires as well as overpressure rupture, overheat or other explosions that do not ignite. This hazard occurs in denser, more urbanized areas statewide and most often occurs in residential structures (US Fire Administration). Urban fires can more easily spread from building to building in these denser areas. Furthermore, urban fires are a more significant threat in the many areas of the Commonwealth with a significant proportion of buildings over 50 years of age. Figure 4.3.24.1 illustrates the concentration of residential structures over 50 years old in Montgomery County. Urban fires and explosions often begin as a result of other hazards, particularly storms, lightning strikes, drought, transportation accidents, hazardous materials releases, criminal activity (arson), and terrorism.

4.3.24.2. Range of Magnitude

In general, the current extensive networks of roads and streets coupled with the number of local fire companies and departments should provide swift access to fire events. It is anticipated that blockage by damage, debris and operations will be localized and temporary. However, urban fires have the potential to cause extensive damage to residential, commercial or public property.

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Damage ranges from minor smoke and/or water damage to the destruction of buildings. People are often displaced for several months to years depending on the magnitude of the event. Urban fires and explosions can also cause injuries and death. In 2014 Pennsylvania recorded the third highest fire fatality total trailing only Texas and California. In 2016 117 fire deaths were reported in Pennsylvania and up through July 70 have been reported in 2017. Six fire fatalities were in Montgomery County in 2016 – two in the Pottstown area and four in the Norristown area. Generally the number of fire incidents, fatalities and injuries from fire has been dropping since 2005.

Figure 4.3.24.1 Residential Housing Age by Municipality

<i>Municipality</i>	<i>Total Residential Units</i>	<i>Units Built on or Before 1961</i>	<i>Percentage</i>	<i>Units Built After 1961</i>	<i>Percentage</i>
Amber	1788	1465	81.94%	323	18.06%
Bridgeport	1346	1098	81.58%	248	18.42%
Bryn Athyn	293	199	67.92%	94	32.08%
Collegeville	1169	295	25.24%	874	74.76%
Conshohocken	3166	2223	70.21%	943	29.79%
East Greenville	992	510	51.41%	482	48.59%
Green Lane	151	126	83.44%	25	16.56%
Hatboro	2333	1782	76.38%	551	23.62%
Hatfield Borough	801	437	54.56%	364	45.44%
Jenkintown	1592	1099	69.03%	493	30.97%
Lansdale	4529	3299	72.84%	1230	27.16%
Narberth	1365	1213	88.86%	152	11.14%
Norristown	8504	7609	89.48%	895	10.52%
North Wales	1080	878	81.30%	202	18.70%
Pennsburg	969	401	41.38%	568	58.62%
Pottstown	7019	5992	85.37%	1027	14.63%
Red Hill	909	293	32.23%	616	67.77%
Rockledge	826	689	83.41%	137	16.59%
Royersford	1338	937	70.03%	401	29.97%
Schwenksville	424	168	39.62%	256	60.38%
Souderton	1869	1321	70.68%	548	29.32%
Telford	1327	728	54.86%	599	45.14%
Trappe	1329	296	22.27%	1033	77.73%
West Conshohocken	596	379	63.59%	217	36.41%
Abington	18212	14581	80.06%	3631	19.94%
Cheltenham	10104	8452	83.65%	1652	16.35%
Douglass	3249	786	24.19%	2463	75.81%
East Norriton	4835	1934	40.00%	2901	60.00%
Franconia	4252	818	19.24%	3434	80.76%
Hatfield Township	4699	1238	26.35%	3461	73.65%
Horsham	7999	2236	27.95%	5763	72.05%

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Limerick	6188	1008	16.29%	5180	83.71%
Lower Frederick	1783	522	29.28%	1261	70.72%
Lower Gwynedd	3680	1032	28.04%	2648	71.96%
Lower Merion	19520	14055	72.00%	5465	28.00%
Lower Moreland	4266	1610	37.74%	2656	62.26%
Lower Pottsgrove	4025	955	23.73%	3070	76.27%
Lower Providence	7056	2089	29.61%	4967	70.39%
Salford	859	252	29.34%	607	70.66%
Marlborough	1272	466	36.64%	806	63.36%
Montgomery	9114	575	6.31%	8539	93.69%
New Hanover	3736	834	22.32%	2902	77.68%
Perkiomen	2942	461	15.67%	2481	84.33%
Plymouth	5298	2813	53.10%	2485	46.90%
Lower Salford	4533	711	15.68%	3822	84.32%
Skippack	3701	534	14.43%	3167	85.57%
Springfield	6604	5385	81.54%	1219	18.46%
Towamencin	5687	755	13.28%	4932	86.72%
Upper Dublin	8750	2795	31.94%	5955	68.06%
Upper Frederick	1212	311	25.66%	901	74.34%
Upper Gwynedd	5311	1077	20.28%	4234	79.72%
Upper Hanover	2357	567	24.06%	1790	75.94%
Upper Merion	9037	4406	48.76%	4631	51.24%
Upper Moreland	6722	4862	72.33%	1860	27.67%
Upper Pottsgrove	1910	530	27.75%	1380	72.25%
Upper Providence	7250	1182	16.30%	6068	83.70%
Upper Salford	1063	369	34.71%	694	65.29%
West Norriton	5865	2264	38.60%	3601	61.40%
West Pottsgrove	1253	820	65.44%	433	34.56%
Whitemarsh	5704	2871	50.33%	2833	49.67%
Whitpain	6473	1697	26.22%	4776	73.78%
Worcester	3223	774	24.01%	2449	75.99%
Total	255459	122064	47.78%	133395	52.22%

Source: Montgomery County Board of Assessments

In the most serious urban fire events, the extreme heat of a fire event can damage the underlying infrastructure. For example, in 1996, an eight-alarm tire fire ignited in Philadelphia under Interstate 95 produced extreme heat that caused the bridge to buckle and shut down the highway for two months while the bridge was repaired. The governor declared this event a disaster shortly after it occurred.

4.3.24.3. Past Occurrence

Urban fire events occur daily in communities across Pennsylvania. According to the information compiled by the Office of the State Fire Commissioner, in 2010 there were approximately 20,000 fire calls in the county, over 7,770 involving structures and 3,330 involving vehicles. Over 500 calls included explosions. This information is based on all fire company reports

submitted to the Pennsylvania Fire Information Reporting System (PennFIRS). Unfortunately it appears that incomplete submissions are made with information from several Montgomery County fire companies going unreported.

The two largest fires in the county over the past two decades occurred in Bridgeport Borough and Conshohocken Borough. On May 17, 2001 the Continental Business Center, an old industrial complex in Bridgeport on the Schuylkill River and home to about 35 industrial tenants, was consumed in a massive blaze. As a result of the fire, all of the buildings on this 30 acre complex were destroyed.

The fire in Conshohocken Borough started in the late afternoon on August 13, 2008. It began at an apartment construction site adjacent to the occupied Riverwalk Millennium Apartments in Conshohocken, which consisted of 5 different buildings. The intense radiant heat from the burning construction site ignited the Riverwalk Millennium Complex buildings. The incident became an 8-alarm blaze with 86 fire companies on site. Due to the intensity of the blaze at the construction site, three of the five apartment buildings were destroyed. The entire construction site was consumed by the fire as well. Though the blaze resulted in damages in excess of \$50 million, no fatalities occurred due to the blaze.

In addition to those fires several other notable fires in Norristown and Pottstown have destroyed several buildings and displaced residents and businesses. These fires illustrate that in addition to the overall destruction of property and potential injuries, fires also have a big social and economic impact that is difficult to quantify.

Other notable fires that occurred in the county are described in sections of this plan dealing with flooding and environmental hazards.

4.3.24.4. Future Occurrence

Many factors contribute to the cause of urban fires and explosions. Most fires are caused by cooking. Other significant residential fire causes include heating and electric system malfunction. In non-residential structures, fires are also caused by carelessness or are intentionally set. Due to the various factors, urban areas in Pennsylvania are considered at risk to one degree or another. Minor urban fires can be expected every day in Montgomery County. Major fires will continue to occur several times a year, particularly in dense, urban areas with aging building stock. However, the probability of future occurrences may decrease with the construction of new buildings to that meet building codes which address fire prevention, detection and extinguishment. Also, continued efforts to increase public awareness of the dangers of urban fires will help to mitigate injury, death, and property loss. Even with these efforts, the probability of future occurrence may increase slightly in some communities whose populations are growing and where new areas are developed.

4.3.24.5. Environmental Impacts

The impact of urban fire and explosion events vary based on the size of the incident and the type of structure being burned. There may be environmental impacts related to hazardous materials when a fire event or explosion releases dangerous materials. There are additional economic consequences related to this hazard. Urban fires and explosions may result in lost

wages due to temporarily or permanently closed businesses, destruction and damage involving business and personal assets, loss of tax base, recovery costs, and lost investments in destroyed property.

The secondary effects of urban fire and explosion events relate to the ability of public, private and non-profit entities to provide post-incident relief. Human services agencies (community support programs, health and medical services, public assistance programs and social services) can be affected by urban fire and explosion events as well. Effects may consist of physical damage to facilities and equipment, disruption of emergency communications, loss of health and medical facilities and supplies, and an overwhelming demand for service by victims who are suffering from the effects of the urban fire, including loss of their home or place of business.

4.3.24.6. Vulnerability Assessment

Generally speaking, the areas of the county that have the highest population densities coupled with the oldest residential buildings are most vulnerable to urban fire threats. Vulnerability thresholds for Pennsylvania municipalities occur when population densities are over 8,000 persons per square mile and are located in communities with 68 percent or more of residential structures older than 50 years. Only Norristown and Narberth Borough meet both the population density and house age criteria. Another source of urban fire is due to vacancies and unattended properties. As described in Section 4.3.14 Building or Structure Collapse, there are very few vacancies or abandoned buildings in the county. Overall the county is well served by professionally trained and well equipped fire companies. Over the past, several Montgomery County fire companies have merged to strengthen their abilities to service their community. In the future, fire companies need to continually recruit new members as the average age of fire fighters grow.

4.3.24.7. Additional Information

[Office of the PA Fire Marshall](#)



4.3.25. Utility Interruption

Utility interruption is the impairment of the ability of various types of energy and communication systems to provide service to their customers. Utility interruption may result from various types weather conditions, fuel or resource shortage, electromagnetic pulse, information technology failure, support system accident or failure, or major power or conveyance system accident or failure.

4.3.25.1. Location and Extent

At any time utility interruption could impact telecommunication, gas, electric, water or waste networks serving the county. These interruptions or outages occur because of lightning storms, fuel or resources shortage, electromagnetic pulses, information technology failures, transmission facility or linear utility accident, and major energy, power, or utility failure. The focus of utility interruptions as a hazard lies in fuel, energy, or utility failure; this hazard is often secondary to other natural hazard event, particularly transportation accidents, lightning strikes, extreme heat or cold events, and coastal and winter storms. Utility interruptions occur throughout the Commonwealth but usually are small-scale, localized incidents. Utility interruptions are possible anywhere there is utility service. Figure 4.3.25.1.1 illustrates the geographic extent high voltage power lines within the county.

Figure 4.3.25.1.1. Location of High Voltage Power Lines



This hazard has the possibility to affect the whole county at once or scattered neighborhoods. According to the 2016 estimates of the American Community Survey, there are 312,447 occupied housing units in Montgomery County; of these units, 51.2% use utility gas, 18.1% use fuel oil or kerosene, 2.8% use bottled gas, and 25.4% use electric power to heat their homes (US Census, 2017). Nearly all homes use electricity from PECO, Metropolitan Edison, PPL, Lansdale Borough, or Hatfield Borough for basic power supply. About 13% of the homes in the county have individual wells for their primary water supply. During electrical outages, these residents are without water. Verizon and Windstream Communications are the major telephone wire line providers in the county. Additionally, several cable systems operate in the county provide voice and internet service.

4.3.25.2. Range of Magnitude

The most severe utility interruptions will be regional or widespread power outages. With the loss of power, electrical powered equipment and systems will not be operational. Examples may include: lighting; HVAC and ancillary support equipment; communication (i.e. public address systems, telephone, computer servers, and peripherals); ventilation systems; fire and security systems; refrigerators, sterilizers, trash compactors, office equipment; and medical equipment. This can cause food spoilage, loss of heat or air conditioning, basement flooding (sump pump failure), lack of light, loss of water (well pump failure), lack of phone service, or lack of internet service. However, this is most often a short-term nuisance rather than a catastrophic hazard. The severity of a utility interruption can be compounded with extreme weather events, especially winter weather events. Interruptions can also be more severe for special needs populations that

are dependent on electronic medical equipment. Utility interruptions can significantly hamper first responders in their efforts to provide aid in a compound disaster situation, especially with losses of telecommunications and wireless capabilities. In a possible worst-case scenario, a winter storm event causes widespread power outages, leaving citizens without heat in the midst of subzero temperatures. The power outage also means that elderly populations or others at risk of health problems due to the lack of heat are unable to call for assistance or leave their homes. In large storms, power lines cannot be repaired easily because of the magnitude of the storm allowing the power outage to last for several days.

4.3.25.3. Past Occurrence

Utility interruptions are largely minor, routine events, but there has been one Presidential Declaration of Emergency and two Gubernatorial Disaster Declarations in which a utility interruption was a major component of a disaster. A series of bankruptcies in 1972 led to the major steam heat provider in Lower Merion Township to cut off heat to residents with no intention to resume service in the wintertime; the governor declared the event a disaster. In January 1977, the nation's gas shortage coupled with severe winter weather led to a President's Declaration of Emergency. In more recent years, PEIRS collects information on utility interruption incidents. The Pennsylvania Utilities Commission (PUC) requires electric utilities to report all disruption and to stay within a 10% range of the PUC established disruption benchmark. Generally, PECO, PPL and Metropolitan Edison have worked to minimize disruptions in accordance with these requirements. For example in 2011, during Hurricane Irene, PECO brought in 1500 additional personnel for assistance in power restoration and tree trimming. The damage from the hurricane resulted in 511,102 customer outages. Yet, PECO was able to restore 81% of those within 24 hours and 97% were restored within 48 hours.

PHMSA tracks pipeline incidents in Pennsylvania. Over the past five years, there have been 73 pipeline incidents in the state resulting in two fatalities, eight injuries, and \$33,581,894 in damage.

Utility interruptions will continue to occur annually with minimal impact. Widespread utility interruption events usually occur approximately once every five years, usually as a secondary effect of an extreme weather event. These interruptions should be anticipated and first responders should be prepared during severe weather events. Likewise, all critical facilities should have adequate backup generator facilities in place with sufficient fuel supplies to provide power to core facilities for over a week. The impact of power outages during extreme weather conditions, both cold and hot weather, should be anticipated in all emergency plans for critical facilities. Sometimes disastrous situations can arise through the failure of gas and electric utilities.

Three major pipeline incidents have occurred in the county. On November 24 1950, a newly built 30 inch natural gas pipeline ruptured for nearly 3,000 feet, causing a fire that destroyed two nearby homes that were under construction.

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On October 7, 1986 a 14” petroleum pipe line ruptured spilling thousands of barrels of gasoline. This emergency resulted in the closure of several major roadways and the evacuation of area homes and the King of Prussia Mall.

The most disastrous pipe line accident in Montgomery County occurred on the evening of January 27, 1971 when gas line exploded on Front Street, in West Conshohocken Borough, completely destroying 15 homes and damaging 25 others. Fifty people were injured and taken to nearby hospitals. Five people were killed, including a nineteen-year old fireman.

PECO experienced 3 of their top ten power outage events from October 2012 to August 2017. These included:

Superstorm Sandy created several power service interruptions throughout the county. During that storm, PECO which services a large portion of the county and surrounding counties saw power service disruptions to 850,000 customers. During that storm it was evident that some large facilities that should have been able to rely upon generators did not have them available. Also, several municipalities indicated that residents who rely upon grinder pumps for their sewer systems experienced backups in their home sewer lines. Even facilities with backup generators in place such as the Upper Gwynedd Fire Company experienced power loss when their overworked generator ceased operation during the Superstorm Sandy power outage.

During the February 3-4 2014 winter storm, dangerously icy conditions resulted in service disruptions to 57 percent of PECO's Montgomery County and Bucks County electric customers. Repairing down service lines was made complicated due to the extremely icy roadway conditions and roadways blocked with downed trees and branches throughout the county.

A violent thunderstorm with 70 mile per hour wind gust caused 352,836 power outages in the PECO service territory on June 23, 2015. Though this storm was strong in Montgomery County, other areas of the PECO service territory were harder hit.

4.3.25.4. Future Occurrence

Utility disruptions will continue to occur due to both natural causes as well as system failures. Investments being made by utility companies to upgrade equipment and to reduce future damage to power lines from wind and falling branches will need to be made to ensure that the occurrence of disruption is minimized. Under the Hazardous Liquids Pipelines Act (Pipeline Act), Act 127 of 2011, to give the Pennsylvania Public Utilities Commission has jurisdiction to enforce Federal pipeline safety laws as they relate to non-public utility gas and hazardous liquids pipeline equipment and facilities within Pennsylvania. This should also enhance the reliability of gas systems throughout the state.

PECO, Montgomery County's largest electric service provider has developed a "System 2020" plan approved by the PUC on Oct 22, 2015. This plan calls for a variety of system resiliency and storm hardening system improvements that will cost an additional \$274 million. These investments are in three key areas: storm hardening and resiliency measures; accelerated cable replacements; and the acceleration of a plan to retire building substations and to upgrade the distribution facilities supplied by those substations. Accelerated spending in the replacement of

aging infrastructure should reduce the number of outages caused by equipment failure. This investment should improve service reliability. Other electric service providers including the Boroughs of Lansdale and Hatfield have been routinely trimming trees along power lines to reduce the potential impact of tree damage.

4.3.25.5. Environmental Impacts

The most significant impact associated with utility interruptions involves a release of hazardous materials. This hazardous material may be released in a pipeline accident or when a material is in transit. For a complete discussion on the impacts of a hazardous materials release, please see Section 4.3.19. Utility pipelines carrying flammable materials also have the possibility of exploding or starting a fire. There are a number of secondary impacts associated with utility interruptions. First, interruptions could affect the ability of the government to function, especially if backup power generation/supply is inadequate or unavailable. Utility interruptions also can reduce the efficient and effective communication that is essential to first responders. Heating loss and severe cold can also impact the health and safety of at-risk populations like young children, the elderly and disabled individuals.

4.3.25.6. Vulnerability Assessment

All jurisdictions are vulnerable on some level to utility interruptions, but because this hazard often occurs in conjunction with other hazards, jurisdictions that have been identified as more vulnerable to winter storms, temperature extremes, tornado, hail events, and lightning strikes may be more vulnerable to a utility interruption.

4.3.25.7. Additional Information

[Pipeline and Hazardous Materials Safety Administration](#)

[PA PUC](#)

4.4. Hazard Vulnerability Summary

4.4.1. Methodology

Ranking hazards helps communities set goals and priorities for mitigation based on their vulnerabilities. A risk factor (RF) is a tool used to measure the degree of risk for identified hazards in a particular planning area. The RF can also assist local community officials in ranking and prioritizing hazards that pose the most significant threat to a planning area based on a variety of factors deemed important by the planning team and other stakeholders involved in the hazard mitigation planning process. The RF system relies mainly on historical data, local knowledge, general consensus from the planning team, and information collected through development of the hazard profiles included in Section 4.3. The RF approach produces numerical values that allow identified hazards to be ranked against one another; the higher the RF value, the greater the hazard risk.

RF values were obtained by assigning varying degrees of risk to five categories for each of the hazards profiled in the HMP update. Those categories include *probability*, *impact*, *spatial extent*, *warning time*, and *duration*. Each degree of risk was assigned a value ranging from one to four. The weighting factor agreed upon by the planning team is shown in Appendix F. To calculate the RF value for a given hazard, the assigned risk value for each category was multiplied by the weighting factor. The sum of all five categories equals the final RF value, as demonstrated in the following example equation:

$$\text{Risk Factor Value} = [(Probability \times .30) + (Impact \times .30) + (Spatial \text{ Extent} \times .20) + (Warning \text{ Time} \times .10) + (Duration \times .10)]$$

It is interesting to compare the Risk Factor Values with the perceived threat reported by each municipality in the survey as summarized in Figure 5.2.1. Generally, the results from the municipal survey are similar to the RF system results; though there were some differences of perceived threat expressed for hazards that tend to be more localized or would impact some municipalities harder due to local conditions.

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Figure 4.4.1 summarizes each of the five categories used for calculating a RF for each hazard. According to the weighting scheme applied, the highest possible RF value is 4.0.

Figure 4.4.1: Summary of Risk Factor approach used to rank hazard risk.

RISK ASSESSMENT CATEGORY	DEGREE OF RISK			WEIGHT VALUE
	LEVEL	CRITERIA	INDEX	
PROBABILITY <i>What is the likelihood of a hazard event occurring in a given year?</i>	UNLIKELY	LESS THAN 1% ANNUAL PROBABILITY	1	30%
	POSSIBLE	BETWEEN 1 & 10% ANNUAL PROBABILITY	2	
	LIKELY	BETWEEN 10 & 100% ANNUAL PROBABILITY	3	
	HIGHLY LIKELY	100% ANNUAL PROBABILITY	4	
IMPACT <i>In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?</i>	MINOR	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE & MINIMAL DISRUPTION ON QUALITY OF LIFE. TEMPORARY SHUTDOWN OF CRITICAL FACILITIES.	1	30%
	LIMITED	MINOR INJURIES ONLY. MORE THAN 10% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE DAY.	2	
	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE WEEK.	3	
	CATASTROPHIC	HIGH NUMBER OF DEATHS/INJURIES POSSIBLE. MORE THAN 50% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR 30 DAYS OR MORE.	4	
SPATIAL EXTENT <i>How large of an area could be impacted by a hazard event? Are impacts localized or regional?</i>	NEGLIGIBLE	LESS THAN 1% OF AREA AFFECTED	1	20%
	SMALL	BETWEEN 1 & 10% OF AREA AFFECTED	2	
	MODERATE	BETWEEN 10 & 50% OF AREA AFFECTED	3	
	LARGE	BETWEEN 50 & 100% OF AREA AFFECTED	4	
WARNING TIME <i>Is there usually some lead time associated with the hazard event? Have warning measures been implemented?</i>	MORE THAN 24 HRS	SELF-DEFINED	1	10%
	12 TO 24 HRS	SELF-DEFINED	2	
	6 TO 12 HRS	SELF-DEFINED	3	
	LESS THAN 6 HRS	SELF-DEFINED	4	

(NOTE: Levels of warning time and criteria that define them may be adjusted based on hazard addressed.)

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DURATION <i>How long does the hazard event usually last?</i>	LESS THAN 6 HRS	SELF-DEFINED	<i>(NOTE: Levels of warning time and criteria that define them may be adjusted based on hazard addressed.)</i>	1	10%
	LESS THAN 24 HRS	SELF-DEFINED		2	
	LESS THAN 1 WEEK	SELF-DEFINED		3	
	MORE THAN 1 WEEK	SELF-DEFINED		4	

4.4.2 Ranking Results

Figure 4.4.2: Ranking of hazard types based on RF methodology.

HAZARD RISK	HAZARD NATURAL(N) OR MAN-MADE(M)	RISK ASSESSMENT CATEGORY					RISK FACTOR (RF)
		PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
Low	Building or Structure Collapse	1	2	1	4	1	1.6
Low	Civil Disturbance	2	2	2	4	2	2.2
Low	Dam Failure	2	3	2	4	1	2.4
Moderate	Drought	3	1	4	1	4	2.5
Low	Earthquake	2	3	3	4	1	2.3
Moderate	Environmental Hazard	4	2	2	3	3	2.8
High	Extreme Temperature	4	2	4	1	3	3.0
High	Flood, Flash Flood, Ice Jam	4	3	2	3	2	3.0
Low	Hailstorm	3	1	2	4	1	2.1
High	Hurricane, Tropical Storm, Nor'easter (N)	3	3	4	1	3	3.0
Low	Landslide	2	1	1	4	1	1.6
Low	Levee Failure	1	1	1	4	1	1.3
Low	Lightning Strike	3	1	2	4	1	2.1
Moderate	Radiological Incident	1	4	3	2	4	2.7
Moderate	Radon Exposure	4	1	3	1	4	2.6
Low	Subsidence, Sinkhole	2	2	1	3	3	2.0
Low	Terrorism	1	3	3	4	2	2.4
Moderate	Tornado, Wind Storm	3	3	2	4	1	2.7
Moderate	Transportation Accident	4	2	1	4	1	2.5
Moderate	Urban Fire and Explosion	3	3	1	4	2	2.6
Moderate	Utility Interruption	3	1	3	4	4	2.6
Low	Wildfire	2	2	1	4	2	2.0
High	Winter Storm	3	2	4	3	4	3

Municipalities were not asked to assess the risks associated with pandemic and cyber security.

4.4.3 Overall Hazard Impact

Hazards can create economic, safety, health, psychological, and environmental impacts. Environmental impacts are listed above in each hazard profile. The other four types of impacts are discussed below.

Economic: Hazards can have a substantial impact on local economies and the tax base of a community. The direct impacts include damage to residential, commercial, industrial, and public structures. Often times the greatest damage occurs to transportation and utility infrastructure, which is vital to the community's economy. The loss of a key infrastructure such as a bridge that provides access to businesses can have a dramatic and prolonged negative impact on the local economy.

Safety: The most threatening impact from any disaster is the loss of life. Several drowning deaths have occurred in the county due to flooding. Drowning in vehicles is the number one cause of flooding deaths nation-wide. Often victims put themselves into dangerous situations by driving into flooded areas and getting their vehicle swept away in the water currents. Electrocuting is the second most frequent cause of death claiming lives in flooded areas carrying live electric currents from downed electrical wires. Floods also damage gas lines, floors, and stairways causing dangerous situations and fires. A major fire from a ruptured gas line occurred in an apartment house in Upper Moreland Township flooded during Tropical Storm Allison. The fire resulted in the death of four residents and the rescue of nearly 30 other residents. Deaths from traffic accidents have been caused by wind storms, winter storms, and excessive rain. Tree damage from wind storms has also caused fatalities.

Health: There are different types of health problems that can accompany any disaster. The loss of power supplies and essential infrastructure such as public sewer and water facilities can greatly impact the health of the community. Also, floods can create localized pollution problems. As chemical storage areas, sewage treatment plants, and industrial properties become flooded, potentially harmful pollutants get mixed into the floodwaters. Water pollution problems can persist for a period of time after a flood. Flooded out homes require careful cleaning to prevent the formation of unhealthy mold conditions. Local wells are often contaminated for a period of time after a flood.

Psychological: The overall psychological impact of any disaster can be very significant. Psychological health impacts can occur among residents whose homes are damaged and personal possessions are destroyed. The loss of lives can devastate the surviving members in hard hit communities. The psychological impacts of a large terrorist incident could be particularly significant.

4.4.4 Future Development and Vulnerability

The county grew at a rapid pace with nearly 3,000 residential units and approximately 5,000,000 square feet of non-residential constructed each year over several decades. As a result of the economic down turn that started in 2008, the development activity dropped to less than half of

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those historic numbers. Continual growth in both housing and non-residential has occurred since 2012 boasting the housing totals to over 2,219 units residential and over 2,335,884 square feet non-residential development to in 2016. Municipal growth projections are included in Figure 4.4.4 below.

Figure 4.4.4 Population Projections

Municipality	2010**	2020	2030	2040	Pop. Change 2010-40
Montgomery County	799,874	823,564	873,361	894,486	94,612
Abington township	55,310	55,534	56,314	56,538	1,228
Ambler borough	6,417	6,519	6,872	6,973	556
Bridgeport borough	4,554	4,746	5,144	5,275	721
Bryn Athyn borough	1,375	1,390	1,440	1,455	80
Cheltenham township	36,793	36,985	37,653	37,845	1,052
Collegeville borough	5,089	5,141	5,323	5,376	287
Conshohocken borough	7,833	8,917	9,554	9,938	2,105
Douglass township	10,195	11,009	12,350	13,014	2,819
East Greenville borough	2,951	2,989	3,121	3,159	208
East Norriton township	13,590	13,910	14,353	14,524	934
Franconia township	13,064	13,902	16,368	17,656	4,592
Green Lane borough	508	510	519	521	13
Hatboro borough	7,360	7,609	7,869	7,983	623
Hatfield borough	3,290	3,291	3,296	3,297	7
Hatfield township	17,249	17,974	19,155	19,580	2,331
Horsham township	26,147	27,144	30,614	31,611	5,464
Jenkintown borough	4,422	4,440	4,501	4,518	96
Lansdale borough	16,269	17,091	17,935	18,307	2,038
Limerick township	18,074	19,167	21,623	23,516	5,442
Lower Frederick township	4,840	5,037	5,423	5,920	1,080
Lower Gwynedd township	11,405	11,581	12,192	12,368	963
Lower Merion township	57,825	58,600	59,507	59,882	2,057
Lower Moreland township	12,982	13,154	13,752	13,924	942
Lower Pottsgrove township	12,059	12,434	13,517	14,117	2,058
Lower Providence township	25,436	25,984	27,892	28,440	3,004
Lower Salford township	14,959	15,479	17,291	17,811	2,852
Marlborough township	3,178	3,309	3,640	3,896	718
Montgomery township	24,790	25,542	26,815	27,266	2,476
Narberth borough	4,282	4,305	4,383	4,405	123
New Hanover township	10,939	12,286	14,921	16,268	5,329
Norristown borough	34,324	34,817	35,460	35,713	1,389
North Wales borough	3,229	3,249	3,320	3,341	112
Pennsburg borough	3,843	3,938	4,069	4,119	276
Perkiomen township	9,139	9,320	9,950	10,131	992
Plymouth township	16,525	16,763	17,591	17,829	1,304
Pottstown borough	22,377	22,865	23,555	23,818	1,441
Red Hill borough	2,383	2,414	2,521	2,552	169
Rockledge borough	2,543	2,556	2,602	2,615	72

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Municipality	2010**	2020	2030	2040	Pop. Change 2010-40
Royersford borough	4,752	4,915	5,259	5,372	620
Salford township	2,504	2,697	3,026	3,290	786
Schwenksville borough	1,385	1,411	1,504	1,530	145
Skippack township	13,715	14,871	16,680	17,587	3,872
Souderton borough	6,618	6,711	7,036	7,129	511
Springfield township	19,418	19,522	19,884	19,988	570
Telford borough	2,665	2,723	2,927	2,985	320
Towamencin township	17,578	18,366	19,428	19,840	2,262
Trappe borough	3,509	3,571	3,786	3,848	339
Upper Dublin township	25,569	26,118	27,357	27,756	2,187
Upper Frederick township	3,523	3,726	4,206	4,634	1,111
Upper Gwynedd township	15,552	15,779	16,569	16,795	1,243
Upper Hanover township	6,464	7,467	8,717	9,495	3,031
Upper Merion township	28,395	28,912	30,041	30,409	2,014
Upper Moreland township	24,015	24,176	24,735	24,896	881
Upper Pottsgrove township	5,315	5,687	6,682	7,354	2,039
Upper Providence township	21,219	22,681	25,755	26,767	5,548
Upper Salford township	3,299	3,461	3,904	4,185	886
West Conshohocken borough	1,320	1,353	1,469	1,502	182
West Norriton township	15,663	15,942	16,914	17,193	1,530
West Pottsgrove township	3,874	3,937	4,156	4,218	344
Whitemarsh township	17,349	17,852	18,783	19,286	1,937
Whitpain township	18,875	19,134	20,034	20,293	1,418
Worcester township	9,750	10,651	12,108	12,634	2,884

The [Montgomery County Comprehensive Plan Montco 2040: A Shared Vision](#) adopted in 2015 identified significant areas for new growth in the Route 422 corridor in the western portion of the county, Gilbertsville, New Hanover and Boyertown area, the Indian Valley along Route 113, Limerick, Upper Providence, and other portions of the North Penn Area west of Lansdale. In these areas development that may be similar to the suburban style of building found in adjacent areas. As available vacant land to be developed grows scarce, more development pressure will also occur in difficult sites to develop that were passed over initially. Development on these types of properties could result in the future conditions where natural hazards may cause property damage and injuries. Overall there seems to be a preference for new building within existing development areas. In these locations infill development and redevelopment is taking place at a greater pace. These sites have the advantage of available infrastructure and adjoining facilities.

The Montco 2040: Shared Vision Plan's designated growth areas were established to avoid development within flood plain or other obvious hazard areas. The plan also promotes regional planning and innovative development techniques to better address future growth. These strategies are described in the Land Use Vision section.

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In recent years, major residential developments have been proposed on older industrial, “brownfields” sites along the Schuylkill River and major rail road corridors. Several of these projects have been built or are proposed within the areas of the floodplain of the Schuylkill River. These buildings are elevated above the flood level of the Schuylkill River which has a one percent chance of being equaled or exceeded in any given year with parking located within flood areas. Evacuation and emergency management plans are required for these developments.

Generally, new development within the county will be built to modern standards and will be more resistant to all types of hazards. Also, in new developments, power and communications lines are located underground making them less vulnerable to wind damage.

5 Capability Assessment

5.1 Update Process Summary

This chapter discusses the capabilities of the various levels of government serving the residents of Montgomery County to mitigate hazards. Current mitigation activities ongoing in the county are also described. It evaluates the capacity and resources that are already available to mitigate the impact of hazards which could occur in Montgomery County. The capabilities of government at municipal, county, and federal levels are assessed. The assessment also underscores areas where there are gaps in service and response that may need improvement.

One of the most important concepts in planning for disaster threats is the coordination of all the various entities involved in emergency management. Coordination of emergency services personnel and equipment can be particularly important in response to a large disaster that strikes vast areas of the county. A major disaster, at a minimum, requires coordination between fire, police, public works, and ambulance services, as well as coordination with other specialized personnel including water rescue teams, tactical heavy equipment rescue teams, hazardous materials specialists, bomb squads, special weapons and tactics teams, radiation specialists, or evacuation planners. In addition, a major incident could trigger the need for coordination at various levels of government. Depending on the scope and nature of an incident, federal, state, county, and local governments may all be involved. A method of coordinating emergency situation response is the Incident Command System (ICS). The Incident Command System provides coordination by utilizing a top-down command structure and enables the evaluation of a situation in terms of the impact on the safety of response personnel. The system fosters the use of common terminology and coordination of communications.

All levels of government are required to adopt or utilize the National Incident Management System (NIMS). The ICS described above is an element of the NIMS. The county commissioners have mandated that the county agencies operate under NIMS and utilize the ICS during all emergency events.

5.2 Capability Assessment Findings

5.2.1 Emergency Management

Montgomery County contains 62 municipalities including 38 townships and 24 boroughs. Under the requirements of Pennsylvania Title 35 (Emergency Management Code) specific roles and responsibilities are assigned to municipalities to provide local emergency services including:

- Authorization to establish a local emergency management organization which is responsible for emergency response and recovery.

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- Ability to declare a local disaster emergency upon finding that a disaster has occurred or is imminent.
- Requirement to appoint an emergency management coordinator who is responsible for the preparation of plans, administration, and operation of the local management organization.
- Adoption of appropriate intergovernmental agreements with other municipalities to address shared roles and responsibilities.

A listing of municipal facilities is provided in Appendix E.

Mutual Aid Agreements: Many municipalities have formally adopted mutual aid plans. It is a practice of MC DPS to facilitate mutual aid agreements among all jurisdictions.

Emergency Operations Centers: Each municipality has an equipped emergency operations center which will be utilized as a command center in the event of a local incident. Typically these are housed in the municipal building, public safety building, or local fire company.

Local Emergency Services: Various municipal emergency services are provided at a local level, including police, fire, public works, and ambulance. Every municipality and school district has adopted comprehensive emergency management plans, which itemize local resources and response protocols. All municipalities operate under the NIMS.



Public Safety: Most municipalities in the county are served by local police departments. The 11 municipalities without local public safety staff are: East Greenville Borough, Lower Frederick Township, Perkiomen Township, Red Hill Borough, Salford Township, Skippack Township, Trappe Borough, Upper Frederick Township, Upper Hanover Township, Upper Salford Township, and Worcester Township. These municipalities are covered by the Pennsylvania State

Police barracks located in Skippack and Upper Merion Township. Over 1,200 full time public safety officers are employed by Montgomery County municipalities. Local public safety departments work closely with each other and with the county district attorney's office on various special crime task force units. Most municipal police departments cooperate on training and recruiting through the Montgomery County Consortium. They also utilize the training facilities at the Montgomery County Public Safety Campus in Plymouth Township.

Fire Control: There are 104 fire stations spread around Montgomery County. Fire stations in Montgomery County are listed in Appendix M. Several fire stations have been expanded or reconstructed over the past decade to provide improved service.

The local fire companies within Montgomery County are staffed either partially or completely by volunteers. Some municipalities employ full-time or part-time paid professional firemen. Also, slightly more than half of the municipalities in the county employ a paid Fire Marshal. In many cases, local volunteer fire companies are affiliated with one municipality. Fire companies in rural areas may serve several municipalities. Some of the county fire companies are undergoing consolidations with other fire companies to provide more efficient service in their regions. Some fire companies are equipped and trained to provide additional teams for water rescue, hazardous materials incidents, and technical rescue.

Emergency Medical Services: Emergency medical assistance services are provided by private non-profit organizations serving multi-municipal areas. Ambulance services are a part of the emergency medical services which include paramedics, emergency medical technicians, and quick responders. These units are coordinated by MC DPS. There are 21 ambulance operators providing prompt service to county residents. Most portions of the county can be accessed by a trained emergency medical assistance team and ambulance within eight minutes. In the event that a victim has life threatening injuries, rapid transport will be made by emergency service helicopters for direct access to hospitals in the region that are equipped with heliports.



Communications/ Monitoring Systems: Municipalities and local emergency responders currently operate with various monitoring and communications systems. All utilize the county 800-mHz system which is being upgraded. In addition, some also support their own radio communication systems.

Municipal Code Enforcement and Public Works Departments: Both the code enforcement and public works departments in each municipality play a role in responding to and mitigating disasters at the local level. Zoning and building permit decisions are made by the municipal code officer. All 62 municipalities have zoning and subdivision ordinances. Road and bridge maintenance is performed by the public works department or municipal road superintendent. Additionally public works departments in some municipalities maintain storm sewers, stormwater management basins, stream channels, and other public facilities that pertain to flooding. Public works department personnel deploy traffic barriers and other controls during road flooding and other disasters that could potentially impact public areas in the municipality. Often they are the first on the scene to manage the damage from various types of disasters. These activities include removing debris from roadways, repairing infrastructure, and stabilizing damaged public

facilities. Snow and ice removal during winter storms is also an important function of the public works departments in Montgomery County, and often requires significant overtime work for staff. Public works department personnel often perform initial post-disaster inspections and damage assessments. In some of the larger developed municipalities, shade trees are routinely trimmed by professional arborists or public works personnel.

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Montgomery County Public Safety Department: Most incidents caused by hazards will require emergency response services from fire, police, and ambulance personnel and impact more than one municipality. A major incident, such as the Limerick Township tornado in 1994, or the flooding in Upper Moreland and Abington Townships caused by Hurricane Floyd in 1999 are examples of situations where fire, police, and emergency medical services were needed from several public responders to address a large incident. This section will briefly describe services and issues related to the general provision and coordination of emergency service performed by the MC PSD.

MC PSD operates through six divisions: Administration, Emergency Communications, Emergency Medical Services, Emergency Management, Fire Academy, and Law Enforcement. Five of these six divisions are described below.

Emergency Communications: As one of the core functions of MC PSD, Montgomery County provides 24/7 enhanced 911 dispatch service from the Montgomery County Emergency Operations Center (EOC) located in Eagleville. In 2016 the center received nearly 800,000 calls for police, fire, and ambulance service. The Emergency Communications Division is one of only 16 of over 6,000 nationwide to have dual accreditation from the Association of Public-Safety Communications Officials and the Commission on Accreditation of Law Enforcement Agencies.

Montgomery County is completing the \$36.4 million upgrade to the emergency management dispatch system. The new 800 megahertz system will utilize 30 radio communications sites and provide wider coverage to handle the increased emergency communications needs of the county. As part this effort, the county has distributed new radios to municipalities and emergency responders.

Emergency Medical Services (EMS): The County's EMS system is coordinated by the Emergency Medical Services Division in accordance with Pennsylvania's Act 45 of 1985. This division works closely with the emergency medical service providers described above to improve services and avoid duplication. As part of their work, County EMS staff inspect and license 113 Emergency Services Provider vehicles. They also coordinate the readiness and response for mass casualty and mass care incidents. County EMS staff also coordinate local emergency service providers in the administration of drugs to sedate delirious patients and to administer antidotes for opioid overdose victims.

Emergency Management: The Montgomery County Emergency Management Division is responsible for coordinating 62 emergency management agencies and oversees the HAZMAT

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team, Urban Search and Rescue Team, Training and Exercises, Radiation Planning, and Community Outreach. During emergency events, the Emergency Management staff helps navigate the complexities of the response and recovery. This division works closely with municipalities, day care centers, and schools to assist them with planning, response, mitigation and recovery from disaster emergencies. To date, the county has been successful in assisting each municipality and school district in the preparation of a local emergency plan. Most of the nearly 300 day care centers in the county also have emergency plans. The Emergency Management Division also works closely with Exelon to maintain the evacuation plan for the area surrounding the Limerick Nuclear Reactor.

Fire Academy: The County operates the Fire Academy at the Public Safety Training Campus located at 1175 Conshohocken Road in Plymouth Township with full-time and several part-time professional instructors. The campus contains several facilities that are used for education and training for the fire, rescue, police departments, and ambulance companies in Montgomery County. During 2016, the Fire Academy offered 403 classes that included 6,072 attendees, who received a combined 58,696 hours of fire, rescue and hazardous materials training. The Montgomery County Fire Academy is one of 18 institutions in Pennsylvania recognized by the State Fire Academy as an educational training agency (ETA) authorized to conduct emergency service training to first responders.

Law Enforcement: The Law Enforcement Division also operates at the Montgomery County Public Safety Training Campus where it provides various law enforcement agencies with quality training consistent with national standards in conjunction with the Police Chiefs Association and District Attorney's office. In addition to providing classroom training, students use the tactical response training center including two (50- and 100-meter) indoor shooting ranges, a live fire shoot house, and a classroom with a fire arms simulator. This facility allows law enforcement officers and other first responders to train for a barricaded person, officer down, hostage rescue or weapons of mass destruction incidents.

The Law Enforcement Division personnel also conduct the School Safety and Security Program that assists all public and non-public schools and institutes of higher learning establish a safe, secure and healthy learning environment. The C.L.A.S.S. program offered by the MC PSD provides a countywide law enforcement alert system.

Emergency Operations Center: MC PSD's EOC is located in Eagleville. The center includes the offices for the department, the 911 call center, the emergency operations control room, and houses various types of equipment and vehicles needed to respond to different type of events. The center was expanded and upgraded in 2007 as part of an \$8.7 million construction effort. The center would serve as a command post to dispatch emergency responders and for coordination and distribution of resources and equipment needed to address an emergency incident. Highly trained and experienced personnel in the EOC provide expertise in the following: transportation, firefighting, communications, public works and engineering, emergency management, mass care and housing, resource support, public health and medical services, search and rescue, oil and hazardous materials response, energy, public safety and security, community recovery and mitigation, and external affairs. When activated, the EOC works

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closely with the 911 center to ensure the coordination of activities and the gathering of information about the impacts of the disaster.

In 2011, the emergency operations center was recognized as an accredited facility by the Commission for the Accreditation of Law Enforcement Agencies (CALEA). As such, it is the only accredited system in the state.

Monitoring and Communications Systems: The County can receive disaster-related information and provide updates and warnings using the following systems:

- 800-mHz Radio System - Montgomery County has an 800-megahertz communication system which has recently been upgraded to enhance coverage, capacity, and technological improvements for emergency communications. All emergency service providers will now be able to utilize the improved system with the new radios distributed to them by the county.
- Storm Ready, designated by the National Weather Service (NWS), includes methods for monitoring, warning, and responding to natural hazard situations. As part of Storm Ready, the county has hosted Skytran training.
- The Emergency Alert System can be used to broadcast messages and alerts on AM radio and scroll messages across TV screens.
- 1,000 weather radios procured using Homeland Security funding are positioned within special needs and special population facilities to provide advance warning of approaching storms or conditions. Units have also been deployed in municipal buildings, school districts, and daycare centers.
- The NWS weather radio system has been upgraded to include signals that blanket Montgomery County from three distinct weather monitoring locations: Mount Holly/Philadelphia, Hibernia Park/Chester County (a new site), and Allentown.
- Roam Secure - is a web based text messaging, instant alert mechanism that can reach people via e-mail, Blackberry/Trio devices and text cell phones. Montgomery County will utilize this to alert responders and groups about natural and manmade hazards and events. The system is internet based and can alert personnel to events by type, i.e. severe weather, as well as by geographical area.
- RACES - Radio Amateur Civil Emergency Services (RACES) is a network of amateur radio operators who donate their services in the time of natural disaster. They can provide additional communications services for various responders or agencies that need assistance. This service can provide backup communications in the event that other systems fail.
- County Law Enforcement Alert System (CLASS) was developed to provide a two-way emergency alert capability for every school in the Montgomery.

→ ReadyNotifyPA is a text messaging system used to send emergency communications directly to cell phones, pagers, BlackBerrys, PDAs and/or e-mail accounts when there is an emergency occurs. <http://www.readynotifypa.org/>

Emergency Operations Plan: Montgomery County has an Emergency Operations Plan, adopted in April 2012, to document the appropriate response procedures during various disaster events. EOC operations and other activities are guided by this plan.

Mutual Aid and Joint Planning: Montgomery County has mutual aid agreements with surrounding counties and is currently participating with other Philadelphia area counties in the SEPA RTF. Montgomery County is also involved in Delaware Valley Working Group, a cooperative that plans for the response to various disasters that could strike the three states along the Delaware River. Current regional projects include a communication link between all emergency operation centers within the three states in the Delaware Valley. Surge capacity planning for all hospitals, pandemic planning, and regional mass evacuation plans are being prepared.

Montgomery Health Department: MCHD provides information and educational materials on disease outbreak, severe weather, water conservation, radon, West Nile Virus, and other health issues. Throughout the year, warnings are issued by MCHD prior to extreme hot or cold conditions. A task force with representatives from government, business, water purveyors, and environmental groups convened during drought conditions is managed by the health department to address water conservation. MCHD and MC PSD, working with an advisory committee, developed a plan in 2006 to outline county actions in the event of an outbreak of a deadly contagious disease. The advisory committee was reconvened in 2009 and renamed the Emergency Preparedness Advisory Committee to encompass a response to all hazards, both natural and human caused.

The Health Department has also established the Montgomery County Medical Reserve Corps' (MRC) program to develop a network of local volunteer medical and non-medical residents who can contribute their skills and expertise throughout the county to prepare for and respond to public health emergencies, as well as assist with other Health Department initiatives to improve the health of the community.

MCHD also distributes Potassium Iodide to schools, businesses and persons living within a 10-mile radius of the Limerick Generating Station. Potassium Iodide (known as KI) is a compound that can prevent damage to the thyroid gland in the event of exposure to radioactive iodine releases.

5.2.2 Participation in the National Flood Insurance Program (NFIP)

Flood insurance does not stop flood losses; instead, it changes how flood losses are reimbursed. FEMA, through private insurance companies and with assistance from the states, operates the National Flood Insurance Program (NFIP). Through this program, any residential

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property owner, including those living outside of the area identified as the one-percent-annual-chance (formerly referred to as “100-year”) floodplain on the Flood Insurance Rate Maps (FIRM), may purchase flood insurance on their structure and personal property. To be eligible, an individual’s community must first adopt a floodplain ordinance that conforms to NFIP regulations. At present, all 60 of the Montgomery County municipalities with flooding problems are eligible. Although Telford and Red Hill Boroughs have no designated floodplain areas, Red Hill chose to participate in the flood insurance program and has an ordinance in place. Telford Borough did not participate and has no floodplain ordinance.

As of April 30, 2017, 4,449 properties in the county have flood insurance policies in effect for \$1,030,601,100. From 1978 through the end of April 30, 2017, flood insurance claims have paid on a total of \$117,637,083 in property losses. The largest total payments were made in Whitemarsh Township, Upper Dublin Township, Lower Merion Township, West Norriton Township, and Plymouth Township. The total claims are more than 10% of the value of the claims made throughout Pennsylvania during that same time period. A table of flood insurance claims is included in Appendix J.

There are currently 75 repetitive loss structures and 157 severe repetitive loss structures listed in Montgomery County. This is significantly less than the 761 repetitive loss and severe repetitive loss structures listed in the county in 2012. Several of these properties are in Upper Providence Township and West Norriton Township. The current number may be even less since it appears that some of the properties listed have either been removed or elevated out of the flood hazard area.

The NFIP supports itself on the premiums paid by the policyholders. For owners of property within the one-percent-annual-chance floodplain, the NFIP is the only way they may purchase flood insurance. Property owners that have federal loans for buildings within the floodplain are generally required to carry floodplain insurance. Also, many lending institutions require flood insurance on all mortgaged property in flood plains.

Over the years, the Federal Emergency Management Agency has incorporated incentives for better floodplain management into the flood insurance program. For example, the Community Rating System offers discounts of up to 50% on flood insurance premiums if communities undertake a proactive flood loss reduction program. Actions include adopting stringent floodplain management regulations and developing floodplain management controls. No municipalities in Montgomery County qualify for reduced rating.

Even with all of these incentives, on average about 20% of the properties within the 1% chance floodplains in Pennsylvania are covered by flood insurance. It appears that a much higher percentage of flood risks are insured in the county. Even still, some properties within the most notoriously flooded areas of the county are without insurance coverage.

5.2.3 Planning and Regulatory Capability

[Montgomery County Planning Commission](#): The Montgomery County Planning Commission

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(MCPC) offers professional planning services to address land use management, transportation, environmental preservation, open space and farmland protection, site design, and community growth. The planning commission works with municipalities, businesses, and various organizations to maintain the high quality of life experienced in Montgomery County. Since its inception in 1950, the major focus the planning commission has been to promote orderly development while preserving valuable county amenities. Professional planners on staff develop county plans, model ordinances, and other informational publications as well as provide technical assistance and services to the 62 municipalities. Through planning assistance contract agreements with municipalities, county planners are employed as municipal planners in over half of the townships and boroughs. Since 2000, four regional planning commissions have been formed and are staffed by county planners.

The planning commission performs specific functions discussed below that aid in the county's hazard mitigation efforts. In the future, key aspects of this plan will be incorporated in other plans when appropriate.

Comprehensive Plan: On January 15, 2015, the Montgomery County Commissioners adopted *Montco 2040: A Shared Vision* as required in the Municipalities Planning Code (MPC) sections 301 (a). The plan provides an overall framework for local municipal plans and provides guidance on issues that transcend local boundaries, such as highways, public transportation, flooding, trails, growth trends, redevelopment trends, shopping needs, impact of large developments, overall housing needs, natural systems, and economic growth.

The plan includes three themes: Connected Communities, Sustainable Places and Vibrant Economy. Fifteen goals are established connected with these themes. Two goals in particular are relevant to the Hazard Mitigation Plan. These include – 1) Improve stormwater management and reduce the impact of flooding and 2) Enhance community character and protect neighborhoods.

The Montco 2040 Implementation Grant Program was started in 2016 to assist municipalities in making targeted physical improvements that achieve real progress toward the goals of the Montco 2040: A Shared Vision, Montgomery County's comprehensive plan. In 2018 there will be an increased funding allotment of \$1.5 million available on a competitive grant basis for municipalities and their partners to make real progress on the goals of the comprehensive plan affecting their local communities. A new focus category, Adaptation and Resiliency, is being introduced to address negative environmental changes through projects such as floodplain mitigation, streambank restoration, green streets, and community gardens.

Natural Resources Protection: The planning commission staff has undertaken several projects aimed at protecting the environment and restoring natural systems. The planning staff has prepared a riparian corridor protection ordinance that has been adopted by several municipalities in the county. In addition the staff has prepared a stream corridor restoration guidebook to help municipalities and non-profit organizations restore degraded stream corridors. In developing this guidebook, the planning commission partnered with non-profit organizations in stream bank restoration and replanting efforts. The planning commission has

also worked with a municipality and local watershed association in the replanting stormwater basins.

A natural areas inventory update of the 1996 Montgomery County Natural Diversities Inventory was prepared by the Morris Arboretum staff in 2008. The natural areas inventory identifies 13 significant conservation landscapes which contribute to the county's natural diversity. The inventory will be used as a basis for protecting these sites.

Multi-Regional Greenway Study: In 2015, MCPC and Natural Lands received grant funding from DCNR to develop a Multi-Regional Greenway and Stewardship Study. As part of its efforts, MCPC staff have identified existing greenway corridors located within the four planning regions, which include 24 Montgomery County municipalities that comprise the northern half of the county. MCPC staff has also conducted field studies to identify opportunities to enhance the greenway sections along the main street sections of the study area. Natural Lands has conducted evaluations of designated municipal parks and is developing stewardship recommendations to preserve the natural resources and features found in the parks.

Open Space Preservation Program: The Montgomery County Commissioners adopted the [Trails, Parkland, and People 2015 Implementation Recommendations for a Healthy Montgomery County Plan](#) establishing a \$15.3 million open space preservation initiative. This initiative places strong emphasis on the preservation of greenways and the establishment of trails.

5.2.4 Administrative and Technical Capability

Montgomery County Planning Commission

Planning Education and Technical Assistance: The planning commission offers regular education forums and provides technical assistance to all appointed municipal planning commission members, municipal staff, and elected officials. Three planning courses, each nine hours long, are offered throughout the year for newly appointed and elected officials. The planning commission distributes four newsletters annually addressing key planning issues. A series of model ordinances has been published to provide local elected and appointed officials with strategies for achieving the recommendations of the county and municipal comprehensive plans. Specific fact sheets and reports on technical issues are also distributed periodically. The planning commission also maintains a detailed web site with important information and links to better address the concerns that municipal



leaders have.

Pennsylvania Emergency Management Agency (PEMA)

[PEMA](#) is the state government agency responsible for the development and implementation of the state's disaster preparedness program. PEMA also handles the coordination and management of disaster recovery operations. Similar to the county and local governments, the state operates an emergency operations center which would serve as the main point of contact for large incidents, emergencies, and disasters that impact multiple counties. The state center works to support the county centers by sharing warning information and gathering requests for resources to be filled by other state and federal agencies.

PEMA provides various types of training and education programs for county and local emergency management officials. They also work through the State Fire Commissioner's office and state fire academy to address firefighting training needs.

On October 21, 2013, Pennsylvania's hazard mitigation plan was approved by U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA). The state is currently being revised to meet its 5-year update requirement.

US Army Corps of Engineers: The Corps of Engineers designs and maintains various facilities that reduce flood damage, enhance water navigation, protect natural resources, and provide recreation. The Corps provides technical support to various federal agencies and municipal government. In the past the Philadelphia office of the US Army Corps of Engineers has aided Montgomery County municipalities in performing feasibility studies and design work to reduce flood impacts in vulnerable locations.

United States Geological Survey (USGS): The USGS develops various maps and technical reports on natural resource conditions throughout the United States. The local USGS office in southeastern Pennsylvania has performed a variety of the studies on water quality and supply. This regional USGS office was helpful to the county in the establishment of the groundwater monitoring network currently in use to better forecast potential drought conditions. They also maintain the stream gauges that are instrumental in flood forecasting.

National Weather Service: The National Weather Service which is housed within the National Oceanic and Atmospheric Administration provides weather, hydrologic, and climate forecasts and warnings. County and local emergency managers have 24-hour access to weather information provided by the NWS.

5.2.5 Fiscal Capability

Federal Government Federal Emergency Management Agency (FEMA): FEMA, now part of the Department of Homeland Security, is charged with planning for, responding to, and providing services to mitigate future disasters. FEMA provides funding, technical assistance, and deploys personnel to directly assist in disaster response and recovery. FEMA also works in partnership with other organizations including the American Red Cross and the United States Army Corps of Engineers. FEMA manages the following grant programs:

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Hazard Mitigation Grant Program: Grant funds under this program are made available to states by FEMA after each federal disaster. These funds can only be used in the area subject to the federal disaster declaration and will only cover 75% of the eligible costs. Examples of fundable projects include: acquisition and demolition of flood prone structures and flood proofing or flood elevation. Individuals or homeowners cannot apply directly; a local government must apply on their behalf.

Flood Mitigation Assistance Program: States and local government can use flood mitigation assistance program funds to reduce or eliminate disaster vulnerability to developed areas. This program is funded annually and is only available to National Flood Insurance Program insured properties. This grant funding is limited and will only cover 75% of the eligible costs. Funding is channeled through PEMA, and will only be awarded for property in municipalities with a FEMA approved hazard mitigation plan.

Pre-Disaster Mitigation Program: The pre-disaster mitigation program is an annually funded competitive grant program. No disaster declaration is required. Federal funds under this program will cover 75% of the project's cost up to \$3 million. A FEMA approved local hazard mitigation plan is required for funding under this program.

Federal Disaster Assistance Programs: After a disaster, different forms of assistance are made by local, state, and federal government. The types and level of assistance depend upon the severity of the damage and the types of declarations that result from the disaster event. When the President of the United States declares a disaster event, the following funding resources can be made available to eligible victims:

- Individual Assistance- includes loans provided through the US Small Business Administration to homeowners, residents, and businesses to cover uninsured losses. Renters can be eligible for personal property losses. Building owners can receive loans up to \$200,000 to repair or replace buildings and up to \$40,000 to replace personal property with an additional 20% for mitigation. Businesses may obtain loans to repair buildings and replace machinery, equipment, and supplies. Even non-profit institutions are eligible for these funds. An economic injury disaster loan can be used by small businesses as working capital to restart their operations.
- □Public Assistance- provides cost reimbursement aid to local governments and certain non-profit agencies that participated in disaster response and recovery activities. This program is largely funded by FEMA.

5.2.6 Political Capability

Montgomery County contains 62 municipalities which are governed by various boards, commissions or councils. All municipalities have professional staff which advise the boards and provide information to enable them to make policy decisions.

5.2.7 Self-Assessment

Overall Montgomery County possesses highly developed infrastructure and professional staff assets to address a variety of hazard conditions. With the large number of individuals and organizations who play a role in public safety, on-going coordination and cooperation remains a paramount challenge. Also, the upgrade of the 911 system will require substantial financial investments at all levels of local and county government. The county always needs to expand its capacity to embrace emerging technological opportunities that improve communications and emergency response. Educating the public about hazards is also a large challenge that the Public Safety Department is addressing through the recent hiring of communications professionals.

5.2.8 Existing Limitations

Financial resources remain as the most significant limitation in the county's ability to address emerging public safety concerns.

6. Mitigation Strategy

6.1 Update Process Summary

The county recognizes the fact that hazards exist and will impact the lives of residents, workers, and visitors in Montgomery County. By developing a mitigation strategy, the county and participating municipalities are seeking to substantially reduce the impact of these hazards. Through the actions called for in this plan, the county and local municipalities are making an investment in the future quality of life in the county. Hazard mitigation starts with the avoidance of hazards, though in some cases avoidance is impossible. In these situations, the strategy will be to reduce the impact of the hazard to people and property. To accomplish this, there are roles for all levels of government, businesses, and individual residents.

Within the preceding chapters, the hazard identification, vulnerability analysis, and capability assessment, there has been some discussion about past actions taken to address some of the various hazards that are likely in the county. Additional discussion about potential mitigation goals and measures resulted from the workshop meetings and municipal surveys. Also, the planning team reviewed past proposals that were recommended in previous plans, studies, and reports to see if they were still relevant to address current conditions. A listing of the various studies reviewed appears in the Appendix P.

In the 2012 Hazard Mitigation Plan, four goals were established with appropriate action items for each. As discussed in the Executive Summary, several action items from the previous plan have been implemented or are under development. These include the update of the FIRMs for the county; revisions to all of the municipal floodplain ordinances; completion of a flood control structures for two tributaries of the Sandy Run upstream of the Fort Washington Business Park; several property buy outs and structure elevations occurred in West Norriton, Springfield Whitemarsh, and Abington Townships and Hatboro; the Montgomery County Radio System upgrade, the completion of the county debris management plan; the completion of a flood study in the Ambler Area; several bridge replacements improving stream channel conditions; adoption of an update of the plan for the Neshaminy and Little Neshaminy Basin; adoption and revision of local stormwater ordinances; increased flood warning road signage throughout the county; installation of road closure gates and other structures; improvements to various stormwater management systems; and various street drainage and stormwater management improvements developed by municipalities.

This section begins with a statement of four goals and objectives to address hazard vulnerabilities described in Chapter 4. These goals and objectives are similar to the goals and objectives in the 2012 Plan. Potential strategies to be taken to address each goal are discussed later in this section. A listing of actions is found at the end of Section 6.4.

6.2 Mitigation Goals and Objectives

Four goals are described below. The first addresses the paucity of information about past disasters and the need to have a better understanding and collective knowledge about potential

future hazards. Developing a culture that understands and knows how to act when confronted with various hazards is the essence of the second goal. The third seeks to reduce the county's overall vulnerability to hazards that might occur in the future, both human caused and natural. The last goal focuses on flooding, overwhelmingly the most significant hazard facing Montgomery County.

Goal #1: Develop a better understanding of the potential disasters that could occur in Montgomery County

During the preparation of the original hazard mitigation plan in 2007, 2012 and this plan update, it was evident that concise and accurate information is not available to the Montgomery County Public Safety Department regarding properties subject to hazard impact. The county has taken various steps to expand GIS information and analytical tools since the preparation of the 2007 plan, yet additional GIS information is still need to evaluate hazard vulnerability such as first floor structure elevations for most buildings in the county. The county should continue to pursue the digitization of all habitable structures in the floodplain over the next five years. Fortunately, the county has 2-foot contour data for the entire county, digital flood plain insurance rate maps (FIRMs) and building footprint information. Also there is a need to tie hazard data to other county data bases, particularly the Board of Assessment data for the County.

The County should continue to investigate the use of the various types of software or other forms of disaster assessment models to further refine information on potential losses from various forms of disaster.

Also, the county can provide additional information out to the public safety community through various convenient digital platforms.

Objectives for Goal #1

- (1) Ensure that all key county and municipal officials and the general public are aware of hazard mitigation
- (2) Improve overall awareness and information associated with the threats to Montgomery County.

Goal #2: Ensure that the public understands potential hazards and is aware of which actions to be taken to minimize their risks.

No public safety action can be fully effective without the complete involvement, understanding, and participation of the public. Understanding hazards requires lifelong learning, so that appropriate response can be second nature. There are many forums and venues for emergency management and hazard awareness information. Certainly, the learning could start in primary and secondary education levels and be part of the community outreach efforts of many types of existing institutions such as community groups, local government forums, faith based organizations, business groups, and social clubs. Also there is a wide array of media that can be deployed in getting the message out effectively.

With the advent of new forms of expanded communications technologies, there are several opportunities for expanding the county's ability to contact and inform local residents and visitors in the county.

Objectives for Goal #2

- (1) Make hazard mitigation a core value in the county
- (2) Improve warnings systems that reach all county residents and travelers in the county

Goal #3: Significantly reduce the risk of loss of life, injuries, economic costs, and destruction of natural and cultural resources that result from all hazards.

Various mitigation strategies are discussed for each potential hazard that might impact the county. Ongoing actions being taken to implement various mitigation measures along with potential strategies are described. Since flooding poses the greatest threat to the county, a more detailed description of actions is presented for flood mitigation under Goal #4. Public information and warning initiatives that would address all hazards are discussed under Goal #2. Building code regulation is also important for most types of hazards. Under the Pennsylvania Uniform Building Code, Montgomery County municipalities are no longer empowered to revise their building codes to address hazard vulnerability. They are dependent upon the state to keep codes up-to-date and responsive to hazards likely in Pennsylvania.

Geologic-Related Hazards

Geologic hazards are generally addressed through various structural improvements and limitations on the location and design of buildings. Since most building in the county is undertaken by private companies, local governments can address the reduction of hazard damage primarily through enactment and enforcement of various building codes and design standards.

Earthquake: The primary mitigation strategy for earthquakes requires the establishment of up-to-date building codes by the state and consistent enforcement of them. Currently each municipality relies on the Uniform Construction Code established by the state and has a building inspector enforcing it. Additional training and technical assistance could improve current building code enforcement efforts to address potential natural disasters such as earthquake. Since the threat of earthquakes is very low, Montgomery County does not anticipate any actions that specifically address them.

Landslide: Many municipalities in the county limit the amount and types of development that can occur on steep sloped areas through various requirements in the zoning or subdivision ordinances. Additionally, municipalities and the Montgomery County Conservation District enforce erosion and sediment controls during all land disturbance activities. Furthermore, steep sloped areas are generally priorities for preservation through acquisition with county open space funding made available to municipalities and private non-profit organizations. At this time, each municipality has updated their open space plan to address resource protection

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priorities. Montgomery County intends to continue to work with municipalities in various resource protection efforts that will, among other things, lessen the potential for landslide activity.

Radon: Radon testing is now performed during home inspections for most house sales in the county. For many years, the annual rate of housing sales in the county was about 5% of the existing housing stock. At that rate, a significant number of homes in the county were probably tested for radon and remediated if radon levels warranted as conditions of the real estate transactions. Also, testing has been performed on various public buildings particularly ones utilizing basement facilities.

Mitigation measures involving air vents and fans have been installed in buildings with high levels of radon. In most cases, a system with pipes and a fan is used to reduce radon. This type of sub-slab depressurization system does not require major changes in a home. The costs for it generally range from \$500 - \$2500, with an average of \$1000.

MCHD, PA DEP and DCNR widely provide information about radon hazards. The United States Environmental Protection Agency (EPA) has also promoted radon awareness.

Options for additional radon mitigation could include expanded education, assistance in testing, and local requirements to test certain buildings. Education efforts include the use of existing outreach vehicles, such as municipal web sites, newsletters, and press releases to better acquaint residents about the dangers of radon and the potential ways to mitigate it. Financial and technical assistance to older residents and lower or moderate income families could be provided by municipalities or various county social service departments. Additionally, municipalities could require radon tests and remediation through the use and occupancy permit or apartment inspection process. Montgomery County is proposing to assist municipalities in efforts to provide additional information to residents about radon.

Subsidence: Subsidence is a localized issue that primarily impacts Upper Merion, Whitemarsh, Cheltenham, and Plymouth Townships. Upper Merion Township, which includes the largest limestone/ dolomite area in the county, has developed zoning based upon the potential hazards caused by karst geology. They have also established special provisions in their stormwater management ordinance which limits the recharge of water into areas with sinkhole potential. Continued review of plans to ensure that buildings and stormwater management systems won't cause sinkhole formation will be an important mitigation strategy in Upper Merion, Whitemarsh, Cheltenham, and Plymouth Townships. Montgomery County will continue to work with these communities in performing various development and land use reviews under the Municipalities Planning Code to address subsidence hazards.

Weather-Related Hazards

Weather related natural hazards include windstorms, thunderstorms, tornadoes, lightning, snow and ice storms, and rain. No mitigation measure is readily available to alter the frequency or intensity of weather related hazards. Mitigation efforts have to make developed areas more resistant to damage caused by these weather events.

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Severe Wind: For the past several years, all municipalities in the county have had building codes in place that address the impact of high winds on buildings. Continued enforcement of these codes will be an important mitigation action. Additionally, since street trees often are affected by wind storms, landscaping requirements and street tree plantings should take into account potential wind damage. The selection of tree species and the maintenance of street trees are important in lessening wind damage. The involvement of the electric utilities in tree maintenance is also important. Montgomery County will continue to assist municipalities in providing advice about urban forestry issues that pertain to potential tree damage from wind through a model landscaping ordinance and future forums.

Tornadoes: Early warning is critical in preparing for a tornado. Despite the best building codes and new building materials, no structure can withstand a strong tornado. The National Weather Service typically provides warnings to the public when weather conditions exist that could touch off a tornado. The municipalities and county play a role in disseminating this information and informing the public about the potential risks of a tornado. Since the threat of tornadoes is low, Montgomery County does not anticipate any new projects to address them other than continuing to provide extreme weather warning information and education.

Lightning: All municipalities in the county have adopted building codes which, among other things, address lightning protection measures. These provisions should be strictly enforced. In addition, continued reminders to the public are important to prevent unsafe behavior during lightning storms. Montgomery County will continue efforts to provide extreme weather warning information and education.

Winter Storms: Each municipality owns and maintains a variety of snow clearing equipment and has developed a solid reputation for keeping roads passable during most winter storms. State roads are handled by the Pennsylvania Department of Transportation (PennDOT) and their contractors. The county also maintains a network of roads with county employees and private contractors. The local building codes in place take snow into account to ensure that new development can sustain heavy snow loads. Utility companies, particularly the electric companies and electric departments servicing the county, have been able to handle a variety of winter storms in the past. With newer subdivisions in the county utilizing underground electric lines, less vulnerability exists for storm damage in these portions of the county. Montgomery County will continue to provide extreme weather warning information and education. It will also foster coordination with the various power companies servicing the county to better address the impacts of winter storms on homeowners and businesses.

Hurricanes: Early warning of hurricanes is important to enable people in unsafe areas to evacuate and to prepare their properties to withstand the impact of a hurricane. Fortunately, the county has been well serviced by government as well as private weather information providers that have the ability to accurately forecast hurricanes. Montgomery County does not propose any new projects to address the threat of hurricanes other than continuing to provide extreme weather warning information, education, and coordination. The flooding impacts from hurricanes are addressed below.

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Extreme Cold Weather: The County declares code blue warnings during extreme cold conditions to better educate county residents to prevent exposure to extreme cold. Resources through the non-profit Community Action Development Commission (CADCOM), which provides services to the county's low-income residents, are available for emergency utility costs and weatherization to prevent the impact of extreme cold conditions. In addition, cold weather can cause a variety of problems including water and gas main breaks. Most utilities servicing the county have been proactive in systematically replacing older pipelines to prevent these types of problems from occurring. Montgomery County will continue efforts to provide education and assistance during extreme cold conditions.

Extreme Heat: The County periodically issues code red warnings (during extreme warm conditions). The Montgomery County Department of Aging and Adult Services works to ensure that low-income elderly residents are prepared for these extreme temperature conditions through energy assistance and electric fan distribution programs. In addition, CADCOM provides emergency utility assistance to the county's low income families. Montgomery County will continue efforts to provide education and assistance during extreme heat conditions.

Drought: The USGS maintains a state-wide network of groundwater monitoring wells, just recently upgraded to contain at least one well in each county. Groundwater is used to indicate drought status in a manner similar to stream flows. The Montgomery County Health Department has recently developed a county-wide groundwater monitoring network to supplement the state system. This monitoring network includes 19 wells, several of which are on public property, located in different geological settings throughout the county. Since July 2005, the health department has been measuring the elevation of the groundwater at each well on a monthly basis to determine changes in the water table. The planning commission and health department have also been actively promoting water conservation through educational outreach materials including public service announcements and written materials. The County Planning Commission has also advocated the interconnection of public water supply systems to enhance reliability during drought conditions.

The Secretary of Department of Environmental Protection on behalf of the Governor can declare drought warning. When sufficient data becomes available from the county groundwater monitoring network, the county may also issue localized drought warnings based upon the findings of the health department working with the USGS regional office. During a drought condition, the Montgomery County Drought Task Force meets regularly to coordinate various response measures and make recommendations to address the impact of the drought. The Montgomery County Drought Task Force is chaired by a representative of the Public Safety and Health Departments.

The Montgomery County Comprehensive plan acknowledges the need to protect available groundwater and surface water supplies. Water resource protection strategies including water conservation, recharge of stormwater, and stream corridor preservation will help make Montgomery County more resistant to future droughts. Many of these recommendations can be incorporated into the subdivision and land development process at the municipal level to ensure that new development does not make the county more vulnerable to drought conditions. The

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Pennsylvania Water Resources Plan contains several water conservation measure recommendations.

Wildfires: The most effective way to reduce damaging wildfires is through good land management. Healthy wood lots do not contain significant amounts of dead wood which could fuel fires. Additionally, old fields and pastures should be mowed at least once each year to break down dead vegetation. Well maintained woodlands and meadows will contain easy access to trucks and other vehicles used for fighting fires. The county promotes good land management through its open space and agriculture preservation programs. To be eligible under the agricultural land preservation program, farmers must maintain an up to date conservation plan. Farm easements are inspected yearly. Montgomery County does not anticipate actions to address wildfires since the threat of them is low. The county will continue to maintain existing park land and open space to reduce the threat of wildfires.

Human Caused Hazards: Various types of hazards are tied to maintenance or use of various human built structures such as buildings, dams, transportation systems, nuclear power plants, energy and communication systems. Though entities responsible for these structures diligently maintain and operate them, problems can arise as systems age or as human errors are made. Various forms of oversight, including the enforcement of building codes and other types of operating regulations work to minimize problems.

Other types of human caused events may arise from willful action taken to disrupt society or result from collective behavior that gets out of control. Sometimes it is not clear why some human hazards arise such as attacks on the internet. In responding to these forms of hazard, measures must fully address the wide array of human thoughts and motivations.

A well trained public safety staff at various levels of state, county and local government is essential in meeting any future challenges of civil disobedience or terrorism.

Objectives for Goal #3

- (1) Ensure that new buildings are constructed and maintained in a manner in which they remain resistant to damage from natural hazards
- (2) Reduce the occurrences and impact of power outages
- (3) Reduce the potential impact from dam failure
- (4) Reduce the occurrences of transportation crashes
- (5) Reduce the occurrences and impact of terrorist and civil disturbance actions
- (6) Reduce the occurrences and impact of hazard materials release events
- (7) Reduce the potential for landslides
- (8) Reduce the impact of drought
- (9) Reduce the impact of a nuclear incident in the county

- (10) Reduce fatalities and injuries caused by extreme heat and cold events
- (11) Reduce building and infrastructure damage and loss of life caused by land subsidence
- (12) Minimize the impact of winter storms on infrastructure and safe travel
- (13) Reduce the impact from a pandemic in the county
- (14) All critical facilities and infrastructure should continue to function during various hazard events

Goal #4: Encourage and promote actions to minimize the impact of floods within the county.

Based upon the vulnerability analysis addressed previously, flooding is viewed as the most significant hazard facing the county. Consequently, a separate goal has been developed for flooding and a detailed description of efforts that are underway to address flooding is provided below. In addition, other potential mitigation strategies that exist for reducing the impact of floods are discussed.

Emergency Services Flood Warning System: A flood warning system consists of converting flood forecasts issued by the National Weather Service into timely flood warnings and evacuation notices prior to flooding. Components of this effort include: emergency communication, flood stage forecast mapping, flood warning, and emergency plans. The primary responsibility for flood warning and evacuation lies with the state, county, and local offices of emergency management. Emergency managers maintain an emergency communications network and work with the tools available to them for flood response. Flood stage forecast mapping, floodplain structure reviews, and evacuation plans, in addition to education of community officials, are needed to improve flood warning and evacuation efficiency. Also flood routing information is essential for safely routing traffic during flood conditions. The news media, radio, and television, provides a valuable communication link in this work. While FEMA participates in flood mitigation and post flood assistance, they do not provide warning/evacuation notices. The National Weather Service and the U.S. Army Corps of Engineers provide assistance to communities in developing flood warning systems and response plans. In some cases, businesses located in floodplains have independently developed flood warning and response systems.

The Delaware River Basin Commission (DRBC) has been working with the U.S. Geological Survey (USGS) and the National Weather Service (NWS) to upgrade the flood warning system within the Delaware River Basin that includes all of Montgomery County. DRBC's Flood Advisory Committee has identified two categories of flood warning deficiencies within the basin. The first category focuses on immediate equipment deficiencies. The second category includes general needs related to monitoring, modernized technology, and improved public outreach. The goals of a flood warning improvements program will be to upgrade the precipitation and

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stream gauging network, complete flood stage forecast mapping, and increase public understanding of flood preparedness.

As a result of recommendations by the Committee, USGS and NWS have upgraded flood monitoring in the basin, including a new stream gauge for the Schuylkill River at Norristown and improved hydrologic data for the stream gauge on the Perkiomen Creek at Graterford. In 2000, the USGS, working with a consortium of organizations and private businesses, installed a new stream gauge along the Wissahickon Creek at Route 73. A listing of all active continuous-record gauges in the county is provided below. In addition, other active continuous-record gauges located out of the county on streams which flow into the county are also listed below in Figure 6.2.1.

Figure 6.2.1 USGS Gage Stations in Montgomery County

USGS Gage Number	Gauge Name	Drainage Area (Sq mi.)	Beginning Year	Precipitation Gauge
1467031	Pennypack Creek at Horsham	3.48	2010	
1467036	Pennypack Creek Trib at Hatboro	4.36	2010	
1467039	Pennypack Creek at Willow Grove	22.2	2010	
14670413	Pennypack Creek at Bethayres	35.3	2010	
1472000	Schuylkill River at Pottstown	1147	1927	yes
1472198	Perkiomen Creek at E. Greenville	38	1981	
1472199	WB Perkiomen at Hillegas	23	1981	
1473500	Schuylkill River at Norristown	1760	2001	yes
1472810	EB Perkiomen Creek near Schwenksville	58.7	1991	
1473000	Perkiomen Creek at Graterford	279	1914	yes
1473110	Skippack Creek at Evansburg	52.9	1995	
1473900	Wissahickon Creek at Fort Washington	40.8	1962-68, 2000	

The flood warning network is effective in predicting flooding within larger streams and rivers where the flood peaks take longer to develop. For most of the smaller creeks in the county, flood warning is difficult since the streams are subject to flash floods which can occur in minutes with little advance warning. The only effective type of warning system for most of the smaller

streams in the county would involve the use of weather forecasts or Doppler images to make future predictions about the potential for flash floods in certain vulnerable areas.

Preventative Activities Building Code Development and Enforcement: Each municipality within the county uses the Pennsylvania Uniform Construction Code maintained by the Department of Labor and Industry. Municipal code staff will need to continue to adequately enforce adopted building codes to ensure that only properly flood proofed buildings are erected in the floodplain. Also, code officers should uniformly enforce the requirements that buildings that are substantially destroyed by floods or other occurrences are rebuilt in accordance with flood proofing standards.

Drainage System Maintenance: Local storm drains need to be periodically maintained by their owners. The removal of debris from inlets, storm sewers, bridge culverts, and drainage channels is important in ensuring sufficient conveyance capacity in stormwater systems and streams. Outlet structures in impounding basins should be periodically inspected and cleaned. During recent storms in the county, specific flooding incidents were directly attributed to clogged inlet structures. In addition, many Montgomery County municipal governments are in the process of complying with the Phase II NPDES requirements to maintain water quality in their stormwater drainage system. This responsibility could be performed during inspections to address potential flood hazards.

Land Use Management: The primary natural determinants of flooding include: slope, soils, geology, and climate. Changes to the natural environment brought about through the development process often result in increased impervious cover making it especially difficult for rainwater to recharge the ground water. Instead of recharging the ground, rainwater falling on developed surfaces will concentrate and may create stormwater problems.

Acquisition and Demolition of Structures: The purchase of a property and removal of structures on it is often times the only effective way to eliminate a flood hazard in developed watersheds. In the past, municipalities within the county have obtained funds to purchase homes from home owners willing to be relocated. The homes are demolished and the ground is restored as a natural floodplain. In some cases, this land is used as public open space. Since federal and state funding for voluntary buy-outs is limited, municipalities should also consider innovative land use techniques to encourage redevelopment that eliminates flood prone structures. Bonuses or transfer of development tools might be effective in providing sufficient incentives.

Montgomery County has grown over the past 60 years—more than doubling in population. Even more than population growth, the county has added numerous businesses, stores, parking lots and roads all of which greatly add to the amount of impervious surface. In the future, the county will continue to grow, not only with new housing but with new offices, stores, factories, schools and roads. These changes will alter natural drainage patterns and create additional stormwater. The Montgomery County Comprehensive Plan (Montco 2040) adopted by the commissioners in 2015 establishes designated growth areas and overall land use policies to guide future development.

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Stormwater Management: Effective stormwater management is achieved through the control of runoff as close as possible to its point of origin. Stormwater is characterized by volume, peak runoff rates, quality, the velocity of its flow, and the time it takes for it to concentrate at any location. Development of the land changes all of these characteristics in ways that are often damaging for the environment and cause flooding. Stormwater management measures seek to reestablish predevelopment stormwater flow characteristics to eliminate these potential negative impacts. Traditionally stormwater management has included detention basins and has focused on new development as opposed to modifications to existing development.

Counties are required to prepare stormwater management plans for designated watersheds under Act 167 of 1978. Of the 17 designated watersheds in Montgomery County, the county has adopted 11 stormwater management plans. Once the plans are adopted, municipalities must implement the recommendations of the plans through ordinances. The County is also required to update plans every five years.

There are many techniques for stormwater management, including natural landscaping, eliminating lawn mowing in floodplains and stream buffers, diverting gutter downspouts to lawns instead of driveways, and use of porous paving. The objective is to slow runoff and allow maximum time for infiltration. The retrofitting of stormwater controls in urban areas is an especially difficult problem since many areas have extensive impervious coverage.

Stormwater programs are the most important feature in preventing additional flood damage due to new development and can serve to reduce flood damage if applied to existing development. Stormwater management has additional benefits for water quality control and enhancement of infiltration to groundwater.

Retrofitting: Structures can be retrofitted and flood proofed to reduce future flood damage. The most commonly used flood proofing technique is to raise a structure one foot above the 1% yearly chance flood elevation. While this can work in urbanized areas along water courses with predictable flood elevation data, elevating is no guarantee against future flood loss. Changes in watershed characteristics or the lack of precision in the flood elevation estimate can result in the flooding of elevated structures. During several recent storms, residential property owners with elevated structures were still vulnerable to property damage resulting from flooded vehicles and damage to various accessory structures in their yard. Furthermore, rescues are often required when residents of elevated homes are trapped by rising floodwaters. Other forms of flood proofing such as sealing off openings can be effective in protecting historic structures that can't be moved or structures that need to be located along a stream or river such as recreation facilities or utilities.

Floodplain Management: The Pennsylvania Flood Plain Management Act, adopted in 1978 as Act 166, encourages proper management of floodplains throughout Pennsylvania. Every municipality with flood prone areas is required to participate in the National Flood Insurance program. Municipalities do this by enacting floodplain management regulations that, at least, comply with minimum standards adopted by the Pennsylvania Department of Community and Economic Development (DCED). Currently all 62 municipalities in the county that are eligible

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under the National Flood Insurance Program have adopted the minimum floodplain management standards. Under Act 166, municipalities may adopt more restrictive floodplain management requirements.

The Montgomery County Planning Commission will continue to work with municipalities to prohibit all new development in floodplains, except for the development of elevated flood proofed buildings on brownfields sites in redevelopment areas that are part of economic revitalization initiatives. A [series of model floodplain ordinances and a guidebook](#) was published last year by the Montgomery County Planning Commission. This will be used by municipalities as they revise their current codes to address the new FIRM changes. Even with good codes, it will be important for municipalities to continue to enforce provisions of their floodplain ordinances that address the rebuilding of substantially damaged structures within the floodplain.

New revised and modernized Flood Insurance Rate Maps (FIRMs) were adopted by FEMA on March 2, 2016. In response to the new maps, each municipal flood plain ordinance was updated and adopted to be fully compliant with appropriate federal and state requirements. Assistance in the ordinance updates was provided by the Montgomery County Planning Commission staff. Currently each of the 62 municipalities in the county are fully compliant with the National Flood Plain Insurance Program.

Flood Control Structures: The purpose of a flood control structure is to physically constrain or to convey flood waters. Flood control structures include dams, levees, lined stream channels, and storm sewers. Dams and levees have been used for centuries to open floodplains to agriculture and settlement, and in the case of dams, to detain flood waters for gradual release or for use as water supply, recreation, and the generation of hydroelectric power. In certain locations, dams and levees can be highly effective in flood loss reduction.

Though effective, one drawback to the use of dams and levees for flood loss reduction is that they are very expensive and require substantial land area. Secondly, local cost sharing requirements and environmental issues have slowed construction of new facilities in recent years. Flood control dams and levees are not necessary where there is no floodplain development to start with.

Structures funded by the Natural Resources Conservation Service (NRCS) are generally maintained by state or county sponsors. In the early 1960s Montgomery County participated in several NRCS (formerly SCS) projects in the Neshaminy, Wissahickon, and Perkiomen watersheds. The only project to be implemented, in part, was the Neshaminy basin project. Through that project eight flood control basins were developed in central Bucks County. Two other basins one in Bucks and the other in Montgomery County were never developed. A portion of Montgomery County benefits from one of the flood control structures developed as part of the Neshaminy project.

Upper Dublin Township recently constructed two flood control structures on Pine Run and Rapp Run to protect the Fort Washington Business Park.

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Several municipalities including Abington Township, Springfield Township and Whitemarsh Townships have installed various stormwater management and flood control structures to address localized flooding.

Norristown and Lower Merion Township also have flood control basins. The Norristown basin was constructed along the Saw Mill Run and protects portions in the eastern end of the municipality. The Lower Merion Township basin is located on Remington Avenue along the Indian Creek. Several of the municipalities in the Wissahickon, Pennypack, and Tookany Creek watersheds have installed various stormwater basins and control structures to reduce localized flood impact. A levee was built in Cheltenham Township near Brookdale Avenue. Modifications to this levee are being proposed to raise it to address recent flood elevations.

Stream channel modification is performed to enhance channel stability from a geo-morphologic perspective. In combination with watershed floodplain management, this approach has become a part of flood loss reduction activities in areas around the country. In the past channelization and other stream channel improvements have also been employed in eastern Montgomery County and in Lower Merion Township.

Natural Resources Protection: Various natural resources associated with aquatic systems should be protected. These resources can include riparian corridors and wetlands. Measures to protect these resources include best management practices, erosion and sediment control regulations, land use controls, and riparian corridor protection standards. The county planning commission has developed a model guidebook and ordinance for riparian corridor protection which has been used by several municipalities to adopt stream protection codes. The county planning commission has also published a [model subdivision and land development ordinance](#) which provides appropriate standards addressing floodplain corridor protection, stormwater management, steep slope protection and other measures to ensure that the placement of roads and infrastructure minimizes the impact of various types of hazards. The county planning commission has also developed a [cluster ordinance model ordinance and guidebook](#). By employing a cluster option, a developer has more flexibility in siting new development while setting aside open space areas which can also contain significant natural resources such as floodplains and stream corridors. The county conservation district performs erosion and sediment control reviews. Also various land use regulations and techniques such as transfer of development rights could be used.

Acquisition of floodplain properties and the conversion of these properties to passive land uses not damaged by flooding is a form of natural resource protection. Because of the multiple objectives for stream corridors, including tourism and recreational uses, there are various sources of money that may be available for floodplain acquisition. These include money for parklands and open space, as well as money from the Federal Emergency Management Agency's Hazard Mitigation Grants Program. Over the past several decades, several small stream corridor improvement projects have been undertaken in the eastern portion of the county. These projects have been implemented through partnerships between the municipalities and both PA DEP and the US Army Corps of Engineers.

Public Information Programs: A broad-based public awareness and understanding of hazards is needed to reduce risks, particularly during floods. Often times, the poor choices made by the public during floods create situations where lives and property are placed at risk. Much of the flood risks occur among motorists who drive into floodwaters or homeowners who fail to heed evacuation warnings. Also, some homeowners place fences, sheds, automobiles, and outdoor equipment in flood prone areas of their property. These structures get swept away in the floodwaters and occasionally clog up bridge openings and culverts, further elevating floodwaters. A number of public awareness initiatives have been successfully employed in other flood prone areas of the country. These programs include: street signage, maps and displays, library projects, direct mailings such as fliers, youth environmental education, real estate disclosure, and commuter awareness. The American Red Cross has disseminated flood awareness information in the Sandy Run and Pennypack Creek watersheds.

With the passage of an amendment to the Pennsylvania Motor Vehicle Code during June 2012, local police will have the opportunity to fine motorists who drive past or around a sign or traffic control device closing a road due to a hazardous condition. Additionally, if a person who ignores safety precautions and requires rescue, they will be subject to pay the full costs of fire, police and medical services required in the rescue. This law creates a further opportunity to build a public information initiative to catch the attention of drivers during rain events.

Objectives for Goal #4

- (1) Reduce the number of structures subject to flood inundation
- (2) Effectively manage stormwater and improve stream channels to reduce flooding.
- (3) Eliminate flooded conditions along the transportation system in the county
- (4) Reduce traveler injuries and fatalities during flood events
- (5) Continue to comply with the Federal Flood Insurance Program

These goals are consistent with the hazard mitigation goals formulated in Pennsylvania Hazard Mitigation Plan, Montgomery County Comprehensive Plan, and the general policies adopted by Commonwealth.

6.3 Identification and Analysis of Mitigation Techniques

There are four categories of mitigation actions. The relevancy of each action group to the hazards reviewed in the plan is shown in Figure 6.3.1.

:

- **Local plans and regulation:** Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built and public activities to reduce hazard losses. Examples include planning, zoning, building codes, subdivision regulations, hazard-specific regulations (such as floodplain regulations), capital improvement programs, open space preservation, and stormwater regulations.

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- **Structure and Infrastructure:** Actions that involve modifying or removing existing buildings or infrastructure to protect them from a hazard. Examples include structure acquisition, elevation, relocation; retrofitting; flood-proofing; and shatter-resistant glass use. While this category predominantly includes techniques that constitute a “sticks and bricks” approach to property protection, it also includes insurance.
- **Public Education and Awareness:** Actions to educate citizens, elected officials, and property owners about potential risks from hazards and potential ways to mitigate them. Examples include performing hazard mapping, implementing outreach projects, disseminating library materials, providing real estate disclosures, establishing hazard information centers, and developing educational programs for school-age children or for adults.
- **Natural Systems Protection:** Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. Examples include sediment and erosion control, stream corridor restoration, forest and vegetation management, wetlands restoration or preservation, slope stabilization, and historic property and archeological site preservation.

Figure 6.3.1 General Hazard Mitigation Strategy Matrix

	Local Plans and regulations	Structure and Infrastructure	Public Education and Awareness	Natural Protection
Drought			x	x
Earthquake		x	x	
Extreme Temperature			x	
Flood, Flash Flood, Ice Jam	x	x	x	
Hailstorm			x	
Hurricane, Tropical Storm, Nor'easter	x		x	
Landslide	x	x	x	x
Lightning Strike			x	
Pandemic	x		x	
Radon Exposure		x	x	
Subsidence, Sinkhole	x		x	x
Tornado, Wind Storm			x	
Wildfire			x	
Winter Storm		x	x	
Building or Structural Collapse			x	
Civil Disturbance			x	
Dam Failure			x	
Cyber Security Disruption			x	
Environmental Hazard	x		x	x

Levee Failure			X	
Radiological Release Incidents			X	
Terrorism		X	X	
Transportation Crash		X	X	
Urban Fire and Explosion	X		X	
Utility Disruption		X	X	

6.4 Mitigation Action Plan

Specific mitigation projects that address potential hazards likely to occur in the county are summarized under each goal in this section. Information for each project is provided including project type, priority from a county perspective, project number, project implementers, general time frame, budget, and overall description.

Most of the listed projects propose actions that would provide countywide benefits. The plan does not list all of the individual site specific municipal projects being considered. These projects including drainage projects, public infrastructure improvement projects, flood management studies, and various types of storm sewer system improvements provided in the various survey responses and are generally consistent with recommendations made below.

Priorities were assigned to each action from a county perspective. Local municipalities may also choose to assign priorities to various projects. This may be helpful when a municipality has more than one project in their community. County priorities were based upon social, technical, administrative, political, legal, economic, and environmental criteria (STAPLEE) considerations along with the cost to benefit outcome and time for the county.

- Social criteria. The public must support the overall implementation strategy and specific mitigation actions.
- Technical criteria. Such factors as technical feasibility of the proposal to reduce losses over the long term with minimal secondary impacts.
- Administrative criteria. Anticipated staffing, funding, and maintenance for each mitigation action must be considered.
- Political criteria. The political leadership of the communities must support the overall implementation strategy and specific mitigation actions.
- Legal criteria. Implementing bodies must have the legal authority to undertake proposed actions.
- Economic criteria. Funding and budget constraints must be considered.
- Environmental criteria. Negative environmental impacts from actions must be avoided or be effectively mitigated.

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Mitigation activity projects were also evaluated to the extent that they are able to maximize the benefits according to a cost/ benefit review. For example, low cost activities that support cross jurisdiction and multi-hazard benefits are assigned a high priority based upon a benefit cost review. Also, low cost activities that enhance public awareness or motivate actions to be taken by others in avoiding multiple hazards are considered high benefit cost priority. The STAPLEE Worksheets are included in Appendix R. Detailed economic benefit analysis for each activity is beyond the scope of this plan.

Goal #1: Develop a better understanding of the potential disasters that could occur in Montgomery County

Project Number	Mun. Priority	County Priority	Municipality	Project Type	Description
Objective 1a: Ensure that all key county and municipal officials and the public are aware of hazard mitigation					
1a-1		High	County-wide	Conduct Annual Hazard Mitigation Plan Training	The Public Safety Department should continue to offer a training class in the Hazard Mitigation Planning each year to municipal emergency management personnel and appropriate corporate and institutional personnel. (yearly at internal cost of \$5,000/yr.)
1a-2		Medium	County-wide	Hazard Mitigation Plan Availability	The County Planning Commission should publish the final Montgomery County Hazard Mitigation Plan and make it available throughout the county in county libraries and on the internet. (year 1 at a cost of \$1,000)
Objective 1b: Improve overall awareness and information associated with potential threats to Montgomery County					
1b-1		Medium	County-wide	Monitor and Map Rescue Attempts	The Public Safety Department and Planning Commission should create GIS tracking for all rescue attempts during disasters to assess problem areas. (begin year 1 at an internal cost of \$3,000)
1b-2		Medium	County-wide	Maintain GIS database of properties impacted by hazards	The Public Safety Department and Planning Commission should continue to develop and maintain a confidential GIS data base of individual properties that are impacted by various hazards. (begin year 1 at an internal cost of \$8,000)

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Project Number	Mun. Priority	County Priority	Municipality	Project Type	Description
1b-3		Medium	County-wide	County Groundwater Network Monitoring	The County Health Department should continue to monitoring groundwater levels around the county. (yearly at an internal cost of \$8,000)
1b-4		Medium	County-wide	Riparian Corridor Forest Canopy Study	The County Planning Commission should continue to monitor the riparian corridor forested areas to evaluate the health of the county stream systems to naturally manage floodwaters. (every 10 years at a cost of \$16,000)
1b-5		Medium	County-wide	Fire Company Reporting	The County and municipalities should encourage all fire companies to report fire response information on PennFIRS. (on-going, no cost estimate)
1b-6		Low	Upper Merion, Plymouth, Cheltenham and Whitemarsh Townships	Sink Hole GIS Data Base Map	The County Planning Commission, Public Safety Department and four primarily impacted municipalities should work with the PA Geological Survey to establish a sinkhole GIS data base. Mapping has already been completed for Upper Merion Township. (year 3-5 at an internal cost of \$4,000)
1b-7		High	County-wide	Building Information for GIS	The County Planning Commission should attribute and maintain newly acquired property information including building footprints. Acquisition of first floor elevation data for flood prone areas of the county should be pursued. (3-5 year)
1b-8		Medium	County-wide	Monitoring and coordination	The Public Safety Department should expand the use of a web based multi-user sharing platform to track hazard incidents and coordinate response.
1b-9		Medium	County-wide	Information Management	The County should continue to compile a listing of specific mitigation projects including flood prone buildings to elevate or remove and drainage improvement projects.

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Goal #2: Ensure that the public understands potential hazards and is aware of which actions to be taken to minimize their risks.

Project Number	Priority Municipal	Priority - County	Municipality	Project Name	Description
Objective2a: Make hazard mitigation a core value					
2a-1		High	County-wide	Internet and Social Media Outreach	The County Public Safety Department, Public Information Department, Health Department, and all municipalities should use various types of media to remain in communication with residents, workers and visitors to the county to explain potential hazards. (on-going at an internal cost of \$10,000/ yr.)
2a-2		High	County-wide	Critical Facilities Addressing	The County Public Safety Department should continue to periodically verify the location and addressing for all critical facilities such as school, nursing homes, hospitals, day care centers, wastewater treatment plants and pumping stations, water treatment plants and other similar facilities. All critical facilities addresses should be shared with utilities to ensure that sites can be properly located for quick emergency utility restoration.
2a-3		Medium	County-wide	Flood Plain Evacuation Education	The County and municipalities should make residents in flood prone areas aware of their responsibilities to safely evacuate prior to flood conditions and not rely upon rescue services.
2a-4		High	County-wide	Emergency management plans	The County Public Safety Department should periodically check to assure that all critical facilities in the county have up to date emergency response plans in place and their occupants are aware of potential hazards that could impact them. (each year at an internal cost of \$5,000)
2a-5		High	County-wide	Hazard Awareness promotion	The County Public Safety Department, Health Department, Communications Department, and Planning Commission should participate in various community and youth events to promote hazard awareness. The Emergency Preparedness guide and other attractive

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Project Number	Priority Municipal	Priority - County	Municipality	Project Name	Description
					publications could be disseminated at these events.(yearly at an internal cost of \$5,000)
2a-6		Medium	County-wide	Public Awareness/ Warning - Radon	The County Health Department should continue to promote radon awareness. (yearly at \$5,000/yr.)
2a-7		Medium	County-wide	Public Awareness/ Warning	The County Public Safety Department and Planning Commission, working with the municipalities and the National Weather Service, should investigate the feasibility of technology that can predict flash floods from Doppler imagery. (year 3-5 no budget)
2a-8		Medium	County-wide	Citizens Corps	The County Public Safety Department should promote the formation of Citizen Corps to provide opportunities for people to participate in a range of measures to make their families, their homes, and their communities safer from the threats of crime, terrorism, and disasters of all kinds.
Objective 2b: Improve warning systems that reach all county residents and travelers through the county					
2b-1		Medium	County-wide	Expand use digital contact warning systems	The County Public Safety Department should expand the use of emergency warnings and weather information to residents, businesses, institutions, and visitors to the county by increasing the use of Everbridge, Smart 911 Ap and other appropriate systems.
2b-2		Medium	County-wide	Special Needs Population	The County should continue to encourage special needs persons to sign up with the county Everbridge communication system.

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Project Number	Priority Municipal	Priority - County	Municipality	Project Name	Description
2b-3		Medium	County-wide	Enhance Obedience to Hazardous Conditions Control Device Law	Municipal and State police should enforce the law which establishes penalties for ignoring hazardous condition control devices. Education and outreach about the law should also be provided to prevent public from driving around public safety barriers (on-going, no budget)
2b-4		Medium	County-wide	Warning Signage	Municipalities should continue to install appropriate signage along roadways and in public properties to explain potential hazard conditions such as road flooding. (year 1, overall cost of \$50,000- \$100,000)
2b-5		High	County-wide	Public Awareness/ Warning	The County Public Safety Department and Communications Department working with various business organizations should establish a county-wide education program for commuters to better educate them about driving in the county during flood conditions. (year 3, no cost estimate)

Goal #3: Significantly reduce the risk of loss of life, injuries, economic costs, and destruction of natural and cultural resources that result from all hazards

Project Number	Priority Municipal	Priority - County	Municipality	Project Type	Description
Objective 3a: Ensure that new buildings are constructed and maintained in a manner in which they remain resistant to damage from hazards					
3a-1		High	County-wide	Continue to enforce building codes	Municipal code officials should receive annual training and resources (particularly related to building resiliency and mitigation of structures) to effectively enforce the appropriate building codes. (yearly, no budget)

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Project Number	Priority Municipal	Priority - County	Municipality	Project Type	Description
3a-2		Medium	County-wide	Building Code modernization	Montgomery County and municipalities should strongly advocate that the state expeditiously adopt revisions to the 2009 International Construction Code as part of the state Uniform Construction Code used by Montgomery County municipalities to ensure that safe building practices are consistently used.
Objective 3b: Reduce the occurrences and impact of power outages					
3b-1		High	County-wide	Coordination during utility outages	The County Public Safety Department should work with municipal emergency coordinators and representatives of power companies to improve the flow of information about power outages. (during storm events, internal cost of approximately \$25,000/ year)
3b-2		Medium	County-wide	Landscaping Ordinance	The County Planning Commission should develop a model ordinance for landscaping and tree protection to aid municipalities. This would contribute to developing a healthy tree canopy and avoid potential storm damage of trees. (year 2-4 at an internal cost of \$10,000)
3b-3		Medium	County-wide	Landscaping	The County Planning Commission should work with local planning commissions and governing bodies to ensure that all proposed vegetation near power lines complies with appropriate design requirements to avoid interference with electrical transmission.
3b-4		Medium	County-wide	Emergency Power Supply	Emergency managers should work to ensure that all critical facilities have adequate back up power supplies with sufficient fuel to energize critical electrical power needs for at least two weeks during a utility power outage.
Objective 3c: Reduce the potential impact from dam failure					

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Project Number	Priority Municipal	Priority - County	Municipality	Project Type	Description
3c-1		Medium	County-wide	Dam Safety	In coordination with the Department of Environmental Protection (DEP) the County Public Safety Department should continue to ensure that the Emergency Action Plans for the significant dams in the county are available and up to date. (yearly at an internal cost of \$5,000)
Objective 3d: Reduce the occurrences of transportation crashes					
3d-1		Medium	County-wide	Transportation Safety Design	The County Planning Commission should promote transportation safety in design reviews of new developments. (on-going at an internal cost of \$5,000)
Objective 3e: Reduce the occurrences of terrorist and civil disturbance actions					
3e-1		High	County-wide	Philadelphia Regional Counter Terrorism Task Force	The County Public Safety Department should continue to work through the Southeastern Pennsylvania Regional Task Force to address Terrorism threats and response. (on-going at an internal cost of \$5,000)
3e-2		Medium	County-wide	Tactical Weapon Training	The Public Safety Department working with the Police Chiefs Assn. should continue various tactical weapon training. (on-going, no budget)
3e-3		Medium	Countywide	Civil unrest response training	The County should provide training for public safety personnel on the response to lone wolf incidents in which a person or persons are seeking to cause mass fatalities through use of weapons, explosives or vehicles. (Year 1, no budget)
Objective 3f: Reduce the occurrence and impact of hazard material release incidents					
3f-1		Medium	County-wide	Hazardous Material Emergency Response	The County Public Safety Department should continue to offer various types of training to first responders and other business personnel in addressing hazardous material. (yearly at an internal cost of \$10,000)

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Project Number	Priority Municipal	Priority - County	Municipality	Project Type	Description
3f-2		Medium	County-wide	Hazardous Waste Collection	Montgomery County should continue to provide household hazardous waste collection events. (4-6 collection events per year at a total cost of \$400,000). The development of a permanent collection site should be pursued at one or several sites around the county.
Objective 3g: Reduce the potential for landslides					
3g-1		Low	County-wide	Steep Slope Ordinances	The County Planning Commission should offer assistance to municipalities in developing land use controls to limit development in steep slope areas. (year 3-5 at an internal cost of \$7,000)
Objective 3 h; Reduce the impact of drought					
3h-1		Medium	County-wide	Water Supply interconnections	The County Planning Commission and Health Department along with the municipalities should work with public water suppliers to ensure that water service systems are interconnected to allow for the transfer of water during a drought
3h-2		High	County-wide	Drought Task Force	The Health Department should continue to convene a drought task for during drought conditions
3h-3			County-wide	Well Development Standards	The County should advocate the passage of a state-wide well construction law to ensure the proper development of all water supply wells.
Objective 3i: Reduce the impact of a nuclear incident in the county					
3i-1		High	Limerick EPZ	Limerick Power Station EPZ evacuation	The Public Safety Department should ensure that the evacuation plans for the Limerick Power Station are up-to-date

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Project Number	Priority Municipal	Priority - County	Municipality	Project Type	Description
3i-2		High	Limerick EPZ	Limerick Power Station	The County Department of Public Safety, municipal officials along with state and federal officials should continue the nuclear incident training exercises at the Limerick Power Station
Objective 3j: Reduce fatalities and injuries caused by extreme heat and cold events					
3j-1		Medium	County-wide	Heat and Cold Warnings	The County Commissioners should continue releasing code red and code blue warnings for extremely hot and cold weather. (on-going, no budget)
3j-2		Medium	County-wide	Sensitive Population Services	The County Health and Human services departments will continue to coordinate various services to sensitive population groups to reduce the health impacts associated with extreme weather conditions.
Objective 3k: Reduce building and infrastructure damage and loss of life caused by land subsidence					
3k-1		Medium	Upper Merion, Plymouth, Whitemarsh and Cheltenham Townships	Sinkhole prevention	Municipalities in limestone and dolomite geological areas should adopt zoning and stormwater ordinances that address the potential for sinkhole formation.
Objective 3l: Minimize the impact of winter storms on infrastructure and safe travel					
3l-1			County-wide	Snow and Ice removal	PaDot, the PA Turnpike Commission, Montgomery County Roads and Bridges Division, and each municipality should continue to maintain sufficient capacity for the removal of snow and the treatment of roads to ensure safe travel during winter storm events.
Objective 3m Reduce the impact from a pandemic in the county					

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Project Number	Priority Municipal	Priority - County	Municipality	Project Type	Description
3m-1		Medium	County-wide	Medical Staff Training	Emergency medical staff should be provided first receiver training to understand how to manage mass casualty patients who dropped off directly at hospital facilities without being prescreened by emergency medical technicians. Directly receiving patients from mass casualty imposes potential risk to medical staff due to exposures to chemical, biological, or radiological materials.
3m-2		Medium	County-wide	Pandemic Plan Update	The County Health Department and the Public Safety Department should update county pandemic plan
Objective 3n: All critical facilities and infrastructure should continue to function during various hazard events					
3n-1		Medium	County-wide	County and municipal facilities hazard evaluation	The County Infrastructure and Assets Department and all municipalities should inventory all essential government properties for hazard vulnerability and establish a plan to address found vulnerabilities. (year 1, internal cost estimate of \$15,000 for county portion)
3n-2		Medium	County-wide	Emergency Preplan	Various public safety professional in the county should continue to develop and update existing preplans for high hazard chemical facilities, rail lines and yards, and major highway facilities. (on-going, no budget)
3n-3			County-wide	Critical Infrastructure design	All municipalities, the County Department of Assets and Infrastructure and other public service entities should ensure that all infrastructure is designed to function safely during severe weather events

Goal #4: Encourage and promote actions to minimize the impact of floods within the county.

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Individual municipal improvement projects submitted as part of the plan development process have not been listed individually. Generally all these projects fit within the overall types of projects listed below.

Project Number	Priority Municipal	Priority - County	Municipality	Project Type	Description
Objective 4a: Reduce the number of structures subjected to flood inundation.					
4a-1		High	All with flood damage	Acquire and remove homes in floodplain	The County Public Safety Department and municipalities should work to remove homes in the floodplain that have sustained damage from past floods through voluntary buyout programs. Various sources of funding should be sought for this action. (Immediately as funding opportunities arise.) Repetitive loss and severe repetitive loss properties should be considered priorities for removal. Potential projects listed in Figure 6.3.2
4a-2		Medium	All with flood damage	Elevation/ Flood Proofing	The County Public Safety Department and municipalities should seek to direct financial assistance to residents to elevate homes in the floodplain that have sustained damage from past floods. This option should only be pursued if removal is infeasible and safe ways to access the elevated structure during hazard events exist. (Immediately with any disaster declaration funding projects, budget based upon estimated elevation costs). All repetitive loss and severe repetitive loss properties should be considered priorities for elevation when removal is not feasible) Potential projects listed in Figure 6.3.2
4a-3		Low	County-wide	Innovative land use tools to reduce development in flood prone areas	The County Planning Commission should work with municipalities to develop land use tools to encourage the removal of buildings within flood plain areas. (Year 2,3, internal cost estimate at \$5,000)
4a-4		Medium	County-wide	Repetitive Loss Property Data	The County Planning Commission shall review and recommend corrections to the listings of repetitive Loss Property Data

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Project Number	Priority Municipal	Priority - County	Municipality	Project Type	Description
Objective 4b: Effectively manage stormwater and improve stream channels to reduce flooding					
4b-1		High	Various Municipalities	Flood Control Structures and channel improvements	Municipalities should construct flood control structures, stormwater detention basins, and channel improvements in appropriate locations in accordance with county model flood plain ordinance requirements to protect developed sections of the floodplain downstream where relocation is infeasible. (several potential projects exist in the Wissahickon Creek and Tookany Creek basins as identified in reports pertaining to these areas) Potential projects are listed in Figure 6.3.3
4b-2		Low	Riverfront Communities	Public Awareness/ Warning	The County Public Safety Department and municipalities should educate residents along the Schuylkill River about warning system opportunities. (3-5 year with an internal budget of \$5,000)
4b-3		Low	County-wide	Stormwater basin effectiveness study	The County Planning Commission should work with municipalities and other organizations to study the effectiveness of stormwater basins in the county or a portion of the county. The study should address needed improvements to the basins. (year 3-5 with an internal cost of \$15,000)
4b-4		High	County-wide	Stream corridor management	Local municipalities and PennDot should routinely inspect and maintain stream corridors, drainage ways, drainage structures, stormwater basins, bridges, and culverts to identify and remove, if possible, impediments to flood flow. (yearly or more frequently depending upon conditions, costs dependent upon level of debris)
4b-5		High	County-wide	Stream corridor Natural Resources Protection	Municipalities and the County should continue to preserve open space along the Schuylkill River and along stream corridors. (the county has approved funding capital funds for open space projects, some municipalities have separate open space funding initiatives)

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Project Number	Priority Municipal	Priority - County	Municipality	Project Type	Description
4b-6		High	County-wide	Countywide Land Use Management	The County Planning Commission, working with the 62 municipalities and 4 planning regions, should promote low stormwater impact development in accordance with local and county comprehensive plans. (ongoing, no budget established)
4b-7		High	County-wide	Stormwater Management	The County Planning Commission should complete and maintain stormwater management plans for all designated watersheds if state funding is provided. (year 1, \$400,000)
4b-8		Low	County-wide	Drainage	The County Planning Commission and municipalities should investigate ways to link key stormwater facilities release rates through SCADA (Supervisory Control and Data Acquisition) technology to better coordinate flood control efforts at a local and watershed level. (year 3-5, no budget)
4b-9		Medium	County-wide	Flood Studies	The County Public Safety Department, Planning Commission, municipalities, Temple University Center for Sustainable Communities and other organizations should develop appropriate studies to analyze local hydrological and hydraulic conditions to better define flood mitigation opportunities.
4b-10		High	County-wide	Drainage and infrastructure Projects	Various municipal projects designed to reduce localized flooding as identified in municipal survey responses should be implemented. (See attached listing).
4b-11		Medium	County-wide	Act 167 funding	The County should lobby for adequate state funding for the Stormwater Management Planning in accordance with Act 167.
4b-12		Medium	County-wide	Stream bed management	The County should advocate for an expeditious permitting process to allow municipalities to clean out accumulated silt and gravel bars and other debris that impact stream flow.

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Project Number	Priority Municipal	Priority - County	Municipality	Project Type	Description
4b-13		High	County-wide	Montco 2040 Implementation Grant Program	Continue to provide grant funding to assist municipalities in making targeted physical improvements that address the goals of the Montgomery County comprehensive plan including adaptation and resiliency which is focused on addressing negative environmental changes through projects such as floodplain mitigation, streambank restoration, green streets, and community gardens.
Objective 4c: Eliminate flooded conditions along the transportation system in Montgomery County					
4c-1		Medium	County-wide	PennDot Road improvements	Montgomery County should encourage PennDot to make road and bridge improvements to minimize the impact of flooding.
4c-2		High	County-wide	County Bridge maintenance	The County Department of Infrastructure and Assets should inspect their bridges periodically and after major storm events to ensure that there is no blockage to flood waters. (yearly and potentially more frequently, \$15,000 internal cost for inspections)
4c-3		Medium	Schuylkill River Communities	Schuylkill River Flood Level Markers	The County Public Safety Department and municipalities should investigate the feasibility of placing visible flood markers with elevation points along the Schuylkill River to assist local public safety personnel in making decisions about road closures. Other visible markers should be placed at critical stream crossing and bridges throughout the county. (year 3-5, no budget)
Objective 4d: Reduce traveler injuries and fatalities during flood events.					
4d-1			County-wide	Road Closure Barriers and Gates	The County Public Safety Department and municipalities should work to install appropriate and uniform barrier systems including gate structures, at roads to be closed during flood events. Keys to gates should allow use by various entities. The design and location of these facilities should prevent any interference with adjoining electric

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Project Number	Priority Municipal	Priority - County	Municipality	Project Type	Description
					transmission lines. (year 2-5, \$1 million)
4d-2		High	Lower Wissahickon Creek Communities	Safe Flood Routes	The County Public Safety Department, Planning Commission, Delaware Valley Regional Planning Commission, and municipalities should work to develop a commuter safe route system study for the Lower Wissahickon Creek Area. (budget \$50,000)
4d-3		High	County-wide	Emergency Routing Information	The County and local emergency management personnel should cooperate with various on-line traffic routing information services to broadcast critical transportation information during local disasters.
Objective 4e: Continue to comply with the National Flood Insurance Program					
4e-1		High	County-wide	Flood Plain Model Ordinance	The County Planning Commission and the Montgomery County Conservation District should promote their model flood plain management ordinance so that is used by municipalities during any updates of their floodplain ordinances. (year 1-2, internal cost of \$10,000)
4e-2		Medium	County-wide	Federal Flood Insurance	The County Department of Public Safety and Planning Commission should promote participation in the Federal Flood Insurance Program. (on-going, no budget)
4e-3		Medium	Selected Municipalities	Federal Flood Insurance	The County Planning Commission should work with selected municipalities to become eligible for inclusion in the Community Rating System (CRS)
4e-4		Medium	County-wide	Federal Flood Insurance	Municipal code officers should participate in training for the administration of the flood plain ordinance

Figure 6.3.2 Potential Structure Elevation and Removal Projects

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Municipality	General Location
Abington Twp	Houses within the 500 block of WANAMAHER RD
Abington Twp	House(s) within the 800 block of LLANFAIR RD
Abington Twp	House(s) within the 100 block of MEETINGHOUSE RD
Abington Twp	House(s) within the 2700 block of ROSSITER AVE
Ambler Bor	House(s) within the 100 and 400 Block of S MAIN ST
Ambler Bor	House(s) within the Unit Block of TENNIS AVE
Ambler Bor	House(s) within the unit block of E BUTLER AVE
Bridgeport Bor	House(s) within the 200 block of DEKALB ST
Cheltenham Twp	House(s) within the 200 block of CHURCH RD
Cheltenham Twp	House(s) within the 8000 block of HIGH SCHOOL RD
Cheltenham Twp	House(s) within the 500 Block of SHOEMAKER RD
Cheltenham Twp	House(s) within the unit block of NORTH AVE
Cheltenham Twp	House(s) at the 800 block of GLENSIDE AVE
Collegeville Bor	House(s) on 1ST AVE
Collegeville Bor	House(s) within the 100 block of CHESTNUT ST
Conshohocken Bor	House(s) on Washington Avenue
Conshohocken Bor	House(s) within the unit block of COLWELL LN
Harboro	House(s) within the unit and 300 block of HORSHAM RD
Harboro	House(s) within the 300 block of S YORK RD
Harboro	House(s) within the 300 block of S YORK RD
Harboro	House(s) within the unit block of MILL RD
Harboro	House(s) within the unit block of DRUMMERS WAY
Harboro	House(s) within the 500 block of S WARMINSTER RD
Hatfield Twp	House(s) within the unit block of E BROAD ST
Hatfield Twp	House(s) within the 2700 block of LENHART RD
Horsham Twp	House(s) within the 200 block of MCKEAN RD
Lower Frederick Twp	House(s) within the unit block of MAIN ST
Lower Gwynedd Twp	House(s) within the unit block of MILL RACE
Lower Merion Twp	House(s) within the 1200 block of W WYNNEWOOD RD
Lower Merion Twp	House(s) within the 200 block of RIVER RD
Lower Moreland Twp	House(s) within the 2300 block of VALLEY RD
Lower Moreland Twp	House(s) within the 200 block of CLEARVIEW AVE

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Municipality	General Location
Lower Providence Twp	House(s) in the 3500 and 3600 block of ARCOLA RD
Lower Providence Twp	House(s) within the 1500 block of GERTRUDE ST
Lower Providence Twp	House(s) within the unit block of INDIAN HEAD AVE
Lower Providence Twp	House(s) within the 1500 block of PAWLINGS RD
Lower Providence Twp	House(s) within the 200 block of PINETOWN RD
Lower Providence Twp	House(s) within the 100 block of TYSON MILL RD RR 2
Lower Providence Twp	House(s) on Getrude Avenue
Norristown	House(s) within the unit block of DEKALB ST
Norristown	Building at the 500 block of W WASHINGTON ST
Perkiomen Twp	Houses within the unit block of SKIPPACK PIKE
Plymouth Twp	Building within the 200 block of W GERMANTOWN PIKE
Schwenksville Bor	House(s) within the unit block of PARK AVE
Skipack Twp	House(s) within the 4900 SKIPPACK PIKE
Springfield Twp	House(s) within the unit block of BROOKSIDE RD
Towamencin Twp	House(s) within the 1600 block of OLD FORTY FOOT RD
Upper Dublin Twp	House(s) within the 300 block of RANDOLPH AVE
Upper Dublin Twp	House(s) within the 1300 block of S BETHLEHEM PIKE
Upper Dublin Twp	Buildings on VIRGINIA DR
Upper Merion Twp	House(s) within the 1000 block of JONES RD
Upper Moreland Twp	House(s) within the 500 block of S WARMINSTER RD
Upper Moreland Twp	House(s) within the unit block of HORSHAM RD
Upper Moreland Twp	House(s) within the 800 block of S YORK RD
Upper Moreland Twp	House(s) within the unit block of BONNET LN
Upper Providence Twp	House(s) within the 200 and 300 block of CANAL ST
Upper Providence Twp	House(s) within the 300 and 400 block of HOLLOW RD
Upper Providence Twp	House(s) within the 400, 800, and 900 block of PORT PROVIDENCE RD
Upper Providence Twp	House(s) within the 100 block of WALNUT ST
Upper Providence Twp	House(s) within the 400 block of LOWER INDIAN HEAD RD
Upper Providence Twp	House(s) within the unit block of YERKES RD
Upper Providence Twp	House(s) with the 100 block of W 1ST AVE
Upper Providence Twp	House(s) within the unit block of BROWER AVE

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Municipality	General Location
West Norriton Twp	House(s) within the unit block of East and West Indian Lane
Whitemarsh Twp	House(s) within the 400, 500 and 700 block of S BETHLEHEM PIKE
Whitemarsh Twp	House(s) within the unit block of MILITIA WAY
Whitemarsh Twp	House(s) within the 400 block of MILITIA HILL RD
Whitemarsh Twp	House(s) within the unit block of STENTON AVE
Whitemarsh Twp	House(s) within the 6200 block of W VALLEY GREEN RD
Whitemarsh Twp	Buildings within the 500 block of PENNSYLVANIA AVE

Figure 6.3.3 Potential Flood Drainage Improvement Projects

Municipality	Flood Drainage Improvement Areas
Ambler Borough	6 area drainage improvements identified in the 2014 Stormwater Plan by Temple University
Abington	Various drainage improvements listing in the capital budget starting on page 365
Cheltenham Twp	Construct Flood Control Dams identified in the USACOE study
Cheltenham Twp	Replacement of Sewer Main along Tookany Creek and bank stabilization work
Lower Merion	Dredge Remington Avenue Stormwater Basin
Pottstown Bor	Replace large arch culverts subject to collapse
Pottstown Bor	Expand capacity of Culvert in the 300 block of HANOVER ST
Schwenksville Bor	Expand capacity of culvert on CENTENNIAL ST
Whitpain Twp	Drainage improvements on the 1700 Block of YOST RD
Whitpain Twp	Drainage improvements on STENTON AVE btwn PENLLYN BLUE BELL PIKE and WALTON RD

7. Plan Maintenance

7.1 Update Process Summary

The current plan update is based on information available to the county at the time it was prepared. As new information becomes available or as new opportunities emerge, the plan may need to be reevaluated and revised. As with any plan, this document is meant to be used and revised to remain relevant and responsive to the hazard mitigation needs of the county and each municipality.

7.2 Monitoring, Evaluating, and Updating the Plan

The Montgomery County Public Safety Department and Planning Commission will work with each municipality to maintain this plan. This process will be coordinated by Public Safety and Planning Commission staff working through the Hazard Mitigation Plan Committee which will meet twice a year and after significant disasters to evaluate the relevancy and effectiveness of the plan. Meeting minutes documenting progress towards implementing actions identified in the plan will be submitted to PEMA and FEMA after each bi-annual meeting of the Hazard Mitigation Plan Committee. Municipalities will be periodically surveyed as part of the plan update process. Critical issues to evaluate periodically include, but are not limited to, the following:

- Relevancy of the plan goals
- Changes in the availability of technical information and tools to evaluate disaster vulnerability
- Changes to GIS mapping tools to improve the ability to evaluate flood risk vulnerability
- Changes in local capabilities or resources to address mitigation needs
- Impact of natural disasters and potential mitigation actions
- Problems or changes in the implementation of recommended actions

Based upon their review, the planning committee may initiate a revision to the plan to make changes to the recommendations, project prioritization, hazard vulnerability characterization, or substantially alter key analyses included in the plan. At a minimum, the county recognizes its obligation to revise the plan at five year intervals. The plan revision process would include the full involvement of each municipality and the public.

In the plan maintenance and evaluation process, the county will utilize forms generally consistent with the forms contained in Appendix Q. These forms address many of the factors described above.

7.3 Incorporation into Other Planning Mechanisms

The previous plan was made part of the county's overall emergency management plans and summarized in the Montgomery County Comprehensive Plan which was adopted in 2015. Other relevant county and municipal policy documents will also reference the plan as appropriate. The Public Safety Department and Planning Commission will work with each of the 62 municipalities to ensure that the recommendations of this plan is incorporated into various local polices, programs and plans.

61 of the 62 Montgomery County municipalities has a comprehensive plan that is used to guide actions taken in determining future land use, infrastructure development, park and recreation facilities expansion and development, and in the establishment of various public facilities and programs servicing the municipality among other things. The Pennsylvania Municipalities Planning Code, initially adopted in 1968, establishes requirements for the content of a comprehensive plan and for the process to develop one. Furthermore Section 301(c) of the MPC requires municipalities to review their comprehensive plans every 10 years. Section 603 (j) requires municipalities to adopt zoning ordinances that are generally consistent with their adopted comprehensive plans.

As municipalities review their comprehensive plans, they should incorporate strategies for making their communities more resilient to future threats as described in this Hazard Mitigation Plan. The Montgomery County Planning Commission will also incorporate elements of the 2017 Hazard Mitigation Plan in updates to the Montgomery County Comprehensive Plan.

Under the MPC, the Montgomery County Planning Commission and local municipal planning commissions established in all Montgomery County municipalities are given the opportunity to review and comment on all proposed actions involving changes in comprehensive plans, zoning ordinances, subdivision and land development ordinances, and proposed subdivisions and land development plans. During this review process, the Montgomery County Planning Commission will specifically address the compliance of the proposed action with the 2017 Montgomery County Hazard Mitigation Plan as well as generally good practice in improving local community resiliency to future threats. Additionally, the Montgomery County Planning Commission provides direct planning consultancy in over half of the municipalities in the county and in all of the four regional planning commissions. Planners serving these municipalities will also work closely to ensure that the 2017 Montgomery County Hazard Mitigation Plan is used to guide municipal policy.

7.4 Continued Public Involvement

Copies of the plan will be made available on the Montgomery County internet site. Paper copies of it will also be disseminated. Future community meetings will be held as needed to discuss the plan. Appropriate county personnel will be available for periodic presentations to the public, municipal officials, and various service groups to discuss hazard mitigation. The Public Safety Department and County Planning Commission will continue to use social media to promote the plan and expand public awareness of it

8. Plan Adoption

8.1 County Plan Adoption

The Montgomery County Board of Commissioners adopted the plan on _____. The commissioners' adoption resolution is included in Appendix C.

8.2 Municipal Plan Adoption

The model municipal adoption ordinance is included in Appendix D. This model is offered to assist municipalities in the adoption process. A listing of municipalities which have adopted the plan is also contained below. County staff was available to visit each municipality to present the plan update to their governing body as part of the adoption process.

9. Appendices

Appendix A – Bibliography

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Appendix B – Local Mitigation Plan Review Crosswalk

LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA’s evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan’s strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: Montgomery County	Title of Plan: 2017 Hazard Mitigation Plan	Date of Plan: 2017
Local Point of Contact: Michael Stokes	Address: Montgomery County Planning Commission Court House Box 311 Norristown PA 19404-0311	
Title: Assistant Director		
Agency: Montgomery County Planning Commission		
Phone Number: 610 278.3729	E-Mail: mstokes@montcopa.org	

State Reviewer: Erine Szabo	Title: PEMA State Hazard Mitigation Planner	Date: 12/26/2017
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FEMA Reviewer:	Title:	Date:
Date Received in FEMA Region <i>(insert #)</i>		
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved		

**SECTION 1:
REGULATION CHECKLIST**

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
	ELEMENT A. PLANNING PROCESS		
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Chapter 3 starting at Page 38 and Appendix G		
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Section 3.3 on page 40, Section 3.4 on Page 41 and Appendix G		
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Chapter 3 starting at page 38 and Appendix G		
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Executive Summary, pp.18-23, Capabilities p. 190-194, Section 5.2.3 p.194		
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Several recommendations under Goal 1 and Page 235		
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Page 234-235 and Appendix Q		

Montgomery County 2017 Hazard Mitigation Plan

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
ELEMENT A: REQUIRED REVISIONS				
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT				
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Chapter 4 itemizes 25 hazards including all natural hazards			
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Chapter 4 hazard profiles include past and future occurrence			
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Chapter 4 contains a summary table 4.2.1.1 on page 45			
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Page 91-95			
ELEMENT B: REQUIRED REVISIONS				
ELEMENT C. MITIGATION STRATEGY				
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Chapter 5 starting on page 187 and Appendix H			
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Page 213, objective 4 e on page 230, and Appendix I			
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Four goals are listed in Chapter 5			
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Specific actions and projects are listed in Chapter 5; summary table of jurisdictional impact and project summary forms in Appendix O			

Montgomery County 2017 Hazard Mitigation Plan

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)		Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)					
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Priorities are listed with each action. Appendix R contains potential impacts				
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Section 7.3 in Chapter 7				
ELEMENT C: REQUIRED REVISIONS					
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)					
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 6.1 and executive summary				
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 6.1 and executive summary				
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 6.1 and executive summary				
ELEMENT D: REQUIRED REVISIONS					
ELEMENT E. PLAN ADOPTION					
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	A sample resolution is in Appendix D				
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	A sample resolution is in Appendix D				
ELEMENT E: REQUIRED REVISIONS					
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)					
F1.					
F2.					
ELEMENT F: REQUIRED REVISIONS					

SECTION 2: PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- *Involvement of stakeholders (elected officials/decision makers, plan implementers, business owners, academic institutions, utility companies, water/sanitation districts, etc.);*
- *Involvement of Planning, Emergency Management, Public Works Departments or other planning agencies (i.e., regional planning councils);*
- *Diverse methods of participation (meetings, surveys, online, etc.); and*
- *Reflective of an open and inclusive public involvement process.*

Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

- 1) *A general description of land uses and future development trends within the community so that mitigation options can be considered in future land use decisions;*
- 2) *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; and*
- 3) *A description of potential dollar losses to vulnerable structures, and a description of the methodology used to prepare the estimate.*

How does the Plan go above and beyond minimum requirements to document the Hazard Identification and Risk Assessment with respect to:

- *Use of best available data (flood maps, HAZUS, flood studies) to describe significant hazards;*
- *Communication of risk on people, property, and infrastructure to the public (through tables, charts, maps, photos, etc.);*
- *Incorporation of techniques and methodologies to estimate dollar losses to vulnerable structures;*
- *Incorporation of Risk MAP products (i.e., depth grids, Flood Risk Report, Changes Since Last FIRM, Areas of Mitigation Interest, etc.); and*
- *Identification of any data gaps that can be filled as new data became available.*

Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- Key problems identified in, and linkages to, the vulnerability assessment;
- Serving as a blueprint for reducing potential losses identified in the Hazard Identification and Risk Assessment;
- Plan content flow from the risk assessment (problem identification) to goal setting to mitigation action development;
- An understanding of mitigation principles (diversity of actions that include structural projects, preventative measures, outreach activities, property protection measures, post-disaster actions, etc);
- Specific mitigation actions for each participating jurisdictions that reflects their unique risks and capabilities;
- Integration of mitigation actions with existing local authorities, policies, programs, and resources; and
- Discussion of existing programs (including the NFIP), plans, and policies that could be used to implement mitigation, as well as document past projects.

Element D: Plan Update, Evaluation, and Implementation (Plan Updates Only)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- Status of previously recommended mitigation actions;
- Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk;
- Documentation of annual reviews and committee involvement;
- Identification of a lead person to take ownership of, and champion the Plan;
- Reducing risks from natural hazards and serving as a guide for decisions makers as they commit resources to reducing the effects of natural hazards;
- An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.);
- Discussion of how changing conditions and opportunities could impact community resilience in the long term; and
- Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.

B. Resources for Implementing Your Approved Plan

Ideas may be offered on moving the mitigation plan forward and continuing the relationship with key mitigation stakeholders such as the following:

- *What FEMA assistance (funding) programs are available (for example, Hazard Mitigation Assistance (HMA)) to the jurisdiction(s) to assist with implementing the mitigation actions?*
- *What other Federal programs (National Flood Insurance Program (NFIP), Community Rating System (CRS), Risk MAP, etc.) may provide assistance for mitigation activities?*
- *What publications, technical guidance or other resources are available to the jurisdiction(s) relevant to the identified mitigation actions?*
- *Are there upcoming trainings/workshops (Benefit-Cost Analysis (BCA), HMA, etc.) to assist the jurisdictions(s)?*
- *What mitigation actions can be funded by other Federal agencies (for example, U.S. Forest Service, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA) Smart Growth, Housing and Urban Development (HUD) Sustainable Communities, etc.) and/or state and local agencies?*

**SECTION 3:
MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)**

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

#	Jurisdiction Name	Jurisdiction Type (city/borough/township/village, etc.)	Plan POC	Mailing Address	Email	Phone	MULTI-JURISDICTION SUMMARY SHEET					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy Implementation	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
1	Abington	Township	Richard Manfredi	1176 Old York Road, Abington PA 19001-3713	rmanfredi@abington.org	267-536-1000	Y	Y	Y	Y		
2	Ambler	Borough	Mary Aversa	131 Rosemary Ave., Ambler PA 19002-4476	manager@ambler.pa.us	215-641-1000	Y	Y	Y	Y		
3	Bridgeport	Borough	Keith Truman	63 W. Fourth St., Bridgeport, PA 19405	kt Truman@bridgeport.org	610-272-1811	Y	Y	Y	Y		

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MULTI-JURISDICTION SUMMARY SHEET											
#	Jurisdiction Name	Jurisdiction Type (city/borough/township/village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)				
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption
4	Bryn Athyn	Borough	Vicki Trost	P.O. Box 683, Bryn Athyn PA 19009-0683	vikt@brynathynbo.org	215-947-9689	Y	Y	Y		
5	Cheltenham	Township	Bryan Havir	8230 Old York Road, Elkins Park PA 19027-1589	bhavir@cheltenhamtownship.or	215-887-1000	Y	Y	Y		
6	Collegeville	Borough	Geoff Thompson	491 E. Main Street, Collegeville PA 19426	gthompson@boroughcollegevillepa.gov	610-489-9208	Y	Y	Y		
7	Conshohocken	Borough	Stephanie Cecco	400 Fayette Street Suite 200 Conshohocken, PA 19428	scecco@conshohockenpa.gov	610-828-1092	Y	Y	Y		

Local Mitigation Plan Review Tool (FEMA, October 1, 2011)

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/township/village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)				F. State Requirements	
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation		E. Plan Adoption
8	Douglas	Township	Peter Hiryak	1320 E. Philadelphia Ave Box 297 Gilbertsville, PA 19525-9574	phiryak@do uglass towns hip.or g	610-367-6062	Y	Y	Y	Y		
9	East Greenville	Borough	James Fry	206 Main Street East Greenville, PA 18401-1405	codes@gre enville.org	215-679-5194	Y	Y	Y	Y		
10	East Norriton	Township	Robert Hart	2501 Stambridge Street East Norriton PA 19401-1616	rhart@east norrit ownt wp.or g	610-275-2800	Y	Y	Y	Y		
11	Franconia	Township	Jan Hammer	671 Allentown Road Telford PA 18969-2205	jham mer@ franco nila- towns hip.or g	215-723-1137	Y	Y	Y	Y		
12	Green Lane	Borough	Melissa Balne	PO Box 514 Green Lane PA 18054-0514	greenl anebo ro@co mcast. net	215-234-8633	Y	Y	Y	Y		

Local Mitigation Plan Review Tool (FEMA, October 1, 2011)

Montgomery County 2017 Hazard Mitigation Plan

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)				F. State Requirements	
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation		E. Plan Adoption
13	Hatboro	Borough	Alfred Zollers	414 S. York Road Hatboro, PA 19040-4799	tzollers@hatborov.org	215-443-9100	Y	Y	Y	Y		
14	Hatfield	Borough	Michael DeFinis	401 s. Main Street Box 190 Hatfield PA 19440-0190	mdefinis@hatfieldborough.com	215-855-0781	Y	Y	Y	Y		
15	Hatfield	Township	Aaron Blbro	1950 School Road Hatfield, PA 19440-1992	abibro@hatfieldtownship.org	215-855-0900	Y	Y	Y	Y		
16	Horsham	Township	William Walker	1025 Horsham Road, Horsham, PA 19044-1326	wwalker@horsham.m.org	215-643-3131	Y	Y	Y	Y		
17	Jenkintown	Borough	George Locke	700 Summit Avenue, Jenkintown Pa 19046	glocke@jenkintownboro.com	215-855-0700	Y	Y	Y	Y		
18	Lansdale	Borough	John Ernst	1 Vine Street, Lansdale, PA 19446-3601	jernst@lansdale.org	215-368-1691	Y	Y	Y	Y		

Local Mitigation Plan Review Tool (FEMA, October 1, 2011)

Montgomery County 2017 Hazard Mitigation Plan

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/township/village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)				F. State Requirements	
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation		E. Plan Adoption
19	Limerick	Township	Daniel Kerr	646 W. Ridge Pike, Limerick Pa 19468	dkerr@lime rickpa. org	610-495-6432	Y	Y	Y	Y		
20	Lower Frederick	Township	Kevin Tobias	PO Box 253, Zieglerville, PA 19492-0253	manag er@lo werfre derick. org	610-287-8857	Y	Y	Y	Y		
21	Lower Gwynedd	Township	Craig McAnally	1130 N. Bethlehem Pike, PO Box 625, Springhouse, PA 19477-0625	cmcan ally@l ower gwyned d.org	215-646-5302	Y	Y	Y	Y		
22	Lower Merion	Township	Ernie McNeely	75 E. Lancaster Ave, Ardmore, PA 19003-2376	erncne ely@l ower merio n.org	610-645-6103	Y	Y	Y	Y		
23	Lower Moreland	Township	Chris Hoffmann	640 Red Lion Road, Huntingdon Valley, PA 19006-6234	choff man@ lower morel and.or g	215-947-3100	Y	Y	Y	Y		

Montgomery County 2017 Hazard Mitigation Plan

MULTI-JURISDICTION SUMMARY SHEET										
#	Jurisdiction Name	Jurisdiction Type (city/borough/township/village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)			
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation
24	Lower Pottsgrove	Township	Edward Wagner	2199 Buchert Road, Pottstown, Pa 19464-3042	ewagner@lpo.werpo.ttsgr.ve.org	610-323-0436	Y	Y	Y	
25	Lower Providence	Township	Don Delamater	100 Parkland Drive, Eagleville, PA 19403	ddelamater@loweprovidencidence.org	610-635-3526	Y	Y	Y	
26	Lower Salford	Township	Joseph Czajowski	379 Main Street, Harleysville, PA 19438-2309	township@harleysvilleownersalfordtownship.org	215-256-8087	Y	Y	Y	
27	Marlborough	Township	Marybeth Cody	6040 Upper Ridge Road, Green Lane, Pa 18054	mccody@marlboroughpa.org	215-234-9300	Y	Y	Y	
28	Montgomery	Township	Lawrence Grogan	1001 Stump Road, Montgomerlyville, Pa 18936-9605	drivas@montgomerlyville.org	215-393-6900	Y	Y	Y	

Montgomery County 2017 Hazard Mitigation Plan

MULTI-JURISDICTION SUMMARY SHEET											
#	Jurisdiction Name	Jurisdiction Type (city/borough/township/village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)				F. State Requirements
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	
29	Narberth Borough	Sean Metrick	100 Conway Ave., Narberth PA 19072-2257	smetrick@narberthpa.org	610-664-2840	Y	Y	Y	Y		
30	New Hanover Township	Jamie Gwynn	2943 N. Charlotte St., Gilbertsville, PA 19525-9718	jgwynn@newhanoverpa.org	610-323-1008	Y	Y	Y	Y		
31	Norristown Borough	Crandall Jones	235 E. Airy Street, Norristown, PA 19401-5003	cjones@norristown.org	610-270-0421	Y	Y	Y	Y		
32	North Wales Borough	Christine Hart	300 School St., North Wales PA 19454-3136	chart@northwalesborough.org	215-699-4424	Y	Y	Y	Y		
33	Pennsburg Borough	Jeanne Hopkins	76 W. 6 th Street, Pennsburg, PA 18073	Pennsburgfo@pennsburgpa.us	215-679-4546	Y	Y	Y	Y		

MULTI-JURISDICTION SUMMARY SHEET										
#	Jurisdiction Name	Jurisdiction Type (cty/borough/township/village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)			
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation
34	Perkiomen Township	Cecile Daniel	1 Trappe Road, Collegeville, PA 19426-1829	cdaniel@perkiomen.org	610-489-4034	Y	Y	Y	Y	
35	Plymouth Township	Karen Weiss	700 Belvoir Rd. Plymouth Meeting, PA 19462	kweiss@plymouthtownship.org	610-233-0608	Y	Y	Y	Y	
36	Pottstown Borough	Justin Keller	100 E. High Street, Pottstown, PA 19464-9525	jkeller@pottstown.org	610-970-6511	Y	Y	Y	Y	
37	Red Hill Borough	Gla Mckinley	56 W. 4 th St., Red Hill, PA 18076	Info@redhillborough.org	215-679-2040	Y	Y	Y	Y	
38	Rockledge Borough	Grace Metzinger	121 Huntingdon Pike, Rockledge, PA 19046-4341	gmetzinger@rockledgeborough.org	215-379-8572	Y	Y	Y	Y	
39	Royersford Borough	Michael Leonard	300 Main Street, Royersford, PA 19468	mleonard@royersfordborough.org	610-948-3737	Y	Y	Y	Y	

Local Mitigation Plan Review Tool (FEMA, October 1, 2011)

Montgomery County 2017 Hazard Mitigation Plan

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/township/village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy Implementation	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
40	Salford	Township	Karen Landis	139 Ridge Road- Box 54, Tylersport, PA 18971	salford@salfordto.wnshi.p.org	215-257-5664	Y	Y	Y	Y		
41	Schwenksville	Borough	Annie Klepfer	140 Main Street, Schwenksville, PA 19473-1116	gail@schwenksville.pa.org	610-287-7442	Y	Y	Y	Y		
42	Skippack	Township	Christopher Heleniak	PO Box 164-4089 Heckler Rd., Skippack, PA 19474	cheleniak@skippacktownship.org	610 454-0909	Y	Y	Y	Y		
43	Souderton	Borough	P. Michael Coll	31 W Summit St., Souderton, PA 18964-1693	bee@souderton.org	215-723-4371	Y	Y	Y	Y		
44	Springfield	Township	Donald Berger	1510 Paper Mill Rd., Wyndmoor, PA 19038	dberger@springfieldmonaco.or	215-836-7600	Y	Y	Y	Y		
45	Telford	Borough	Mark Fournier	122 Penn Ave, Telford PA 18969	Telfordborough@comcast.net	215-723-5000	Y	Y	Y	Y		

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MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
46	Towamencin	Township	Robert Ford	1090 Troxel Rd., Lainsdale PA. 19446	rford@towamencin.org	215-368-7602	Y	Y	Y	Y		
47	Trappe	Borough	Robert Urstead	525 W. Main St. Trappe, PA 19426-1923	Boroughmainer@trappeborough.com	610-489-7181	Y	Y	Y	Y		
48	Upper Dublin	Township	Paul Leonard	801 Loch Aish Ave., Fort Washington PA 19034-1697	pleonard@upperdublin.net	215-643-1600	Y	Y	Y	Y		
49	Upper Frederick	Township	Jackie Tallon	PO Box 597, Frederick Pa 19435-0597	jtallon@upperfrederick.com	610-754-6436	Y	Y	Y	Y		
50	Upper Gwynedd	Township	Mike Lapinski	PO Box 1, West Point, PA 19486	mlapinski@uppergwynedd.org	215-699-7777	Y	Y	Y	Y		

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/township/village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
51	Upper Hanover	Township	Stan Seitzinger	1704 Pillsbury Rd, PO Box 27, East Greenville, PA 18041-0027	sseitzinger@comcast.net	215-679-4401	Y	Y	Y	Y		
52	Upper Merion	Township	David Kraynik	175 W. Valley Forge Rd., King of Prussia, PA 19406	dkraynik@mtownship.org	610-265-8722	Y	Y	Y	Y		
53	Upper Moreland	Township	David Dodies	117 Park Ave, Willow Grove, PA 19090-3215	ddodies@ppermoreland.org	215-659-3100	Y	Y	Y	Y		
54	Upper Pottsgrove	Township	Carol Lewis	1409 Farmington Ave., Pottstown PA 19464-1829	manager@pottstownship.org	610-323-8675	Y	Y	Y	Y		
55	Upper Providence	Township	Timothy Tieperman	1286 Black Rock Rd., Box 406, Oaks Pa 19456-0406	admin@uprmtco.org	610-933-9179	Y	Y	Y	Y		

Montgomery County 2017 Hazard Mitigation Plan

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
56	Upper Salford	Township	Amy Shafer	PO Box 100, Salfordville, PA 18958-0100	Amy.ushafer@salfordpa.com	610-287-6160	Y	Y	Y	Y		
57	West Conshohocken	Borough	Michael English	112 Ford Street, West Conshohocken, PA 19428-2916	menglish@westconshohoc.com	610-828-9747	Y	Y	Y	Y		
58	West Norriton	Township	Jason Bopst	1630 W. Marshall St., Jeffersonville, PA 19403-3236	jbopst@wntwp.com	610.631.0450	Y	Y	Y	Y		
59	West Pottsgrove	Township	Craig Lloyd	980 Grosstown Rd., Stowe, PA 19464-6124	wptmmanager@ccomcast.net	610-323-7717	Y	Y	Y	Y		
60	Whitemarsh	Township	Richard Mellor	616 Germantown Pike, Lafayette Hill, PA 19444-1810	rmellor@whitemarshwp.org	610-825-3535	Y	Y	Y	Y		

Local Mitigation Plan Review Tool (FEMA, October 1, 2011)

MULTI-JURISDICTION SUMMARY SHEET													
#	Jurisdiction Name	Jurisdiction Type (city/borough/township/village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)						
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements	
61	Whitpain	Township	Roman Proncka	960 Wentz Rd., Blue Bell, PA 19422	rpronczak@whitpain.org	610-277-2400	Y	Y	Y	Y			
62	Worcester	Township	Tommy Ryan	Box 767, Worcester, PA 19490	tryan@worcester.twp.pa.gov	610-584-1410	Y	Y	Y	Y			

**Appendix C – Montgomery County Commissioners
Adoption Resolution**

RESOLUTION OF

THE MONTGOMERY COUNTY BOARD OF COMMISSIONERS ADOPTING THE REVISED
2017 MONTGOMERY COUNTY HAZARD MITIGATION PLAN

WHEREAS, hazards including flooding periodically threaten the safety of people and result in property damage in Montgomery County; and

WHEREAS, the vulnerability of the Montgomery County to some hazard events may be reduced through various mitigation measures; and

WHEREAS, Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), 42 U.S.C. 5165, enacted under paragraph 104 of the Disaster Mitigation Act of 2000, provides new approaches to mitigation planning and requires local government to prepare and adopt mitigation plans as a condition for receiving certain federal disaster grants and loans and to amend these plans each five years; and

WHEREAS, a Montgomery County Hazard Mitigation Plan was prepared in 2012 and adopted by the county and nearly all Montgomery County municipalities; and

WHEREAS, a revised hazard mitigation has been prepared by the Montgomery County Planning Commission and Public Safety Department in accordance with appropriate federal guidelines established in accordance with the Stafford Act; and

WHEREAS, the public and each municipality in the county was been given an opportunity to fully participate in the preparation of the Montgomery County Hazard Mitigation Plan Amendment process; and

NOW THEREFORE BE IT RESOLVED, that the Montgomery County Board of Commissioners hereby adopts the Revised 2017 Montgomery County Hazard Mitigation Plan; and

BE IT FUTHER RESOLVED, the Montgomery County Public Safety Department is directed to formally submit the plan amendment to the Pennsylvania Emergency Management Agency (PEMA) and Federal Emergency Management Agency (FEMA) to enable the plan's final approval.

Appendix D – Municipal Adoption Resolution Template

RESOLUTION OF

THE [governing body] of [municipality]

ADOPTING THE 2017 MONTGOMERY COUNTY HAZARD MITIGATION PLAN

WHEREAS, hazards including flooding periodically threaten the safety of people and result in property damage in [municipality]; and

WHEREAS, the vulnerability of the [municipality] to some hazard events may be reduced through various mitigation measures; and

WHEREAS, Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), 42 U.S.C. 5165, enacted under paragraph 104 of the Disaster Mitigation Act of 2000, provides new approaches to mitigation planning and requires local government to prepare and adopt mitigation plans as a condition for receiving certain federal disaster grants and loans and to amend these plans each five years; and

WHEREAS, a Montgomery County Hazard Mitigation Plan was prepared in 2012 and adopted by the county and [municipality]; and

WHEREAS, a revised hazard mitigation plan has been prepared by the Montgomery County Planning Commission and Public Safety Department in accordance with appropriate federal guidelines established in accordance with the Stafford Act; and

WHEREAS, the public and [municipality] in the county was given an opportunity to fully participate in the preparation of the 2017 Montgomery County Hazard Mitigation Plan preparation process; and

NOW THEREFORE BE IT RESOLVED, that the [governing body] of [municipality] hereby adopts the 2017 Montgomery County Hazard Mitigation Plan; and

BE IT FUTHER RESOLVED, the [municipal manager/ secretary] is directed to formally submit the a copy of this resolution to Montgomery County to be transmitted to Pennsylvania Emergency Management Agency (PEMA) and Federal Emergency Management Agency (FEMA) to enable the plan's final approval.

Appendix E – Critical Facilities

Medical Facilities in Montgomery County									
Facility	Number	Prefix	Road	Suffix	Postal Address	Ownership	Municipality		
General Hospitals									
Abington Memorial Hospital	1200		Old York	Rd	Abington	nonprofit	Abington		
Einstein Medical Center- Elkins Park	60		Township Line	Rd	Elkins Park	profit	Cheltenham		
Holy Redeemer Hospital and Medical Center	1648		Huntingdon	Pk	Meadowbrook	nonprofit	Abington		
Main Line Hospitals - Bryn Mawr	130 S		Bryn Mawr	Ave	Bryn Mawr	nonprofit	Lower Merion		
Main Line Hospitals - Lankenau	100		Lancaster	Ave	Wynnewood	nonprofit	Lower Merion		
Mercy Suburban Hospital	2701		DeKalb	Pk	Norristown	nonprofit	East Norriton		
Montgomery Hospital	1301		Powell	St	Norristown	nonprofit	Norristown		
Lansdale Hospital	100		Medical	Dr	Lansdale	profit	Hatfield Township		
Pottstown Memorial Medical Center	1600 E		High	St	Pottstown	profit	Pottstown		
Specialty Hospitals									
Eagleview Hospital	100		Eagleview	Rd	Eagleview	nonprofit	Lower Providence		
Horsham Clinic	722 E		Butler	Pk	Ambler	profit	Horsham		
Montgomery County Emergency Service Inc.	50		Beech	Dr	Norristown	nonprofit	West Norriton		
Norristown State Hospital	1001		Sterigere	St	Norristown	state	Norristown		
Brook Glen Behavior Hospital- Northwestern Institute	7170		Lafayette	Ave	Fort Washington	profit	Whitemarsh		
Valley Forge Medical Center and Hospital	1033 W		Germanstown	Pk	Norristown	profit	East Norriton		
Montgomery County Ambulatory Surgery Centers									
Abington Surgical Center	2710		Blair Mill	Rd	Willow Grove	profit	Upper Moreland		
Delaware Valley Laser Surgery Institute	2		Bala	Pz	Bala Cynwyd	profit	Lower Merion		
Endoscopic Associates	1235		Old York	Rd	Abington	profit	Abington		
Foundation Surgery Ctr. at Fort Washington	467		Pennsylvania	Ave	Fort Washington	profit	Upper Dublin		
Hillmont Endoscopy Center	1811		Bethlehem	Pk	Flourtown	profit	Springfield		
Holy Redeemer Ambulatory Surgery Center	821		Huntingdon	Pk	Huntingdon Valley	profit	Abington		
Surgery Center at Limerick	420		Linfield Trappe	Rd	Limerick	profit	Limerick		
Kremer Laser Eye Center	601 S		Henderson	Rd	King of Prussia	profit	Upper Merion		
Main Line Surgery Center	10		Presidential	Bldv	Bala Cynwyd	profit	Lower Merion		
Wills Eye Surgery Center - Plymouth	625		Ridge	Pk	Conshohocken	profit	Plymouth		
Physician's Care Surgical Hospital	454		Enterprise	Drive	Royersford	profit	Limerick		

Montgomery County 2017 Hazard Mitigation Plan

Montgomery County Nursing Home Facilities, 2017

Map #	Long-Term Care Facility	Street Number	Prefix	Street Name	Suffix	Post Office	Municipality	Type of Ownership	Number of Beds
1	Ambler Extended Care Center	32	S	Bethlehem	Pk	Ambler	Ambler	1	100
3	Anistacare at Meadow Spring	845		Germanstown	Pk	Plymouth Meeting	Plymouth	2	153
4	Arman Luthem Home	250	N	Bethlehem	Pk	Ambler	Ambler	1	61
5	Beaumont at Bryn Mawr	601	N	Ithan	Ave	Bryn Mawr	Lower Merion	1	44
7	Brookside Healthcare and Rehab. Facility	2630		Woodland	Rd	Roslyn	Abington	2	120
8	Chestnut Hill Lodge Health and Rehab Center	8833		Stenton	Ave	Wynndoor	Springfield	2	181
10	Dock Terrace	275		Dock	Dr	Lansdale	Towamencin	1	72
11	Dresher Hill Health and Rehabilitation Center	1390		Camp Hill	Rd	Fort Washington	Upper Dublin	2	118
12	Edgehill Nursing and Rehabilitation Center	146		Edgehill	Rd	Glenside	Abington	1	60
13	Elkins Crest Health and Rehabilitation Center	265	E	Towship Lane	Rd	Elkins Park	Cheltenham	2	150
14	Elm Terrace Gardens	660	N	Broad	St	Lansdale	Lansdale	1	72
15	Fairview Care Center of Papermill Road	850		Papermill	Rd	Glenside	Springfield	2	129
17	Foulkeways at Gwynedd	1120		Meetinghouse	Rd	Gwynedd	Lower Gwynedd	2	52
9	Fox Subacute at Clara Burke	251		Stenton	Ave	Plymouth Meeting	Whitemarsh	2	60
18	Frederick Mennonite Community	2849		Big	Rd	Frederick	Upper Frederick	1	61
19	Garden Spring Center	1113	N	Easton	Rd	Willow Grove		2	173
21	Gwynedd Estates	301		Norristown	Rd	Ambler	Lower Gwynedd	1	40
22	Gwynedd Square Center for Nursing and Conv. Care	773		Summitstown	Pk	Lansdale	Upper Gwynedd	3	181
23	Harston Hall	350		Haws	Ln	Flourtown	Springfield	2	120
24	Health Center at the Hill in Whitemarsh	4000		Fox Hound	Dr	Lafayette Hills	Whitemarsh	1	60
25	Hillcrest Center	1245		Church	Rd	Wyncote	Cheltenham	2	180
26	Holy Redeemer Hospital Transitional Care Unit	1648		Huntingdon	Pk	Meadowbrook	Abington	1	21
27	Hopkins Center	8100		Washington	Ln	Wyncote	Cheltenham	2	107
28	Ivy Hill Rehabilitation and Nursing Center	1401		Ivy Hill	Rd	Wynmoor	Springfield	2	145
29	Lankenau Hospital Transitional Care Center	100		Lancaster	Ave	Wynnewood	Lower Merion	1	22
30	Luther Woods Convalescent	313	W	County Line	Rd	Harboro	Horsham	3	140
31	Madlyn and Leonard Abramson Center for Jewish Life	1425		Horsham	Rd	North Wales	Horsham	1	324
32	Manorcare Health Service of Pottstown	724	N	Charlotte	St	Pottstown	Pottstown	2	150
33	Manorcare Health Services of Huntingdon Valley	3430		Huntingdon	Pk	Huntingdon Valley	Lower Merion	2	125
34	Manorcare Health Services of King of Prussia	600	W	Valley Forge	Rd	King of Prussia	Upper Merion	2	170
35	Manorcare Health Services of Lansdale	640		Bethlehem	Pk	Montgomeryville	Montgomery	2	155
37	Masonic Home of Pennsylvania	801		Ridge	Pk	Lafayette Hill	Whitemarsh	1	160
38	Meadowood	3205		Skippack	Pk	Worcester	Worcester	1	59
39	Meadows at Shannondell	6000		Shannondell	Dr	Audubon	Lower Providence	2	60
2	Meadowview Rehab and Nursing Center	9209		Ridge	Pk	Philadelphia	Whitemarsh	2	244
48	Norriton Square Nursing and Rehab Center	1700		Pine	St	Norristown	Norristown	2	99
42	Parkhouse Geriatric and Rehabilitation Center	1600		Black Rock	Rd	Royersford	Upper Providence	5	467
43	Pennsburg Manor	530		Macoby	St	Pennsburg	Pennsburg	3	120
44	Peter Becker Community	800		Maple	Ave	Harleysville	Franconia	1	72
45	Phoebe Wyncote	208		Ferbrook	Ave	Wyncote	Cheltenham	1	58
46	Pottstown Memorial Med. Center Transitional Care Unit	1600	E	High	St	Pottstown	Pottstown	1	8
47	Regina Community Nursing Center	550	E	Fornace	St	Norristown	Norristown	1	121
49	Rydal Park of Philadelphia Presbyterian Homes Inc.	1515		Fairway	Fairway	Rydal	Abington	1	114
50	Saint Joseph's Villa	110	W	Wissahickon	Ave	Flourtown	Springfield	4	106
51	Saint Mary's Manor, Lansdale	701		Lansdale	Ave	Lansdale	Lansdale	4	120
52	Sanatoga Center	225		Evergreen	Rd	Pottstown	Lower Pottsgrove	2	130
53	Saunders House	100		Lancaster	Ave	Wymelwood	Lower Merion	1	180

Montgomery County 2017 Hazard Mitigation Plan

Montgomery County Nursing Home Facilities, 2017

Map #	Long-Term Care Facility	Street Number	Prefix	Street Name	Suffix	Post Office	Municipality	Type of Ownership	Number of Beds
54	Silver Stream Center	905		Penllyn	Pk	Spring House	Lower Gwynedd	2	120
55	Souderton Mennonite Homes	207 W		Summit	St	Souderton	Franconia	1	71
57	St. Joseph's Manor	1616		Huntingdon	Pk	Meadowbrook	Abington	1	296
58	Suburban Woods Health and Rehabilitation Center	2751		DeKalb	Pk	Norristown	East Norriton	2	120
59	Towne Manor East	2004		Old Arch	Rd	Norristown	East Norriton	1	120
60	Towne Manor West	205 E		Johnson	Hy	Norristown	East Norriton	1	119
61	Waverly Heights	1400		Waverly	Rd	Gladwynne	Lower Merion	1	49
62	White Ballet Subacute Center	412 S		York	Rd	Halboro	Halboro	2	37
63	Willow Ridge Center	3485		Davisville	Rd	Halboro	Upper Moreland	2	92
6	Willowbrook at Brittany Points Estates	1001		Valley Forge	Rd	Lansdale	Upper Gwynedd	1	92
16	Willowbrook at Fort Washington Estates	735		Susquehanna	Rd	Fort Washington	Upper Dublin	1	40
41	Willowbrook at Normandy Farms Estates Nursing Facility	8000		Twin Silos	Dr	Blue Bell	Whitpain	1	73
56	Willowbrook at Spring House Estates	728		Norristown	Rd	Lower Gwynedd	Lower Gwynedd	1	96
40	Wyndmoor Hills Health Care	8601		Stenton	Ave	Wyndmoor	Springfield	2	77
County Total									7066

Source: PA Department of Health, 2017.

- 1 Nonprofit corporation
- 2 For-profit corporation
- 3 For-profit partnership
- 4 Church owned and operate
- 5 County owned

Municipal Buildings

Municipality	Location	Police Station	Municipality	Location	Police Station
Abington Township	1176 Old York Rd, Abington	Yes	Pennsburg Borough	76 West Sixth St, Pennsburg	Yes
Ambler Borough	122 East Butler Ave, Ambler	Yes	Perkiomen Township	1 Traape Rd, Collegeville	No
Bridgetown Borough	63 W. Four St, Bridgetown	Yes	Plymouth Township	700 Belvoir Rd, Plymouth Meeting	Yes
Bryn Athyn Borough	2835 Buck Road, Bryn Athyn	Yes	Pottstown Borough	100 East High St, Pottstown	Yes
Cheltenham Township	8230 Old York Rd, Elkins Park	Yes	Red Hill Borough	56 W. 4th St, Red Hill	No
Collegeville Borough	491 E Main St, Collegeville	Yes	Rockledge Borough	121 Huntingdon Pike, Rockledge	Yes
Conshohocken Borough	400 Fayette St., Conshohocken	Yes	Royersford Borough	300 Main St, Royersford	Yes
Douglass Township	1320 E Philadelphia Ave, Gilbertsville	Yes	Salford Township	139 Ridge Rd, Tylersport	No
East Greenville Borough	206 Main Street, East Greenville	Yes	Schwensville Borough	140 Main St, Schwensville	Yes
East Norriton Township	2501 Stanbridge Street, Norristown	Yes	Skippack Township	1246 Bridge Rd, Skippack	No
Franconia Township	671 Allentown Rd, Franconia	Yes	Souderton Borough	31 W Summit St, Souderton	Yes
Green Lane Borough	Main Street, Green Lane	No	Springfield Township	1510 Paper Mill Rd, Wyndmoor	Yes
Hatboro Borough	414 S York Rd, Hatboro	Yes	Telford Borough	122 Penn Ave, Telford	Yes
Hatfield Township	401 S Main Street, Hatfield	Yes	Towamencin Township	1090 Troxel Rd, Kulpsville	Yes
Horsham Township	1950 School Road, Hatfield	Yes	Trappe Borough	525 West Main St, Trappe	No
Jenkintown Borough	1025 Horsham Road, Horsham	Yes	Upper Dublin Township	801 Loch Alsh Ave, Fort Washington	Yes
Lansdale Borough	700 Summit Ave, Jenkintown	Yes	Upper Frederick Township	Big Road, Obelisk	No
Limerick Township	One Vine St, Lansdale	Yes	Upper Gwynedd Township	Parkside Place, West Point	Yes
Lower Frederick Township	646 West Ridge Pike, Limerick	Yes	Upper Hanover Township	1704 Pittsburg Rd, East Greenville	No
Lower Gwynedd Township	53 Spring Mount Road, Spring Mount	Yes	Upper Merion Township	175 West Valley Forge Rd, King of Prussia	Yes
Lower Merion Township	1130 N. Bethlehem Pike, Spring House	Yes	Upper Moreland Township	117 Park Ave, Willow Grove	Yes
Lower Moreland Township	75 East Lancaster Ave, Ardmore	Yes	Upper Pottsgrove Township	1409 Farmington Ave, Pottstown	Yes
Lower Providence Township	640 Red Lion Rd, Huntingdon Valley	Yes	Upper Providence Township	1286 Black Rock Rd, Oaks	Yes
Lower Salford Township	2199 Buchert Rd, Pottstown	Yes	Upper Salford Township	Salford Station Rd, Salfordville	No
Lower Southampton Township	100 Parklane Dr., Eagleville	Yes	West Conshohocken Borough	112 Ford St, West Conshohocken	Yes
Marlborough Township	379 Main St, Harleysville	Yes	West Norriton Township	1630 West Marshall St, Norristown	Yes
Montgomery Township	6040 Upper Ridge Rd, Green Lane	Yes	West Pottsgrove Township	980 Grosstown Rd, Stowe	Yes
Narberth Borough	1001 Stump Rd, Montgomeryville	Yes	Whitmarsh Township	616 Germantown Pike, Lafayette Hills	Yes
New Hanover Township	100 Conway Ave, Narberth	Yes	Worcester Township	960 Wentz Rd, Blue Bell	Yes
Norristown	2943 North Charlotte St, Gilbertsville	Yes			
North Wales Borough	235 East Airy St, Norristown	Yes			
	300 School St, North Wales	Yes			

Montgomery County 2017 Hazard Mitigation Plan

Public Safety			
Municipality	Number of Officers		Location of Police Station
	Full-Time	Part-Time	
Abington Township	92	0	1166 Old York Road, Abington, PA
Ambler Borough	13	0	122 E. Butler Ave., Ambler, PA
Bridgeport Borough	7	7	95 W. 4th St., Bridgeport, PA
Bryn Athyn Borough	5	1	2835 Buck Road, Bryn Athyn, PA
Cheltenham Township	68	0	8230 Old York Road, Elkins Park, PA
Collegeville Borough	8	0	491 Main St., Collegeville, PA
Conshohocken Borough	21	2	400 Fayette St., Conshohocken, PA
Douglass Township	12	1	1320 E. Philadelphia Ave., Gilbertsville, PA
East Norriton Township	29	0	2501 Stanbridge St., Norristown, PA
Franconia Township	11	2	671 Allentown Road, Franconia, PA
Hatboro Borough	14	0	120 E. Montgomery Ave., Hatboro, PA
Hatfield Township	28	0	2000 School Road, Hatfield, PA
Horsham Township	40	0	1025 Horsham Road, Horsham, PA
Jenkintown Borough	11	4	700 Summit Ave., Jenkintown, PA
Lansdale Borough	24	4	35 Vine St., Lansdale, PA
Limerick Township	27	0	646 W. Ridge Pike, Limerick, PA
Lower Frederick Township	3	0	53 Spring Mount Road, Zieglersville, PA
Lower Gwynedd Township	18	1	1130 N. Bethlehem Pike, Spring House, PA
Lower Merion Township	136	0	71 E. Lancaster Ave, Ardmore, PA 19003
Lower Moreland Township	22	0	640 Red Lion Road, Huntingdon Valley, PA
Lower Pottsgrove Township	20	0	2199 Buchert Road, Pottstown, PA
Lower Providence Township	31	1	100 Parklane Drive, Eagleville, PA
Lower Salford Township	21	0	474 Main Street, Harleysville, PA 19438
Marlborough Township	3	3	6040 Upper Ridge Road, Green Lane, PA
Montgomery Township	36	0	1001 Stump Road, Montgomeryville, PA
Narberth Borough	5	0	100 Conway Ave, Narberth, PA
New Hanover Township	10	2	2943 N. Charlotte St., Gilbertsville, PA
Norristown Borough	65	0	235 E. Airy Street, Norristown, PA
North Wales Borough	4	3	300 School Street, North Wales, PA
Plymouth Township	46	0	700 Belvoir Rd., Plymouth Meeting PA
Pottstown Borough	46	0	100 E. High Street, Pottstown, PA
Rockledge Borough	4	8	1 Park Ave., Rockledge, PA
Royersford Borough	7	4	300 Main Street, Royersford, PA
Souderton Borough	6	5	31 W. Summit Street, Souderton, PA
Springfield Township	28	0	1510 Paper Mill Road, Wyndmoor, PA
Telford Borough	6	3	100 Penn Ave., Telford, PA
Towamencin Township	23	0	1655 Sumneytown Pike, Kulpsville, PA
Upper Dublin Township	40	0	801 Loch Alsh Ave., Fort Washington, PA
Upper Gwynedd Township	20	0	Parkside Place, West Point, PA
Upper Merion Township	65	0	175 W. Valley Forge Road, King of Prussia, PA
Upper Moreland Township	34	0	117 Park Ave., Willow Grove, PA
Upper Perkiomen Police			88 W. 6th St., Pottstown, PA
Upper Pottsgrove Township	9	3	1420 Heather Place, Pottstown, PA
Upper Providence Township	29	0	1286 Black Rock Road, Oaks, PA
West Conshohocken Borough	12	4	1001 New DeHaven St., West Conshohocken, PA
West Norriton Township	27	0	1630 Marshall Street, Jeffersonville, PA
West Pottsgrove Township	8	3	980 Grosstown Road, Stowe, PA
Whitemarsh Township	35	0	616 Germantown Pike, Lafayette Hill, PA
Whitpain Township	30	0	960 Wentz Road, Blue Bell, PA
Pennsylvania State Police (King of Prussia)			251 Flinthill Rd, King of Prussia, PA 19406
Pennsylvania State Police (Skipack)	-	-	2047 Bridge Road, Schwenksville, PA
TOTALS	1260	61	

Colleges and Universities

Name	Number	Prefix	Road	Suffix	Postal Address	Municipality	Enrollment
Arcadia University	450 S		Easton Road	Rd	Glenside	Cheltenham	3850
Biblical Theological Seminary*	200 N	Main	College	St	Hatfield	Hatfield T	337
Bryn Athyn College of the New Church				Dr	Bryn Athyn	Bryn Athyn	302
Bryn Mawr College	101 N	Merion	Merion	Ave	Bryn Mawr	Lower Merion	1709
Calvary Baptist Theological Seminary	1380	Valley Forge	Valley Forge	Rd	Lansdale	Towamencn	106
DeSales University-Lansdale Campus	815	Summitown	Summitown	Pk	Lansdale	Lansdale	150
Devry's University	1140	Virginia	Virginia	Dr	Fort Washington	Upper Dublin	900
Eastern Baptist Theological Seminary (Palmer)	588 N	Gulph	Gulph	Rd	King of Prussia	Upper Merion	252
Gratz College	7605	Old York	Old York	Rd	Melrose Park	Cheltenham	1002
Gwynedd-Mercy College	1325	Summitown	Summitown	Pk	Gwynedd Valley	Lower Gwynedd	2700
Harcum College	750	Montgomery	Montgomery	Ave	Bryn Mawr	Lower Merion	1516
Haverford College	370	Lancaster	Lancaster	Ave	Haverford	Lower Merion	1290
Manor College	700	Fox Chase	Fox Chase	Rd	Jenkintown	Abington	858
Montgomery County Community College-Main	340	Dekalb Pike	Dekalb Pike	Pk	Blue Bell	Whitpain	12742
Montgomery County Community College-West	101	College	College	Dr	Pottstown	Pottstown	**
Pennsylvania College of Optometry	8380	Old York	Old York	Rd	Elkins Park	Cheltenham	1007
Pennsylvania State University-Abington Campus	1600	1600 Woodland Road	1600 Woodland Road	Rd	Abington	Abington	4000
Reconstructionist Rabbinical College	1299	Church	Church	Rd	Wyncote	Cheltenham	72
Rosemont College	1400	Montgomery	Montgomery	Ave	Rosemont	Lower Merion	900
Saint Charles Borromeo Theological Seminary	1000 E	Wynnwood	Wynnwood	Rd	Wynnwood	Lower Merion	167
Temple University-Ambler Campus	580	Meetinghouse	Meetinghouse	Rd	Ambler	Upper Dublin	3000
Temple University-Fort Washington Campus	401	Commerce	Commerce	Dr	Fort Washington	Upper Dublin	
University of Phoenix	1170	Devon	Devon	Dr	Wayne	Upper Merion	
Ursinus College	610 E	Main	Main	St	Collegeville	Collegeville	1556
Westminster Theological Seminary	2960 W	Church	Church	Rd	Glenside	Cheltenham	613

*Proposed relocation of the Seminary in 2018

** part of Blue Bell Campus Enrollment

Montgomery County 2017 Hazard Mitigation Plan

Private Schools

School Name	Address	Municipality	Enrollment
Abington Friends School	675 Washington Ln Jenkintown PA 19046	Abington	537
Academy of the New Ch Boys	2815 Benade Circle Bryn Athyn PA 19009	Bryn Athyn	113
Academy of the New Ch Girls	2815 Huntington Pk Bryn Athyn PA 19009	Bryn Athyn	97
Ancillae Assumpta Academy	2025 Church Rd Wyncote PA 19095	Cheltenham	595
Baldwin School	701 W. Montgomery Ave Bryn Mawr PA 19010	Lower Merion	571
Beth Shalom Goldman Nur & Kdg	8231 Old York Road Elkins Park PA 19027	Cheltenham	4
Beth Tikvah Bnai Jeshurun	1001 Paper Mill Rd Erdenheim PA 19038	Springfield	0
Bethel Christian Academy	2901 W. Cheltenham Avenue Wyncote PA 19095	Cheltenham	30
Bishop McDevitt High School	125 Royal Ave Wyncote PA 19095	Cheltenham	434
Blessed Teresa of Calcutta Education Center	256 Swamp Pike Schwenksville PA 19473	Limerick	290
Bryn Athyn Church School	600 Tomlinson Road Bryn Athyn PA 19009	Bryn Athyn	261
Calvary Baptist School	1380 S. Valley Forge Road Lansdale PA 19446	Towamencin	370
Cheder Chabad Philadelphia	276 South Bryn Mawr Avenue Bryn Mawr PA 19010	Lower Merion	73
Christopher Dock Men HS	1000 Forty Foot Rd Lansdale PA 19446	Towamencin	790
Conshohocken Catholic School	130 West 5th Ave. Conshohocken PA 19428	Conshohocken	0
Corpus Christi School	920 Sumneytown Pike Lansdale PA 19446	Upper Gwynedd	477
Coventry Christian Schools Inc	699 North Pleasantview Road Pottstown PA 19464	Lower Pottsgrove	239
Family Worship Center Kingergarten	1000 Troxel Road Lansdale PA 19446	Towamencin	21
Friends Central School	1101 City Ave Wynnewood PA 19086	Lower Merion	779
Friendship House	1333 Cow Path Road Hatfield PA 19440	Hatfield	0
Gan Chabad of the Main Line	625 Montgomery Avenue Merion Station PA 19066	Lower Merion	0
Germantown Academy	340 Morris Road Fort Washington PA 19034	Whitmarsh	1128
Good Shepherd Catholic Regional School	835 North Hills Ave Ardley PA 19038	Abington	162
Grace Christian School	320 N 3rd St Telford PA 18969	Souderton	68
Gwynedd Friends	Rt 202 and Sumneytown Pike Gwynedd PA 19436	Lower Gwynedd	11
Gwynedd Mercy Acad El Division	616 Norristown Rd P.O. Box 241 Springhouse PA 19477	Lower Gwynedd	411
Gwynedd Mercy High School	1345 Sumneytown Pk Gwynedd Valley PA 19437	Lower Gwynedd	376
Haverford School	450 Lancaster Ave Haverford PA 19041	Lower Merion	978
Hill School **	717 East High St. Pottstown PA 19464	Pottstown	502
Holy Cross Regional Catholic School	701 Locust Street Collegeville PA 19426	Collegeville	560
Holy Rosary Regional Catholic School	3040 Walton Rd Plymouth Meeting PA 19462	Plymouth	296
Huntingdon Valley Christ Academy	1845 Byberry Road Huntingdon Valley PA 19006	Upper Moreland	171
I S Kosloff Torah Academy High School for Girls	50 Montgomery Avenue Bala Cynwyd PA 19004	Lower Merion	77
Indian Creek Mennonite School	Box 637 Harleysville Pike Telford PA 18969	Franconia	0
Indian Valley Kindergarten	423 N Main St Souderton PA 18964	Souderton	9
Jack M. Barrack Hebrew Academy	272 South Bryn Mawr Avenue Bryn Mawr PA 19010	Lower Merion	380
Kids in the Village Early Learning Center	3050 West Germantown Pike Eagleville PA 19403	Lower Providence	7
La Salle College High School	8605 Cheltenham Ave Wyndmoor PA 19038	Springfield	1109
Lansdale Catholic High School	700 Lansdale Ave. Lansdale PA 19446	Lansdale	703
Life Changing Christian Academy	518 Ryers Avenue Cheltenham PA 19012	Cheltenham	0
Main Line Reform Temple	410 Montgomery Ave Wynnewood PA 19096	Lower Merion	22
Mary Mother of the Redeemer School	1321 Upper State Road North Wales PA 19454	Montgomery	591
Mater Dei Catholic School	493 E. Main Street Lansdale PA 19446	Lansdale	415
Meadowbrook School	1641 Hampton Road Meadowbrook PA 19046	Abington	119
Merion Mercy Academy	511 Montgomery Ave Merion Station PA 19066	Lower Merion	552
Mesivta High School of Greater Philadelphia	314 Levering Mill Road Bala Cynwyd PA 19004	Lower Merion	29
Miquon School	2025 Harts Lane Conshohocken PA 19428	Whitmarsh	152
Mother Teresa Regional Catholic School	405 Allendale Road King of Prussia PA 19046	Upper Merion	205
Mount Saint Joseph Academy	120 W Wissahickon Ave Flourtown PA 19031	Springfield	530
New Life Academy	565 Freeman School Rd Schwenksville PA 19473	Lower Salford	0
Open Door Christian Academy	1260 Fort Washington Ave Fort Washington PA 19034	Upper Dublin	107
Our Lady of Mercy Regional Catholic School	29 Conwell Dr Maple Glen PA 19002		425
Penn Christian Academy	50 W Germantown Pike East Norriton PA 19401	East Norriton	127
Perkiomen School **	200 Seminary Street Pennsburg PA 18073	Pennsburg	340
Philadelphia Montgomery Christian Academy	35 Hillcrest Ave Erdenheim PA 19038	Springfield	253
Plymouth Meeting Friends School	2150 Butler Pike Plymouth Meeting PA 19462	Plymouth	127
Pope John Paul II High School	181 Rittenhouse Road Royersford PA 19468	Upper Providence	869
Presentation BVM School	105 Old Soldiers Road Cheltenham PA 19012	Cheltenham	209
Quaker School At Horsham	250 Meetinghouse Road Horsham PA 19044	Horsham	52
Queen of Angels Regional Catholic School	401 N. Easton Road Willow Grove PA 19090	Upper Moreland	229
Red Hill Christian School	208 E 5th St Red Hill PA 18076	Red Hill	12
Regina Angelorum Academy	105 Argyle Road Ardmore PA 19003	Lower Merion	95
Regina Coeli Academy	1525 Marian Road Abington PA 19001	Abington	83

Montgomery County 2017 Hazard Mitigation Plan

Private Schools

School Name	Address	Municipality	Enrollment
Rosemont School of Holy Child	1344 Montgomery Ave Rosemont PA 19010	Lower Merion	252
Saint Miriam Academy	654 Bethlehem Pike Flourtown PA 19031	Whitemarsh	0
Salford Mennonite Kindergarten	480 Groffs Mill Rd Harleysville PA 19438	Lower Salford	9
Shipley School	814 Yarrow St Bryn Mawr PA 19010	Lower Merion	838
St Albert the Great School	214 Welsh Rd Huntingdon Valley PA 19006 *	Lower Moreland	493
St Aloysius	220 N. Hanover St. Pottstown PA 19464	Pottstown	195
St Basil Academy	711 Fox Chase Rd Jenkintown PA 19046	Abington	251
St Francis of Assisi School	601-A Buttonwood St Norristown PA 19401	Norristown	190
St Gabriels Hall	1350 Pawlings Road Audubon PA 19407	Lower Providence	142
St Genevieve School	1237 Bethlehem Pike Flourtown PA 19031	Springfield	267
St Helena School	1499 DeKalb Pike Blue Bell PA 19422	Whitpain	510
St Hilary of Poitiers School	920 Susquehanna Rd Rydal PA 19048	Abington	234
St Joseph The Protector School	2336 Fairhill Ave Glenside PA 19038	Abington	361
St Katherine Day Sch -Lower/Jr	930 Bowman Ave Wynnewood PA 19096	Lower Merion	47
St Margaret School	227 N Narberth Ave Narberth PA 19072	Narberth	255
St Mary School	40 Spring Mount Rd Schwenksville PA 19473	Lower Frederick	231
St Philip Neri School	3015 Chestnut St Lafayette Hill PA 19444	Whitemarsh	473
Stowe Lighthouse Christ Acad	527 Glasgow Street Stowe PA 19464	West Pottsgrove	0
theVillage School	452 South Roberts Rd Rosemont PA 19010	Lower Merion	44
Tiferet Bet Israel	1920 Skippack Pike Blue Bell PA 19422	Whitpain	0
Torah Academy of Greater Philadelphia	742 Argyle Road Wynnewood PA 19096	Lower Merion	301
Trinity Christian Academy	4055 Davisville Rd Hatboro PA 19040-2929	Upper Moreland	0
Valley Christian School	2364 Huntingdon Pike Huntingdon Valley PA 19006	Lower Moreland	108
Valley Forge Baptist Academy	616 S Trappe Rd Collegeville PA 19426	Upper Providence	176
Villanova Acad Honor Studies	1860 Montgomery Ave Villanova PA 19085	Lower Merion	105
Visitation BVM School	190 North Trooper Road Norristown PA 19403	West Norriton	567
Waldron Mercy Academy	513 Montgomery Ave Merion Station PA 19066	Lower Merion	467
West Hill School	1455 West Hill Road Rosemont PA 19010	Lower Merion	0
Wyndcroft School	1395 Wilson Street Pottstown PA 19464	Pottstown	213
Yeshiva Lab School	612 Montgomery Avenue Narberth PA 19072	Narberth	17
Zipporah S Abramson Ctr. for Early Childhood Ed.	239 Welsh Road Maple Glen PA 19002	Upper Dublin	7

Source: PA Department of Education reflecting enrollment for the 2015- 2016 school year

* moved to Keim Street in Lower Pottsgrove Township August 2017.

** boarding schools

Montgomery County 2017 Hazard Mitigation Plan

Montgomery County Public Elementary Schools

School District	Elementary School	Number	Prefix	Road Name	Suffix	Postal Address	Municipality	Enrollment
Abington	Copper Beech	825	N	Easton	Rd	Glenside	Abington	1069
	Highland	1301		Edgehill	Rd	Abington	Abington	517
	McKinley	370		Cedar	Rd	Elkins Park	Abington	726
	Overlook	1750		Edgehill	Rd	Abington	Abington	527
	Roslyn	2565		Susquehanna	Rd	Roslyn	Abington	512
Boyetown Area	Rydal	1160		Huntington	Pk	Huntington Valley	Abington	562
	Willow Hill	1700		Coakley	Ave	Willow Grove	Abington	404
	Gilbertville	36		Gange	Rd	Gilbertville	Douglas	815
Cheltenham Township	New Hanover-Upper Frederick	2547		Big	Rd	Frederick	New Hanover	788
	Elkins Park	8149		New Second	St	Elkins Park	Cheltenham	720
	Glenside	400		Harrison	Ave	Glenside	Cheltenham	485
	Myers	7609		Montgomery	Ave	Elkins Park	Cheltenham	369
Coltsville	Wyncote	333		Rices Mill	Rd	Wyncote	Cheltenham	366
	Colonial	230		Flourtown	Rd	Plymouth Meeting	Plymouth	720
	Conshohocken	301		Harry	St	Conshohocken	Conshohocken	183
	Plymouth	542		Plymouth	Rd	Plymouth Meeting	Plymouth	544
Hatboro-Horsham	Ridge Park	200		Karns	Ln	Conshohocken	Plymouth	454
	Whitemarsh	4120		4120 Joshua Road	Rd	Lafayette Hill	Whitemarsh	406
	Blair Mill	109		Bender	Rd	Hatboro	Horsham	464
	Crooked Bluff	70		Meadowbrook	Ave	Hatboro	Hatboro	286
Jenkintown	Hallowell	200		Maple	Ave	Horsham	Horsham	307
	Pennypack	130		Spring	Ave	Hatboro	Hatboro	288
	Simmons	411		411 Babylon Road	Rd	Horsham	Horsham	681
	Jenkintown			West & Highland	Ave	Jenkintown	Jenkintown	323
Lower Merion	Belmont Hills	200		200 School Street	St	Basle Cynwyd	Lower Merion	485
	Cynwyd	101	W	Levering	Rd	Basle Cynwyd	Lower Merion	549
	Gladwyne	230	W	Righter's Mill	Rd	Gladwyne	Lower Merion	729
	Merion	549	S	Blowman	Ave	Merion Station	Lower Merion	610
	Penn Valley	301		Righter's Mill	Rd	Nearborth	Lower Merion	666
Lower Moreland Township	Penn Wynne	250		Haverford	Rd	Wynnewood	Lower Merion	739
	Murray Avenue	2551		Murray	Ave	Huntington Valley	Lower Moreland	567
Methuën	Pine Road	3737		Pine	Rd	Huntington Valley	Lower Moreland	938
	Arrowhead	232		Level	Rd	Eagleville	Lower Providence	278

Montgomery County Public High Schools

School District	High School	Number	Prefix	Road Name	Suffix	Postal Address	Municipality	2016 Enrollment
	North Montco Technical Career Center	1288		Sumneytown	Pk	Lansdale	Towamencin	970
	Western Montgomery Career and Technology Center	77		Graterford	Rd	Limerick	Limerick	536

Montgomery County 2017 Hazard Mitigation Plan

Montgomery County Public Elementary Schools

School District	Elementary School	Number	Prefix	Road Name	Suffix	Postal Address	Municipality	Enrollment
	Franconia	366		Harleysville	Pk	Souderton	Franconia	477
	Lower Salford	250		Maple	Ave	Harleysville	Lower Salford	399
	Oak Ridge	465		Moyer	Rd	Harleysville	Lower Salford	511
	Salford Hills	2721		Barnett	Rd	Harleysville	Upper Salford	294
	Vernfield	960		Long	Rd	Telford	Franconia	351
	West Broad Street	342	W	Broad	St	Souderton	Franconia	529
Spring-Ford	Brooke	339	N	Lewis	Rd	Royersford	Limerick	412
	Evans	125		Sunset	Rd	Limerick	Limerick	622
	Limerick	81		Limerick Center	Rd	Royersford	Limerick	359
	Oaks			Oaks School	Dr	Oaks	Upper Providence	541
	Royersford	450		Spring	St	Royersford	Upper Providence	428
	Spring Ford 5-6 Center	833	S	Lewis	Rd	Royersford	Upper Providence	1249
	Upper Providence	833	S	Lewis	Rd	Royersford	Upper Providence	536
Springfield Township	Springfield Township Elementary Enfield	1118		1118 Church Road	Rd	Oreland	Springfield	352
	Springfield Township Elementary Erdenehl	500		500 Haws Lane	Ln	Flourtown	Springfield	714
Upper Dublin	Maple Glen	1581		Fort Washington	Ave	Maple Glen	Upper Dublin	416
	Fort Washington	1010		Fort Washington	Ave	Fort Washington	Upper Dublin	476
	Jarrettown	1520		Limekillin	Pk	Dresher	Upper Dublin	459
	Thomas Fitzwater	12		12 School Lane	Ln	Willow Grove	Upper Dublin	436
Upper Merion	Bridgeport	900		Bush	St	Bridgeport	Bridgeport	376
	Caley	725		Caley	Rd	King of Prussia	Upper Merion	474
	Candlebrook	310		Prince Frederick		King of Prussia	Upper Merion	401
	Roberts	889		Croton	Rd	Wayne	Upper Merion	348
Upper Moreland Township	Upper Moreland Primary School	3980		3980 Orangemans Road	Rd	Hatboro	Upper Moreland	696
Upper Perkiomen	Marlborough	1450		1450 Gravel Pike	Pk	Green Lane	Upper Hanover	653
Wissahickon	Blue Bell	801		Symphony	Ln	Blue Bell	Whitpain	419
	Lower Gwynedd	571		Houston	Rd	Ambler	Lower Gwynedd	463
	Mattson	131		Rosemary	Ave	Ambler	Ambler	171
	Shady Grove	351		West Skippack	Pk	Ambler	Whitpain	481
	Stony Creek	1721		Yost	Rd	Blue Bell	Whitpain	367

Montgomery County 2017 Hazard Mitigation Plan

Montgomery County Public Middle Schools/ Junior High Schools

School District	Middle/Junior High School	Number	Prefix	Road Name	Suffix	Postal Address	Municipality	Enrollment
Abington	Ablington Junior High School	2056		Susquehanna	Rd	Abington	Abington	1,733
Boyetown	Boyetown Area Junior High East	2020		Big Road		Gilbertsville	New Hanover	864
Cheltenham Township	Cedarbrook Middle School	300		Longfellow	Ave	Wyncote	Cheltenham	696
Colonial	Colonial Middle School	716		Belvoir	Rd	Plymouth Meeting	Plymouth	1,028
Hatboro-Horsham	Keith Valley Middle School	227		Meetinghouse	Rd	Horsham	Horsham	1,220
Lower Merion	Bala Cynwyd Middle School	510		Bryn Mawr	Ave	Bala Cynwyd	Lower Merion	817
	Welsh Valley Middle School	325		Tower	Ln	Narberth	Lower Merion	801
Lower Moreland	Murray Avenue	2551		Murray	Ave	Huntingdon Valley	Lower Moreland	804
Metshacton	Arcola Intermediate School	4001		Eagleville	Rd	Eagleville	Lower Providence	1,254
Norristown Area	East Norriton Middle School	330		Roland	Dr	Norristown	East Norriton	910
	Eisenhower Middle School	1601		Markley	St	Norristown	Norristown	566
	Roosevelt Alternative School	1161		Markley	St	Norristown	Norristown	91
	Stewart Middle School	1315	W	Marshall	St	Norristown	Norristown	473
North Penn	Pennbrook Middle School	1201	E	Walnut	St	North Wales	Upper Gwynedd	839
	Penndale Middle School	400		Penn	St	Lansdale	Lansdale	1,348
	Pennfield Middle School	726		Forty Foot	Rd	Hafield	Hafield	779
Perkiomen Valley	Perkiomen Valley Middle School East	100		Kahey	Rd	Collegeville	Perkiomen	759
	Perkiomen Valley Middle School West	220		Big	Rd	Zieglerville	Upper Frederick	644
Pottsgrove	Pottsgrove Middle School	1351	N	Hanover	St	Pottstown	Upper Pottsgrove	734
Pottstown	Pottstown Middle School	600	N	Franklin		Pottstown	Pottstown	617
Souderton Area	Indian Crest Middle School	139		Harleysville	Pk	Souderton	Franconia	807
	Indian Valley Middle School	130		Maple	Ave	Harleysville	Lower Salford	773
Spring-Ford	Spring-Ford 8th Grade Center	700		Washington	St	Royersford	Royersford	574
	Spring-Ford 9th Grade Center	400	S	Lewis	Rd	Royersford	Upper Providence	603
	Spring-Ford 7th Grade Center	833	S	Lewis	Rd	Royersford	Upper Providence	633
Upper Dublin	Sandy Run Middle School	520		Twining	Rd	Dresher	Upper Dublin	1,010

Montgomery County Public Middle Schools/ Junior High Schools

School District	Middle/Junior High School	Number	Prefix	Road Name	Suffix	Postal Address	Municipality	Enrollment
Upper Merion	Upper Merion Middle School	450		450 Keebler Road	Rd	King of Prussia	Upper Merion	1,143
Upper Moreland	Upper Moreland Middle School	3980		Orangemans	Rd	Harboro	Upper Moreland	706
Upper Perkiomen	Upper Perkiomen Middle School	510		Jefferson		East Greenville	East Greenville	708
Wissahickon	Wissahickon Middle School	500		Houston	Rd	Ambler	Lower Gwynedd	1,082

Montgomery County 2017 Hazard Mitigation Plan

Montgomery County Public High Schools

School District	High School	Number	Prefix	Road Name	Suffix	Postal Address	Municipality	Enrollment
Abington	Abington Senior High School	900		Highland	Ave	Abington	Abington	1984
Cheltenham	Cheltenham High School	500		Roces Mill	Rd	Wyncoke	Cheltenham	1712
Colonial	Plymouth-Whitemarsh Senior High School	201 E		(Germanstown)	Pk	Plymouth Meeting	Whitemarsh	1573
Hatboro-Horsham	Hatboro-Horsham Senior High School	899		Horsesham	Rd	Horsesham	Horsesham	1905
Jenkintown	Jenkintown High School			West & Highland	Ave	Jenkintown	Jenkintown	189
Lower Merion	Hamilton Senior High School	600 N		Ithian	Ave	Rosemont	Lower Merion	894
	Lower Merion High School	315 E		Montgomery	Ave	Ardmore	Lower Merion	1584
Lower Moreland	Lower Moreland High School	555		Red Lion	Rd	Huntingdon Valley	Lower Moreland	662
Methacton	Methacton High School	1005		Kriebel Mill	Rd	Esigleville	Worcester	1761
Norristown Area	Norristown Area High School	1900		Eagle	Dr	Norristown	West Norristown	1964
North Penn	North Penn Senior High School	1340		Valley Forge	Rd	Lansdale	Towamencin	3424
Perkiomen Valley	Perkiomen Valley High School	509		Gravel	Pk	Collingdale	Perkiomen	1417
Pottsgrove	Pottsgrove Senior High School	1345		Kauffman	Rd	Pottstown	Lower Pottsgrove	1010
Pottstown	Pottstown Senior High School	750 N		Washington	St	Pottstown	Pottstown	849
Souderton Area	Souderton Area School District	625		625 Lower Road	Rd	Souderton	Franconia	1583
Spring-Ford	Spring-Ford Senior High School	350 S		Lewis	Rd	Royersford	Limerick	1395
Springfield Township	Springfield Township High School	1801 E		Paper Mill	Rd	Enderheim	Springfield	869
Upper Dublin	Upper Dublin High School	800		800 Loch Aish Avenue	Ave	Fort Washington	Upper Dublin	1597
Upper Merion	Upper Merion High School	435		Crossfield	Rd	King of Prussia	Upper Merion	1129
Upper Moreland	Upper Moreland High School	3000		Terwood	Rd	Willow Grove	Upper Moreland	1090
Upper Perkiomen	Upper Perkiomen High School	2		2 Wait Road	Rd	Pennsburg	Red Hill	1096
Wissahickon	Wissahickon High School	521		Houston	Rd	Ambler	Lower Gwynedd	1493
Vocational	Central Montgomery Technical High School Eastern Center for Arts and Technology	821 3075		Plymouth Terwood	Rd Rd	Plymouth Meeting Willow Grove	Plymouth Upper Moreland	629 134

Montgomery County Public High Schools

School District	High School	Number	Prefix	Road Name	Suffix	Postal Address	Municipality	Enrollment
	North Montico Technical Career Center	1265		Summeytown	Pk	Lansdale	Towamencin	263
	Western Montgomery Career and Technology Center	77		Graterford	Rd	Limerick	Limerick	117

Montgomery County 2017 Hazard Mitigation Plan

Private Elementary Schools

Name	Number	Prefix	Road Name	Suffix	Postal Address	Municipality	Enrollment	Notes
Abington Friends School	575	Washington	Ln	Jenkintown	Abington	634		
Academy of the New Church	2815	Huntingdon	Pk	Huntingdon Valley	Bryn Athyn		Grades 6 through 12	
Ancillae Assumpta Academy	2025	Church	Rd	Wyncote	Cheltenham	474		
Armenian Sisters Academy	440	Upper Gulph	Rd	Radnor	Upper Merion	163		
Baldwin School	701	W	Montgomery	Ave	Lower Merion	612	PK-12	
Blessed Teresa of Calcutta Elementary School	256	Swamp	Valley Forge	Pk	Schwenksville	270	PK-8	
Calvary Baptist Christian School	1380	S	Skippack	Rd	Lansdale	308	PK-12	
Centre Square Montessori School	1775	Fayette	St	Blue Bell	Whitpain	125		
Conshohocken Catholic Elementary School	205	Sumneytown	Pk	Conshohocken	Conshohocken	201	Will Close 6/12	
Corpus Christi School	920	962 E	Schuykill	Rd	Upper Gwynedd	527	Adding Students through merger	
Coventry Christian- Lower School	3040	Walton	Rd	Pottstown	Lower Pottsgrove	290		
Epiphany of Our Lord School	150	N	Highland	Ave	Whitpain	212	Adding Students through merger	
French International School of Philadelphia	1101	City	City	Bala Cynwyd	Lower Merion	268		
Friends Central School	340	Morris	Rd	Wynnewood	Lower Merion	272		
Germlantown Academy	920	Youngsford	Rd	Fort Washington	Whitemarsh	459	PK-6	
Gladwyne Montessori School	835	North Hills	Rd	Glasgowne	Lower Merion	273		
Good Shepherd Regional Elementary School	320	N	Third	Ardsley	Abington	240	K-5	
Grace Christian School	816	Norrisdown	Rd	Telford	Souderton	461		
Gwynedd Mercy Academy Elementary Division	450	Lancaster	Ave	Spring House	Lower Gwynedd	470		
Haverford School	1845	Byberry	Rd	Haverford	Lower Merion	451		
Huntingdon Valley Christian Academy	606	West	West	Huntingdon Valley	Upper Moreland	72		
Immaculate Conception School	423	Main	St	Jenkintown	Jenkintown	207	Will Close 6/12	
Indian Creek Mennonite School	124	Bryn Mawr	Ave	Souderton	Franconia	17		
Main Line Academy	1321	Upper State	Rd	Bala Cynwyd	Lower Merion	27		
Mary Mother of the Redeemer Elem. School	1641	Hampton	Rd	North Wales	Montgomery	785		
Meadowbrook School	2025	Harts	Ln	Meadowbrook	Abington	151		
Miquon School	405	Allendale	Rd	Conshohocken	Whitemarsh	149		
Mother of Divine Providence School	585	Freemans School	Rd	King of Prussia	Upper Merion	208	PK-8	
New Life Youth and Family	1260	Fort Washington	Ave	Schwenksville	Lower Salford	55	6 through 12	
Open Door Christian Academy	1525	Elkins	Rd	Fort Washington	Upper Dublin	221	PK-8	
Our Lady Help of Christians Elem. School	314	N	Easton	Abington	Abington	251	Will Close 6/12, PK-8	
Our Lady of Confidence School	351	E	Johnson	Abington	Abington	86		
Our Lady of Victory Elementary School	50	W	Germanstown	Norrisdown	East Norriton	176	Will Close 6/12	
Penn Christian Academy	420	Godshall	Rd	East Norriton	East Norriton	246	PK-8	
Penn View Christian School	200	Seminary	Dr	Souderton	Franconia	617	PK-8	
Perikomen School	35	Hillcrest	Ave	East Greenville	East Greenville	298	PK-8	
Philadelphia Montgomery Christian Academy	2150	Butler	Pk	Erdenheim	Springfield	137	PK-6	
Plymouth Meeting Friends School	105	Old Soldiers	Rd	Plymouth Meeting	Plymouth	145	K-6	
Presentation BVM School	250	Meetinghouse	Rd	Cheltenham	Cheltenham	295	K-8	
Quaker School at Horsham	49	Haverford Road	Rd	Horsham	Horsham	69	k-9	
Perelman Jewish Day School	501	Grabber	Pl	Wynnewood	Lower Merion	484	k-8	
Red Hill Christian School	1344	Montgomery	Ave	Red Hill	Red Hill	141		
Rosemont School of the Holy Child	814	Yarrow	St	Rosemont	Lower Merion	311	PK-8	
Shiplay School		Lewis and Washington	St	Bryn Mawr	Lower Merion	367		
Sacred Heart Elementary School				Royersford	Royersford	200	Will Close 6/12	

Montgomery County 2017 Hazard Mitigation Plan

Private Elementary Schools

Name	Number	Prefix	Road Name	Suffix	Postal Address	Municipality	Enrollment	Notes
St. Albert the Great School	214		Welsh Rd	Rd	Huntingdon Valley	Lower Moreland	537	PK-8
St. Aloysius School	220	N	Hanover	St	Pottstown	Pottstown	163	PK-8
St. Alphonsus School	29		Conwell	Dr	Maple Glen	Upper Dublin	421	Adding Students through merger
St. Anthony - St. Joseph Elementary School	260		Forest	Ave	Ambler	Ambler	196	Will Close 6/12
St. Catherine of Siena School	317		Wilmer	Rd	Horsesham	Horsesham	295	Will Close 6/12
St. David School	401	N	Easton	Rd	Willow Grove	Upper Moreland	315	Adding Students through merger
St. Eleanor	701		Locust	St	Collegeville	Collegeville	482	Adding Students through merger
St. Francis of Assisi School	601		Buttwood	St	Norristown	Norristown	189	
St. Genevieve School	1237		Bethlehem	Pk	Flourtown	Springfield	259	K-8
St. Helena School	1499		DeKalb	Pk	Blue Bell	Whippany	452	PK-8
St. Hillary of Poitiers School	920		Susquehanna	Rd	Rydal	Abington	202	K-8
St. Katherine Day School	930		Bowman	Ave	Wynnewood	Lower Merion	94	
St. Luke Evangelist School	2336		Fairhill	Ave	Glenside	Abington	331	Adding Students through merger
St. Margaret School	227	N	Narberth	Ave	Narberth	Narberth	281	
St. Marie Goretti School	2980		Cowpath	Rd	Hatfield	Hatfield	204	Will Close 6/12
St. Mary School	40		Spring Mount	Rd	Schwerksville	Lower Frederick	581	
St. Philip Neri School, East Greenville	26	E	6th	St	East Greenville	East Greenville	135	Will Close 6/12
St. Philip Neri School, Lafayette Hill	3015		Chestnut	St	Lafayette Hill	Whitmarsh	450	PK-8
St. Rose of Lima School	425	S	Pennsylvania	Ave	North Wales	North Wales	183	Will Close 6/12
St. Stanislaus School	493	E	Main	St	Lansdale	Lansdale	356	Adding Students through merger
St. Teresa of Avila School	2550	S	Parkview	Dr	Norristown	West Norriton	202	PK-8
St. Titus School	3000		Keenwood	Rd	Norristown	East Norriton	185	Will Close 6/12
Torah Academy	742		Argyle	Ave	Wynnewood	Lower Merion	318	
Twin Spring Farm Education Center	1632	E	Butler	Pk	Ambler	Upper Dublin	203	
Valley Christian School	2364		Huntingdon	Pk	Huntingdon Valley	Lower Moreland	112	
Valley Forge Baptist Temple Academy	616	S	Treppie	Rd	Trappe	Upper Providence	92	
Williamva Academy Honor Studies	1860		Montgomery	Ave	Villanova	Lower Merion	106	
Visitation BVM School	190	N	Trooper	Rd	Norristown	West Norriton	681	PK-8
Waldron Mercy Academy	513		Montgomery	Ave	Merion Station	Lower Merion	445	K-8
Wyncote Academy	7920		Washington	Ln	Wyncote	Cheltenham	474	K-8
Wyndcroft School	1395		Wilson	St	Pottstown	Pottstown	240	k-8

Appendix F – Municipal Threat Assessment

Stokes, Michael

From: Stokes, Michael
Sent: Wednesday, August 10, 2016 4:55 PM
To: Stokes, Michael
Cc: Haelig, Joe Anna; Platek, Tom; Stieritz, Todd
Subject: Municipal Survey - Hazard Mitigation Plan Update



Montgomery County Planning Commission

To view this message online, [click here](#)

The graphic features a dark grey vertical bar on the left with the text 'Hazard Mitigation Plan Survey' in white. To the right is a photograph of a blue house partially submerged in floodwater. Below the photo is a green bar with the word 'Survey' in white. To the right of this bar is the text 'Hazard Mitigation Plan Update Municipal Survey' in green. Below that is the text 'Online survey' in green and 'Please complete by August 26' in grey. At the bottom left is the Montgomery County seal, and to its right is the text 'Montgomery County is preparing an update of the current 2012 Hazard Mitigation Plan, which establishes recommendations for reducing the vulnerability of the county'.

to a variety of potential hazards. In order to perform this update, it is important to have an accurate assessment of hazard vulnerability experienced by all municipalities in the county. We also need to know about efforts made by each municipality to reduce hazard vulnerability since 2012. To gather this information to use in the plan amendment, we have developed an easy-to-complete online survey. **We ask that you fill it out as completely as possible by August 26.** Thank you for your help in this important effort. In the future we will be in contact with you regarding other aspects of the Montgomery County Hazard Mitigation Plan Update.

Contact: [Michael Stokes](#) | 610-278-3729

Contact: Michael Stokes 610-278-3729



[Unsubscribe](#) | [Update Email](#)

Sent to all municipal managers/ municipal emergency coordinators

Thank you very much for your help!

Michael M. Stokes, AICP
Assistant Director
Montgomery County Planning Commission
PO Box 311
Norristown, PA 19404-0311
mstokes@montcopa.org
P | 610.278.3729
F | 610.278.3941
www.montcopa.org/planning

Please provide as much information as possible.

* 1. Municipality

* 2. Contact Person

* 3. Phone #

* 4. E-mail Address

Montgomery County 2017 Hazard Mitigation Plan

<p>5. Estimate the potential vulnerability of your municipality to the following hazards. (Please choose the appropriate letter: H = high vulnerability, M = moderate vulnerability, L = low vulnerability.)</p>			
	H	M	L
Civil Disturbance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dam Failure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drought	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Earthquake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental Hazards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Extreme Temperature	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Floods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hail	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hurricanes/Tropical Storms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Landslide	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Land Subsidence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Levee Failure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lightning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nuclear Incident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radon	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Structure/Building Collapse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tornado/Severe Wind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Terrorists	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transportation Accident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Urban Fire and Explosion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Utility Disturbance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wildfire	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Winter Storm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>6. What other types of hazards threaten your municipality?</p> <div style="border: 1px solid black; height: 40px; width: 100%; margin-top: 5px;"></div>			

<p>7. Are there locations in your municipality that have been subject to damage from hazards which have occurred since 2012? (Enter up to three occurrences below. If you need to enter additional events, please do so in the comment box of question #8.)</p> <p>Example: # Address/Location: 888 Main St. # Hazard Type: Flooding # Description: House flooding 3 times in last 5 years</p> <p>#1 Address/Location: <input style="width: 90%;" type="text"/></p> <p>#1 Hazard Type: <input style="width: 90%;" type="text"/></p> <p>#1 Description: <input style="width: 90%;" type="text"/></p> <p>#2 Address/Location: <input style="width: 90%;" type="text"/></p> <p>#2 Hazard Type: <input style="width: 90%;" type="text"/></p> <p>#2 Description: <input style="width: 90%;" type="text"/></p> <p>#3 Address/Location: <input style="width: 90%;" type="text"/></p> <p>#3 Hazard Type: <input style="width: 90%;" type="text"/></p> <p>#3 Description: <input style="width: 90%;" type="text"/></p>	
<p>8. Additional location occurrences from question #7</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	
<p>9. Provide information about infrastructure, including roads, bridges, sewer facilities, and water mains, that have been damaged by hazards since 2012.</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	
<p>10. What critical facilities (i.e., hospitals, nursing homes, schools) in your municipality have been damaged by hazards since 2012?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	

<p>11. Identify any specific studies or reports published since 2012 that describe hazard conditions in your municipality.</p>	
<p>12. What has your municipality done to address hazard vulnerable areas since 2012?</p>	
<p>13. Other comments or remarks:</p>	
<p>Thank you for completing this survey.</p> <p>Survey Contact: Michael Stokes mstokes@montgomery.org 810-278-3729</p>	

Montgomery County 2017 Hazard Mitigation Plan

Montgomery County Threat Assessment Survey 2017

Municipality	Levee Failure	Lightning	Nuclear Incident	Radon	Structure Collapse	Tornado/ Severe Wind	Terrorism	Transportation Accident	Urban Fire/ Explosion	Utility Disturbance	Wildfire	Winter Storm
Abington Township	L	M	L	L	M	M	L	M	M	H	L	M
Ambler Borough	L	M	L	M	M	M	L	M	M	M	L	M
Bridgeport Borough	L	M	L	M	M	L	L	M	M	M	L	M
Bryn Athyn Borough	L	M	L	L	M	M	L	M	L	M	L	M
Cheltenham Township	L	L	L	L	L	L	L	L	M	M	L	M
Collegeville Borough	L	L	L	L	L	L	L	L	L	L	L	L
Conshohocken Borough	L	L	L	L	L	L	L	L	L	L	L	L
Douglass Township	L	M	M	M	M	M	L	L	L	M	L	M
East Greenville Borough	L	H	L	M	M	M	L	H	H	H	L	H
East Norriton Township	L	L	M	H	L	L	L	M	L	L	L	M
Franconia Township	L	L	M	L	L	L	L	M	L	L	L	M
Green Lane Borough	L	L	L	H	L	L	L	H	M	M	M	M
Hatboro Borough	L	H	L	M	M	M	L	H	M	M	L	M
Hatfield Borough	L	H	H	M	L	H	L	H	L	H	M	H
Hatfield Township	L	M	M	L	L	M	L	H	H	H	L	H
Horsham Township	L	L	L	L	L	L	L	L	L	L	L	L
Jenkintown Borough	L	M	L	M	M	M	L	M	M	M	L	M
Lansdale Borough	L	L	L	M	M	L	M	M	L	M	L	M
Limerick Township	L	H	H	H	M	M	H	H	M	H	M	H
Lower Frederick Township	L	M	L	L	L	L	L	L	L	L	L	M
Lower Gwynedd Township	L	M	L	L	L	L	L	M	L	M	L	M
Lower Merion Township	M	M	L	L	L	M	L	M	M	M	L	M
Lower Moreland Township	L	H	L	M	M	M	L	H	L	H	L	H
Lower Pottsgrove Township	L	M	H	M	L	M	L	M	L	L	L	M
Lower Providence Township	L	M	L	L	L	L	L	M	M	L	L	M
Lower Salford Township	L	M	H	M	L	M	M	L	L	M	M	H
Marlborough Township	M	H	H	H	M	H	M	L	L	M	M	H
Montgomery Township	L	M	L	L	M	M	M	M	M	M	L	M
Narberth Borough	L	M	L	M	M	M	L	M	M	M	L	M
New Hanover Township	L	M	M	H	L	M	L	M	L	M	L	M
Norristown	L	L	L	L	L	L	L	M	M	L	L	M
North Wales Borough	L	L	L	L	L	L	L	H	L	L	L	M
Pennsburg Borough	L	M	L	L	L	L	L	M	M	M	L	M
Perkiomen Township	L	M	M	M	M	M	L	M	L	M	L	M
Plymouth Township	L	L	L	L	L	L	L	L	L	L	L	M
Pottstown Borough	L	L	M	L	L	L	L	M	M	M	L	M
Red Hill Borough	L	M	L	M	M	M	L	L	L	M	M	M
Rockledge Borough	L	M	L	L	L	M	M	L	L	L	L	M
Royersford Borough	L	L	M	L	L	L	L	M	M	L	L	L
Salford Township	L	M	M	L	M	M	L	L	L	M	M	M
Schwenksville Borough	L	H	H	H	H	M	M	L	M	H	M	H
Skipack Township	L	M	M	M	M	M	L	M	M	M	M	M
Souderton Borough	L	M	L	L	M	L	L	L	M	M	L	M
Springfield Township	L	M	M	M	L	M	L	H	M	H	L	H
Telford Borough	L	M	L	L	L	L	L	L	M	M	L	M
Towamencin Township	L	M	L	L	L	L	L	M	L	M	L	M
Trappe Borough	L	M	M	M	L	L	L	L	L	M	L	M
Upper Dublin Township	L	L	L	L	L	L	L	M	L	M	L	M
Upper Frederick Township	L	L	L	L	L	L	L	L	L	L	L	L
Upper Gwynedd Township	L	M	L	L	L	L	M	M	L	L	L	H
Upper Hanover Township	L	M	M	M	L	M	L	M	L	L	M	M
Upper Merion Township	L	M	L	M	L	M	L	H	M	H	M	H
Upper Moreland Township	L	L	L	L	L	L	L	M	M	M	L	M
Upper Pottsgrove Township	L	M	M	M	M	M	L	H	L	M	L	H
Upper Providence Township	L	M	H	M	M	M	H	H	M	M	L	H
Upper Salford Township	L	M	M	M	M	M	M	M	L	M	M	M
West Conshohocken Borough	L	L	L	L	L	L	L	M	L	L	L	L
West Norriton Township	L	L	M	L	L	M	L	L	L	M	L	M
West Pottsgrove Township	L	L	L	L	L	L	L	L	L	L	L	L
Whitmarsh Township	L	L	M	L	L	L	L	L	L	L	L	M
Whitpain Township	L	L	L	L	L	L	L	L	L	L	L	M
Worcester Township	L	L	L	L	L	L	L	L	L	M	L	M

L= Low Threat

M= Moderate Threat

H= High Threat

Montgomery County 2017 Hazard Mitigation Plan

Montgomery County Threat Assessment Survey 2017

Municipality	Civil Disturbance	Dam Failure	Drought	Earthquake	Env. Hazards	Extreme Temp	Floods	Hail	Hurricanes/ Tropical Storms	Landslide	Land Subsidence
Abington Township	M	L	L	L	M	M	H	L	M	L	L
Ambler Borough	H	M	H	L	L	L	H	L	H	L	L
Bridgeport Borough	M	M	L	L	L	L	H	L	H	L	M
Bryn Athyn Borough	L	L	L	L	M	L	L	M	M	L	L
Chellenham Township	L	L	L	L	L	L	M	L	M	L	L
Collegetown Borough	L	L	L	L	M	L	M	L	L	L	L
Conshohocken Borough	L	L	L	L	L	L	L	L	L	L	L
Douglass Township	L	L	M	L	M	M	M	L	L	L	L
East Greenville Borough	M	L	H	M	H	M	M	M	M	L	L
East Norriton Township	L	L	L	L	M	M	L	L	L	L	L
Franconia Township	L	L	L	L	L	L	L	L	L	L	L
Green Lane Borough	L	H	M	L	L	L	H	L	L	L	L
Hatboro Borough	L	M	M	L	H	M	H	M	M	L	L
Hatfield Borough	L	L	L	L	H	H	L	H	H	L	L
Hatfield Township	L	L	L	L	M	M	L	H	H	L	H
Horsham Township	L	L	L	L	L	L	L	L	L	L	L
Jerkintown Borough	L	L	M	L	M	M	L	M	M	L	L
Lansdale Borough	L	L	L	L	M	L	L	L	L	L	L
Limerick Township	M	H	H	L	H	H	M	M	M	L	L
Lower Frederick Township	L	L	M	L	L	H	H	M	L	L	L
Lower Gwynedd Township	L	L	L	L	L	L	L	L	L	L	L
Lower Merion Township	L	L	L	L	L	L	M	L	L	M	L
Lower Moreland Township	L	L	M	L	M	H	H	M	H	L	L
Lower Pottsgrove Township	L	L	M	L	M	M	M	M	L	L	L
Lower Providence Township	L	L	L	L	L	L	M	L	M	L	L
Lower Salford Township	L	L	M	L	M	M	M	M	L	L	L
Marlborough Township	L	H	H	L	M	M	H	M	M	L	L
Montgomery Township	L	L	L	L	M	M	L	L	M	L	L
Narberth Borough	L	L	L	L	L	L	M	M	M	L	L
New Hanover Township	L	L	L	L	M	M	M	M	M	L	L
Norristown	L	L	L	L	L	L	M	L	L	L	L
North Wales Borough	L	L	L	L	L	L	L	L	L	L	L
Pennsburg Borough	M	L	L	L	M	M	L	L	M	L	L
Perkiomen Township	L	H	M	L	M	H	H	M	L	L	L
Plymouth Township	L	L	L	L	L	M	L	L	L	L	H
Pottstown Borough	H	L	L	L	M	L	H	L	M	L	L
Red Hill Borough	L	L	M	M	M	M	L	M	M	L	L
Rockledge Borough	L	L	L	L	M	L	L	L	L	L	L
Royersford Borough	L	L	M	L	L	M	M	M	M	L	L
Salford Township	L	M	L	L	L	L	M	L	M	L	L
Schwenksville Borough	L	L	M	L	M	H	H	M	M	L	L
Skippack Township	L	M	M	L	M	M	M	M	M	L	L
Scuderton Borough	L	L	M	L	M	L	M	L	M	L	L
Springfield Township	L	L	M	L	M	M	H	L	M	L	L
Telford Borough	L	L	M	L	M	L	L	L	M	L	L
Towamencin Township	L	L	M	L	M	M	M	L	M	L	L
Trappe Borough	L	L	M	L	L	M	L	L	L	L	L
Upper Dublin Township	L	M	L	L	L	L	H	L	M	L	L
Upper Frederick Township	L	M	L	L	L	L	L	L	L	L	L
Upper Gwynedd Township	M	L	L	L	H	M	M	L	L	L	L
Upper Hanover Township	L	L	L	L	M	L	L	M	M	L	L
Upper Merion Township	L	L	L	L	M	M	M	M	M	L	L
Upper Moreland Township	L	L	M	L	M	M	H	L	L	L	L
Upper Pottsgrove Township	L	L	M	L	M	M	H	M	M	M	L
Upper Providence Township	H	H	H	M	M	M	M	M	M	L	L
Upper Salford Township	L	H	H	L	M	M	H	M	M	L	L
West Conshohocken Borough	L	L	L	L	L	M	M	L	L	M	L
West Norriton Township	L	L	M	L	L	M	M	M	M	L	L
West Pottsgrove Township	L	L	L	L	L	L	M	L	M	L	L
Whitemarsh Township	L	L	L	L	M	M	H	L	L	L	L
Whitpain Township	L	L	L	L	L	L	L	L	L	L	L
Worcester Township	L	L	M	L	L	M	L	L	L	L	L

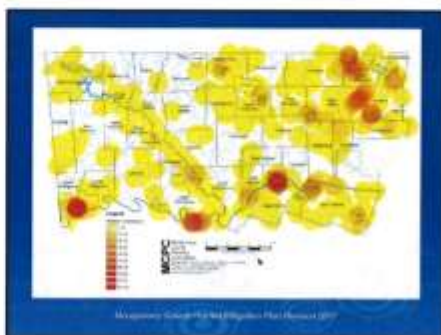
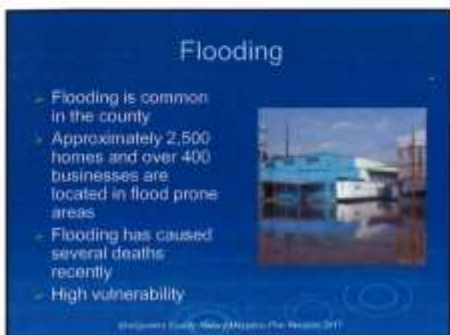
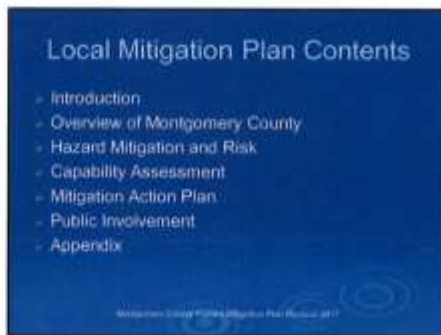
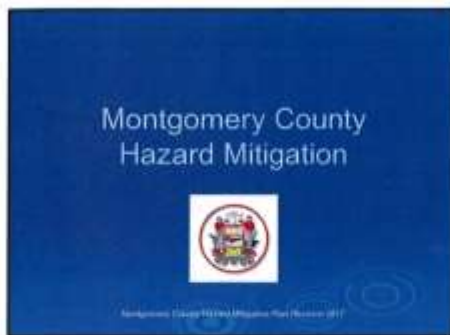
L= Low Threat

M= Moderate Threat

H= High Threat


Appendix G – Meeting and Other Participation Documentation

The slideshow on the following pages was presented at two public meetings for the plan, as well as to individual groups, including the Hazard Mitigation Plan Advisory Committee, the January 10, 2018 meeting of the Montgomery County Planning Commission Board of Directors, and is posted online at <https://www.montcopa.org/DocumentCenter/View/18821>.



Severe Wind


- Severe wind conditions have occurred 37 times since 1950
- 15 tornadoes in the county since 1950
- Primary damage due to fallen trees and downed power lines
- Moderate vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Radon


- Relatively common throughout the county
- Long term impact
- Moderate vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Radon


Montgomery County
Average Radon Levels by Zip Code Area



Montgomery County Hazard Mitigation Plan, Revision 2017

Subsidence

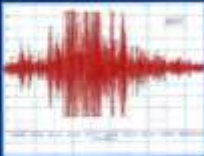
- Sinkholes have formed in several locations in Upper Merion, Whitmarsh and Plymouth Townships. Less than 5% of the county is in sinkhole prone areas
- Moderate vulnerability in a few municipalities



Montgomery County Hazard Mitigation Plan, Revision 2017

Earthquakes


- 35 earthquakes caused damage in PA throughout history.
- No earthquakes above 6 Richter Scale in Montgomery
- Montgomery County is in a moderate earthquake zone.



Montgomery County Hazard Mitigation Plan, Revision 2017

Drought

- 6 drought emergencies in the county over the last 21 years
- Droughts impact the entire county for extended periods of time
- Low vulnerability county wide; Moderate vulnerability in some municipalities



Montgomery County Hazard Mitigation Plan, Revision 2017

Wild Fire

- 47 fires consuming 30 acres in the county over past 40 years
- Currently wild fire is a big concern
- Farmland, vacant and woodland is about one-third of the county
- Low vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Winter Storms

- A variety of winter storms have struck the county in the past
- 1995- 2011 150 winter storm and ice events
- Can cause disruption of utilities and services
- Moderate vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Extreme Temperature

- Heat and cold temperature extremes
- 140 extreme heat events and 65 extreme cold events in past 60 years
- Low to moderate vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Hail

- 61 hail storms in the county since 1950
- Building and crop damage
- Localized events
- Low vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Hurricane, Tropical Storm, and Northeasters

- Major storm systems
- Associated with major flooding and wind damage events
- Storm tracks are often more coastal but rain impact can be more extreme inland



Montgomery County Hazard Mitigation Plan, Revision 2017

Landslide

- Includes various types of soil and rock movement
- Very few areas in the county have extreme slopes subject to landslides
- Can be dangerous when impacts highway or railroads



Montgomery County Hazard Mitigation Plan, Revision 2017

Building/ Structure Collapse

- Significant in areas with high vacancy and orphan properties
- Collapse could impact adjoining properties, roads and sidewalks



Montgomery County Hazard Mitigation Plan, Revision 2017

Civil Disturbance

- Minor events in the past
- Few vulnerable locations for protest events
- Overall low vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Lightning

- 41 major lightning events in the county since 1950
- Can cause fires and utility disruption
- Low vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Dam Failure

- Over 50 dams
- 22 significant dams impacting the county
- Impact is localized and defined in EAPs
- Low vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Cyber Security Disruption

- Various types of disruption to internet and users
- Business and high security systems are the most vulnerable
- Low overall vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Environmental Hazard

- Various types of Environmental Hazards
- Approx. 300 Superfund sites in the county
- History of pipeline leaks and explosions
- Moderate vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Levee Failure

- Two very small levee systems in the county
- Low vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Radiological Release Incidents

- Limerick Nuclear Power Station
- Radioactive material at various medical and research facilities
- Very low probability of events, but dramatic damage potential



Montgomery County Hazard Mitigation Plan, Revision 2017

Terrorist Attack

- Potential targets include government facilities, large gathering spots and symbolic locations
- Activities involve bomb, kidnappings, cyber attacks, and use of chemical, radioactive, or biological materials
- Not as vulnerable as other locations in PA



Montgomery County Hazard Mitigation Plan, Revision 2017

Transportation Accident

- Includes highway, train and aviation
- 609,000 licensed drivers and various commuters
- 5 airports
- 3 major rail operators



Montgomery County Hazard Mitigation Plan, Revision 2017

Urban Fire and Explosion

- Over 20,000 fire calls annually
- Age and density of development are key factors
- Low to moderate vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Utility Interruption

- PUC measures reliability
- Disruption from natural events and equipment failure
- Low to medium vulnerability



Montgomery County Hazard Mitigation Plan, Revision 2017

Mitigation Strategy

- Goals and Objectives
- Strategic Mitigation Actions
- Overall Mitigation Measures
 - County-wide program
 - Additional vulnerability analysis
- Potential Mitigation Projects

Potential Mitigation Projects

- Goal 1: Develop a better understanding of potential disasters that could occur in the county
 - Outreach and training
 - Various database and GIS products
 - Monitoring environment
 - Improve reporting and record keeping
 - Better communication through Knowledge Center

Potential Mitigation Projects

- Goal 2: Ensure that the public understands potential hazards and is aware of which actions to be taken to minimize their risks
 - Internet and social media outlets
 - Signage and warning systems
 - Commuter education
 - Emergency response planning
 - Investigate new warning technology
 - General education for the public

Potential Mitigation Projects

- Goal 3: Significantly reduce the risk of loss of life, injuries, economic costs and destruction of natural and cultural resources that result from all hazards
 - Code officer training
 - Coordination with utilities
 - Ensure maintenance of emergency action plans for dams
 - Continue to provide first responder training
 - Inventory county property for hazard vulnerability
 - Develop emergency preplans for high haz facilities

Potential Mitigation Projects

- Goal 3 Cont':
 - Shade tree controls
 - Extreme temperature warnings
 - Limerick Power Plant evacuation plans
 - Household hazardous waste collection
 - Land use planning to reduce hazards
 - Continue SE PA Regional Task Force involvement

Potential Mitigation Projects

- Goal 4: Encourage and promote actions to minimize the impact of floods within the county
 - Buyouts of frequent flooded property structures
 - Elevation of flood prone structures
 - Develop control basin structures
 - Schuylkill River flood stage warning
 - Stream system management
 - Stormwater basin effectiveness study
 - Stream corridor preservation
 - Complete stormwater management plans

Potential Mitigation Projects

- Goal 4 Cont':
 - Flood reduction through road improvements
 - Develop safe flood routes and uniform road closure systems
 - Complete new flood maps and update municipal flood plain ordinances
 - Work with Temple Univ. and other partners to study critical flooded areas
 - Make various drainage system improvements
 - Develop incentives to remove flood prone structures

Montgomery County Hazard Mitigation Plan, Revision 2017

Changes in the County



Montgomery County Hazard Mitigation Plan, Revision 2017

Since the last Plan

- Bakken Crude Transport
- Landslides
- Extension of Limerick Power Plant License
- New Pa Penitentiary
- Closure of Willow Grove Naval Air Station
- County Debris Management Plan prepared

Montgomery County Hazard Mitigation Plan, Revision 2017

Since the Last Plan (con't)

- FIRM Map modernization update
- All municipal flood plain ordinances revised
- Several highway projects and bridge replacements
- Several hazard mitigation projects completed
- Completion of flood control dams in Upper Dublin

Montgomery County Hazard Mitigation Plan, Revision 2017

Next Steps

- Form a study committee (Summer 2016)
- Schedule public meeting workshop (Fall 2016)
- Mail out vulnerability and issues survey to all municipalities (Fall 2016)
- Various workshops and targeted fact finding meetings (Fall 2016)

Montgomery County Hazard Mitigation Plan, Revision 2017

Montgomery County 2017 Hazard Mitigation Plan

The flyer below was featured at Montgomery County's table at the 2017 Montgomery County Association of Township Officials (MCATO) Annual Conference, held February 24, 2017. Both types of municipalities – boroughs and townships – comprise membership in MCATO. The purpose of this flyer is to raise awareness among the County's municipalities about the plan update and overall planning process.

The flyer was also posted on Montgomery County Department of Public Safety's website (<https://www.montcopa.org/132/Public-Safety>).



Montgomery County Hazard Mitigation Plan

The Montgomery County Planning Commission and Public Safety Department are currently revising the Montgomery County Hazard Mitigation Plan. This plan is used by all 62 municipalities in the county to fulfill hazard mitigation planning requirements established by the Federal Emergency Management Agency (FEMA) in accordance with the Disaster Mitigation Act of 2000. Under these requirements, all state and local governments must adopt an approved mitigation plan as a condition for receiving certain federal disaster grants and loans. Furthermore, mitigation plans must be amended and updated every five years.

The current Montgomery County Hazard Mitigation Plan was prepared in 2012 and adopted by nearly all the municipalities in the county. This plan is now being updated based on the county experience with various hazard threats over the past five years. Additionally new information acquired by the county during the past 5 years is being used to improve the plan.

Throughout the planning process, there will be opportunities for municipal engagement. Once the plan amendment is approved by FEMA, the plan must be adopted by each municipality. The plan generally includes the following information:

- **Community Profile** describing the county.
- **Planning Process** documenting how the plan was revised.
- **Risk Assessment** chronicling and evaluating the 24 potential threats to the county in the future. These threats include: drought; earthquake; extreme temperature; flood, flash flood and ice jam; hail storm; hurricane, tropical storm, nor'easter; landslide; lightning strike; radon exposure; subsidence, sinkhole; tornado, wind storm; wildfire; winter storm; building or structural collapse; civil disturbance; dam failure; cyber security disruption; environmental hazard; levee failure; radiological release incidents; terrorism; transportation accident; urban fire and explosion; and utility disruption.
- **Capability Assessment** examining the county and local municipal ability to manage potential threats.
- **Mitigation Strategy** proposing various recommended future actions to increase county and local municipal resiliency to future threats. This section provides specific recommendations for all potential threats.
- **Plan Maintenance** guiding future implementation, monitoring and evaluation of plan effectiveness.
- **Plan Adoption** describing the adoption of the plan by resolution.

[Visit our our website for more information on the Montgomery County Mitigation Plan](#)



Montgomery County 2017 Hazard Mitigation Plan

Announcements posted on Montgomery County Planning Commission's Facebook page
<https://www.facebook.com/Montgomery-County-Planning-Commission-181442168555334/>



Facebook Post summarizing the meeting held on May 18, 2016



Public Workshop notice for the November 28 Meeting

Montgomery County 2017 Hazard Mitigation Plan



Public Workshop notice for the November 16 Meeting



Public Workshop notice for both November 16 and 28 Meeting

Montgomery County 2017 Hazard Mitigation Plan

Email to neighboring county emergency management staff and Delaware Valley Regional Planning Commission announcing plan draft on website (<https://www.montcopa.org/2873/Montgomery-County-Hazard-Mitigation-Plan>) and public meeting dates.

Fabry, Donna

From: Stokes, Michael
Sent: Friday, November 17, 2017 3:29 PM
To: bgottschall@countyofberks.com; stforster@BucksCounty.org; rkagel@chesco.org; boycet@co.delaware.pa.us; scottlindenmuth@lehighcounty.org; daniel.bradley@phila.gov; Robert Graff (rgraff@dvrpc.org)
Cc: Haelig, Joe Anna; Fabry, Donna; Sullivan, Thomas
Subject: Draft Montgomery County Hazard Mitigation Plan

Follow Up Flag: Follow up
Flag Status: Flagged

Please be aware that Montgomery County has prepared a draft Hazard Mitigation Plan which is available for review. The plan is located at the web site listed below along with a copy of the existing 2012 Plan, maps of critically flooded areas, a power point overview of the planning process and a one sheet plan summary. Our plan was prepared by the planning and public safety staff working with an advisory committee. We will be hosting a plan review workshop meeting at the Lower Salford Township Building on November 28. Information about that meeting is also on the website.

<https://www.montcopa.org/2873/Montgomery-County-Hazard-Mitigation-Plan>

Please contact me if you have any questions or comments on the draft plan. We will be receiving comments through December 8. We look forward to working with you as we complete our Hazard Mitigation Plan.

Have a great weekend.

Michael Stokes

Michael M. Stokes, AICP
Assistant Director
Montgomery County Planning Commission
PO Box 311
Norristown, PA 19404-0311
mstokes@montcopa.org
P I 610.278.3729
F I 610.278.3941
www.montcopa.org/planning



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Montgomery County 2017 Hazard Mitigation Plan

Montgomery County Planning Commission's blog post on November 22, 2017 (<https://www.montcopa.org/Blog.aspx?IID=100>) featured information about the plan update and the municipality's role in hazard mitigation planning.



A portion of a blog post on the four phases of emergency management stressing the development of the hazard mitigation plan.

Montgomery County 2017 Hazard Mitigation Plan

Announcements posted on Montgomery County Planning Commission's Facebook page <https://www.facebook.com/Montgomery-County-Planning-Commission-181442168555334/>



Notice about the comment period and Public Meeting held on November 28

Montgomery County 2017 Hazard Mitigation Plan

Print version of public meeting flyer distributed via email to municipal managers for posting and distribution in municipal buildings.



Montgomery County Draft Hazard Mitigation Plan

November 16 • 2-4 PM

*Upper Dublin Township
Building*
801 Loch Alsh Avenue
Fort Washington

November 28 • 7-9 PM

*Lower Salford Township
Building*
379 Main Street
Harleysville

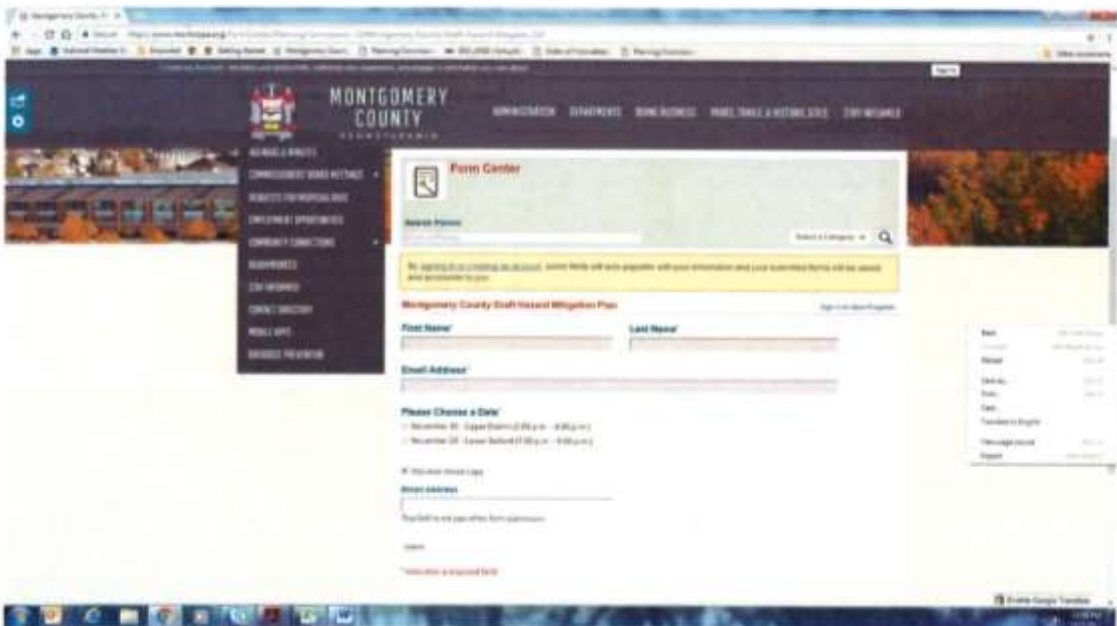
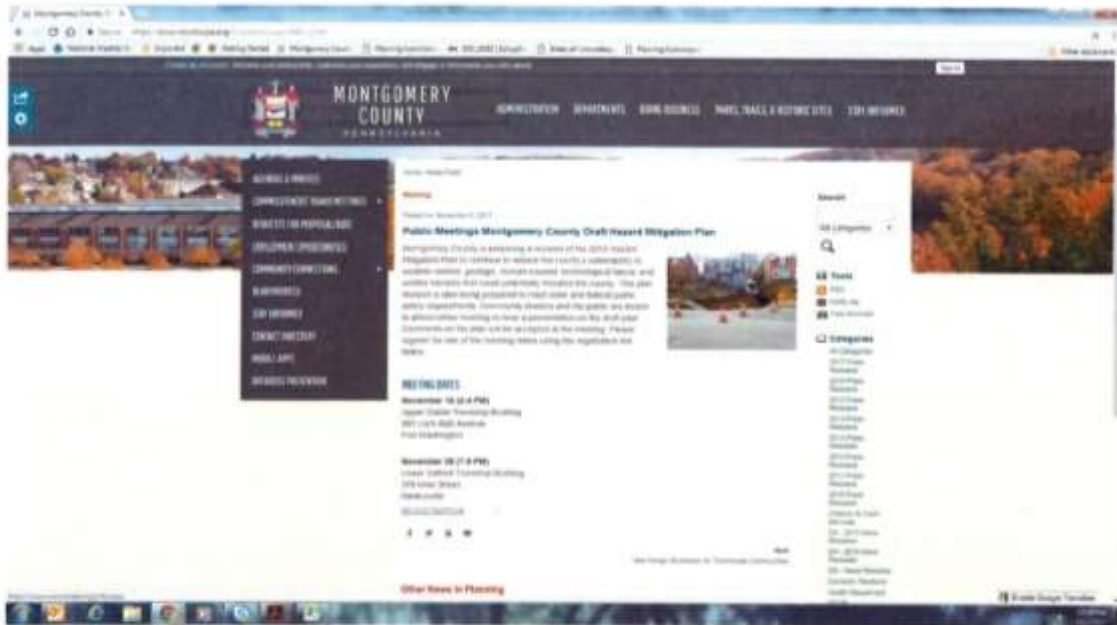


Montgomery County is preparing a revision of the 2012 Hazard Mitigation Plan to continue to reduce the county's vulnerability to weather related, geologic, human-caused, technological failure, and wildfire hazards that could potentially threaten the county. This plan revision is also being prepared to meet state and federal public safety requirements. Community leaders and the public are invited to attend either meeting to hear a presentation of the Draft Plan. Comments on the Plan will be accepted at the meeting.

For more information contact **Michael Stokes**, Assistant Director, Montgomery County Planning Commission at mstokes@montcopa.org or 610.278.3729.

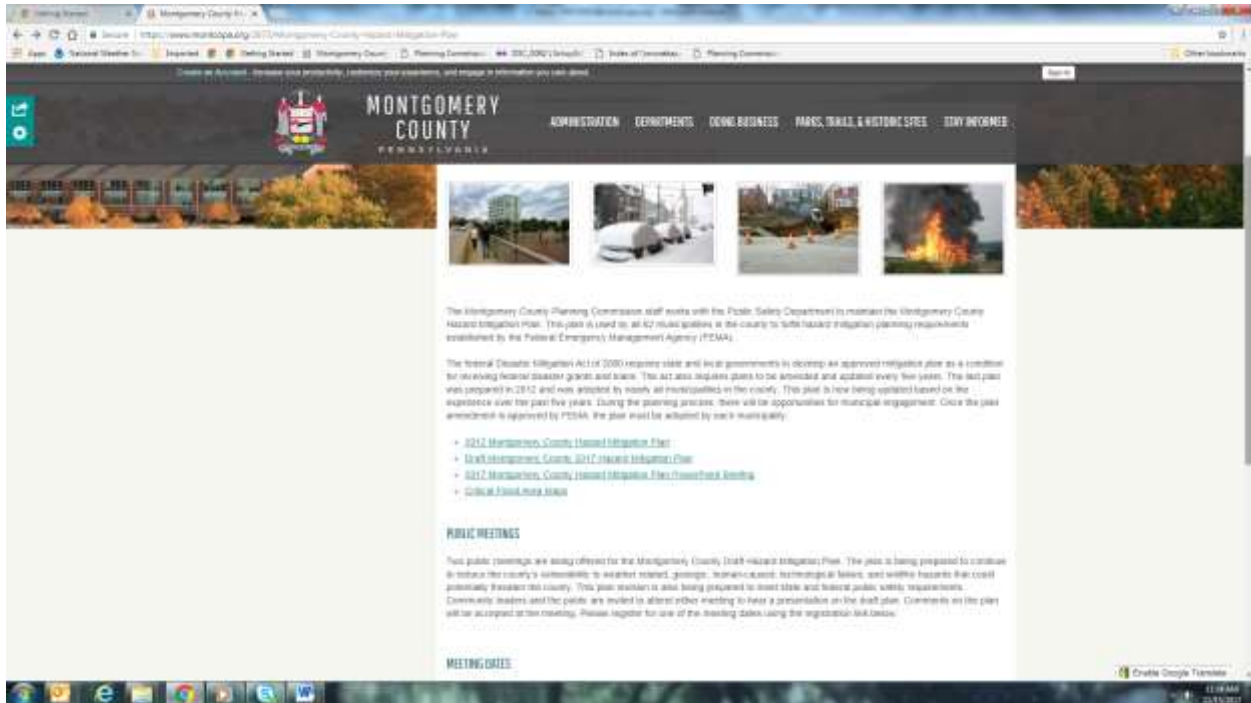
Montgomery County 2017 Hazard Mitigation Plan

Public meeting announcement and sign-up form posted on Montgomery County Planning Commission's Hazard Mitigation Plan website: <https://www.montcopa.org/2873/Montgomery-County-Hazard-Mitigation-Plan>



Montgomery County 2017 Hazard Mitigation Plan

Hazard Mitigation Plan materials posted on Montgomery County Planning Commission's Hazard Mitigation Plan website: <https://www.montcopa.org/2873/Montgomery-County-Hazard-Mitigation-Plan>



Montgomery County 2017 Hazard Mitigation Plan

Public meeting flyer distributed on Facebook (<https://www.facebook.com/Montgomery-County-Planning-Commission-181442168555334/>), Twitter (@MontcoPA) and emailed to municipal managers and emergency management staff.



Montgomery County Draft Hazard Mitigation Plan

November 16 • 2-4 PM

*Upper Dublin Township
Building*
801 Loch Alsh Avenue
Fort Washington



November 28 • 7-9 PM

*Lower Salford Township
Building*
379 Main Street
Harleysville



Montgomery County is preparing a revision of the 2012 Hazard Mitigation Plan to continue to reduce the county's vulnerability to weather related, geologic, human-caused, technological failure, and wildfire hazards that could potentially threaten the county. This plan revision is also being prepared to meet state and federal public safety requirements. Community leaders and the public are invited to attend either meeting to hear a presentation of the Draft Plan. Comments on the Plan will be accepted at the meeting.

CLICK HERE TO REGISTER

For more information contact **Michael Stokes**, Assistant Director, Montgomery County Planning Commission at mstokes@montcopa.org or 610.278.3729.

**MONTGOMERY COUNTY HAZARD MITIGATION PLAN
WORKSHOP MEETING**

November 16, 2017

2:00- 4:00 PM

Upper Dublin Township Building

AGENDA

1. Welcome
2. Hazard Mitigation Plan Update
 - Overview of the plan
 - Goals
 - Proposed Mitigation Actions
3. Comments on the Plan- Attendees
4. Future Plan Completion Schedule
5. Next Steps

**MONTGOMERY COUNTY HAZARD MITIGATION PLAN
WORKSHOP MEETING**

November 28, 2017

7:00- 9:00 PM

Lower Salford Township Building

AGENDA

1. Welcome
2. Hazard Mitigation Plan Update
 - Overview of the plan
 - Goals
 - Proposed Mitigation Actions
3. Comments on the Plan- Attendees
4. Future Plan Completion Schedule
5. Next Steps

Attendance Sheet

Montgomery County Hazard Mitigation Plan Workshop Meeting
 November 16, 2017 (2:00- 4:00pm) - Upper Dublin Township

Name	Organization	Email Address or Phone #
Richard D. Barton	Upper Dublin	rbarton@upperdublin.net
Aue Body	Bensfield	abody@bensfieldmontco.org
SCOTT P. LYNCH	White Marsh Twp	slynch@whitemarshwp.org
DONALD BEUCELL	SPRINGFIELD	DBeuce@springfieldmontco.org
PAUL LEONARD	UPPER DUBLIN	
JENNIFER SPARKS	MUNICIPALITY OF	msparks@munpa.org

Attendance Sheet

Montgomery County Hazard Mitigation Plan Workshop Meeting
November 28, 2017 (7:00- 9:00pm)- Lower Salford Township

Name	Organization	Email Address or Phone #
JOHN DEL PIZZO	HARRISBURG RESIDENTS	TADEL PIZZO @ GMAIL.COM
Tom Nolan	RACES Montco	nolanth@gmail.com
Chris Melville	Schuensville Borough	Christopher.Melville@gmail.com 610 639 5563
Drew Shaw	MUPC	
Jac Anna Haez	MCDPS	
Dan Littley	TOWNSHIP EMER	407-273-9985 dlttle@berish.com
JOSE TORCZAK	Upper Merion EMA	jtorczak@uppermerionpa.org
ADRIAN GORDON	HARRISVILLE BANK	AGORDON @ HARRISVILLE BANK.COM
GUSCH BAEYON	AMERICA TOWNSHIP	gbaeyon@america.pa.org (610) 495-6492 x118
Philip Benigno	Ambler Borough Water Dept	pbenigno@borough.ambler.pa.us
MICHAEL M. STAPES	MINISTRAWAY COUNY PAOLA	MSTAPES@MUNTPA.PA.GOV

Montgomery County 2017 Hazard Mitigation Plan

Appendix H – Municipal Government Information

Municipal Government Information

Municipality Name	Census Population	Land Area (Square Miles)	Gov't Form	Full Time Employees	Part Time Employees
ABINGTON TWP	55310	15.5	Twp 1st Class	271	153
AMBLER BORO	6417	0.8	Borough	46	20
BRIDGEPORT BORO	4554	0.7	Borough	21	9
BRYN ATHYN BORO	1375	1.9	Home Rule	7	17
CHELTENHAM TWP	36793	9	Home Rule	213	154
COLLEGEVILLE BORO	5089	1.6	Borough	10	1
CONSHOHOCKEN BORO	7833	1	Borough	47	23
DOUGLASS TWP	10195	15.3	Twp 2nd Class	17	12
EAST GREENVILLE BORO	2951	0.5	Borough	4	15
EAST NORRITON TWP	13590	6.1	Twp 2nd Class	58	4
FRANCONIA TWP	13064	13.8	Twp 2nd Class	35	3
GREEN LANE BORO	508	0.3	Borough	0	1
HATBORO BORO	7360	1.4	Borough	33	57
HATFIELD BORO	3290	0.6	Borough	8	1
HATFIELD TWP	17249	10	Twp 1st Class	53	13
HORSHAM TWP	26147	17.3	Home Rule	88	38
JENKINTOWN BORO	4422	0.6	Borough	21	17
LANSDALE BORO	16269	3.1	Borough	91	30
LIMERICK TWP	18074	22.6	Twp 2nd Class	54	5
LOWER FREDERICK TWP	4840	8	Twp 2nd Class	7	2
LOWER GWYNEDD TWP	11405	9.3	Twp 1st Class	42	46
LOWER MERION TWP	57825	23.7	Twp 1st Class	433	164
LOWER MORELAND TWP	12982	7.3	Twp 1st Class	50	20
LOWER POTTSBORO TWP	12059	7.9	Twp 1st Class	33	8
LOWER PROVIDENCE TWP	25436	15.3	Twp 2nd Class	63	0
LOWER SALFORD TWP	14959	14.4	Twp 2nd Class	35	11
MARLBOROUGH TWP	3178	12.5	Twp 2nd Class	7	2
MONTGOMERY TWP	24790	10.7	Twp 2nd Class	82	27
NARBERTH BORO	4282	0.5	Borough	15	5
NEW HANOVER TWP	10939	21.6	Twp 2nd Class	32	3
NORRISTOWN BORO	34324	3.5	Home Rule	162	42
NORTH WALES BORO	3229	0.6	Borough	8	5
PENNSBURG BORO	3843	0.8	Borough	4	2
PERKIOMEN TWP	9139	4.9	Twp 2nd Class	8	1
PLYMOUTH TWP	16525	8.4	Home Rule	126	21
POTTSTOWN BORO	22377	4.8	Borough	129	41
RED HILL BORO	2383	0.7	Borough	11	3
ROCKLEDGE BORO	2543	0.3	Borough	5	30
ROYERSFORD BORO	4752	0.8	Borough	17	8
SALFORD TWP	2504	9.5	Twp 2nd Class	4	5
SCHWENKSVILLE BORO	1385	0.4	Borough	2	1
SKIPPACK TWP	13715	13.8	Twp 2nd Class	12	0
SOUDERTON BORO	6618	1.1	Borough	21	6
SPRINGFIELD TWP	19418	6.8	Twp 1st Class	76	19

Montgomery County 2017 Hazard Mitigation Plan

Municipal Government Information

Municipality Name	Census Population	Land Area (Square Miles)	Gov't Form	Full Time Employees	Part Time Employees
TELFORD BORO	2665	0.5	Borough	27	1
TOWAMENCIN TWP	17578	9.7	Twp 2nd Class	45	5
TRAPPE BORO	3509	2.1	Borough	2	0
UPPER DUBLIN TWP	25569	13.2	Twp 1st Class	126	63
UPPER FREDERICK TWP	3523	9.9	Twp 2nd Class	7	10
UPPER GWYNEDD TWP	15552	8.1	Twp 1st Class	61	4
UPPER HANOVER TWP	6464	20.2	Twp 2nd Class	7	4
UPPER MERION TWP	28395	16.8	Twp 2nd Class	183	90
UPPER MORELAND TWP	24015	8	Twp 1st Class	114	17
UPPER POTTS GROVE TWP	5315	5	Twp 1st Class	23	1
UPPER PROVIDENCE TWP	21219	17.8	Twp 2nd Class	55	6
UPPER SALFORD TWP	3299	9	Twp 2nd Class	3	4
WEST CONSHOHOCKEN BORO	1320	0.8	Borough	17	24
WEST NORRITON TWP	15663	5.9	Twp 1st Class	58	17
WEST POTTS GROVE TWP	3874	2.4	Twp 1st Class	15	4
WHITEMARSH TWP	17349	14.6	Home Rule	94	10
WHITPAIN TWP	18875	12.9	Twp 2nd Class	89	21
WORCESTER TWP	9750	16.2	Twp 2nd Class	14	0
Totals	799874	482.8		3401	1326
MONTGOMERY COUNTY	799874	482.8	2-A County	3273	501

Source: DCED, 2011

Telford population is Montgomery County only

Montgomery County 2017 Hazard Mitigation Plan

Municipal Natural Resource Protection Ordinances

Municipality	Stream Corridor	Flood Plain	Steep Slope	Wetlands
Abington Township		Yes	Yes	
Ambler Borough		Yes		
Bridgeport Borough		Yes		
Bryn Athyn Borough		Yes	Yes	
Cheltenham Township		Yes	Yes	Yes
Collegeville Borough	Yes	Yes	Yes	
Conshohocken Borough		Yes		
Douglass Township		Yes	Yes	Yes
East Greenville Borough		Yes		
East Norriton Township		Yes		
Franconia Township		Yes	Yes	Yes
Green Lane Borough		Yes		
Hatboro Borough		Yes		
Hatfield Borough		Yes		Yes
Hatfield Township		Yes		
Horsham Township	Yes	Yes	Yes	Yes
Jenkintown Borough		Yes		
Lansdale Borough		Yes		Yes
Limerick Township		Yes		
Lower Frederick Township		Yes	Yes	
Lower Gwynedd Township		Yes	Yes	
Lower Merion Township		Yes	Yes	
Lower Moreland Township		Yes	Yes	
Lower Pottsgrove Township		Yes		
Lower Providence Township		Yes		
Lower Salford Township		Yes		
Marlborough Township		Yes	Yes	Yes
Montgomery Township		Yes		
Narberth Borough		Yes		
New Hanover Township	Yes	Yes	Yes	Yes
Norristown		Yes		
North Wales Borough		Yes		
Pennsburg Borough	Yes	Yes		Yes
Perkiomen Township	Yes	Yes	Yes	
Plymouth Township		Yes	Yes	
Pottstown Borough		Yes		
Red Hill Borough		Yes		Yes
Rockledge Borough		Yes		
Royersford Borough		Yes		
Salford Township		Yes	Yes	
Schwenksville Borough		Yes		
Skipack Township		Yes		
Souderton Borough		Yes		

Municipal Natural Resource Protection Ordinances

Municipality	Stream Corridor	Flood Plain	Steep Slope	Wetlands
Springfield Township		Yes	Yes	
Telford Borough				
Towamencin Township	Yes	Yes	Yes	
Trappe Borough		Yes	Yes	
Upper Dublin Township		Yes	Yes	
Upper Frederick Township		Yes	Yes	
Upper Gwynedd Township		Yes		
Upper Hanover Township	Yes	Yes	Yes	
Upper Merion Township		Yes	Yes	
Upper Moreland Township		Yes		
Upper Pottsgrove Township		Yes	Yes	
Upper Providence Township		Yes	Yes	
Upper Salford Township	Yes	Yes	Yes	Yes
West Conshohocken Borough		Yes	Yes	
West Norriton Township		Yes		
West Pottsgrove Township		Yes		
Whitemarsh Township	Yes	Yes	Yes	
Whitpain Township		Yes		
Worcester Township	Yes	Yes	Yes	Yes

Montgomery County 2017 Hazard Mitigation Plan

Municipal Plans and Codes

Municipality Name	Comprehensive Plan	Zoning Ordinance	Subdivision Ordinance	Planning Commission	Zoning Hearing Board	UCC
ABINGTON TWP	YES	YES	YES	YES	YES	YES
AMBLER BORO	YES	YES	YES	YES	YES	YES
BRIDGEPORT BORO	YES	YES	YES	YES	YES	YES
BRYN ATHYN BORO	YES	YES	YES	YES	YES	YES
CHELTENHAM TWP	YES	YES	YES	YES	YES	YES
COLLEGEVILLE BORO	YES	YES	YES	YES	YES	YES
CONSHOHOCKEN BORO	YES	YES	YES	YES	YES	YES
DOUGLASS TWP	YES	YES	YES	YES	YES	YES
EAST GREENVILLE BORO	YES	YES	YES	YES	YES	YES
EAST NORRITON TWP	YES	YES	YES	YES	YES	YES
FRANCONIA TWP	YES	YES	YES	YES	YES	YES
GREEN LANE BORO	YES	YES	YES	YES	YES	YES
HATBORO BORO	YES	YES	YES	YES	YES	YES
HATFIELD BORO	YES	YES	YES	YES	YES	YES
HATFIELD TWP	YES	YES	YES	YES	YES	YES
HORSHAM TWP	YES	YES	YES	YES	YES	YES
JENKINTOWN BORO	YES	YES	YES	YES	YES	YES
LANSDALE BORO	YES	YES	YES	YES	YES	YES
LIMERICK TWP	YES	YES	YES	YES	YES	YES
LOWER FREDERICK TWP	YES	YES	YES	YES	YES	YES
LOWER GWYNEDD TWP	YES	YES	YES	YES	YES	YES
LOWER MERION TWP	YES	YES	YES	YES	YES	YES
LOWER MORELAND TWP	NO	YES	YES	YES	YES	YES
LOWER POTTSBORO TWP	YES	YES	YES	YES	YES	YES
LOWER PROVIDENCE TWP	YES	YES	YES	YES	YES	YES
LOWER SALFORD TWP	YES	YES	YES	YES	YES	YES
MARLBOROUGH TWP	YES	YES	YES	YES	YES	YES
MONTGOMERY TWP	YES	YES	YES	YES	YES	YES
NARBERTH BORO	YES	YES	YES	YES	YES	YES
NEW HANOVER TWP	YES	YES	YES	YES	YES	YES
NORRISTOWN BORO	YES	YES	YES	YES	YES	YES
NORTH WALES BORO	YES	YES	YES	YES	YES	YES
PENNSBURG BORO	YES	YES	YES	YES	YES	YES
PERKIOMEN TWP	YES	YES	YES	YES	YES	YES
PLYMOUTH TWP	YES	YES	YES	YES	YES	YES
POTTSTOWN BORO	YES	YES	YES	YES	YES	YES
RED HILL BORO	YES	YES	YES	YES	YES	YES
ROCKLEDGE BORO	YES	YES	YES	YES	YES	YES
ROYERSFORD BORO	YES	YES	YES	YES	YES	YES
SALFORD TWP	YES	YES	YES	YES	YES	NO
SCHWENKSVILLE BORO	NO	YES	YES	YES	YES	YES
SKIPPAK TWP	YES	YES	YES	YES	YES	YES
SOUDERTON BORO	YES	YES	YES	YES	YES	YES
SPRINGFIELD TWP	YES	YES	YES	YES	YES	YES
TELFORD BORO	YES	YES	YES	YES	YES	YES
TOWAMENCIN TWP	YES	YES	YES	YES	YES	YES

Montgomery County 2017 Hazard Mitigation Plan

Municipal Plans and Codes

Municipality Name	Comprehensive Plan	Zoning Ordinance	Subdivision Ordinance	Planning Commission	Zoning Hearing Board	UCC
TRAPPE BORO	YES	YES	YES	YES	YES	YES
UPPER DUBLIN TWP	YES	YES	YES	YES	YES	YES
UPPER FREDERICK TWP	YES	YES	YES	YES	YES	YES
UPPER GWYNEDD TWP	YES	YES	YES	YES	YES	YES
UPPER HANOVER TWP	YES	YES	YES	YES	YES	YES
UPPER MERION TWP	YES	YES	YES	YES	YES	YES
UPPER MORELAND TWP	YES	YES	YES	YES	YES	YES
UPPER POTTSBORO TWP	YES	YES	YES	YES	YES	YES
UPPER PROVIDENCE TWP	YES	YES	YES	YES	YES	YES
UPPER SALFORD TWP	YES	YES	YES	YES	YES	YES
WEST CONSHOHOCKEN BORO	YES	YES	YES	YES	YES	YES
WEST NORRITON TWP	YES	YES	YES	YES	YES	YES
WEST POTTSBORO TWP	YES	YES	YES	YES	YES	YES
WHITEMARSH TWP	YES	YES	YES	YES	YES	YES
WHITPAIN TWP	YES	YES	YES	YES	YES	YES
WORCESTER TWP	YES	YES	YES	YES	YES	YES

Source: DCED, 2011

Montgomery County 2017 Hazard Mitigation Plan

Appendix I – Flood Insurance Information

Community Name	Community ID	Active Contracts	Total Premium	Average Premium	Total # of Structures in Floodplain (2015)	% of Total Structures with Policy Coverage	# of Primary Structures in Floodplain (2015)	% of Primary Structures with Policy Coverage (Assumption)
Abington, Twp	420695	366	\$378,664.00	\$1,035.00	451	81.15%	326	112.27%
Ambler, Bor	420947	71	\$167,931.00	\$2,365.00	97	73.20%	75	94.67%
Bridgeport, Bor	420948	68	\$132,777.00	\$1,953.00	94	72.34%	57	119.30%
Bryn Athyn, Bor		0	\$0.00	\$0.00	3	0.00%	N/A	N/A
Cheltenham, Twp	420696	156	\$170,837.00	\$1,095.00	134	116.42%	95	164.21%
Collegeville, Bor	421900	20	\$32,714.00	\$1,635.70	72	27.78%	51	39.22%
Conshohocken, Bor	420949	40	\$58,022.00	\$1,450.55	60	66.67%	52	76.92%
Douglass, Twp	421911	20	\$21,690.00	\$1,084.50	91	21.98%	46	43.48%
East Greenville, Bor	421901	1	\$316.00	\$316.00	2	50.00%	1	100.00%
East Norriton, Twp	420950	45	\$36,593.00	\$813.18	119	37.82%	71	63.38%
Franconia, Twp	422494	9	\$3,250.00	\$361.11	23	39.13%	N/A	N/A
Green Lane, Bor	421902	4	\$6,419.00	\$1,604.75	19	21.05%	12	33.33%
Hatboro, Bor	420697	56	\$99,548.00	\$1,777.64	81	69.14%	60	93.33%
Hatfield, Bor	420698	22	\$35,495.00	\$1,613.41	84	26.19%	N/A	N/A
Hatfield, Twp	420699	48	\$34,979.00	\$728.73	114	42.11%	N/A	N/A
Horsham, Twp	420700	120	\$93,416.00	\$778.47	181	66.30%	108	111.11%
Jenkintown, Borough	422717	3	\$1,076.00	\$358.67	3	100.00%	0	
Lansdale, Bor	420951	18	\$10,667.00	\$592.61	44	40.91%	12	150.00%
Limerick, Twp	421912	24	\$30,267.00	\$1,261.13	61	39.34%	N/A	N/A
Lower Frederick, Twp	420952	20	\$21,734.00	\$1,086.70	67	29.85%	N/A	N/A
Lower Gwynedd, Twp	420953	70	\$48,437.00	\$691.96	60	116.67%	38	184.21%
Lower Merion, Twp	420701	323	\$336,533.00	\$1,041.90	233	138.63%	186	173.66%
Lower Moreland, Twp	420702	90	\$191,943.00	\$2,132.70	122	73.77%	94	95.74%
Lower Pottsgrove, Twp	421908	21	\$38,948.00	\$1,854.67	46	45.65%	N/A	N/A
Lower Providence, Twp	420703	49	\$41,994.00	\$857.02	77	63.64%	N/A	N/A
Lower Salford, Twp	421170	17	\$9,386.00	\$552.12	27	62.96%	11	154.55%
Marlborough, Twp	421913	25	\$40,020.00	\$1,600.80	64	39.06%	N/A	N/A
Montgomery, Twp	421226	40	\$18,189.00	\$454.73	38	105.26%	18	222.22%
Narberth, Bor	421903	27	\$37,364.00	\$1,383.85	55	49.09%	33	81.82%
New Hanover, Twp	421914	25	\$20,485.00	\$819.40	109	22.94%	N/A	N/A
Norristown, Bor	425386	50	\$122,319.00	\$2,446.38	100	50.00%	91	54.95%
North Wales, Bor	420704	30	\$12,062.00	\$402.07	109	27.52%	50	60.00%
Pennsburg, Bor	422496	2	\$855.00	\$427.50	4	50.00%	3	66.67%
Perkiomen, Twp	421915	27	\$95,729.00	\$1,323.30	73	36.99%	N/A	N/A
Plymouth, Twp	420955	49	\$108,801.00	\$2,220.43	97	50.52%	57	85.96%
Pottstown, Bor	420705	143	\$236,448.00	\$1,653.48	339	42.18%	242	59.09%
Royersford, Bor	421904	14	\$59,160.00	\$4,225.71	17	82.35%	N/A	N/A
Salford, Twp	422497	3	\$1,222.00	\$407.33	23	13.04%	N/A	N/A
Schwenksville, Bor	421905	3	\$3,367.00	\$1,122.33	5	60.00%	3	100.00%
Skipack, Twp	421149	31	\$22,152.00	\$714.58	79	39.24%	N/A	N/A
Souderton, Bor	421906	1	\$244.00	\$244.00	0	0.00%	N/A	N/A
Springfield, Twp	425388	123	\$91,592.00	\$744.65	269	45.72%	151	81.46%
Towamencin, Twp	422236	54	\$47,289.00	\$875.72	80	67.50%	N/A	N/A
Trappe, Bor	421907	8	\$7,461.00	\$932.63	15	53.33%	9	88.89%
Upper Dublin, Twp	420708	176	\$285,899.00	\$1,624.43	110	160.00%	72	244.44%
Upper Frederick, Twp	421916	8	\$11,129.00	\$1,391.13	16	50.00%	N/A	N/A
Upper Gwynedd, Twp	420956	46	\$29,296.00	\$636.87	88	52.27%	50	92.00%
Upper Hanover, Twp	421917	15	\$11,612.00	\$774.13	76	19.74%	N/A	N/A
Upper Merion, Twp	420957	120	\$218,513.00	\$1,820.94	165	72.73%	N/A	N/A
Upper Moreland, Twp	421909	121	\$130,409.00	\$1,077.76	234	51.71%	166	72.89%
Upper Pottsgrove, Twp	421910	1	\$415.00	\$415.00	1	100.00%	N/A	N/A
Upper Providence, Twp	420709	151	\$276,594.00	\$1,831.75	246	61.38%	N/A	N/A
Upper Salford, Twp	421918	6	\$8,670.00	\$1,445.00	42	14.29%	N/A	N/A
West Conshohocken, Bor	420710	11	\$31,188.00	\$2,835.27	23	47.83%	23	47.83%
West Norriton, Twp	420711	91	\$181,535.00	\$1,994.89	147	61.90%	N/A	N/A
West Pottsgrove, Twp	421133	3	\$10,772.00	\$3,590.67	15	20.00%	N/A	N/A
Whitemarsh, Twp	420712	140	\$256,869.00	\$1,834.78	148	94.59%	103	135.92%
Whitpain, Twp	420713	82	\$81,336.00	\$991.90	121	67.77%	60	136.67%
Worcester, Twp	421919	16	\$6,597.00	\$412.31	22	72.73%	N/A	N/A
Totals		3,323	\$4,409,229.00	\$1,249.44	5,295		2,426	136.97%

Appendix J – Disaster Declarations

Emergency Declarations Involving Montgomery County

Date	Type of Disaster	Affected Areas	Action
March 23, 2016	Severe Winter Storm	Adams, Bedford, Berks, Blair, Bucks, Chester, Cumberland, Dauphin, Fayette, Franklin, Fulton, Juniata, Lancaster, Lebanon, Lehigh, Montgomery, Northampton, Perry, Philadelphia, Schuylkill, Somerset, Westmoreland, York	Presidential
February 6, 2014	Winter Storm	Bucks, Chester, Delaware, Lancaster, Montgomery, Philadelphia, York	Presidential
October 26, 2012	Superstorm Sandy	Bedford, Bucks, Cameron, Dauphin, Forest, Franklin, Fulton, Huntingdon, Juniata, Monroe, Montgomery, Northampton, Pike, Philadelphia, Potter, Somerset, Sullivan, and Wyoming Counties	Presidential
September 1, 2011	Remnants from Tropical Storm Lee	Adams County, Berks County, Bradford County, Bucks County, Chester County, Columbia County, Cumberland County, Dauphin County, Delaware County, Huntingdon County, Lancaster County, Lebanon County, Luzerne County, Lycoming County, Monroe County, Montgomery County, Montour County, Northampton County, Northumberland County, Perry County, Philadelphia County, Schuylkill County, Snyder County, Sullivan County, Susquehanna County, Union County, Wyoming County, and York County	Presidential

Emergency Declarations Involving Montgomery County

Date	Type of Disaster	Affected Areas	Action
September 1, 2011	Remnants from Tropical Storm Lee	Adams County, Berks County, Bradford County, Bucks County, Chester County, Columbia County, Cumberland County, Dauphin County, Delaware County, Huntingdon County, Lancaster County, Lebanon County, Luzerne County, Lycoming County, Monroe County, Montgomery County, Montour County, Northampton County, Northumberland County, Perry County, Philadelphia County, Schuylkill County, Snyder County, Sullivan County, Susquehanna County, Union County, Wyoming County, and York County.	Presidential
August 1, 2011	Hurricane Irene	Bucks County, Chester County, Delaware County, Lehigh County, Luzerne County, Monroe County, Montgomery County, Northampton County, Philadelphia County, Sullivan County, and Wyoming County.	Presidential
Aug 2009	Storms and Flooding	Berks, Bucks, Chester, Delaware, Lehigh, Montgomery, and Philadelphia Counties	SBA Physical Damage and Economic Injury
Jan 2009	Fire	Berks, Chester, Delaware, Lancaster, and Montgomery Counties	SBA Physical Damage and Economic Injury
Sep 2008	Fire	Berks, Bucks, Chester, Delaware, Lehigh, Montgomery, and Philadelphia Counties	SBA Physical Damage and Economic Injury
Aug 2008	Fire	Berks, Bucks, Chester, Delaware, Lehigh, Montgomery, and Philadelphia Counties	SBA Physical Damage and Economic Injury
Nov 2007	Fire	Berks, Bucks, Chester, Delaware, Lehigh, Montgomery and Philadelphia counties	SBA Physical Damage and Economic Injury

Emergency Declarations Involving Montgomery County

Date	Type of Disaster	Affected Areas	Action
Apr 2007	Proclamation of Emergency - Severe Winter Storm	All 67 counties - to utilize all available resources and personnel as is deemed necessary to cope with the magnitude and severity of this emergency situation.	Governor Edward G. Rendell
Feb 2007	Proclamation of Emergency - Severe Winter Storm	All 67 counties - to utilize all available resources and personnel as is deemed necessary to cope with the magnitude and severity of this emergency situation.	Governor Edward G. Rendell
Feb 2007	Proclamation of Emergency - Regulations	All 67 counties - waive the regulations regarding hours of service limitations for drivers of commercial vehicles	Governor Edward G. Rendell
Sep 2006	Proclamation of Emergency - Tropical Depression Ernesto	All 67 counties - utilize all available resources and personnel as deemed necessary to cope with the magnitude and severity of the emergency situation.	Governor Edward G. Rendell
Jun 2006	Proclamation of Emergency - Flooding	Adams, Armstrong, Bedford, Berks, Blair, Bradford, Bucks, Carbon, Centre, Chester, Clinton, Columbia, Cumberland, Dauphin, Delaware, Franklin, Fulton, Huntingdon, Indiana, Jefferson, Juniata, Lackawanna, Lancaster, Lebanon, Lehigh, Luzerne, Lycoming, Mifflin, Monroe, Montgomery, Montour, Northampton, Northumberland, Perry, Philadelphia, Pike, Potter, Schuylkill, Snyder, Sullivan, Susquehanna, Tioga, Union, Wayne, Wyoming, and York Counties.	Governor Edward G. Rendell; Presidential - Major Disaster for Individual Assistance, Public Assistance and Hazard , Mitigation, Presidential
Apr 2006	Proclamation of Emergency - Regulations	Southeast Region of the Commonwealth - for greater flexibility in truck driver regulations to accommodate truck drivers in the finding and transporting of fuel.	Governor Edward G. Rendell

Emergency Declarations Involving Montgomery County

Date	Type of Disaster	Affected Areas	Action
Sep 2005	Proclamation of Emergency - Hurricane Katrina	All 67 counties - Proclamation of Emergency to Render Mutual Aid and to Receive and House Evacuees	Governor Edward G. Rendell; Presidential Declaration of Emergency as of 9/10/2005 for Public Assistance, Presidential
Sep 2005	Proclamation of Emergency - Hurricane Katrina	All 67 counties - regarding waiving enforcement of applicable state laws & regs that govern transport of oversized loads	Governor Edward G. Rendell
Sep 2004	Tropical Depression Ivan	AS OF 10/6/04 - Allegheny, Armstrong, Beaver, Bedford, Blair, Bradford, Bucks, Butler, Cameron, Carbon, Centre, Chester, Clarion, Clinton, Clearfield, Columbia, Crawford, Cumberland, Dauphin, Delaware, Franklin, Fulton, Greene, Huntingdon, Indiana, Jefferson, Juniata, Lackawanna, Lawrence, Lebanon, Lehigh, Luzerne, Lycoming, Mifflin, Monroe, Montour, Montgomery, Northampton, Northumberland, Perry, Philadelphia, Pike, Schuylkill, Snyder, Somerset, Sullivan, Susquehanna, Tioga, Union, Washington, Wayne, Westmoreland, Wyoming and York Counties	Governor Edward G. Rendell; AS OF 10/19/04 - Presidential - Major Disaster (Individual Assistance and Public Assistance for Allegheny, Armstrong, Beaver, Bedford, Blair, Bradford, Bucks, Butler, Cameron Carbon, Centre, Chester, Clarion, Clearfield, Clinton, Columbia, Crawford, Cumberland, Dauphin, Elk (Individual Assistance Only), Delaware, Franklin, Fulton, Greene, Huntingdon, Indiana, Jefferson, Juniata, Lackawanna, Lawrence, Lebanon, Lehigh, Luzerne, Lycoming, Mifflin, Monroe, Montgomery, Montour, Northampton, Northumberland, Perry, Philadelphia, Pike, Potter (Individual Assistance Only) Schuylkill, Snyder, Somerset, Sullivan, Susquehanna, Tioga, Union, Washington, Wayne, Westmoreland, Wyoming and York Counties, Presidential
Aug 2004	Multiple Storm Systems	Delaware, Montgomery & Philadelphia Counties	Governor Edward G. Rendell; Presidential - Major Disaster (Individual Assistance and Hazard Mitigation)
Sep 2003	Hurricane Isabel/Henri	Statewide	Governor's Proclamation of Disaster Emergency, Presidential Declaration - Individual Assistance for Chester County; SBA - EIDL for Berks, Delaware, Lancaster and Montgomery Counties, Presidential

Emergency Declarations Involving Montgomery County

Date	Type of Disaster	Affected Areas	Action
Feb 2003	Severe Winter Storm	Adams, Bedford, Berks, Blair, Cambria, Carbon, Chester, Clinton, Columbia, Cumberland, Dauphin, Delaware, Fayette, Franklin, Fulton, Greene, Huntingdon, Juniata, Lancaster, Lebanon, Lehigh, Lycoming, Mifflin, Montour, Montgomery, Northampton, Northumberland, Perry, Philadelphia, Schuylkill, Snyder, Somerset, Union, Washington, Westmoreland, and York counties	Governor's Proclamation of Disaster Emergency, Pres-EM, Presidential
Feb 2002	Drought & Water Shortage	Adams, Bedford, Berks, Bucks, Carbon, Chester, Cumberland, Dauphin, Delaware, Franklin, Fulton, Huntingdon, Lancaster, Lebanon, Lehigh, Montgomery, Monroe, Northampton, Perry, Philadelphia, Pike, Schuylkill, Wayne and York counties	Governor's Proclamation
Aug 2001	Flooding	Lehigh, Berks, Bucks, Carbon, Montgomery, Northampton and Schuylkill counties	SBA - Economic Injury Disaster Loan
Jun 2001	Flash Flood (Tropical Storm Allison)	Bucks, Montgomery, Berks Counties	Governor's Proclamation & President's Declaration Of Major Disaster, Presidential
May 2001	Fire	Montgomery, Bucks, Berks, Chester, Delaware, Lehigh and Philadelphia counties	SBA
Sep 1999	Hurricane Floyd	All 67 Counties	Governor's Proclamation & President's Declaration Of Major Disaster

Emergency Declarations Involving Montgomery County

Date	Type of Disaster	Affected Areas	Action
Jul 1999	Drought	Adams, Allegheny, Beaver, Bedford, Berks, Blair, Bradford, Bucks, Cambria, Cameron, Carbon, Centre, Chester, Clearfield, Clinton, Columbia, Cumberland, Dauphin, Delaware, Fayette, Franklin, Fulton, Greene, Huntingdon, Indiana, Juniata, Lackawanna, Lancaster, Lawrence, Lebanon, Lehigh, Luzerne, Lycoming, Mifflin, Monroe, Montgomery, Montour, Northampton, Northumberland, Perry, Philadelphia, Pike, Potter, Schuylkill, Snyder, Somerset, Sullivan, Susquehanna, Tioga, Union, Washington, Wayne, Westmoreland, Wyoming, and York	Governor's Proclamation, Individual Assistance, Hazard Mitigation Grant Program - Amended to include all 67 counties for an agricultural disaster, Presidential
Jun 1998	Severe Storms/Tornadoes	Allegheny, Beaver, Berks, Chester, Delaware, Lancaster, McKean, Monroe, Montgomery, Northumberland, Philadelphia, Pike, Somerset, Susquehanna, Tioga and Wyoming Counties	Governor's Proclamation

Emergency Declarations Involving Montgomery County

Date	Type of Disaster	Affected Areas	Action
Jan 1996	Severe Winter Storms	Adams, Allegheny, Armstrong, Beaver, Bedford, Berks, Blair, Bradford, Bucks, Cambria, Cameron, Carbon, Centre, Chester, Clearfield, Clinton, Columbia, Cumberland, Dauphin, Delaware, Elk, Fayette, Franklin, Fulton, Greene, Huntingdon, Indiana, Jefferson, Juniata, Lackawanna, Lancaster, Lebanon, Lehigh, Lycoming, Luzerne, McKean, Mifflin, Monroe, Montgomery, Montour, Northampton, Northumberland, Perry, Philadelphia, Pike, Potter, Schuylkill, Snyder, Somerset, Sullivan, Susquehanna, Tioga, Union, Wayne, Westmoreland, Wyoming and York - Public Assistance; All 67 counties declared for individual Assistance	Governor's Proclamation & President's Declaration Of Major Disaster, Presidential
Jan 1996	Flooding	All 67 Counties	Governor's Proclamation & President's Declaration Of Major Disaster, Presidential
Sep 1995	Drought	Adams, Berks, Bradford, Bucks, Cameron, Carbon, Centre, Chester, Clearfield, Clinton, Columbia, Delaware, Lackawanna, Lehigh, Luzerne, Lycoming, Monroe, Montgomery, Montour, Northampton, Northumberland, Philadelphia, Pike, Potter, Schuylkill, Snyder, Sullivan, Susquehanna, Tioga, Union, Wayne, Wyoming	Governor's Proclamation
Mar 1995	Fire	Montgomery	SBA - Physical Disaster Loans & Economic Injury Disaster Loan
Jan 1994	Severe Winter Storms	All 67 Counties (Centre County also received SBA - EIDL)	Governor's Proclamation & President's Declaration Of Major Disaster
Mar 1993	Blizzard	All 67 Counties	Governor's Proclamation & President's Declaration of Emergency

Emergency Declarations Involving Montgomery County

Date	Type of Disaster	Affected Areas	Action
Mar 1989	Fire	Montgomery	SBA - Physical Disaster Loans & Economic Injury Disaster Loan
Nov 1980	Drought Emergency	Berks, Bucks, Carbon, Chester, Delaware, Lackawanna, Lebanon, Lehigh, Luzerne, Monroe, Montgomery, Northampton, Philadelphia, Pike, Schuylkill, Wayne, plus 34 Central/ Eastern Counties	Governor's Proclamation
Jan 1979	Flood	Lackawanna, Lebanon, Lehigh, Luzerne, Mifflin, Montgomery	None
Feb 1978	Blizzard	All 67 Counties	Governor's Proclamation
Jan 1978	Heavy Snow	All 67 Counties	Governor's Proclamation
Apr 1975	High Winds	Statewide	None
Feb 1974	Truckers Strike	Statewide	Governor's Proclamation
Dec 1973	Flood	Montgomery	None
Jul 1973	Flood	Berks, Bucks, Chester, Columbia, Delaware, Lancaster, Monroe, Montgomery, Northampton, Wayne	President's Declaration Of Major Disaster
Dec 1972	Steam Heat Problem	Philadelphia (Lower Merion)	Governor's Proclamation
Jun 1972	Flood (Agnes)	All 67 counties	President's Declaration Of Major Disaster - Governor's Proclamation
Feb 1972	Heavy Snow	Statewide	Governor's Proclamation
Sep 1971	Flood	Bucks, Chester, Delaware, Montgomery, Philadelphia	Governor's Proclamation & President's Declaration Of Major Disaster
Jan 1966	Heavy Snow	Statewide	Governor's Proclamation
Aug 1965	Drought	Delaware River Basin	President's Declaration Of Major Disaster - Governor's Proclamation
Sep 1963	Drought	Numerous Communities Statewide	Governor's Proclamation & President's Declaration Of Major Disaster
Feb 1958	Heavy Snow	Berks, Bucks, Chester, Dauphin, Delaware, Lancaster, Lebanon, Lehigh, Montgomery, Northampton, York, City of Philadelphia	Governor's Proclamation

Appendix K – Major Floods

Major Flood Event Time Line

Flooded Areas	1971	1973	1996	2001	2011
Whitemarsh Township Norristown Lower Moreland Township Hatfield Borough Hatfield Township Hatboro Borough East Norriton Township Severe Regional Storm	Severe Regional Storm	Springfield Township Upper Dublin Township Whitemarsh Township Severe Regional Storm	Summer Storm Abington Township Springfield Township Upper Dublin Township	Tropical Storm Allison Abington Township Lower Moreland Township Springfield Township Upper Moreland Township	TS Lee/ Hurricane Irene Whitemarsh Township Springfield Township Abington Township Upper Dublin Township Upper Moreland Township West Norriton Township Collegeville Borough Upper Providence Township
Whitemarsh Township Norristown Lower Moreland Township Hatfield Borough Hatfield Township Hatboro Borough East Norriton Township Severe Regional Storm	Severe Regional Storm	Springfield Township Upper Dublin Township Whitemarsh Township Severe Regional Storm	Summer Storm Abington Township Springfield Township Upper Dublin Township	Tropical Storm Allison Abington Township Lower Moreland Township Springfield Township Upper Moreland Township	TS Lee/ Hurricane Irene Whitemarsh Township Springfield Township Abington Township Upper Dublin Township Upper Moreland Township West Norriton Township Collegeville Borough Upper Providence Township

Note: This time line only illustrates the most significant flood events in Montgomery County since 1970. The municipalities listed are based on reported damage.

Appendix L – Major Dams Impacting the County

High Hazard Dams in Montgomery County

DAM NAME	STREAM	PERMITTEE	TYPE	PURPOSE	DAM HEIGHT (feet)	CLASS	DRAINAGE AREA (acres)	STORAGE CAPACITY (acre-feet)
GREEN LANE RESERVOIR	PERKOWEN CREEK	PHILADELPHIA SUBURBAN WATER CO	GRAVITY	WATER SUPPLY	87.0	B-1	71.00	25114.00
SAW MILL	SAW MILL RUN	BOROUGH OF NORRISTOWN	EARTH	FLOOD CONTROL	47.0	B-1	3.92	740.00
FLAT ROCK KNIGHT	SCHUYLKILL RIVER	DER. BUREAU OF ABANDONED MINE RECLAMATION	CONCRETE/GRAVITY	RECREATION	21.0	B-1	1809.00	1500.00
DEEP CREEK	PERKOWEN CREEK	MONTGOMERY CO. COMMISSIONERS	CONCRETE/GRAVITY	RECREATION	22.0	C-1	94.50	479.00
MARTINS	DEEP CREEK	MONTGOMERY CO. COMMISSIONERS	EARTH/TIMBER CRIB	RECREATION	19.0	C-1	5.60	250.00
RECREATION POND	CROW CREEK (ABRAMS RUN)	MARTINS DAM SWIM CLUB	EARTH	RECREATION	22.5	C-1	0.52	11.10
	MACOBY CREEK	UPPER PERKOWEN RECREATION CEN	EARTH/STONE/MASONRY	RECREATION	12.0	C-2	1.53	15.00
HATFIELD BOROUGH DAM	TOWAMENCIN CREEK	HATFIELD BOROUGH	EARTH	DETENTION	5.0	C-2	0.20	12.70
RINEHART DAM	TRIBUTARY MANATAWNY CREEK	SCA SERVICES OF PA INC	EARTH/STONE/MASONRY	RECREATION	12.0	C-2	1.90	62.00
TIMBER CREEK CONDO	TRIBUTARY TOWAMENCIN CREEK	WILLOWYCK INC	EARTH	DETENTION	10.0	C-2	0.40	4.00
GREENVIEW ESTATES LOWER DAM	TRIBUTARY TO LANDS CREEK	GREENVIEW ESTATES, INC.	EARTH	RECREATION/STORMWATER	12.0	C-2	0.39	25.00
GRATERFORD DAM	ADJACENT TO PERKOWEN CREEK	PA DEPT OF CORRECTIONS	EARTH	WASTE IMPOUNDMENT	35.0	C-2	0.01	155.00
HORSHAM TOWNE UPPER POND	TRIBUTARY PENNYPACK CREEK	FRICKER CORPORATION	EARTH	DETENTION	17.0	C-2	0.30	22.00
HORSHAM TOWNE LOWER POND	TRIBUTARY PENNYPACK CREEK	FRICKER CORPORATION	EARTH	DETENTION	16.0	C-2	0.50	11.00
MILL CREEK DET. BASIN	TRIBUTARY PENNYPACK CREEK	BOARD OF COMMISSIONERS OF UPPER MORELAND TOWNSHIP	EARTH	DETENTION	11.0	C-2	1.82	43.00
LOCH ALSH RESERVOIR	TRIB. TO WISSAHICKON CREEK	BOROUGH OF AMBLER	EARTH/STONE/MASONRY	RECREATION	16.0	C-2	0.25	41.00
ESTATES OF ALDUBION	TRIB. TO MINE RUN	AUDOBON RIDGE, L.P.	EARTH	RECREATION	20.0	C-2	0.14	10.40
ANDORRA SPRINGS BASIN B	TRIB TO THE SCHUYLKILL RIVER	ANDORRA SPRINGS DEVELOPMENT INC	EARTH	DETENTION	16.0	C-2	200.00	14.00
KNICK ROAD DETENTION DAM	WEST BRANCH INDIAN CREEK	TOWNSHIP OF LOWER MERION	EARTH	DETENTION	10.0	C-2	0.31	7.88
REMINGTON ROAD DETENTION DAM	WEST BRANCH INDIAN CREEK	TOWNSHIP OF LOWER MERION	EARTH	DETENTION	16.0	C-2	0.92	26.31

Montgomery County 2017 Hazard Mitigation Plan

Appendix M – Fire Stations

Montgomery County Fire Management Facilities

Map #	Name	Municipality
100	Abington Fire Company	Abington
200	McKinley Fire Company	Abington
300	Weldon Fire Company	Abington
400	Edge Hill Fire Company	Abington
500	Roslyn Fire Company	Abington
7A	Wissahickon Fire Company	Ambler
31	Bridgeport Fire Company	Bridgeport
32	Goodwill Fire Company	Bridgeport
11	Bryn Athyn Fire Company	Bryn Athyn
4	Cheltenham Fire Company	Cheltenham
1	Glenside Fire Company	Cheltenham
2	LaMott Fire Company	Cheltenham
3	Elkins Park Fire Company	Cheltenham
5	Ogontz Fire Company	Cheltenham
34	Collegeville Fire Company	Collegeville
35	Conshohocken Fire Company #2	Conshohocken
36	Washington Fire Company	Conshohocken
67	Gilbertsville Fire Company	Douglass
38	East Greenville Fire Company	East Greenville
61	Norriton Fire Company	East Norriton
42	Green Lane Fire Company	Green Lane
95	Enterprise Fire Company of Hatboro	Hatboro
17	Hatfield Fire Company	Hatfield Borough
12	Colmar Fire Company	Hatfield Township
17	Hatfield Fire Company	Hatfield Township
15A	Horsham Fire Company	Horsham
15B	Horsham Fire Company	Horsham
16	Independent Fire Company of Jenkintown	Jenkintown
96	Pioneer Fire Company of Jenkintown	Jenkintown
14	Fairmount Fire Company of Lansdale	Lansdale
51	Linfield Fire Company	Limerick
54	Limerick Fire Company	Limerick
52	Lower Frederick Fire Company	Lower Frederick
7B	Wissahickon Fire Company	Lower Gwynedd
21	Penn Wynne Fire Company	Lower Merion
22	Belmont Hills Fire Company	Lower Merion
23	Bryn Mawr Fire Company	Lower Merion
24	Gladwyne Fire Company	Lower Merion
25	Merion Fire Company	Lower Merion
28	Union Association of Cynwyd	Lower Merion
8	Huntingdon Valley Fire Company	Lower Moreland
58	Saratoga Fire Company	Lower Pottsgrove
59	Ringing Hill Fire Company	Lower Pottsgrove
53A	Lower Providence Fire Company	Lower Providence
53B	Lower Providence Fire Company	Lower Providence
89	Harleysville Fire Company	Lower Salford
18A	Montgomery Twp Dept. Fire Services	Montgomery
18B	Montgomery Twp Dept. Fire Services	Montgomery
26	Narberth Fire Company	Narberth
37	New Hanover Fire Company	New Hanover
37B	New Hanover Fire Company	New Hanover
27A	Norris Hose Company	Norristown
27B	Montgomery Hose Company	Norristown

Map #	Name	Municipality
27C	Humane Fire Company	Norristown
27D	Fairmount Fire Company	Norristown
27E	Hancock Fire Company	Norristown
62	North Penn Fire Company of North Wales	North Wales
65	Pennsburg Fire Company	Pennsburg
66	Perkiomen Township Fire Company	Perkiomen
MCFA	Montgomery County Fire Academy	Plymouth
43	Plymouth Fire Company	Plymouth
44	Harmorville Fire Company	Plymouth
69A	Goodwill Fire Company of Pottstown	Pottstown
69B	Philadelphia Fire Company of Pottstown	Pottstown
69C	Empire Hook and Ladder	Pottstown
69D	North End Fire Company of Pottstown	Pottstown
71	Red Hill Fire Company	Red Hill
9	Rockledge Fire Company	Rockledge
98	Royersford Fire Department	Royersford
72	Tylersport Fire Company	Salford
73	Lower Frederick Fire Company	Schwenksville
86	Skippack Fire Company	Skippack
41	North Penn Goodwill Service	Souderton
74	Perserverence Fire Company of Souderton	Souderton
82	Wyndmoor Fire Company	Springfield
6	Flourtown Fire Company	Springfield
700	Oreland Fire Company	Springfield
75	Telford Fire Company	Telford
76A	Towamencin Fire Company	Towamencin
76B	Towamencin Fire Company	Towamencin
77	Trappe Fire Company	Trappe
88A	Fort Washington Fire Company	Upper Dublin
88B	Fort Washington Fire Company	Upper Dublin
87	Upper Frederick Fire Company	Upper Frederick
80	Upper Gwynedd Fire Company	Upper Gwynedd
47A	King of Prussia Fire Company	Upper Merion
47B	King of Prussia Fire Company	Upper Merion
48	Swedeland Fire Company	Upper Merion
49	Swedesburg Fire Company	Upper Merion
10A	Willow Grove Fire Company	Upper Moreland
10B	Willow Grove Fire Company	Upper Moreland
79	Upper Pottsgrove Fire Company	Upper Pottsgrove
99	Black Rock Volunteer Fire Co- Mont Clare	Upper Providence
99	Black Rock Volunteer Fire Co- Oaks	Upper Providence
64	Telford Diving Unit	Upper Salford
78	Upper Salford Fire Company	Upper Salford
39	George Clay Fire Company	West Conshohocken
46	Jefferson Fire Company	West Norriton
57	West End- Stowe Fire Company	West Pottsgrove
29	Barren Hill Fire Company	Whitemarsh
45	Spring Mill Fire Company	Whitemarsh
56	Lincoln Fire Company	Whitemarsh
33	Center Square Fire	Whitpain
83	Worcester Fire Company	Worcester

Montgomery County 2017 Hazard Mitigation Plan

Appendix N – Municipal Participation

Municipal Participation in the Montgomery County Hazard Mitigation Plan

	Hazard Mitigation Plan Training Session (5/18/2016)	Advisory Committee	Survey	Consortium Meeting (11/18/2016)	Public Meetings 11/2017	2012 Plan Adoption	2017 Plan Update Adoption
Abington Township	✓	✓	✓	✓		✓	
Ambler Borough			✓		✓	✓	
Bridgeport Borough			✓			✓	
Bryn Athyn Borough	✓		✓			✓	
Cheltenham Township			✓			✓	
Collegeville Borough			✓			✓	
Conshohocken Borough			✓			✓	
Douglass Township			✓			✓	
East Greenville Borough	✓		✓			✓	
East Norriton Township			✓			✓	
Franconia Township			✓			✓	
Green Lane Borough			✓			✓	
Hatboro Borough			✓	✓		✓	
Hatfield Borough			✓	✓		✓	
Hatfield Township			✓			✓	
Horsham Township			✓			✓	
Jenkintown Borough			✓			✓	
Lansdale Borough			✓	✓		✓	
Limerick Township		✓	✓	✓	✓	✓	
Lower Frederick Township			✓	✓		✓	
Lower Gwynedd Township		✓	✓	✓		✓	
Lower Merion Township			✓	✓		✓	
Lower Moreland Township	✓		✓	✓		✓	
Lower Pottsgrove Township	✓		✓	✓		✓	
Lower Providence Township			✓			✓	
Lower Salford Township			✓		✓	✓	
Marlborough Township			✓			✓	
Montgomery Township	✓		✓	✓		✓	
Narberth Borough			✓			✓	
New Hanover Township			✓			✓	
Norristown	✓		✓	✓		✓	
North Wales Borough			✓			✓	
Pennsburg Borough			✓			✓	
Perkiomen Township			✓			✓	
Plymouth Township			✓	✓		✓	
Pottstown Borough	✓		✓			✓	
Red Hill Borough			✓			✓	
Rockledge Borough			✓			✓	
Royersford Borough			✓			✓	
Salford Township			✓			✓	
Schwenksville Borough			✓		✓	✓	
Skipack Township			✓	✓		✓	
Souderton Borough			✓			✓	
Springfield Township		✓	✓		✓	✓	
Telford Borough			✓			✓	
Towamencin Township	✓	✓	✓		✓	✓	

Montgomery County 2017 Hazard Mitigation Plan

Municipal Participation in the Montgomery County Hazard Mitigation Plan

	Hazard Mitigation Plan Training Session (5/18/2016)	Advisory Committee	Survey	Consortium Meeting (11/18/2016)	Public Meetings 11/2017	2012 Plan Adoption	2017 Plan Update Adoption
Trappe Borough			✓			✓	
Upper Dublin Township		✓	✓	✓	✓	✓	
Upper Frederick Township			✓			✓	
Upper Gwynedd Township	✓	✓	✓		✓	✓	
Upper Hanover Township			✓			✓	
Upper Merion Township		✓	✓			✓	
Upper Moreland Township	✓		✓			✓	
Upper Pottsgrove Township			✓			✓	
Upper Providence Township		✓	✓			✓	
Upper Salford Township			✓			✓	
West Conshohocken Borough			✓	✓		✓	
West Norriton Township			✓			✓	
West Pottsgrove Township			✓		✓	✓	
Whitemarsh Township	✓	✓	✓	✓		✓	
Whitpain Township	✓		✓	✓		✓	
Worcester Township			✓			✓	

HAZARD MITIGATION PROJECT OPPORTUNITY FORM

DATE: *January 4, 2018*

NAME OF PROJECT: *Hazardous Mitigation Plan Training (1a-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT: *Donna Fabry*

TITLE: *Environmental Planner*

AGENCY: *Montgomery County Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Annual review and training will be offered to municipal emergency management coordinators on the Hazard Mitigation Plan for Montgomery County. These annual training sessions would also provide an opportunity to review and discuss various elements of the plan in preparation for the next plan revision.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Familiarizes all municipal personnel about the Montgomery County Hazard Mitigation Plan*

TOTAL ESTIMATED COST: *About \$5,000 internal staff costs for a two hour training session and follow up to be conducted yearly.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

HAZARD MITIGATION PROJECT OPPORTUNITY FORM

DATE: *January 4, 2018*

NAME OF PROJECT: *Hazardous Mitigation Plan Availability (1a-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT: *Donna Fabry*

TITLE: *Environmental Planner*

AGENCY: *Montgomery County Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Copies of the adopted Montgomery County Hazard Mitigation Plan will be made available to the public through on-line posting on the Montgomery County Planning Commission website and by making paper copies available in the 20+ libraries serving the county.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Provides opportunities for more people to become familiar with the plan.*

TOTAL ESTIMATED COST: *Plan distribution activities by county staff would result in about\$1,000 in costs- labor and travel.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

HAZARD MITIGATION PROJECT OPPORTUNITY FORM

DATE: *January 4, 2018*

NAME OF PROJECT: *Rescue Attempts Inventory (1b-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE: *GIS Coordinator*

AGENCY: *Montgomery County Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The GIS cartographers from the Planning Commission will coordinate with the Public Safety Department and local responders to obtain information on all rescue attempts to assemble a data base that can help predict future emergency response needs during certain types of hazard events.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Provides additional information to be used during a hazard event*

TOTAL ESTIMATED COST: *Primarily internal staffing with an overall budget of about \$3,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

HAZARD MITIGATION PROJECT OPPORTUNITY FORM

DATE: *January 4, 2018*

NAME OF PROJECT: *Impacted Property Inventory (1b-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE: *GIS Coordinator*

AGENCY: *Montgomery County Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The GIS cartographers from the Planning Commission will coordinate with the Public Safety Department and local responders to obtain all relevant data about properties impact by various types of hazards. The collected information would be linked with the county property records maintained by the Department of Assessment Appeals. Due to the sensitive real estate nature of this information, this data would only be made available for internal use and would not be shared.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Provides detailed information about historic impact on property resulting from various types of hazards.*

TOTAL ESTIMATED COST: *Primarily internal staffing with an overall budget of about \$8,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

HAZARD MITIGATION PROJECT OPPORTUNITY FORM

DATE: *January 4, 2018*

NAME OF PROJECT: *Groundwater Monitoring (1b-3)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT: Kyle Schmeck

TITLE:

AGENCY: *Montgomery County Health Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Continual monitoring of ground water height will be conducted monthly at 18 different wells located throughout the county occurring in different types of geologic formations*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *This data is important in the monitoring of ground water heights in order to identify key trends.*

TOTAL ESTIMATED COST: *Primarily internal staffing with an overall budget of about \$8,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

HAZARD MITIGATION PROJECT OPPORTUNITY FORM

DATE: *January 4, 2018*

NAME OF PROJECT: *Riparian Corridor Forest Canopy Study (1b-4)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE: *Environmental Planning Section Chief*

AGENCY: *Montgomery County Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission should continue to monitor the riparian corridor forested areas to evaluate the health of the county stream systems and their ability to provide natural stormwater attenuation. Similar analysis work using older aerial photography has already been performed by the county. Future analysis would follow past analysis protocols to enable comparison and trend analysis.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *This data is important in the monitoring of the health of county streams and their ability to provide natural flood attenuation.*

TOTAL ESTIMATED COST: *Primarily internal staffing with an overall budget of about \$16,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

HAZARD MITIGATION PROJECT OPPORTUNITY FORM

DATE: *January 4, 2018*

NAME OF PROJECT: *Fire Company Reporting (1b-5)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Montgomery County Public Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department and municipalities should encourage local fire companies to continue making accurate reports of all fire response information on PennFIRS, the Pennsylvania Fire Information Reporting System. This system is used to report and manage the flow of incidents into the National Fire Incident Reporting System (NFIRS). The OSFC reports all incidents to the United States Fire Administration's National Fire Data Center. PennFIRS also has the potential for reviewing and analyzing Pennsylvania's fire situation.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *This data is important to understand the overall effectiveness of the county's current fire response facilities and personnel.*

TOTAL ESTIMATED COST: No cost estimate.

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

HAZARD MITIGATION PROJECT OPPORTUNITY FORM

DATE: *January 4, 2018*

NAME OF PROJECT: *Sinkhole Mapping (1b-6)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE: GIS Cartographers

AGENCY: *Montgomery County Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission should work with the PA Geological Survey to produce a GIS layer and maps depicting all sinkhole activity in the county. These maps can be used during the planning process to identify any potential hazards for future development. A sinkhole map for Upper Merion Township has been recently produced for the Upper Merion Township Comprehensive Plan. Mapping in other communities would be used in their comprehensive plans. The plan for Plymouth Township is currently being developed.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *This data is important to understand potential risks to future development from sinkholes.*

TOTAL ESTIMATED COST: *Mapping work could be performed with in-house GIS professionals at a cost of about \$4,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Low-*

PROJECT TIME FRAME: *Ongoing*

HAZARD MITIGATION PROJECT OPPORTUNITY FORM

DATE: *January 4, 2018*

NAME OF PROJECT: *Building Information (1b-7)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE: GIS Cartographers

AGENCY: *Montgomery County Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission should work with the Public Safety Department and GIS Manager (a new position to be created in the county) to further attribute building data within existing building foot print files recently acquired by the county. As part of this project, the county should explore the feasibility of acquiring first floor elevation data to be used in determining potential flood impact.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *This data could be used in various types of hazard risk analysis and modeling. This information is also important for the development of E-911.*

TOTAL ESTIMATED COST: *Mapping work could be performed with in-house GIS professionals and various consultants at a cost of about \$200,000+*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Monitoring and Coordination (1b-8)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE: GIS Cartographers

AGENCY: *Montgomery County Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The Public Safety Department should expand the use of a web based multi-user sharing platform to track hazard incidents and coordinate response.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *This data could be used in various types of hazard risk analysis and modeling. This information is also important for the development of E-911.*

TOTAL ESTIMATED COST: *No cost estimate has*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Hazard Mitigation Project Management (1b-9)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Montgomery County Public Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County should continue to compile a listing of specific mitigation projects including flood prone buildings to elevate or remove and drainage improvements.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *This information would be used in developing future mitigation projects and in developing potential grant applications.*

TOTAL ESTIMATED COST: *No cost estimates are made. Work would be performed by in-house personnel*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Low*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Internet and Social Media Outreach (2a-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Montgomery County Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission should work with the Public Safety Department and GIS Manager (a new position to be created in the county) to further attribute building data within existing building foot print files recently acquired by the county. As part of this project, the county should explore the feasibility of acquiring first floor elevation data to be used in determining potential flood impact.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *This data could be used in various types of hazard risk analysis and modeling. This information is also important for the development of E-911.*

TOTAL ESTIMATED COST: *Mapping work could be performed with in-house GIS professionals at a cost of about \$200,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Critical Facilities Addressing (2a--2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE: GIS Cartographers

AGENCY: *Montgomery County Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department will contact municipal emergency coordinators to get up to date addressing information to verify the location and addressing of all critical facilities including municipal buildings, school facilities, water treatment plants and booster pump stations, sewage treatment plants and pump stations, and other critical public infrastructure and governmental facilities.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *This data could be used in various types of emergency response and recovery actions by first responders and various utilities working to restore service.*

TOTAL ESTIMATED COST: *Address verification work could be performed with in-house public safety professionals working with municipal emergency management coordinators at a cost of about \$20,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Flood Plain Evacuation Education (2a--3)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County and Municipalities should make residents in flood prone areas aware of their responsibilities to safely evacuate prior to flood conditions and not rely upon rescue services.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Informed homeowners will be more cooperative and understanding during flood events.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Emergency Management Plans (2a--4)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department should periodically check to assure that all critical facilities in the county have up to date emergency response plans in place and their occupants are aware of potential hazards that could impact them.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Critical facilities serving special needs population, youth , and providing critical public services should keep their response plans up to date.*

TOTAL ESTIMATED COST: *Approximately a year at an internal cost of \$5,000 for personnel time coordinating with critical facility owners.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Hazard Awareness Promotion (2a--5)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department, Health Department, and Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department, Health Department, Communications Department, and Planning Commission should participate in various community and youth events to promote hazard awareness. The Emergency Preparedness guide and other attractive publications could be disseminated at these events.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Informed homeowners will be more aware of hazards and will know potential actions to take to ensure their family safety.*

TOTAL ESTIMATED COST: *Yearly internal budget cost of \$5,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Public Awareness Warning- Radon (2a--6)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Health Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Health Department should continue to promote radon awareness. Various communications should be made through print and digital media and decimated at various community events typically attended by Public Health Department Staff.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Informed homeowners will take require health risk precautions such as testing and remediation if necessary.*

TOTAL ESTIMATED COST: *On going staff responsibility. Yearly budget for material production is about \$5,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Public Awareness Warning (2a--7)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department/ Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department and Planning Commission, working with the municipalities and the National Weather Service, should investigate the feasibility of technology that can predict flash floods from Doppler imagery. (year 3-5 no budget)*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Expanded use of available weather technology may provide quicker warnings to potentially effected population groups.*

TOTAL ESTIMATED COST: *No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Citizens Corps (2a--8)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department should promote the formation of Citizen Corps to provide opportunities for people to participate in a range of measures to make their families, their homes, and their communities safer from the threats of crime, terrorism, and disasters of all kinds.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Word of mouth information appropriately disseminated by trained Citizen Corps members could be reach residents not typically reached by other communication sources.*

TOTAL ESTIMATED COST: *No budget established.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Expand Use of Digital Contact Warning Systems (2b-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department should expand the use of emergency warnings and weather information to residents, businesses, institutions, and visitors to the county by increasing the use of Everbridge, Smart 911 Ap and other appropriate systems.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *People continue to rely on portable digital devices for all of their information.*

TOTAL ESTIMATED COST: *No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Special Needs Population (2b--2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County should continue to encourage special needs persons to sign up with the county Everbridge communication system.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *The county does not have a complete and up to date listing of special needs individuals residing in different types of hazard areas..*

TOTAL ESTIMATED COST: *No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Enhance Obedience to Hazardous Conditions Control Device Law (2b-3)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Municipal and State police should enforce the law which establishes penalties for ignoring hazardous condition control devices. Education and outreach about the law should also be provided to prevent public from driving around public safety barriers*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Several injuries and fatalities resulted in the past from drivers ignoring warnings about flooded roadways.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Warning Signage (2b-4)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Municipalities should continue to install appropriate signage along roadways and in public properties to explain potential hazard conditions such as road flooding.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Signs inform local travelers about potential flooding. Signage also reminds local residents about existing hazards in their community.*

TOTAL ESTIMATED COST: *Deployment of about 100-200 signs could cost about \$50,000 in personnel and labor costs.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Public Awareness Warning (2b-5)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department and Communications Department working with various business organizations should establish a county -wide education program for commuters to better educate them about driving in the county during flood conditions.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Informed homeowners and travelers through the county will be more aware during flood events.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Continue to Enforce Building Codes (3a-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Municipal Codes Departments*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Municipal code officials should receive annual training and resources (particularly related to building resiliency and mitigation of structures) to effectively enforce the appropriate building codes.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Well-constructed buildings are less vulnerable to potential hazards.*

TOTAL ESTIMATED COST: *No budget established. Individual municipalities provide for staff training in annual operating budgets.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Building Code Modernization (3a-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Municipal Codes Departments*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Montgomery County and municipalities should strongly advocate that the state expeditiously adopt revisions to the 2009 International Construction Code as part of the state Uniform Construction Code used by Montgomery County municipalities to ensure that safe building practices are consistently used.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Under state law, an older version of the International Building Code is used for all building construction in PA. Several amendments to the International Building Code to provide improved building safety from potential hazards have been enacting subsequent to the date of the code used by PA.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Coordination During Power Utility Outages (3b-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department should work with municipal emergency coordinators and representatives of power companies to improve the flow of information about power outages.*

Montgomery County 2017 Hazard Mitigation Plan

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Many events involve various power outages require enhanced coordination with power companies to ensure restoration which often requires road clearance.*

TOTAL ESTIMATED COST: *During storm events, internal cost of approximately \$25,000/year*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Landscape Ordinance (3b-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission should develop a model ordinance for landscaping and tree protection to aid municipalities. This would contribute to developing a healthy tree canopy and avoid potential storm damage of trees.*

Montgomery County 2017 Hazard Mitigation Plan

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *A model ordinance will promote smart tree location in the vicinity of power lines.*

TOTAL ESTIMATED COST: *no budget estimate*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Landscaping (3b-3)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission should work with local planning commissions and governing bodies to ensure that all proposed vegetation near power lines complies with appropriate design requirements to avoid interference with electrical transmission.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Reduce the number of inappropriate trees planted near power lines which could cause power interruptions during hazard events.*

TOTAL ESTIMATED COST: *No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Emergency Power Supply (3b-4)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department and Municipal Code Enforcement personnel*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Emergency managers should work to ensure that all critical facilities have adequate back up power supplies with sufficient fuel to energize critical electrical power needs for at least two weeks during a utility power outage.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Critical facilities are unable to provide services during power interruptions without adequate back up power supply.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Dam Safety (3c-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department, PA Department of Environmental Protection (DEP)*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *In coordination with the Department of Environmental Protection (DEP) the County Public Safety Department should continue to ensure that the Emergency Action Plans for the significant dams in the county are available and up to date.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Dam Emergency Action plans should reflect the changing conditions at the dam site and down stream.*

TOTAL ESTIMATED COST: *In house yearly personel cost of \$5,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Transportation Safety Design (3d-1*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission should promote transportation safety in design reviews of new developments.*

Montgomery County 2017 Hazard Mitigation Plan

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Transportation safety is an important element in the municipal planning process established under the Pa Municipalities Planning Code. Under that law, the county planning commission can provide comments on all developments which include comments on transportation system design.*

TOTAL ESTIMATED COST: *On-going at an internal cost of \$5,000)*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Philadelphia Regional Counter-Terrorism Task Force (3e-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department should continue to work through the Southeastern Pennsylvania Regional Task Force to address Terrorism threats and response.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *The Philadelphia Regional Counter Terrorism task force is the logical forum to address issues involving the protection of the county from terrorism threats..*

TOTAL ESTIMATED COST: *(on-going at an internal cost of \$5,000).*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Tactical Weapon Training (3e-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department (Public Safety Training Campus)*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The Public Safety Department working with the Police Chiefs Assn. should continue various tactical weapon training.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *The existing training facility offers a appropriate setting for training in various counter-terrorism tactical weaponry.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Civil Unrest Response Training (3e-3)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department (Public Safety Academy)*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County should provide training for public safety personnel on the response to lone wolf incidents in which a person or persons are seeking to cause mass fatalities through use of weapons, explosives or vehicles.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *The growing threat from lone wolf shooting events recently demonstrates the need to provide public safety officer training in this type of event at the Public Safety Training Academy.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Hazardous Material Emergency Response (3f-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department (Public Safety Academy)*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department should continue to offer various types of training to first responders and other business personnel in addressing hazardous material.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Several businesses in the county store various chemicals and other potential hazardous materials that could cause harm to first time responders if ignited or released through spillage or vehicle crash*

TOTAL ESTIMATED COST: *Yearly at an internal cost of \$100,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

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DATE: *January 4, 2018*

NAME OF PROJECT: *Hazardous Waste Collection (3f-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Montgomery County should continue to provide household hazardous waste collection events. (4-6 collection events per year at a total cost of \$400,000). The development of a permanent collection site should be pursued at one or several sites around the county.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *The safe removal of hazardous materials from residences reduces exposure to them by the residents and prevents them from being discarded with other forms of trash.*

TOTAL ESTIMATED COST: *Approximately \$400,000 per year for collection and disposal of household hazardous wastes.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

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DATE: *January 4, 2018*

NAME OF PROJECT: *Steep Slope Ordinances (3g-1)*

MUNICIPALITY: *County-wide in areas with steep slopes*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission and Municipal Code Enforcement personnel in municipalities with steep slope conditions.*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission should offer assistance to municipalities in developing land use controls to limit development in steep slope areas.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *With much of the county already developed, the few remaining properties are often constrained with steep slopes or other limitations. Poorly planned development on the steep slope properties could result in landslide conditions due to removal of vegetation, regrading of landscape or concentrated stormwater flow.*

TOTAL ESTIMATED COST: *Potential internal cost of \$7,000)*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Low*

PROJECT TIME FRAME: *Ongoing*

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DATE: *January 4, 2018*

NAME OF PROJECT: *Water Supply Interconnection (3h-1)*

MUNICIPALITY: *County-wide (particularly important among smaller public water systems in the western portion of the county)*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission and Health Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission and Health Department along with the municipalities should work with public water suppliers to ensure that water service systems are interconnected to allow for the transfer of water during a drought*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Interconnected water supply systems offer increased flexibility in providing public water during drought conditions.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

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DATE: *January 4, 2018*

NAME OF PROJECT: *Drought Task Force (3h-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT: Kyle Schmeck

TITLE:

AGENCY: *Health Department and Public Safety Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The Health Department should continue to convene a drought task for during drought conditions. The Drought Task Force will also contain key representatives from the Department of Environmental Protection, County Planning Commission, water suppliers, manufacturing, municipal government, agriculture, and golf course owners.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *The Drought Task Force identifies critical response and public health issues associated with a drought and will play a vital role in informing the public about water conservation and other measures to undertake to reduce the impact of the drought.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Well Development Standards (3h-3)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Health Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County should advocate the passage of a state-wide well construction law to ensure the proper development of all water supply wells.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Though the county has established its own well development regulations, statewide regulation of water well development could provide further insurance against the development of substandard wells.*

TOTAL ESTIMATED COST: *Advocacy of this law would be an ongoing staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

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DATE: *January 4, 2018*

NAME OF PROJECT: *Limerick Power Station EPZ Evacuation (3i-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department and local emergency management personnel*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The Public Safety Department should ensure that the evacuation plans for the Limerick Power Station are up-to-date*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Evacuation plans are revised periodically for the area surrounding the Limerick Nuclear Power station to ensure that persons working and residing in that area would be able leave any areas that may be subject to unhealthy radioactivity levels.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Limerick EPZ (3i-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department and Municipal Code Enforcement personnel*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Department of Public Safety, municipal officials along with state and federal officials should continue the nuclear incident training exercises at the Limerick Power Station*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *A complete evacuation of the area surrounding the Limerick Power Station would involve a variety of organizations to perform various tasks. To ensure that all participants understand their roles, training exercises are scheduled every other year.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Heat and Cold Warnings (3j-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department and Health Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Commissioners should continue releasing code red and code blue warnings for extremely hot and cold weather.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Extreme hot and cold weather warnings inform the public about dangerous weather conditions that are predicted. These*

Montgomery County 2017 Hazard Mitigation Plan

warnings also trigger action by various organizations would assist vulnerable populations during conditions that may cause serious injury or death.

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Sensitive Populations Services (3j-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Health Department and various Health and Human Services Departments*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Health and Human services departments will continue to coordinate various services to sensitive population groups to reduce the health impacts associated with extreme weather conditions.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Various types of services such as food, heated or cooled shelter, and different types of medical treatment may be needed during extreme heat and cold events. Additional services such as assistance in paying utility bills due to extreme heating and cooling needs may also be needed during extreme heat and cold events.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Sinkhole Prevention (3k-1)*

MUNICIPALITY: *Primarily 4 municipalities: Upper Merion, Whitmarsh, Plymouth and Cheltenham*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Local code deparments*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Municipalities in limestone and dolomite geological areas should adopt zoning and stormwater ordinances that address the potential for sinkhole formation.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Development needs to be carefully designed in high potential sinkhole areas. In addition, special design considerations for stormwater management are important to reduce the potential impact of stormwater conveyance and storage on the formation of sinkholes.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Snow and Ice Removal (31-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Municipal Public Works Departments, PennDot, PA Turnpike Commission, County Assets and Infrastructure Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *PennDot, the PA Turnpike Commission, Montgomery County Roads and Bridges Division, and each municipality should continue to maintain sufficient capacity for the removal of snow and the treatment of roads to ensure safe travel during winter storm events.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Road travel is necessary in the county during all types of weather including snow. The safe removal of snow and ice from roads, enables emergency management vehicle traffic as well as business and personal travel.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Medical Staff Training (3m-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department (Public Safety Academy)*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Emergency medical staff should be provided first receiver training to understand how to manage mass casualty patients who dropped off directly at hospital facilities without being prescreened by emergency medical technicians. Directly receiving patients from mass casualty imposes potential risk to medical staff due to exposures to chemical, biological, or radiological materials.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *A growing trend in mass casualty events is for injured victims to be transported to area medical facilities by means other than traditional EMT vehicles. As a result victims may not be pretreated and may contain contamination of other conditions that receiving medical facility staff should be aware of.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

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DATE: *January 4, 2018*

NAME OF PROJECT: *Pandemic Plan Update (3m-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Health Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Infrastructure and Assets Department and all municipalities should inventory all essential government properties for hazard vulnerability and establish a plan to address found vulnerabilities. (*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Having an up to date pandemic plan is important since potential diseases can change dramatically over a period of time and the potential response partners can change as well.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *County and Municipal Facilities Hazard Identification (3n-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department, County Assets and Infrastructure Department and Municipal Managers/ Secretaries.*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Infrastructure and Assets Department and all municipalities should inventory all essential government properties for hazard vulnerability and establish a plan to address found vulnerabilities.*

Montgomery County 2017 Hazard Mitigation Plan

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *It is important that all county and municipal facilities can continue to function in all types of hazard conditions.*

TOTAL ESTIMATED COST: *Internal cost estimate of \$15,000 for county portion.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Emergency Pre-Plan (3n-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department and Municipal Code Enforcement personnel*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Various public safety professionals in the county should continue to develop and update existing preplans for high hazard chemical facilities, rail lines and yards, and major highway facilities.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Preplans for potentially critical sites enable responders to respond quicker during hazard events at those facilities.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Critical Infrastructure Design (3n-3)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Montgomery County Assets and Infrastructure Department and Municipal Managers/ Secretaries*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *All municipalities, the County Department of Assets and Infrastructure and other public service entities should ensure that all infrastructure is designed to function safely during severe weather events.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Resilient infrastructure is important in ensuring continuity of service during various disasters and in enabling responders to move throughout the county during a disaster event.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Acquire and Remove Homes in Flood Plain (4a-1)*

MUNICIPALITY: *Municipalities with flood history*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department and Municipal Managers/ Secretaries*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department and municipalities should work to remove homes in the floodplain that have sustained damage from past floods through voluntary buyout programs. Various sources of funding should be sought for this action. (Immediately as funding opportunities arise.) Repetitive loss and severe repetitive loss properties should be considered priorities for removal. Potential projects listed in Figure 6.3.2*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Removing structures from floodplain areas eliminates future flood damage and rescue of occupants.*

TOTAL ESTIMATED COST: *Funding requirements based on property value established through appraisals*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Elevate and Flood Proof Structures (4a-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department and Municipal Manager/ Secretary*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department and municipalities should seek to direct financial assistance to residents to elevate homes in the floodplain that have sustained damage from past floods. This option should only be pursued if removal is infeasible and safe ways to access the elevated structure during hazard events exist. All repetitive loss and severe repetitive loss properties should be considered priorities for elevation when removal is not feasible) Potential projects are listed in Figure 6.3.2*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Elevating structures above the expected flood eliminates damage to occupied portions of the structure. Evacuation of the structure or rescue may still be required in flood elevated structures.*

TOTAL ESTIMATED COST: *Value of the elevation is based upon the overall structural requirements of the building.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Develop Innovative Land Use Tools to Reduce Development in Flood Prone Areas (4a-3)*

MUNICIPALITY: *County-wide with a focus on municipalities in frequently flooded areas.*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission should work with municipalities to develop land use tools to encourage the removal of buildings within flood plain areas.*

Montgomery County 2017 Hazard Mitigation Plan

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Local land use ordinances can direct development away from areas flood hazard.*

TOTAL ESTIMATED COST: *Yearly staff cost is approximately \$5,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Repetitive Loss Property Data (4a-4)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department and Municipal Code Enforcement personnel*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission shall review and recommend corrections to the listings of repetitive Loss Property Data*

Montgomery County 2017 Hazard Mitigation Plan

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Current listing of repetitive loss properties appear to have several errors including properties where the structure had been removed and properties not located in the county.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Develop Flood Control Structures and Channel Improvements (4b-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Municipal Public Works Departments*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Municipalities should construct flood control structures, stormwater detention basins, and channel improvements in appropriate locations in accordance with county model flood plain ordinance requirements to protect developed sections of the floodplain downstream where relocation is infeasible. (several potential projects exist in the Wissahickon Creek and Tookany Creek basins as identified in reports pertaining to these areas) Potential projects are listed in Figure 6.3.3*

Montgomery County 2017 Hazard Mitigation Plan

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Due to historic patterns of development, reduction of the flood elevations in certain portions of the county resulting from flood control structures may be more cost effective than structure removal. Also, by lower flood levels, existing residents can remain in place.*

TOTAL ESTIMATED COST: *Cost is dependent upon feasibility studies and engineered designs.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Public Awareness Warning (4b-2)*

MUNICIPALITY: *Communities along the Schuylkill River*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department and Municipal Code Enforcement personnel*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department and municipalities should educate residents along the Schuylkill River about warning system opportunities.*

Montgomery County 2017 Hazard Mitigation Plan

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Several new residential communities that are elevated above the 100-year flood level are located along the Schuylkill River. Residents of these communities should be aware of warning systems that would alert them to evacuate or to remove vehicles parked at these developments.*

TOTAL ESTIMATED COST: *Internal staff budget would be approximately \$5,000 annually*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Low*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Stormwater Basin Effectiveness Study (4b-3)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission should work with municipalities and other organizations to study the effectiveness of stormwater basins in the county or a portion of the county. The study should address needed improvements to the basins. (year 3-5 with an internal cost of \$15,000)*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Stormwater basins do not always perform as they are designed. A study of basins currently installed could identify improvements that would enhance their flood control capacity.*

TOTAL ESTIMATED COST: *Internal staff budget of about \$15,000 for basins within a defined portion of a critical watershed.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Stream Corridor Management (4b-4)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Works Department, PennDot and County Assets and Infrastructure Department*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Local municipalities and PennDot should routinely inspect and maintain stream corridors, drainage ways, drainage structures, stormwater basins, bridges, and culverts to identify and remove, if possible, impediments to flood flow. This should be performed yearly or more frequently depending upon conditions.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Critical facilities are unable to provide services during power interruptions without adequate back up power supply.*

TOTAL ESTIMATED COST: *Costs dependent upon level of debris*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Stream Corridor Natural Resources Protection (4b-5)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department and Municipal Code Enforcement personnel*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Municipalities and the County should continue to preserve open space along the Schuylkill River and along stream corridors. (the county has approved funding capital funds for open space projects, some municipalities have separate open space funding initiatives)*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Preserving lands along streams and rivers protect natural flood plains.*

TOTAL ESTIMATED COST: *Costs are based upon the value of land to be preserved.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Countywide Land Use Management (4b-6)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission, working with the 62 municipalities and 4 planning regions, should promote low stormwater impact development in accordance with local and county comprehensive plans.*

Montgomery County 2017 Hazard Mitigation Plan

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Low impact development reduces the amount of stormwater generated.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Stormwater Management (4b-7)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission should complete and maintain stormwater management plans for all designated watersheds if state funding is provided.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Critical facilities are unable to provide services during power interruptions without adequate back up power supply.*

TOTAL ESTIMATED COST: *Approximately \$400,000 for county staff and consultants is required to complete stormwater management plans for the county.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Drainage (4b-8)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission and municipalities should investigate ways to link key stormwater facilities release rates through SCADA (Supervisory Control and Data Acquisition) technology to better coordinate flood control efforts at a local and watershed level.*

Montgomery County 2017 Hazard Mitigation Plan

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Often releases from stormwater management facilities are not coordinated with releases from other facilities sometimes resulting in increased flow rather than flow reduction.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Flood Studies (4b-9)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Public Safety Department, Planning Commission, municipalities, US Army Corps of Engineers, and Temple University*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department, Planning Commission, municipalities, Temple University Center for Sustainable Communities and other organizations should develop appropriate studies to analyze local hydrological and hydraulic conditions to better define flood mitigation opportunities.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Flooding problems can be complex need to be studied carefully to identify the most appropriate solution that fit other community growth and development objectives.*

TOTAL ESTIMATED COST: *Budget of any study would be based upon the scope and size of area to be studied.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Drainage and Infrastructure Projects (4b-10)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Municipal Public Works Departments and County Department of Assets and Infrastructure*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Various municipal projects designed to reduce localized flooding as identified in municipal survey responses should be implemented.*

Montgomery County 2017 Hazard Mitigation Plan

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Localized drainage problems may cause road flooding and water damage outside of designated flood plain areas.*

TOTAL ESTIMATED COST: *Budget is based upon specific drainage projects*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Act 167 Funding (4b-11)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County should lobby for adequate state funding for the Stormwater Management Planning in accordance with Act 167.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *The State curtailed funding for Act 167 Stormwater Management Act grant funds to assist the counties in the development of watershed based plans.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

DATE: *January 4, 2018*

NAME OF PROJECT: *Stream Bed Management (4b-12)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Municipal Public Works Departments*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County should advocate for an expeditious permitting process to allow municipalities to clean out accumulated silt and gravel bars and other debris that impact stream flow.*

Montgomery County 2017 Hazard Mitigation Plan

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *In some cases municipalities are not able to remove silt and gravel bars that may create enhanced flooding without going through a prolonged permitting process.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Montco 2040 Implementation Grant Program (4d-13)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Continue to provide grant funding to assist municipalities in making targeted physical improvements that address the goals of the Montgomery County comprehensive plan including adaptation and resiliency which is focused on addressing negative environmental changes through projects such as floodplain mitigation, streambank restoration, green streets, and community gardens.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Municipalities often lack final gap funding to complete important projects in a timely manner.*

TOTAL ESTIMATED COST: *Management of the grant program by Planning Commission staff is an on-going cost estimated at about \$20,000 per year.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *PennDot Road Improvements (4c-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *PennDot*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Montgomery County should encourage PennDot to make road and bridge improvements to minimize the impact of flooding.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Several older bridges may contribute to localized flooding due to the overall bridge hydraulics.*

TOTAL ESTIMATED COST: *Cost of bridge replacement is dependent upon the structure design.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *County Bridge Maintenance (4c-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Department of Infrastructure and Assets should inspect their bridges periodically and after major storm events to ensure that there is no blockage to flood waters. (yearly and potentially more frequently, \$15,000 internal cost for inspections)*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Bridges should be inspected after flooding requires their closure and other storm events to make sure that they are safe to use. Additionally, bridge inspection can identify restrictions caused by flood debris in their ability to carry flood waters.*

TOTAL ESTIMATED COST: *Bridge inspection costs depend upon the number of bridges.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Schuylkill River Flood Level Markers (4c-3)*

MUNICIPALITY: *Schuylkill River Municipalities*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department and municipalities should investigate the feasibility of placing visible flood markers with elevation points along the Schuylkill River to assist local public safety personnel in making decisions about road closures. Other visible markers should be placed at critical stream crossing and bridges throughout the county.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *The ability to visually monitor flood stage by various emergency management and public safety personnel can contribute to their ability to direct appropriate response actions..*

TOTAL ESTIMATED COST: *Cost estimate for construction of flood markers dependent upon design.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Road Closures Barriers and Gates (4d-1)*

MUNICIPALITY: *Municipalities with flood history*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Municipal Public Works Departments*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department and municipalities should work to install appropriate and uniform barrier systems including gate structures, at roads to be closed during flood events. Keys to gates should allow use by various entities. The design and location of these facilities should prevent any interference with adjoining electric transmission lines. (year 2-5, \$1 million)*

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BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Road closure barriers that are obvious and prevent drive arounds will help ensure that travelers do not drive into flood waters.*

TOTAL ESTIMATED COST: *Based on a rough assessment of potential locations, total costs for establishing gate road closure facilities is about \$1 million.*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Safe Flood Routes (4d-2)*

MUNICIPALITY: *Lower Wissahickon Area as a Pilot Project*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Public Safety Department, Planning Commission, Delaware Valley Regional Planning Commission, and municipalities should work to develop a commuter safe route system study for the Lower Wissahickon Creek Area. This would be a pilot project for potential application in other flood prone portions of the county.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Road closures due to flooding need to be better coordinated to enable local responders to direct traffic in flood prone areas such as the Lower Wissahickon Creek floodplain. A system of safe routes could be communicated with the public as well to help them plan out their commutes during flood events.*

TOTAL ESTIMATED COST: *Initial study costs are about \$50,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Emergency Routing Information (4d-3)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County and local emergency management personnel should cooperate with various on-line traffic routing information services to broadcast critical transportation information during local disasters.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Most commuters gather their navigation information from on-line sources. Improving the quality of information provided by these sources is important in routing traffic during flood conditions.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Floodplain Model Ordinance (4e-1)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission and the Montgomery County Conservation District should promote their model flood plain management ordinance so that is used by municipalities during any updates of their floodplain ordinances.*

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BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Improving flood plain ordinances prevents in appropriate development within flood prone areas.*

TOTAL ESTIMATED COST: *Internal staffing cost of \$10,000*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide High*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Federal Flood Insurance (4e-2)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Department of Public Safety and Planning Commission should promote participation in the Federal Flood Insurance Program.*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Participation in the flood insurance program enables homeowners to restore losses that occur from flooding and generally provides for the public welfare of the community.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Federal Flood Insurance Program CRS Program (4e-3)*

MUNICIPALITY: *County-wide (focus would be on larger communities with significant flooding problems in the past and high numbers of residents in the federal flood insurance program)*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Planning Commission*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *The County Planning Commission should work with selected municipalities to become eligible for inclusion in the Community Rating System (CRS)*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *Participation in the Community Rating System (CRS) could allow a reduction in the flood insurance premiums paid by local county residents. With lower premiums, additional homeowners may choose to participate.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Montgomery County 2017 Hazard Mitigation Plan

DATE: *January 4, 2018*

NAME OF PROJECT: *Federal Flood Insurance Program Training (4e-4)*

MUNICIPALITY: *County-wide*

COUNTY: *Montgomery County*

PROJECT CONTACT:

TITLE:

AGENCY: *Municipal Code Enforcement Officers*

LOCATION OF PROJECT: *County wide*

LATITUDE: *NA* **LONGITUDE:** *NA*

UNIT: *NA* **BLOCK:** *NA*

PARCEL NUMBER: *NA*

ELEVATION: *NA* **CERTIFICATE:** *N*

Is the property within the 100-year floodplain? *NA*

The property is located on FIRM Panel Number: *NA*

FLOOD INSURANCE: *Y/N* **DATE OF INSURANCE VERIFICATION:** *NA*

BRIEF DESCRIPTION OF PROJECT: *Municipal code officers should participate in training for the administration of the flood plain ordinance*

BRIEF DESCRIPTION OF PROBLEM TO BE SOLVED: *The role of the Code Enforcement Officer in the administration of the Federal Flood Insurance Program is vital. They should be knowledgeable in every aspect of it.*

TOTAL ESTIMATED COST: *On going staff responsibility. No budget established*

SOURCE OF FUNDING FOR NON-FEDERAL SHARE:

COMMUNITY RANKING SCORE: *Countywide Medium*

PROJECT TIME FRAME: *Ongoing*

Appendix P – Various Hazard Studies

Montgomery County Flooding Studies
(available in the Montgomery County Planning Commission Library)

Call #:	Title:	Author:	Date:
TC 530 .H64	Storm Drainage Plan Study Design for York County	Hoheneder, Joseph C.	1976
TC 530 .J36	Flood Plain as a Residential Choice: Resident Attitudes and Perceptions...	James, L. Douglas	1971
TC 530 .K66	Best Management Practices for Stormwater Control	Chesapeake Bay Foundation	1988
TC 530 .P20	Pennypack Watershed: Expanded Flood Plain Information Study: Technical Report	Unknown	1977
TC 530 .P21	Pennypack Watershed: Expanded Flood Plain Information Study	Unknown	1977
TC 530 .P22	Pennypack Creek Basin: Expanded Flood Plain Information Report: Plan of Study	Philadelphia District Corps of Engineers	1973
TC 530 .P23	Pennypack Creek: Flood Plain Information: Meadow Brook, Southampton Creek....	Philadelphia District Corps of Engineers	1974
TC 530 .P47	East Branch Perkiomen Creek: Flood Plain Information	US Army Corps of Engineers: District Philadelphia	1971
TC 530 .P48	East Branch Perkiomen Creek: Flood Plain Information	US Army Corps of Engineers: District Philadelphia	1969
TC 530 .P49	Perkiomen Creek: Extent and Frequency of Inundation From Green Lane to...	US Department of the Interior	1966
TC 530 .S38	Schuylkill River: Extent and Frequency of Inundation From Conshohocken to Phila...	US Department of the Interior	1971
TC 530 .S39	Schuylkill River: Extent and Frequency of Inundation From Conshohocken to Phila...	US Department of the Interior	1973
TC 530 .S40	Schuylkill River: Extent and Frequency of Floods Near Norristown, PA	Busch, W.F. and L.C. Shaw	1976
TC 530 .S76	Special Flood Hazard Report: Stony Creek; Montgomery County PA	US Army Corps of Engineers: District Philadelphia	1976
TC 530 .U53	Special Flood Hazard Report: Unami Creek and Tributaries	US Army Corps of Engineers: District Philadelphia	1976
TC 530 .Z33	Special Flood Hazard Report: Zacharias Creek	DWRPC	1974
TC 530.D97.R44	Floodplain Information: Regional Report	PA Environmental Council	1973
TC 530 .P4.P76	Floodplain Management: The Prospects for Pennsylvania	PA Department of Community Affairs	1982
TC 530.P4.R44	Regulating Floodplain Development: A Handbook for Local Officials	Flood Plain Management Subcommittee of the PA	1977
TC 530.P4.T43	Flood Plain Management: A Technical Manual for Implementation by Local Gov't	US Army Corps of Engineers: District Philadelphia	1974
TD 665 .H36	Flood Plain: Handle With Care	Department of Community Affairs	1990
TC 530.A3	Administering Floodplain Management Regulations	Federal Insurance Administration	1976
TH9034 .E44	Elevated Residential Structures: Reducing Flood Damage Through Building Design...	American Institute of Architects	1984
TH9034 .E45	Elevated Residential Structures	US Army Corps of Engineers: District Philadelphia	1972
TH9034 .F55	Flood-Proofing Regulations	Federal Emergency Management Agency	1986
TH9034 .F56	Floodproofing Non-Residential Structures	Federal Emergency Management Agency	1986

Plan Goal(s)/Objective(s) Addressed:

Goal: _____

Objective: _____

Indicator of Success (e.g., losses avoided as a result of the acquisition program):

In most cases, you will list losses avoided as the indicator. In cases where it is difficult to quantify the benefits in dollar amounts, you will use other indicators, such as the number of people who now know about mitigation or who are taking mitigation actions to reduce their vulnerability to hazards.

Status (Please check pertinent information and provide explanations for items with an asterisk. For completed or canceled projects, see Worksheet #2 — to complete a project evaluation):

Project Status

Project on schedule

Project completed

Project delayed*

*explain: _____

Project canceled

Project Cost Status

Cost unchanged

Cost overrun*

*explain: _____

Cost underrun*

*explain: _____

Summary of progress on project for this report:

A. What was accomplished during this reporting period?

B. What obstacles, problems, or delays did you encounter, if any?

C. How was each problem resolved?

Worksheet #2 Evaluate Your Planning Team step 3

When gearing up for the plan evaluation, the planning team should reassess its composition and ask the following questions:

	YES	NO
Have there been local staffing changes that would warrant inviting different members to the planning team?		
Comments/Proposed Action:		
Are there organizations that have been invaluable to the planning process or to project implementation that should be represented on the planning team?		
Comments/Proposed Action:		
Are there any representatives of essential organizations who have not fully participated in the planning and implementation of actions? If so, can someone else from this organization commit to the planning team?		
Comments/Proposed Action:		
Are there procedures (e.g., signing of MOAs, commenting on submitted progress reports, distributing meeting minutes, etc.) that can be done more efficiently?		
Comments/Proposed Action:		
Are there ways to gain more diverse and widespread cooperation?		
Comments/Proposed Action:		
Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?		
Comments/Proposed Action:		

If the planning team determines the answer to any of these questions is "yes," some changes may be necessary.

Worksheet #3 Evaluate Your Project Results

step 3

page 1 of 2

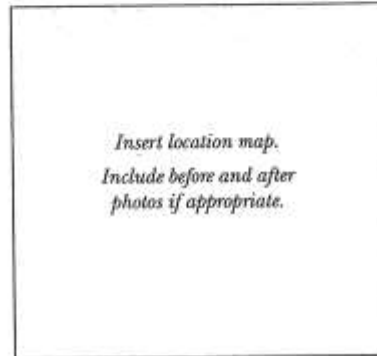
Project Name and Number: _____

 Project Budget: _____

 Project Description: _____

 Associated Goal and Objective(s): _____

 Indicator of Success (e.g., losses avoided): _____



Was the action implemented? YES NO



Why not?

- Was there political support for the action?
- Were enough funds available?
- Were workloads equitably or realistically distributed?
- Was new information discovered about the risks or community that made implementation difficult or no longer sensible?
- Was the estimated time of implementation reasonable?
- Were sufficient resources (for example staff and technical assistance) available?

YES NO

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>



What were the results of the implemented action? _____

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	YES	NO
Were the outcomes as expected? If No, please explain:		
Did the results achieve the goal and objective(s)? Explain how:		
Was the action cost-effective? Explain how or how not:		
What were the losses avoided after having completed the project?		
If it was a structural project, how did it change the hazard profile?		
Additional comments or other outcomes:		

Date: _____
 Prepared by: _____

Worksheet #4 Revisit Your Risk Assessment step 4

Risk Assessment Steps	Questions	YES	NO	COMMENTS
Identify hazards	Are there new hazards that can affect your community?			
Profile hazard events	Are new historical records available?			
	Are additional maps or new hazard studies available?			
	Have chances of future events (along with their magnitude, extent, etc.) changed?			
	Have recent and future development in the community been checked for their effect on hazard areas?			
Inventory assets	Have inventories of existing structures in hazard areas been updated?			
	Is future land development accounted for in the inventories?			
	Are there any new special high-risk populations?			
Estimate losses	Have loss estimates been updated to account for recent changes?			

If you answered "Yes" to any of the above questions, review your data and update your risk assessment information accordingly.

Worksheet #5

Revise the Plan

step 4

page 1 of 4

Prepare to update the plan.

When preparing to update the plan:

Check the box when addressed:

1. Gather information, including project evaluation worksheets, progress reports, studies, related plans, etc.	
Comments:	
2. Reconvene the planning team, making changes to the team composition as necessary (see results from Worksheet #2).	
Comments:	

Consider the results of the evaluation and new strategies for the future.

When examining the community consider:

Check the box when addressed:

1. The results of the planning and outreach efforts.	
Comments:	
2. The results of the mitigation efforts.	
Comments:	

3. Shifts in development trends.	
Comments:	
4. Areas affected by recent disasters.	
Comments:	
5. The recent magnitude, location, and type of the most recent hazard or disaster.	
Comments:	
6. New studies or technologies.	
Comments:	
7. Changes in local, state, or federal laws, policies, plans, priorities, or funding.	
Comments:	

8. Changes in the socioeconomic fabric of the community.	
Comments:	
9. Other changing conditions.	
Comments:	

Incorporate your findings into the plan.

When examining the plan consider:

Check the box when addressed:

1. Revisit the risk assessment. (See Worksheet #4)	
Comments:	
2. Update your goals and strategies.	
Comments:	
3. Recalculate benefit-cost analyses of projects to prioritize action items.	
Comments:	

Montgomery County 2017 Hazard Mitigation Plan

Appendix R – STAPLEE Worksheets

Mitigation Actions Prioritization Worksheet

Scoring: For each consideration, indicate a plus (+) for favorable, and a negative (-) for less favorable.

Goal 1: Develop a better understanding of the potential disasters that could occur in Montgomery County

STAPLEE Criteria Considerations → for Alternative Actions ↓	S (Social)		T (Technical)			A (Administrative)			P (Political)			L (Legal)			E (Economic)			E (Environmental)					
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance / Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste Sites	Consistent with Community Environmental Goals	Consistent With Federal Laws
1a-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+	
1a-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	0	0	+	+
1b-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	0	0	+	+
1b-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
1b-3	+	+	+	+	+	-	+	+	+	+	+	+	+	+	-	+	-	+	+	0	0	+	+
1b-4	+	+	+	+	+	+	+	+	+	+	-	-	+	+	+	+	+	+	+	0	0	+	+
1b-5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
1b-6	+	+	+	+	+	-	-	+	+	+	+	+	+	+	-	+	-	+	+	0	0	+	+
1b-7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
1b-8	+	+	+	+	+	-	-	+	+	+	+	+	+	+	-	+	-	+	+	0	0	+	+
1b-9	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+

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Mitigation Actions Prioritization Worksheet

Scoring: For each consideration, indicate a plus (+) for favorable, and a negative (-) for less favorable.

Goal 2: Ensure that the public understands potential hazards and is aware of which actions to be taken to minimize their risks.

STAPLEE Criteria Considerations → for Alternative Actions ↓	S (Social)		T (Technical)			A (Administrative)			P (Political)			L (Legal)		E (Economic)			E (Environmental)					
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance / Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste Sites	Consistent with Community Environmental Goals
2a-1	+	+	+	+	+	+	-	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
2a-2	+	+	+	+	+	+	-	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
2a-3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
2a-4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
2a-5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
2a-6	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
2a-7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
2a-8	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
2b-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
2b-2	+	+	-	+	+	+	-	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
2b-3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	+	+
2b-4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
2b-5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+

Montgomery County 2017 Hazard Mitigation Plan

Mitigation Actions Prioritization Worksheet

Scoring: For each consideration, indicate a plus (+) for favorable, and a negative (-) for less favorable.

Goal 3: Significantly reduce the risk of loss of life, injuries, economic costs, and destruction of natural and cultural resources that result from all hazards.

STAPLEE Criteria Considerations → for Alternative Actions ↓	S (Social)		T (Technical)			A (Administrative)			P (Political)			L (Legal)			E (Economic)			E (Environmental)				
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance / Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste Sites	Consistent with Community Environmental Goals
3a-1	+	+	+	+	+	+	-	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
3a-2	+	+	+	+	+	+	-	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
3b-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
3b-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
3b-4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
3c-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	+	+	+
3d-1	+	+	+	+	+	+	-	+	+	+	+	+	+	+	-	+	-	+	0	+	+	+
3e-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
3e-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
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3f-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
3f-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
3g-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
3h-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
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3h-3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
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3i-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
3j-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
3j-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
3k-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	0	0	+	+
3l-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
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Montgomery County 2017 Hazard Mitigation Plan

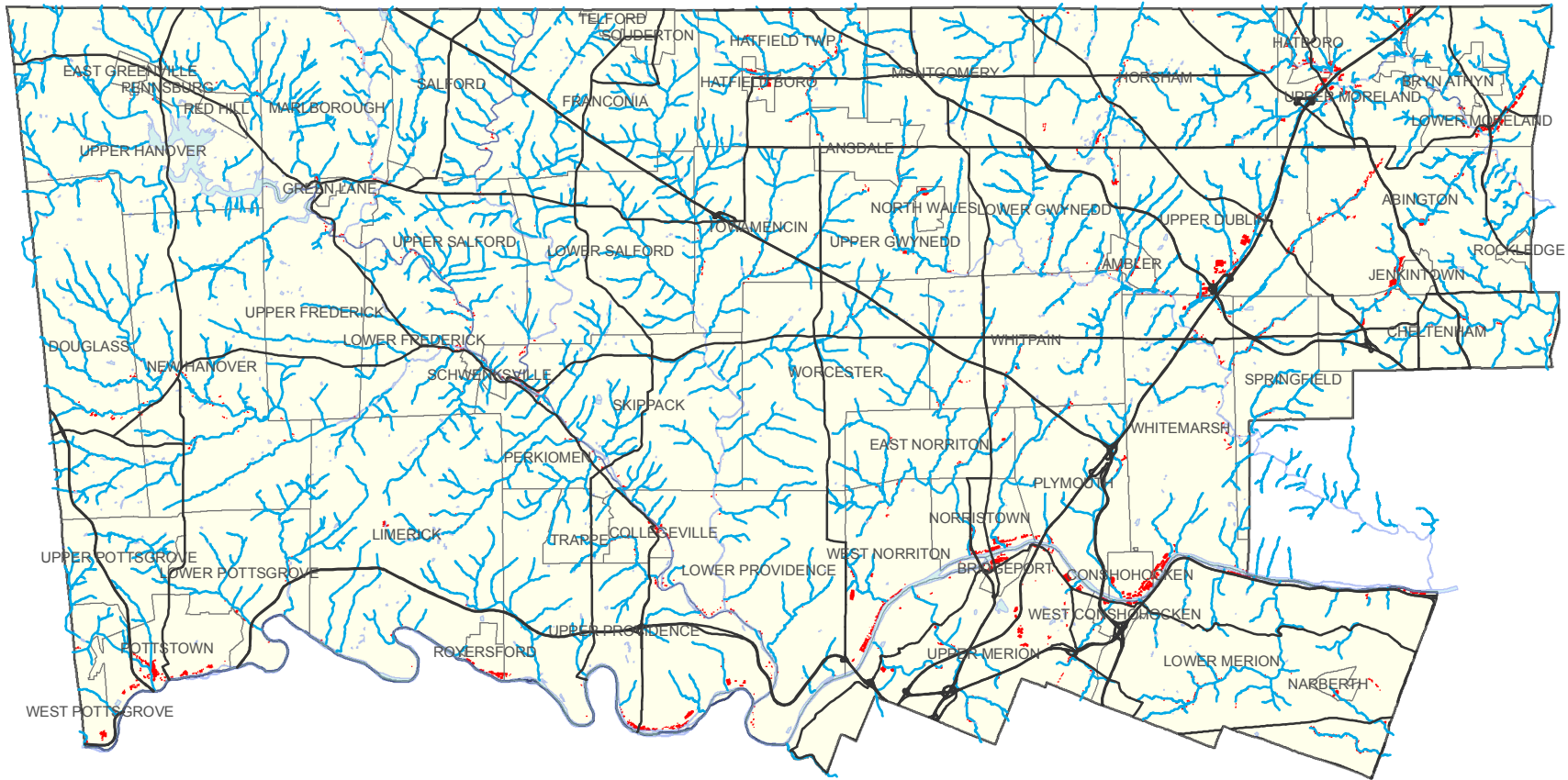
Mitigation Actions Prioritization Worksheet

Goal 4: Encourage and promote actions to minimize the impact of floods within the county.



STAPLEE Criteria Considerations → for Alternative Actions ↓	S (Social)		T (Technical)			A (Administrative)			P (Political)			L (Legal)			E (Economic)			E (Environmental)				
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance / Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenges	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HADMA / Water Sites	Consistent with Community Environmental Goals
4a-1	+	+	+	+	+	-	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4a-2	+	+	+	+	+	-	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4a-3	+	+	+	+	+	-	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4a-4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
4b-1	+	+	+	+	-	-	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4b-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4b-3	+	+	+	+	-	-	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4b-4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4b-5	+	+	+	+	-	-	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4b-6	+	+	+	+	+	-	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4b-7	+	+	+	+	+	-	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4b-8	+	+	+	+	+	-	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
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4b-13	+	+	+	+	-	+	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4c-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
4c-2	+	+	+	+	-	-	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4c-3	+	+	+	+	-	-	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4d-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
4d-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
4d-3	+	+	+	+	-	-	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4e-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
4e-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+
4e-3	+	+	+	+	-	-	+	+	+	+	+	+	+	+	-	+	-	+	0	0	+	+
4e-4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	+	+

Appendix S – Significant Floodplain Areas

Structures within the Regulatory Floodplain Montgomery County, Pennsylvania



Legend

-  Water bodies and streams
-  Buildings in floodplain






0 3.5 7 14 Miles

Structures within the Regulatory Floodplain Ambler Area

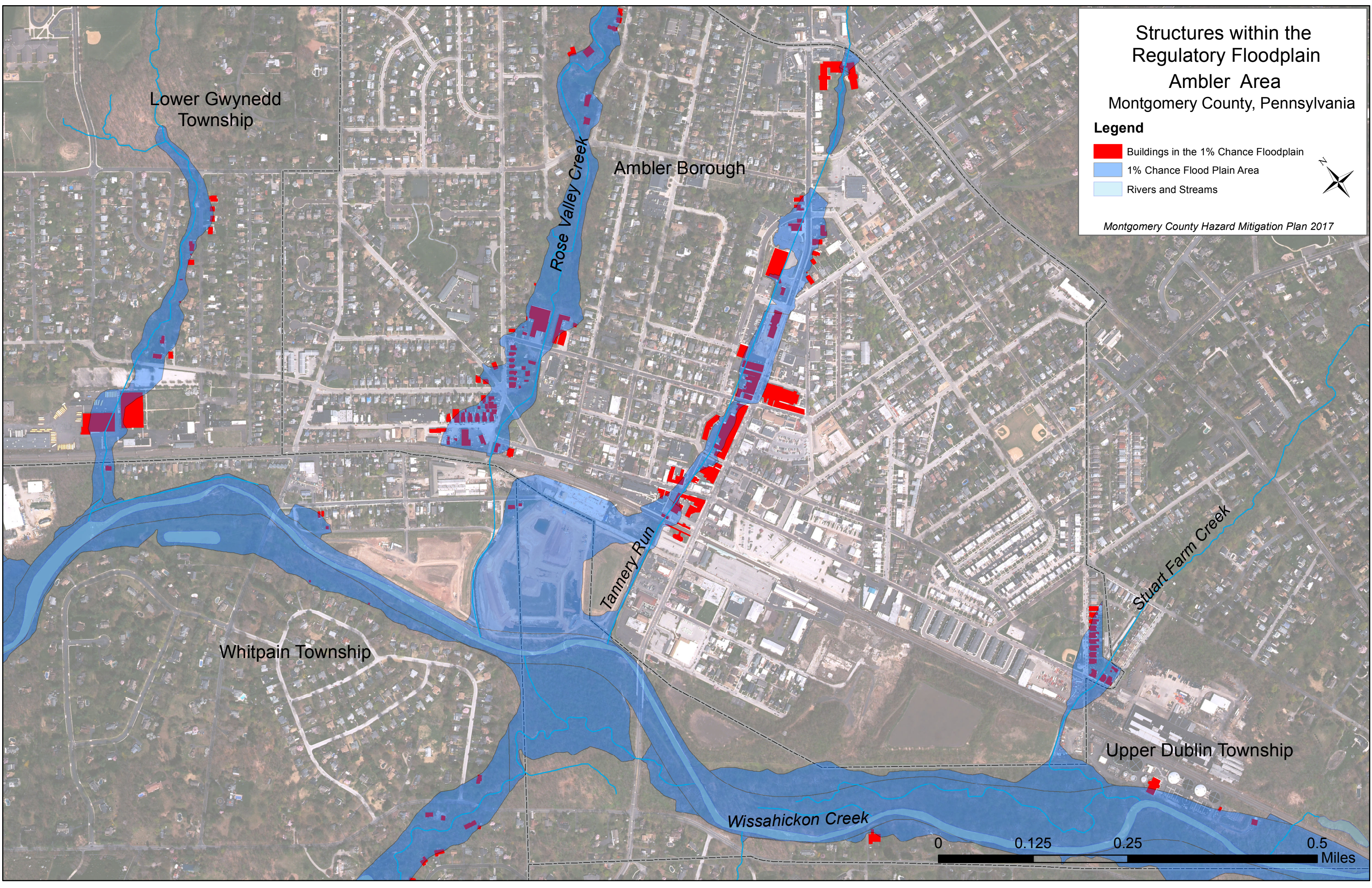
Montgomery County, Pennsylvania

Legend

-  Buildings in the 1% Chance Floodplain
-  1% Chance Flood Plain Area
-  Rivers and Streams



Montgomery County Hazard Mitigation Plan 2017



Lower Gwynedd
Township

Ambler Borough

Whitpain Township

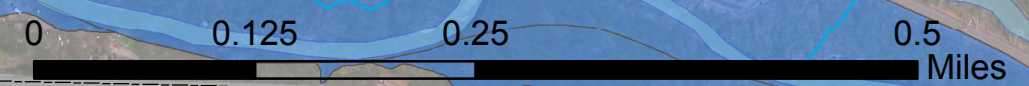
Upper Dublin Township

Rose Valley Creek

Tannery Run

Wissahickon Creek




Stuart Farm Creek



Structures within the Regulatory Floodplain Collegeville Area

Montgomery County, Pennsylvania

Legend

-  Buildings in the 1% Chance Floodplain
-  1% Chance Flood Plain Area
-  Rivers and Streams



Montgomery County Hazard Mitigation Plan 2017

Lower Providence Township

Perkiomen Creek

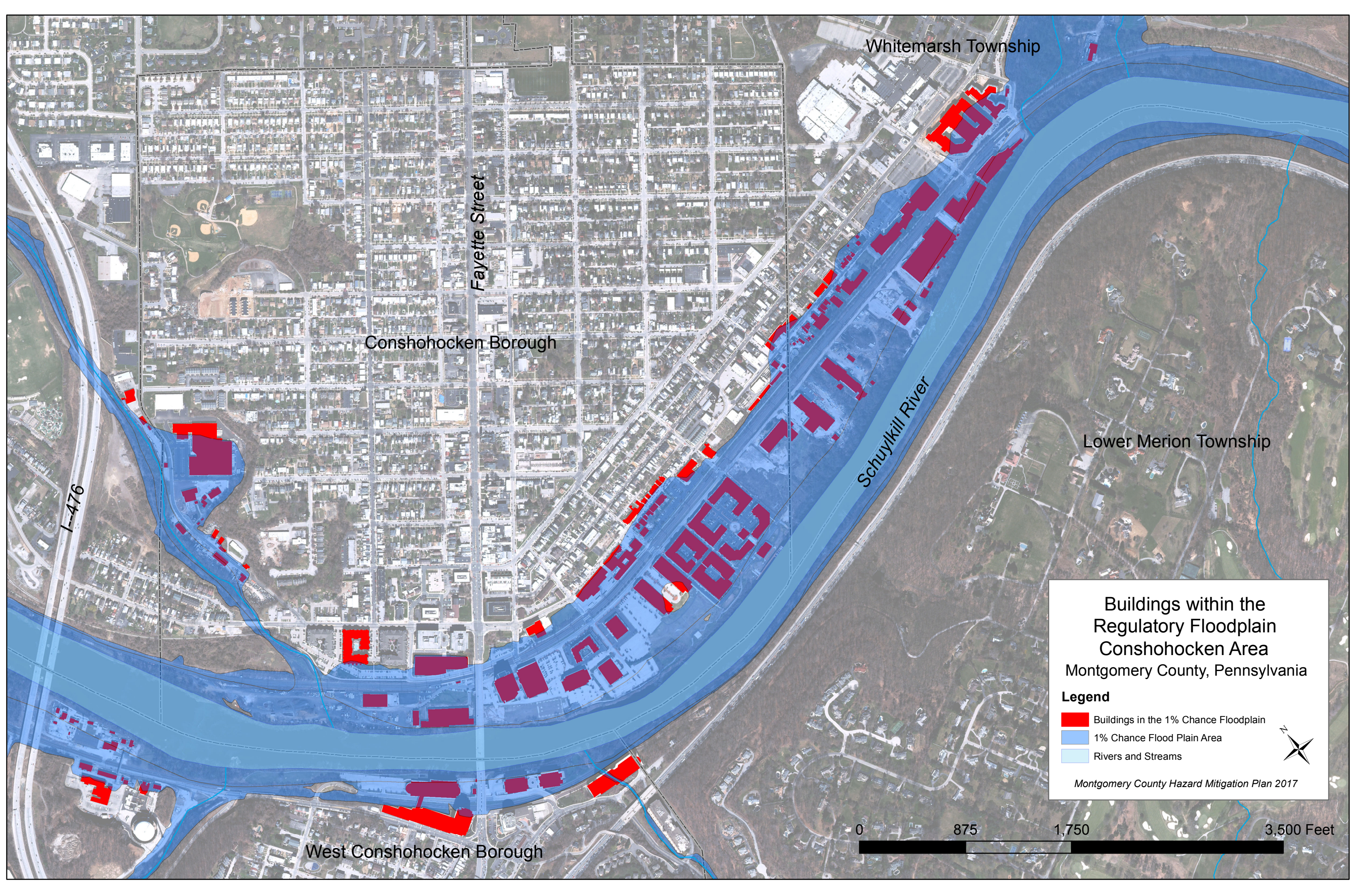
Ridge Pike

Main Street

Collegeville Borough

Perkiomen Creek





Whitemarsh Township

Fayette Street

Conshohocken Borough

Schuylkill River

Lower Merion Township

I-476

West Conshohocken Borough

**Buildings within the Regulatory Floodplain
Conshohocken Area
Montgomery County, Pennsylvania**

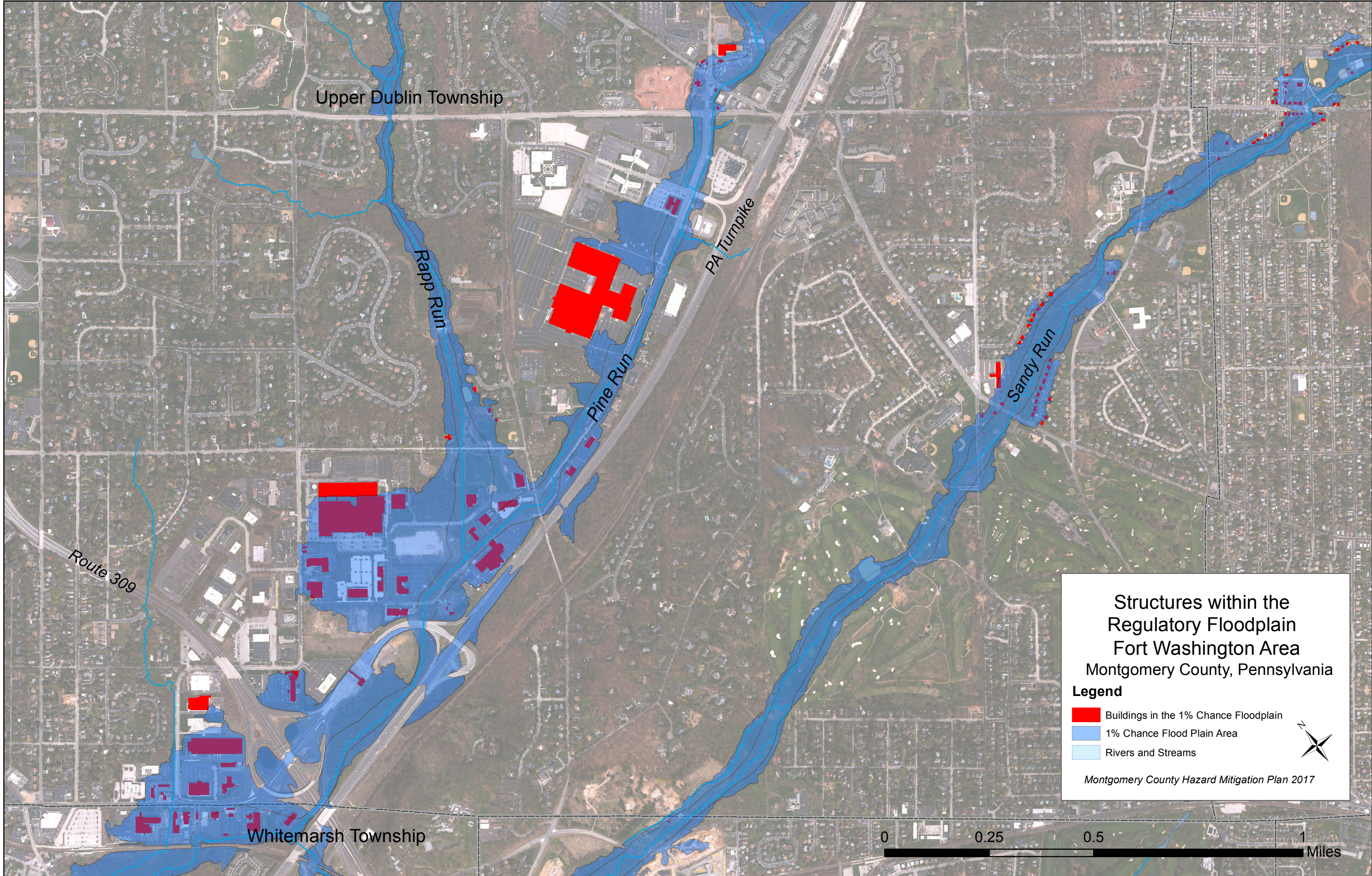
Legend

- Buildings in the 1% Chance Floodplain
- 1% Chance Flood Plain Area
- Rivers and Streams

Montgomery County Hazard Mitigation Plan 2017



0 875 1,750 3,500 Feet



Upper Dublin Township

Rapp Run

Pine Run

PA Turnpike

Sandy Run

Route 309

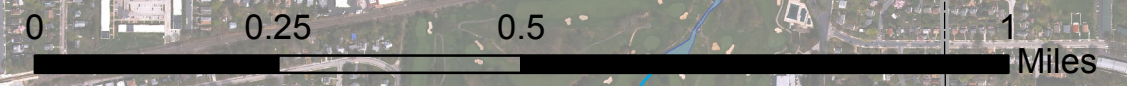
Whitemarsh Township

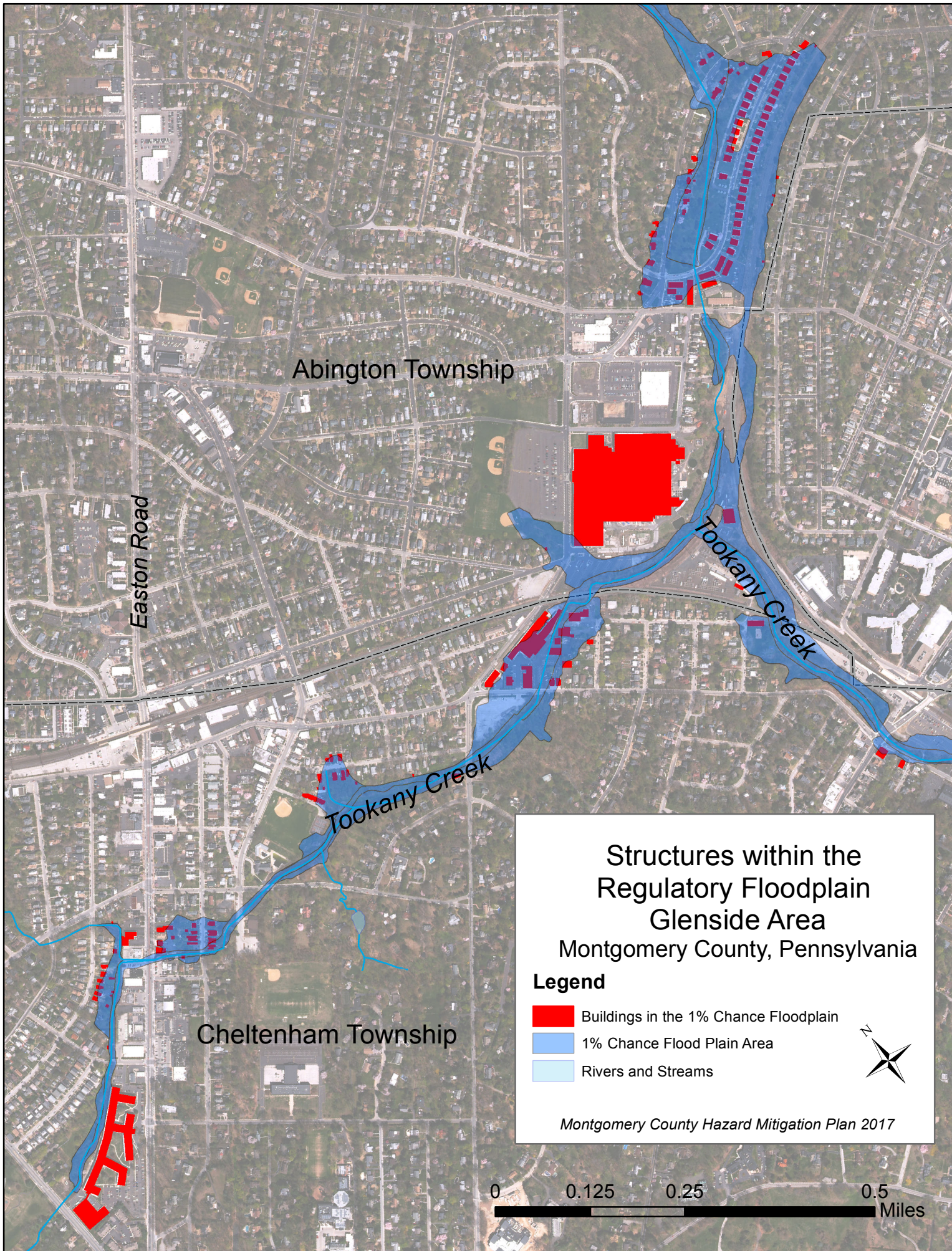
**Structures within the
Regulatory Floodplain
Fort Washington Area
Montgomery County, Pennsylvania**

Legend

- Buildings in the 1% Chance Floodplain
- 1% Chance Flood Plain Area
- Rivers and Streams

Montgomery County Hazard Mitigation Plan 2017





Abington Township

Easton Road

Tookany Creek


Tookany Creek

Cheltenham Township

**Structures within the
Regulatory Floodplain
Glenside Area
Montgomery County, Pennsylvania**

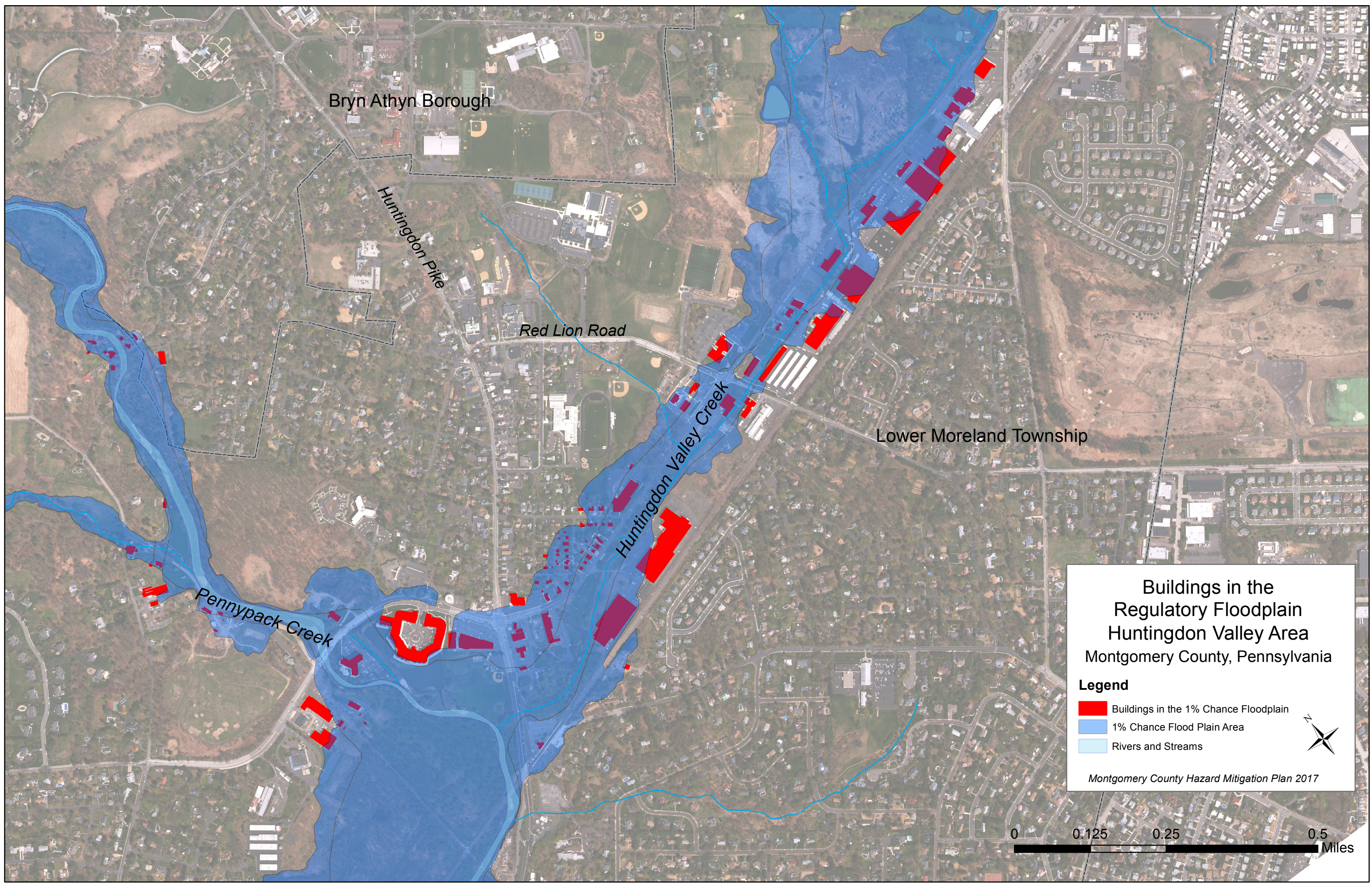
Legend

- Buildings in the 1% Chance Floodplain
- 1% Chance Flood Plain Area
- Rivers and Streams



Montgomery County Hazard Mitigation Plan 2017

0 0.125 0.25 0.5
Miles



Bryn Athyn Borough

Huntingdon Pike

Red Lion Road

Huntingdon Valley Creek

Lower Moreland Township

Pennypack Creek

**Buildings in the
Regulatory Floodplain
Huntingdon Valley Area
Montgomery County, Pennsylvania**

Legend




- Buildings in the 1% Chance Floodplain
- 1% Chance Flood Plain Area
- Rivers and Streams

Montgomery County Hazard Mitigation Plan 2017



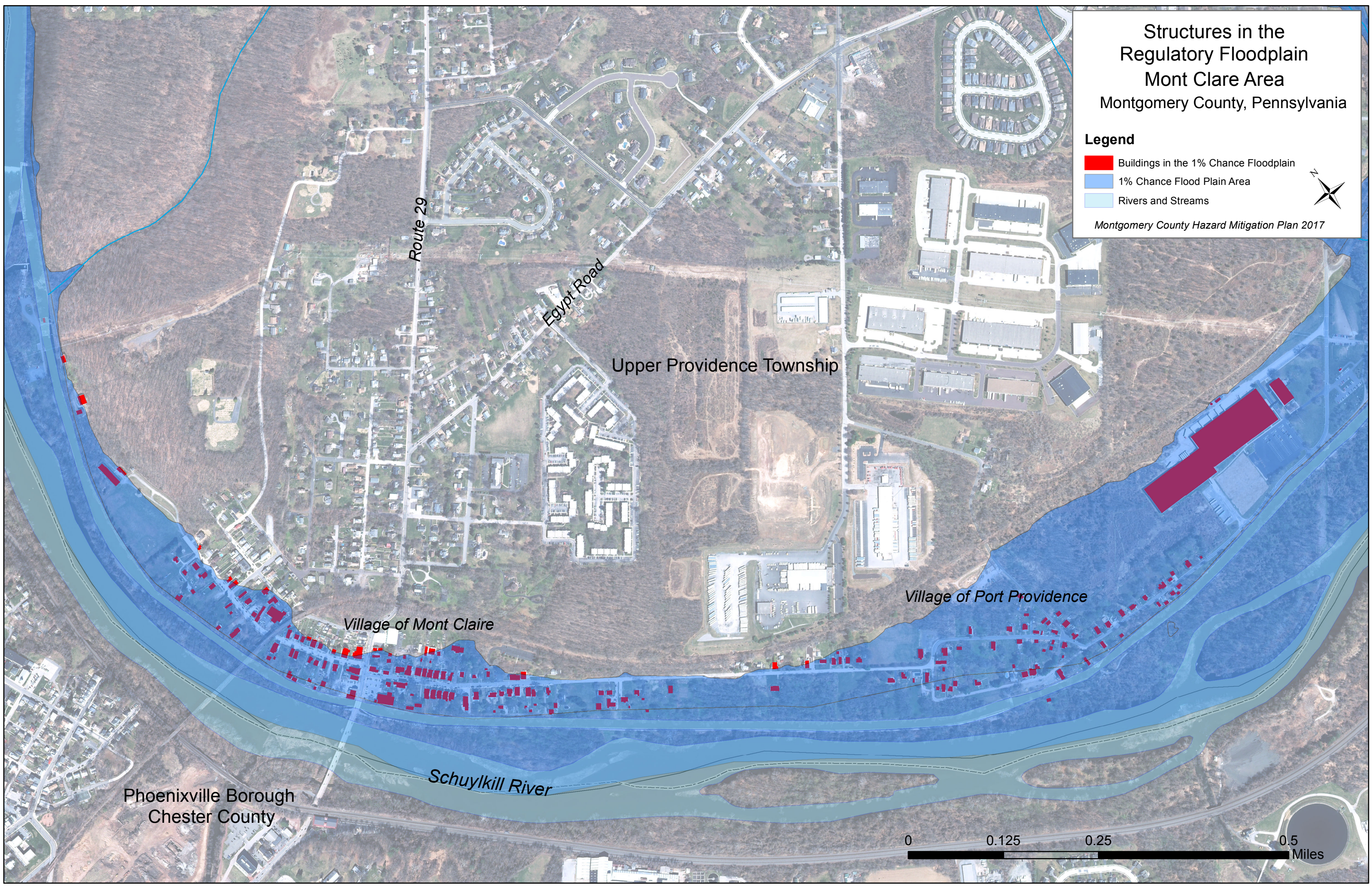
Structures in the
Regulatory Floodplain
Mont Clare Area
Montgomery County, Pennsylvania

Legend

-  Buildings in the 1% Chance Floodplain
-  1% Chance Flood Plain Area
-  Rivers and Streams



Montgomery County Hazard Mitigation Plan 2017



Route 29

Egypt Road

Upper Providence Township

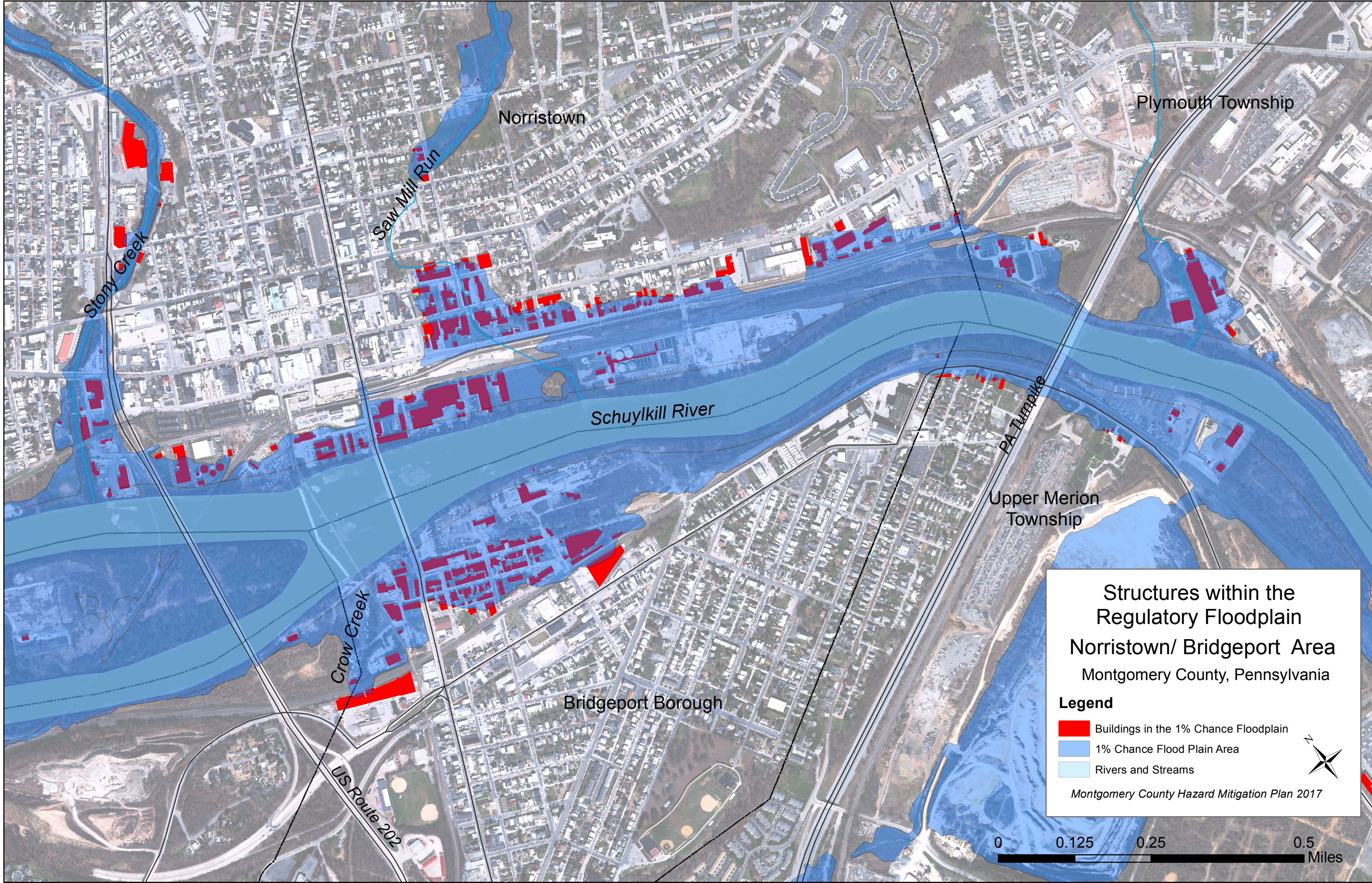
Village of Port Providence

Village of Mont Claire

Schuylkill River

Phoenixville Borough
Chester County





Norristown

Plymouth Township

Saw Mill Run

Stony Creek

Schuylkill River

PA Turnpike

Upper Merion Township

Crow Creek

Bridgeport Borough

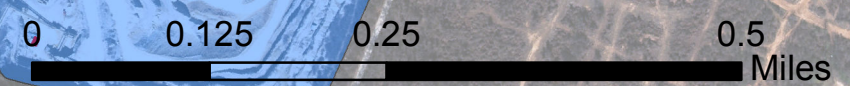
US Route 202

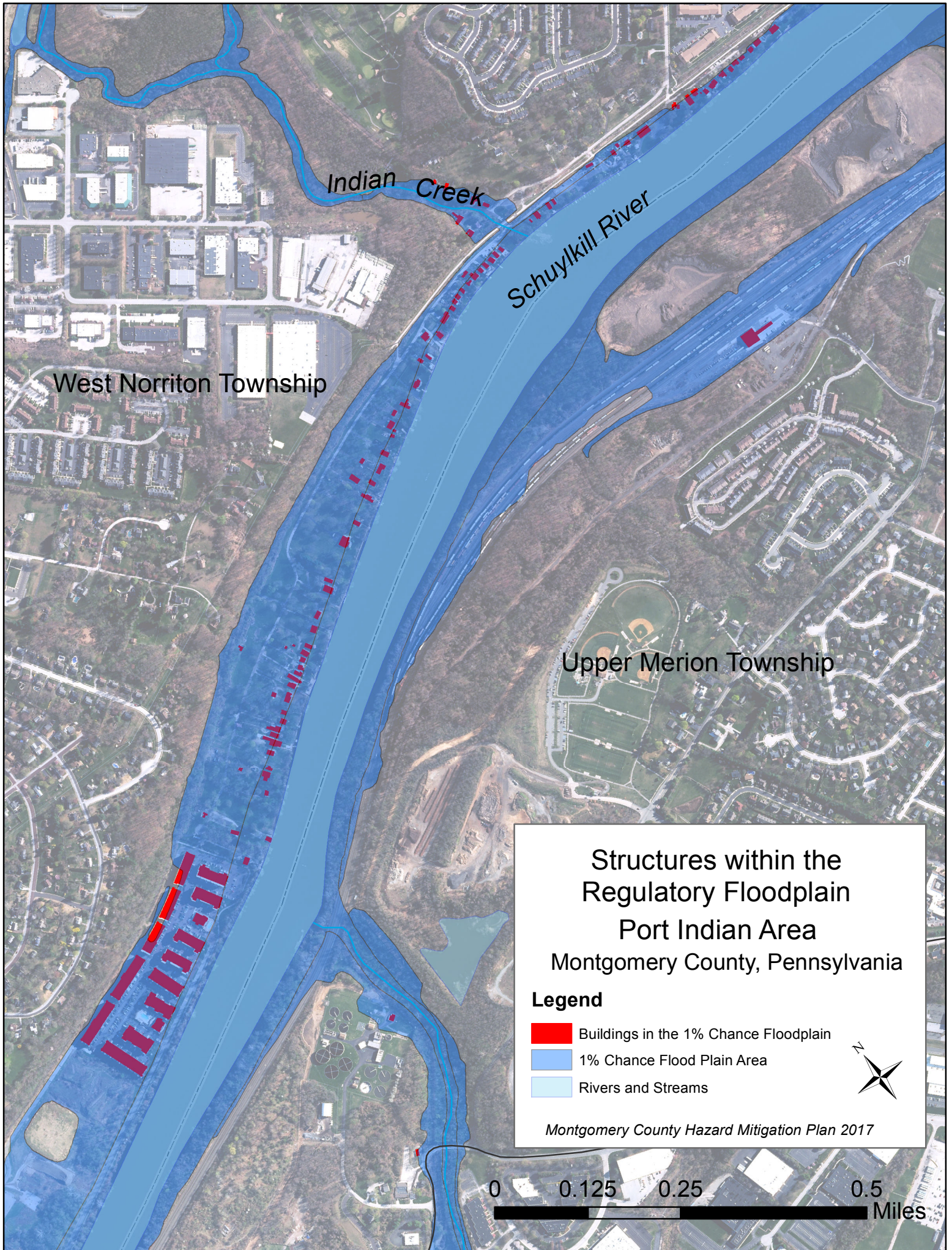
**Structures within the Regulatory Floodplain
Norristown/ Bridgeport Area
Montgomery County, Pennsylvania**

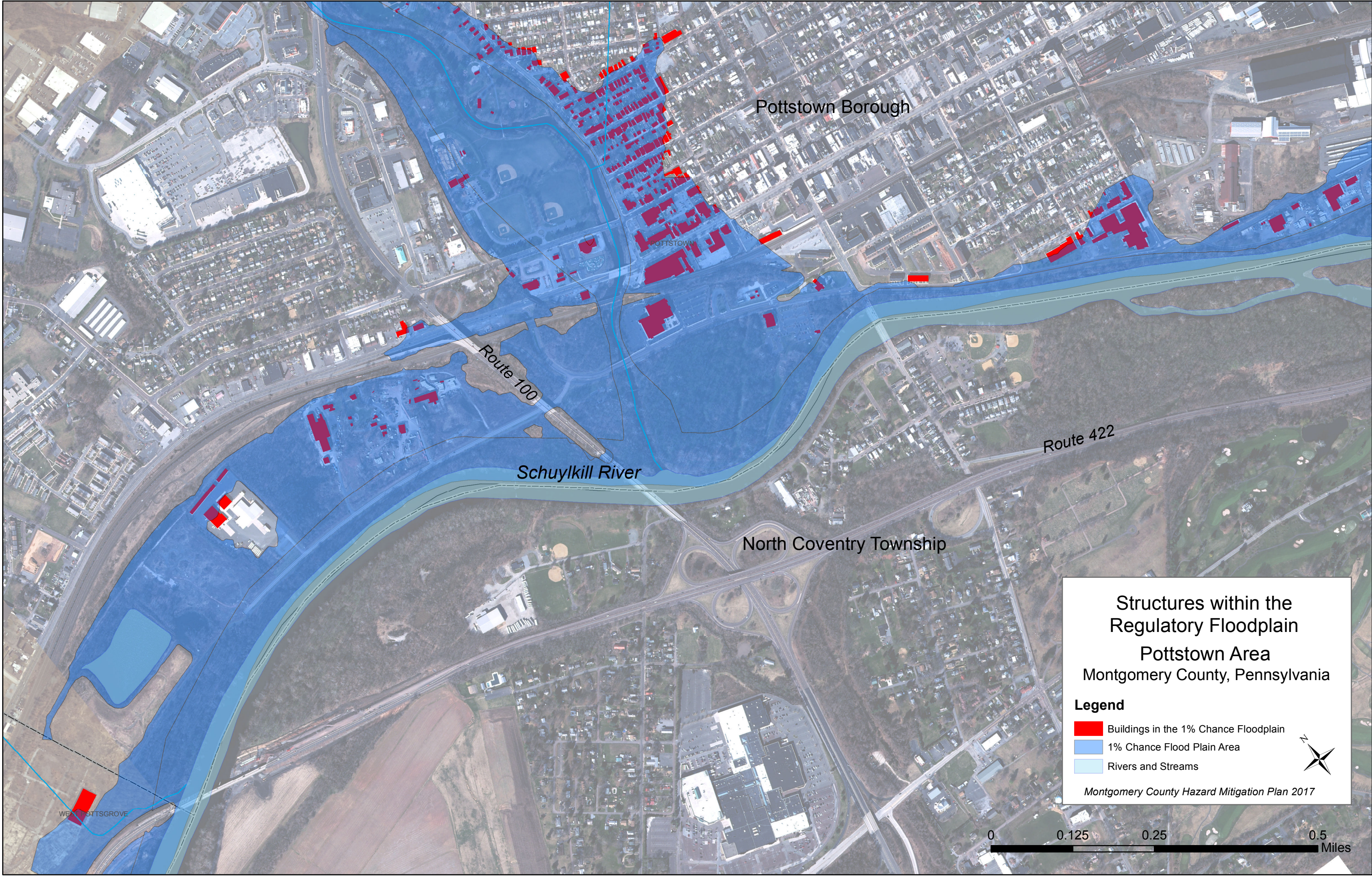
Legend

- Buildings in the 1% Chance Floodplain
- 1% Chance Flood Plain Area
- Rivers and Streams

Montgomery County Hazard Mitigation Plan 2017







Pottstown Borough

POTTSTOWN

Route 100

Schuylkill River

Route 422

North Coventry Township

Structures within the Regulatory Floodplain Pottstown Area Montgomery County, Pennsylvania

Legend

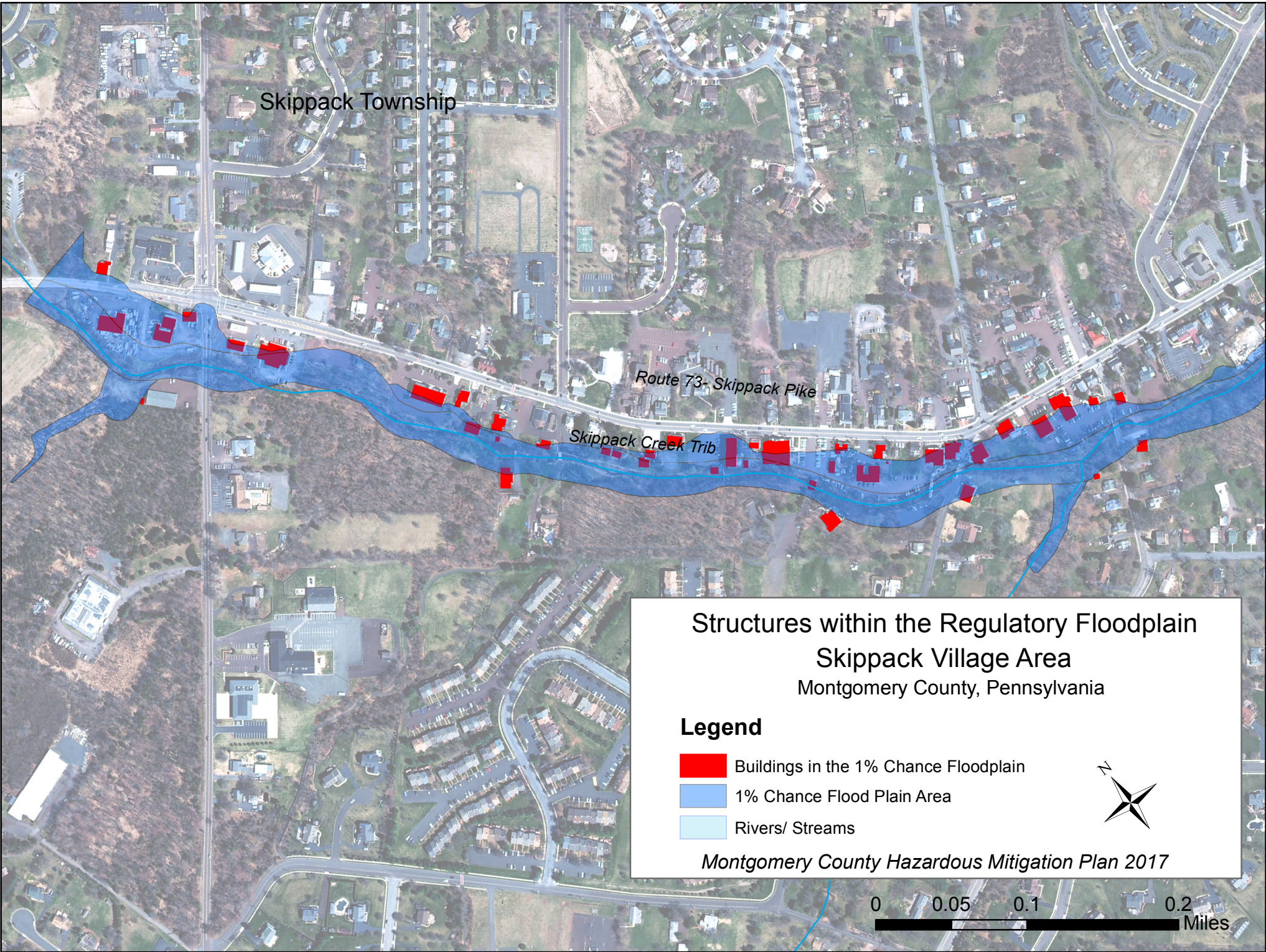
- Buildings in the 1% Chance Floodplain
- 1% Chance Flood Plain Area
- Rivers and Streams



Montgomery County Hazard Mitigation Plan 2017

0 0.125 0.25 0.5 Miles

WEST POTTSGROVE






Skippack Township

Route 73- Skippack Pike

Skippack Creek Trib

Structures within the Regulatory Floodplain Skippack Village Area Montgomery County, Pennsylvania

Legend

-  Buildings in the 1% Chance Floodplain
-  1% Chance Flood Plain Area
-  Rivers/ Streams



Montgomery County Hazardous Mitigation Plan 2017

0 0.05 0.1 0.2 Miles