CHESTER COUNTY 2026

HAZARD MITIGATION PLAN UPDATE



PREPARED FOR:

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CERTIFICATION OF ANNUAL REVIEW MEETINGS

The Chester County Hazard Mitigation Planning Team (HMPT) has reviewed this Hazard Mitigation Plan. See Section 8 for further details regarding this form. The director of the team hereby certifies the review.

YEAR	DATE OF MEETING	AUDIENCE	SIGNATURE
2021	N/A	N/A	To the best knowledge of the Chester County Hazard Mitigation Steering Committee (HMSC) no HMP meetings were held before the beginning of the HMP Update process. See Section 3 of the Chester County 2026 HMP Update for details regarding the meetings held during this process.
2022	N/A	N/A	
2023	N/A	N/A	
2024	N/A	N/A	
2025	N/A	N/A	
2026	See Section 3	See Section 3	

RECORD OF CHANGES

DATE	DESCRIPTION OF CHANGE MADE, MITIGATION ACTION COMPLETED, OR PUBLIC OUTREACH PERFORMED	CHANGE MADE BY (PRINT NAME)	CHANGE MADE BY (SIGNATURE)
2021-2026	To the best knowledge of the Chester County HMSC no HMP progress reports were submitted from municipalities for the period from 2021 through 2026, although mitigation actions were accomplished in this period. Progress on actions is discussed in detail in Section 6.1 of this plan.	N/A	N/A

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

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ACRONYMS

ACRONYM	FULL NAME	ACRONYM	FULL NAME
ACS	US Census American Community Survey	NFIP	National Flood Insurance Program
CDC	Centers for Disease Control and Prevention	NFPA	National Fire Protection Association
CFR	Code of Federal Regulations	NIDIS	National Integrated Drought Information System
CRS	Community Rating System	NOAA	National Oceanic and Atmospheric Administration
DCED	Department of Community and Economic Development	NWS	National Weather Service
DCNR	Department of Conservation and Natural Resources	PA DEP	Pennsylvania Department of Environmental Protection

ACRONYM	FULL NAME	ACRONYM	FULL NAME
DMA	Disaster Mitigation Act	PaGWIS	Pennsylvania Groundwater Information System
DOH	Department of Health	PASDA	Pennsylvania Spatial Data Access
EF-Scale	Enhanced Fujita Scale	PDSI	Palmer Drought Severity Index
EOP	Emergency Operations Plan	PEMA	Pennsylvania Emergency Management Agency
EOC	Emergency Operations Center	PennDOT	Pennsylvania Department of Transportation
EMC	Emergency Management Coordinator	pCi/L	pico Curies per Liter
EPA	Environmental Protection Agency	RF	Risk Factor
EPZ	Emergency Planning Zone	RL	Repetitive Loss
FEMA	Federal Emergency Management Agency	SFHA	Special Flood Hazard Area
FIRM	Flood Insurance Rate Map	SOG	Standard Operating Guide
FMA	Flood Mitigation Assistance Program	SRL	Severe Repetitive Loss
GIS	Geographic Information Systems	TRI	Toxic Release Inventory
HMGP	Hazard Mitigation Grant Program	UCC	Uniform Construction Code
HMP	Hazard Mitigation Plan	USACE	United States Army Corps of Engineers
HMPT	Hazard Mitigation Planning Team	USDA	United States Department of Agriculture
HMSC	Hazard Mitigation Steering Committee	USGS	United States Geological Survey
ICC	International Code Council	WATS-MPO	Williamsport Area Transportation Study Metropolitan Planning Organization
IBC	International Building Code	WOG	Watershed Outreach Groups
MSA	Metropolitan Statistical Area	WYO	Write Your Own
NDMC	National Drought Mitigation Center		

1. INTRODUCTION

1.1. BACKGROUND

Across the United States, natural and human-caused disasters have led to increasing deaths, injuries, property damage, and interruptions of business and government services. The time, money, and effort spent to recover from these disasters exhaust resources, diverting attention from important public programs and private agendas.

Chester County, Pennsylvania, has experienced a significant number of statewide or county-specific disaster declarations since 1954. The emergency management community, citizens, elected officials, and other stakeholders in Chester County recognize the impact of disasters on the community and have concluded that proactive efforts need to be taken to reduce the impact of natural and human-caused hazards. To that purpose, Chester County is committed to updating and maintaining the Chester County Hazard Mitigation Plan (HMP).

"Hazard mitigation" describes actions taken to prevent or reduce the long-term risks to life and property caused by a hazard event. Pre-disaster mitigation actions are taken in advance of a hazard event and are essential to ending the typical disaster cycle of damage, reconstruction, and repeated damage. With careful selection, mitigation actions can be long-term, cost-effective measures taken to reduce the risk of loss.

Chester County Department of Emergency Services (CCDES) and the Planning Team (composed of Chester County officials, County departments, municipal representatives, emergency responders, school and higher education representatives, community groups, and any other stakeholder with a role in hazard mitigation) has updated this HMP with an all-hazards approach.

The Chester County Hazard Mitigation Plan, also referred to as the Plan or HMP, is the result of work by local officials and citizens of the County to develop a pre-disaster multi-hazard mitigation plan that will not only guide the County towards greater disaster resistance but will also respect the character and needs of the community

1.2. PURPOSE

This HMP update was developed for the purpose of:

- Providing a blueprint for reducing property damage and saving lives from the effects of future natural and human-caused disasters in Chester County;
- Complying with state and federal legislative requirements for County mitigation in order for the County to be eligible for federal and technical assistance from state and federal hazard mitigation programs;
- Identifying, introducing, and implementing cost-effective hazard mitigation measures in order to accomplish County goals and objectives and to raise awareness and acceptance of hazard mitigation;

- Demonstrating a firm local commitment to hazard mitigation principles; and
- Improving community resiliency following a disaster event.

Adoption of this plan supports Chester County and participating jurisdictions eligibility to apply for and receive certain federal grant funds that are administered by the Commonwealth of Pennsylvania for Federal Emergency Management Agency (FEMA). This plan complies with the requirements of the Disaster Mitigation Act of 2000, which requires local governments to develop hazard mitigation plans for federal funding for mitigation activities, and its implementing regulations published in Title 44 of the Code of Federal Regulations (CFR) Section 201.6.

1.3. SCOPE

The Chester County 2026 HMP update has been prepared to meet requirements set forth by FEMA and the Pennsylvania Emergency Management Agency (PEMA) in order for the County to be eligible for funding and technical assistance from state and federal hazard mitigation programs. It will be updated and maintained to address both natural and human-made hazards determined to be probable and/or present a risk for multiple deaths/injuries and property damages to the local municipalities within the County. Updates will take place following significant disasters or, at a minimum, this plan will be subject to review and update on an annual basis.

In accordance with the Disaster Mitigation Act (DMA) of 2000, the HMP update documents the following topics:

- Planning Process;
- Hazard Identification;
- Risk Assessment;
- Mitigation Strategy: Goals, Objectives, and Actions;
- Formal Adoption by the Participating Jurisdictions; and
- PEMA and FEMA approval.

The report format is structured in accordance with the most current planning guidance from FEMA, Local Mitigation Planning Policy Guide (2025), and PEMA, Commonwealth of Pennsylvania's All-Hazard Mitigation Planning Standard Operating Guide (SOG) (2025).

It should be noted that future funding for mitigation projects will be contingent upon each jurisdiction in Chester County adopting the Plan. Any jurisdiction that does not adopt the 2026 HMP update within one year of plan approval will be ineligible for pre- and post-disaster mitigation funds and must take additional steps before adopting the plan.

1.4. AUTHORITY AND REFERENCES

Authority for this plan originates from the following federal sources:

- Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C., Section 322, as amended.
- CFR, Title 44, Parts 201 and 206.
- Disaster Mitigation Act of 2000, Public Law 106-390, as amended.
- National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001 et seq.
- Executive Order 12989 on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. February 1994.

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

- Pennsylvania Emergency Management Services Code. Title 35, Pa C.S. Section 101.
- Pennsylvania Municipalities Planning Code of 1968, Act 247 as reenacted and amended by Act 170 of 1988.
- Pennsylvania Stormwater Management Act of October 4, 1978. P.L. 864, No. 167.
- Pennsylvania Floodplain Management Act of 1978. P.L. 851, No. 166.
- Pennsylvania Hazardous Material Emergency Planning and Response Act of 1990 (Act 165).

The following FEMA guides and reference documents were used to prepare this document:

- FEMA 386-1: Getting Started. 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. 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: Integrating Hazard Mitigation into Local Planning: Case Studies and Tools for Community Officials. March 2013
- FEMA: Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards. January 2013.
- FEMA: National Fire Incident Reporting System 5.0: Complete Reference Guide. January 2015.
- FEMA: Hazard Mitigation Assistance Unified Guidance. February 2015.
- FEMA. Rehabilitation of High Hazard Potential Dams (HHPD) Grant Program FAQ. June 2020.

- FEMA. Region 3 High Hazard Potential Dams: Local and Tribal Mitigation Planning Tips. July 2024.
- FEMA: Local Mitigation Planning Policy Guide. April 2025.
- FEMA: Local Mitigation Planning Handbook. June 2025.

The following 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 2009.
- PEMA. Administrative Processes. December 20, 2019.
- PEMA: Pennsylvania's Hazard Mitigation Planning Standard Operating Guide. 2025.

The following additional guidance document produced by the National Fire Protection Association (NFPA) was used to update this plan:

- NFPA 1600: Standard on Disaster/Emergency Management and Business Continuity Programs. 2007.

Additional materials are present in **Appendix A.**

2. COMMUNITY PROFILE

This section profiles Chester County and its municipalities. Information on the county's geographic profile, climate, demographic profile, and employment and industry profile are provided.

2.1. GEOGRAPHY AND ENVIRONMENT

Chester County encompasses 760 square miles of urban, suburban, and rural areas with woodland and agricultural resource areas. Topography in Chester County includes rolling hills and valleys characteristic to the Piedmont plateau region in the Eastern United States. This region runs along the eastern foothills of the Appalachian Mountains. The highest elevation is 1,071 feet above mean sea level (MSL) at Welsh Mountain in Honey Brook Township and the lowest elevation of approximately 70 feet above MSL is located at the Schuylkill River, Chester-Montgomery county line. Figure 2.1-1 illustrates the County's transportation network, water bodies, and municipal boundaries.

Located in Southeastern Pennsylvania, Chester County is bordered to the southeast by the State of Delaware, to the south by the State of Maryland, to the west by Lancaster County, to the northwest by Berks County, to the northeast by Montgomery County, and to the east by Delaware County.

A considerable number of rivers and streams are present in and around the county and Chester County itself contains 20 rivers, streams, and creeks. French Creek and the Schuylkill River run along the northern part of the county, Octoraro Creek runs along the western border, and the Brandywine Creek forms part of its eastern border. Figure 2.1-2 shows the watersheds in Chester County.

Key features across the county include historic downtowns, regional economic, population, and transportation centers, residential communities, rural villages, open space and woodlands, and farmlands ranging from small, scattered farms to large concentrations of active and diverse farm operations. Water bodies make up 8.7 square miles of the county. Valley Forge National Historical Park lies on the boundary between Chester and Montgomery Counties. Hopewell Big Woods National Historical Site lies on the boundary of Chester and Berks Counties. The Schuylkill River Heritage Area encompasses the northern 1/3 of the county.

Figure 2.1-1 Chester County Base Map (CDC/ASTDR, 2022)

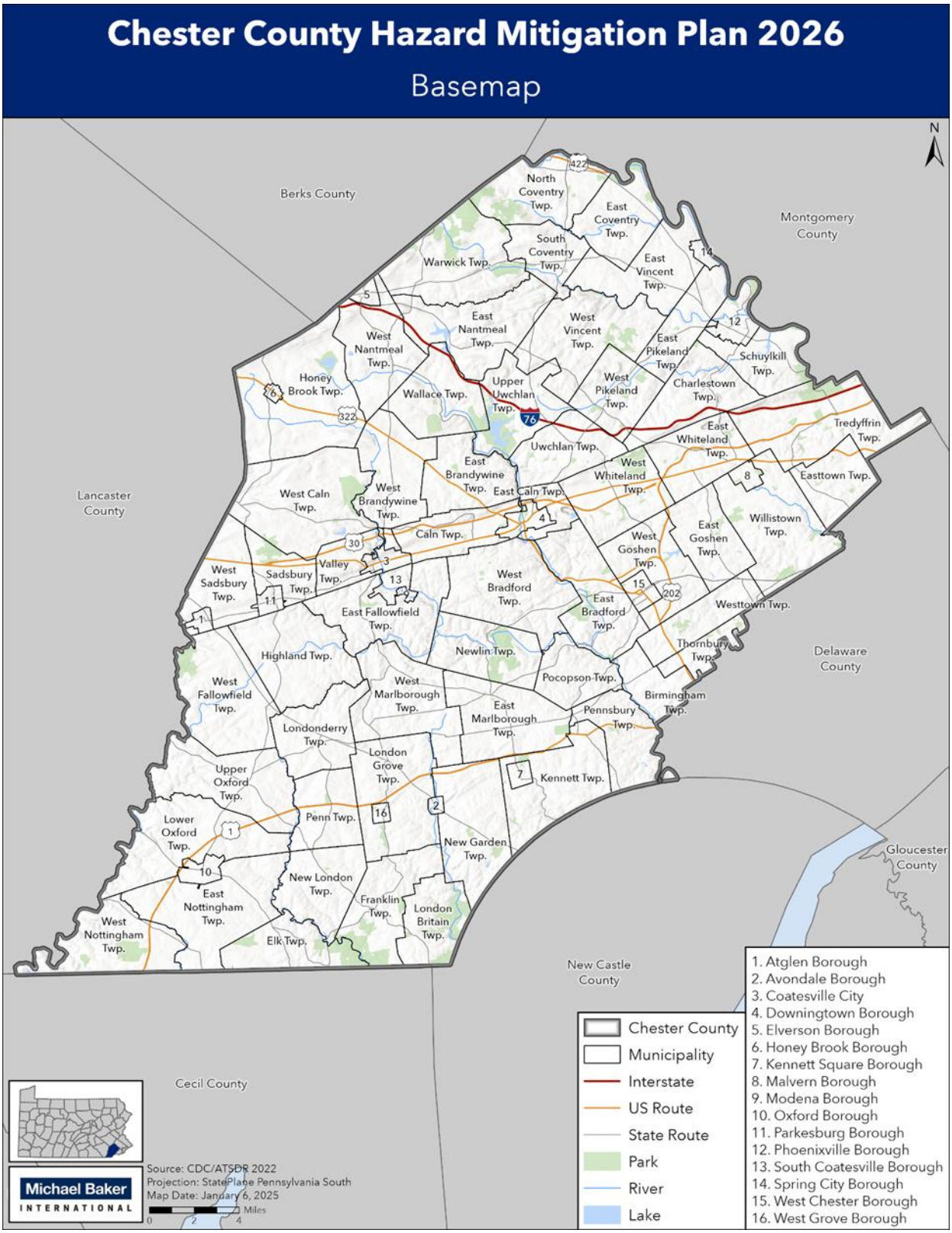
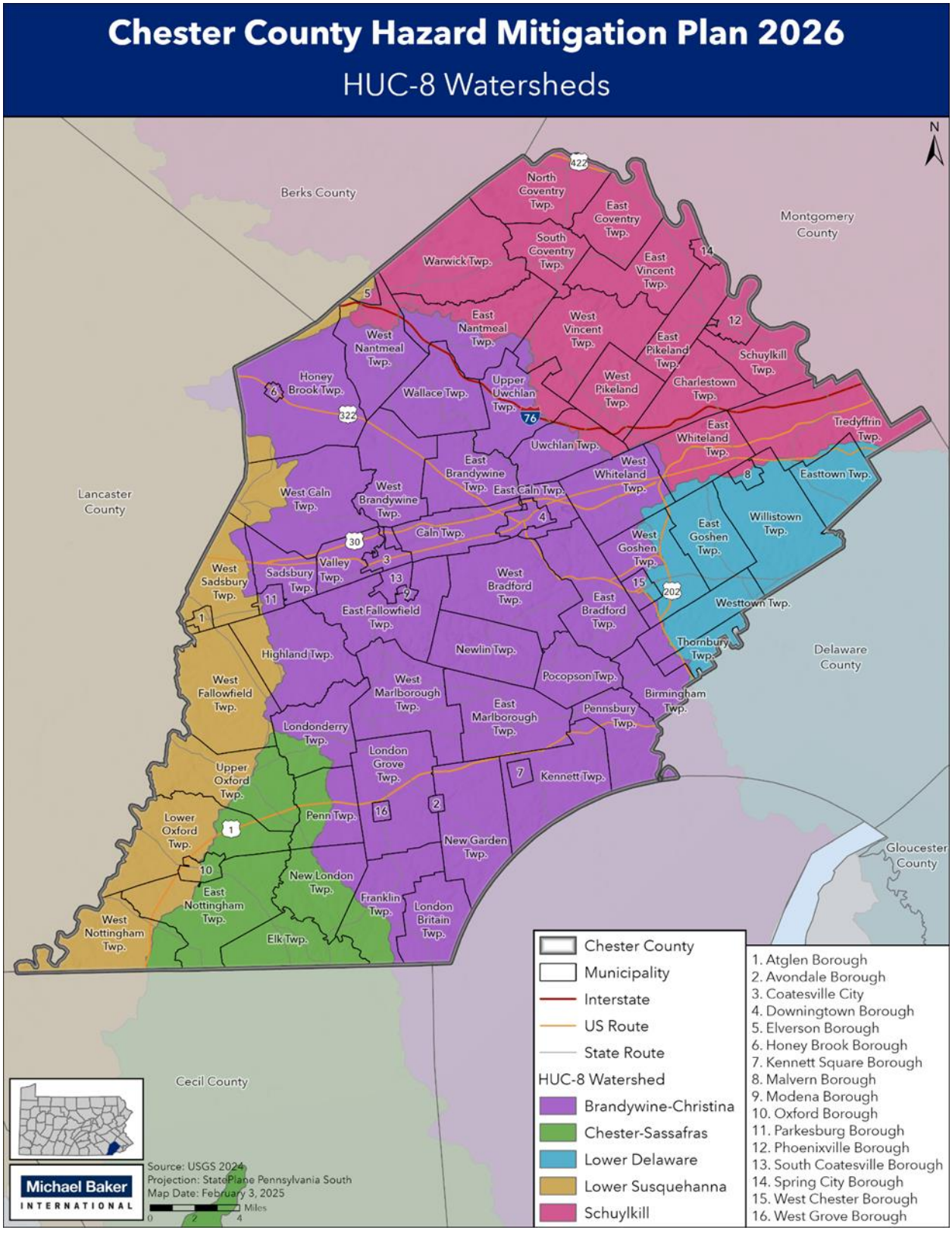


Figure 2.1-2: Chester County Watersheds (USGS, 2024)



2.2. COMMUNITY FACTS

On March 4, 1681, Chester County replaced the Pennsylvania portion of New Netherland/New York's Upland. Chester County was one of the three Pennsylvania counties initially created by William Penn on August 24, 1682. Originally, the county's borders were Philadelphia County to the north, the Susquehanna River to the west, the Delaware River to the East, and Delaware and Maryland to the south.

The first county seat was in the city of Chester, but in 1788, it moved to Turk's Head (later named West Chester), a more central location to accommodate the increased population of the western part of the county. In 1789, the eastern part of the county separated from Chester County becoming Delaware County. A three-person Board of Commissioners administers Chester County government. These commissioners appoint the nine members of the Chester County Planning Commission, which serves an advisory role and helps implement the county's comprehensive plan. Since Pennsylvania is a commonwealth state, many rights and duties reside with the municipal elected officials within the county.

Chester County is also served by the Delaware Valley Regional Planning Commission (DVRPC), the federally designated Metropolitan Planning Organization (MPO) for the greater Philadelphia region. DVRPC is an advisory agency that convenes partners across their nine-county jurisdiction to address key issues, including those related to transportation, land use, environmental protection, economic development, and equity. DVRPC is responsible for coordinating transportation planning efforts throughout its entire region, including the long-range plan titled Connection 2050 (adopted September 2021) and the DVRPC FY2025 Transportation Improvement Plan for PA that took effect on October 1, 2024.

The first road "to the West", Lancaster County, passed through the central part of Chester County, following the Great Valley westward, which later became known as U.S. Route 30. The first railroad, Pennsylvania Railroad, followed the same route as the Reading Railroad and proceeded up the Schuylkill River to Reading. Improved transportation allowed workers to commute to urban jobs, which led to the rise of the suburbs. There are several key transportation routes throughout the county. The population is clustered along these routes, making transit into Philadelphia and other major metropolitan areas easier. Interstate 76 and Routes 1, 30, and 322 provide for eastbound and westbound travel throughout the county. U.S. Routes 100 and 202 provide for northbound and southbound travel. In addition to these major transportation routes, there are smaller State Routes that support regional transport.

Throughout the mid-19th and 20th century, Chester County was largely rural with farms, mills, and forges easily transporting goods such as corn, wheat, barley, oats, rye, buckwheat, and flax through the Pennsylvania Railroad that linked the county's central valley to Philadelphia. Just before the Civil War, investors built the Philadelphia & Baltimore Central Railroad through the middle of the county to link Philadelphia to the cities of Lancaster to the west and Baltimore to the south. The addition of the railroad to the region grew local economies that were located along the route. The West Chester Railroad opened in 1832, and the West Chester &

Philadelphia Railroad opened in the 1850s, connecting towns within the county to Philadelphia and Delaware. Agriculture served as the county's economic base as it operated within a mostly self-sufficient economy as the demand for meat and dairy rose and transportation was available. The 1860 agricultural census reported that Chester County's 50,000 cattle were used for beef and dairy purposes. Plant cultivation also contributed significantly to the county economy with mushrooms being the best-known food crop. An iron industry also flourished due to the county's rich iron ore deposits and waterpower. During the Civil War, Phoenix Iron produced the Griffin Gun and became a major supplier of the Union Army.

In 1950, the completion of the Pennsylvania Turnpike drastically altered development in the northeast region of the county. The turnpike initially provided only two exits within Chester County (Downingtown and Malvern/Phoenixville). These two exits became the focal points for growth along with the Valley Forge/King of Prussia exit located in Montgomery County at the border with Chester County. Beginning in the 1970s, the stretch of Route 202 between West Chester and King of Prussia attracted hundreds of computer-related companies, biomedical research, and other service and information-based firms and drew thousands of new residents. Large-scale developments multiplied during the 1970s to the 1990s and Chester County lost over 50,000 acres of land to development.

Chester County's economy has traditionally been diverse and stable and employment has consistently been the best in the region. No longer a bedroom suburb of the city, Chester County houses major employment centers for the Philadelphia metropolitan region and is not dominated by a single industry. In the eastern and central sectors of the county, there has been an increase of corporate headquarters, industrial parks, and businesses. Commercial land uses are concentrated in the urban centers, such as Coatesville City and the boroughs along major highways such as Route 202 and Route 30. Industrial land use is extensive in Coatesville, Downingtown, West Chester, and Phoenixville, the county's urban centers.

Chester County includes 73 municipalities with 57 townships, 15 boroughs, and 1 city, which are listed in Table 2.3-2.

2.3. POPULATION AND DEMOGRAPHICS

Population and demographic data provide baseline information about residents. Changes in demographics or population may be used to identify higher-risk populations. Maintaining up-to-date data on demographics will allow Chester County to accurately assess magnitudes of hazards and develop more specific mitigation plans. The American Community Survey (ACS) provides the most statistically accurate population estimates. This plan utilizes 5-year estimates for all population and demographic data gathered from the U.S. Census Bureau. 2023 5-Year estimates were the most current data during this plan update.

Since the 2021 plan update, Chester County's population has grown considerably. The population increased by almost 3.25% in 2022 despite a 0.57% decrease two years prior, in 2020. From its first federal census counts of 1790, Chester County's population grew by 10.2%

from 498,886 in 2010 to 549,784 in 2023 (ACS, 2023). The county is the seventh most populated in the Commonwealth.

Table 2.3-1 lists County population counts with annual percent population change from 2014 to 2023. As of 2023, Chester County's population density is 721 persons per square mile, compared to the statewide average of 29.

Table 2.3-1 Chester County Population Growth (ACS, 2023)

YEAR	TOTAL POPULATION	PERCENT CHANGE (%)
2014	512,784	0.65%
2015	515,939	0.62%
2016	516,312	0.07%
2017	519,293	0.58%
2018	522,046	0.53%
2019	524,989	0.56%
2020	521,980	-0.57%
2021	528,649	1.28%
2022	545,823	3.25%
2023	549,784	0.73%

Table 2.3-2 lists municipal population counts in 2010 and 2023 with percent population change in that timeframe. The population of the entire county is estimated to be 647,330 by the year 2040, which represents a net population increase of 213,818 people (29.8 percent) in a 30-year period. As shown in the table below, 69 municipalities in Chester County are projected to see an increase in population. The table also shows that Modena Borough, Spring City Borough, Warwick Township, and West Marlborough Township are projected to see a decrease in population. It should be noted that changes in population or demographics may be used to identify higher-risk populations. Maintaining up-to-date data on demographics will allow Chester County to better assess magnitudes of hazards and develop more specific mitigation plans and strategies.

Table 2.3-2 Chester County Population Growth by Municipality

MUNICIPALITY	2010 POP.	2023 POP.	% CHANGE
Atglen Borough	1,296	1,319	1.8%
Avondale Borough	1,426	1,286	-9.8%
Birmingham Township	4,238	4,086	-3.6%
Caln Township	13,589	14,555	7.1%
Charlestown Township	5,420	6,169	13.8%
Coatesville City	12,774	13,323	4.3%
Downingtown Borough	7,907	8,163	3.2%
East Bradford Township	9,924	10,599	6.8%
East Brandywine Township	6,644	9,935	49.5%
East Caln Township	4,473	5,493	22.8%
East Coventry Township	6,301	7,136	13.3%
East Fallowfield Township	7,065	7,737	9.5%

Table 2.3-2 Chester County Population Growth by Municipality

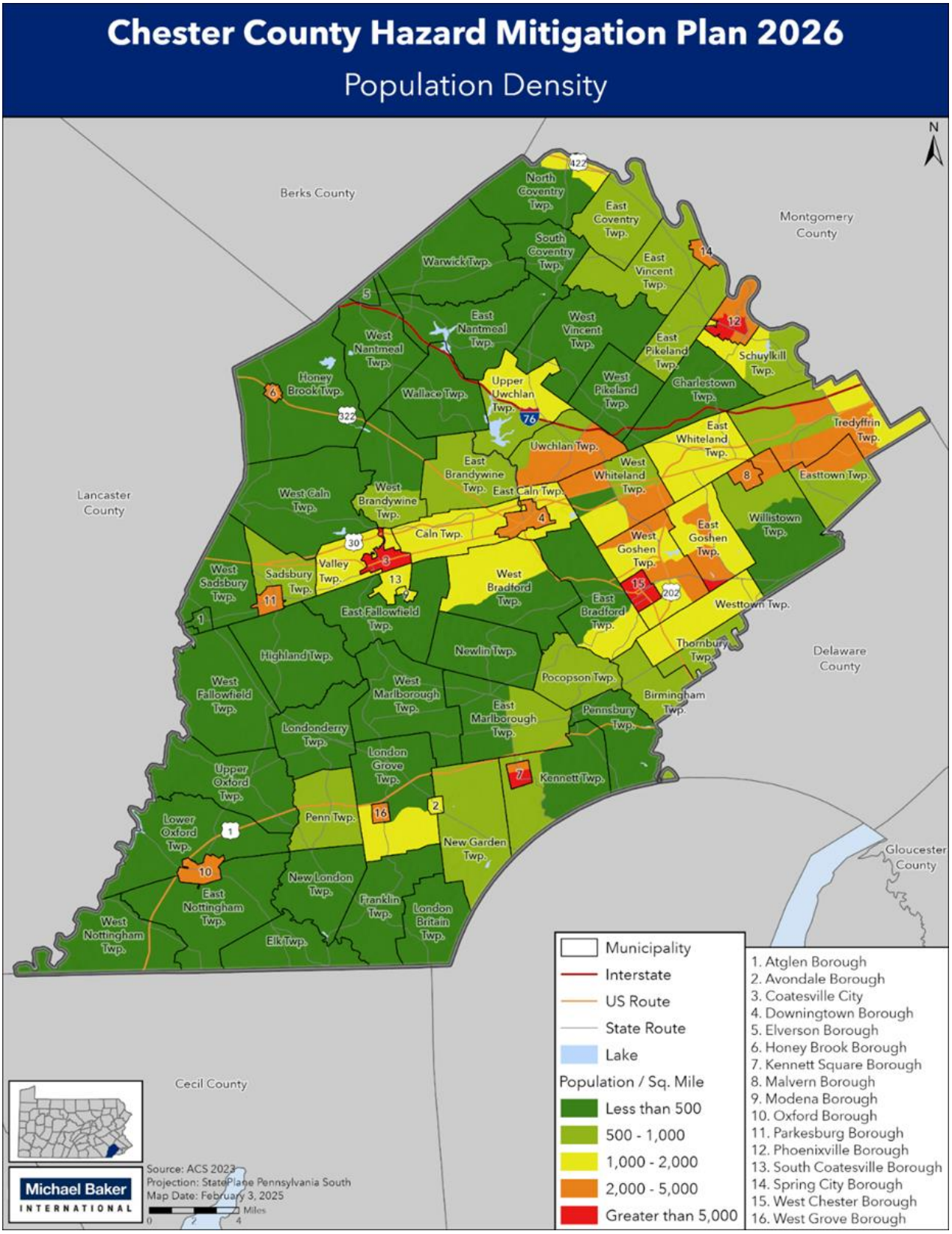
MUNICIPALITY	2010 POP.	2023 POP.	% CHANGE
East Goshen Township	17,978	18,392	2.3%
East Marlborough Township	6,921	7,567	9.3%
East Nantmeal Township	1,784	1,650	-7.5%
East Nottingham Township	8,176	9,022	10.3%
East Pikeland Township	7,036	8,413	19.6 %
Easttown Township	10,538	11,015	4.5%
East Vincent Township	6,633	7,521	13.4%
East Whiteland Township	10,481	14,459	38.0%
Elk Township	1,683	1,731	2.9%
Elverson Borough	1,266	1,392	10.0%
Franklin Township	4,286	4,430	3.4%
Highland Township	1,235	1,225	-0.8%
Honey Brook Borough	1,518	2,089	37.6%
Honey Brook Township	7,431	8,319	11.9%
Kennett Township	7,418	8,763	18.1%
Kennett Square Borough	5,959	6,096	2.3%
London Britain Township	3,098	3,200	3.3%
Londonderry Township	2,136	2,525	18.2%
London Grove Township	7,134	8,884	24.5%
Lower Oxford Township	5,066	5,570	9.9%
Malvern Borough	3,023	3,427	13.4%
Modena Borough	466	348	-25.3%
New Garden Township	11,573	11,423	-1.3%
Newlin Township	1,319	1,223	-7.3%
New London Township	5,481	5,823	6.2%
North Coventry Township	7,841	8,419	7.4%
Oxford Borough	4,971	5,763	15.9%
Parkesburg Borough	3,582	3,894	8.7%
Penn Township	4,938	5,654	14.5%
Pennsbury Township	3,607	3,875	7.4%
Phoenixville Borough	16,249	19,062	17.3%
Pocopson Township	4,411	4,452	0.9%
Sadsbury Township	3,406	4,248	24.7%
Schuylkill Township	8,306	8,811	6.1%
South Coatesville Borough	1,359	1,843	35.6%
South Coventry Township	2,493	2,796	12.2%
Spring City Borough	3,346	3,551	6.1%
Thornbury Township	2,969	3,181	7.1%
Tredyffrin Township	29,480	31,822	7.9%
Upper Oxford Township	2,589	2,547	-1.6%
Upper Uwchlan Township	10,498	12,731	21.3 %
Uwchlan Township	17,937	19,231	7.2%
Valley Township	6,537	7,965	21.8%
Wallace Township	3,449	3,736	8.3%

Table 2.3-2 Chester County Population Growth by Municipality

MUNICIPALITY	2010 POP.	2023 POP.	% CHANGE
Warwick Township	2,537	2,596	2.3%
West Bradford Township	12,012	14,520	20.9%
West Brandywine Township	7,382	7,534	2.1%
West Caln Township	8,744	8,938	2.2%
West Chester Borough	18,530	19,235	3.8%
West Fallowfield Township	2,567	2,430	-5.3%
West Goshen Township	21,773	23,281	6.9%
West Grove Borough	2,838	2,791	-1.7%
West Marlborough Township	899	891	-0.9%
West Nantmeal Township	2,024	2,203	8.8%
West Nottingham Township	2,727	2,803	2.8%
West Pikeland Township	3,968	4,026	1.5%
West Sadsbury Township	2,204	2,570	16.6%
Westtown Township	10,811	11,201	3.6%
West Vincent Township	4,345	6,751	55.4%
West Whiteland Township	18,074	19,951	10.4%
Willistown Township	10,472	11,286	7.8%

Population density in Chester County is shown in Figure 2.3-1. The Borough of West Chester has the highest population density of all the municipalities in the county (10,771 persons per square mile) (ACS, 2020). Most of the municipalities in Chester County have population densities above the statewide average. However, many municipalities in the county have low population density. Dispersing information, instructions, and resources during a disaster response is more difficult in low-density areas, since residents are less centralized.

Figure 2.3-1: Population Density in Chester County



As of 2023, 15,289 people in Chester County live in group quarters. The term "group quarters" refers to communal living settings such as prisons, college dormitories, or long-term care facilities West Chester University's main campus, comprised of north campus and south campus, occupies parts of West Chester Borough, West Goshen Township and East Bradford Township. The total enrollment at the main campus during fall 2022 was 17,076 students. The campus has 1,879 total employees, 1,526 full-time and 353 part-time (West Chester University, 2023). Residents living in group quarters may have unique needs during hazard events It is important to ensure that each group quarter facility has its own emergency plan to account for the unique needs of its residents during a hazard event.

While low-density areas may provide challenges to disseminating hazard mitigation information, a low population density also means that hazards will not affect as many people. For example, diseases may not spread as quickly because citizens are in contact with less people. Similarly, fires are less likely to spread to other structures because of the large distances between them. The magnitude of an event is typically smaller in a less- populated area because each event affects fewer people and properties.

Table 2.3-3 highlights some demographic information for Chester County. The median age of 40.6 years. Population densities for individuals under the age of five are shown in Figure 2.3-2 below, while population densities for individuals aged 65 and older are shown in Figure 2.3-3. These populations are concentrated in boroughs and northeastern townships, where overall population density is higher.

Table 2.3-3 Chester County Demographics

DATA POINT	2023 FIGURE
Total Population	549,784
Female	277,737
Male	272,047
Median Age (years)	40.6
Under 5 years	29,208
5 – 19 years	106,892
20 – 64 years	312,466
65 years and older	101,218

Figure 2.3-2 Population Density Under 5 Years Old in Chester County

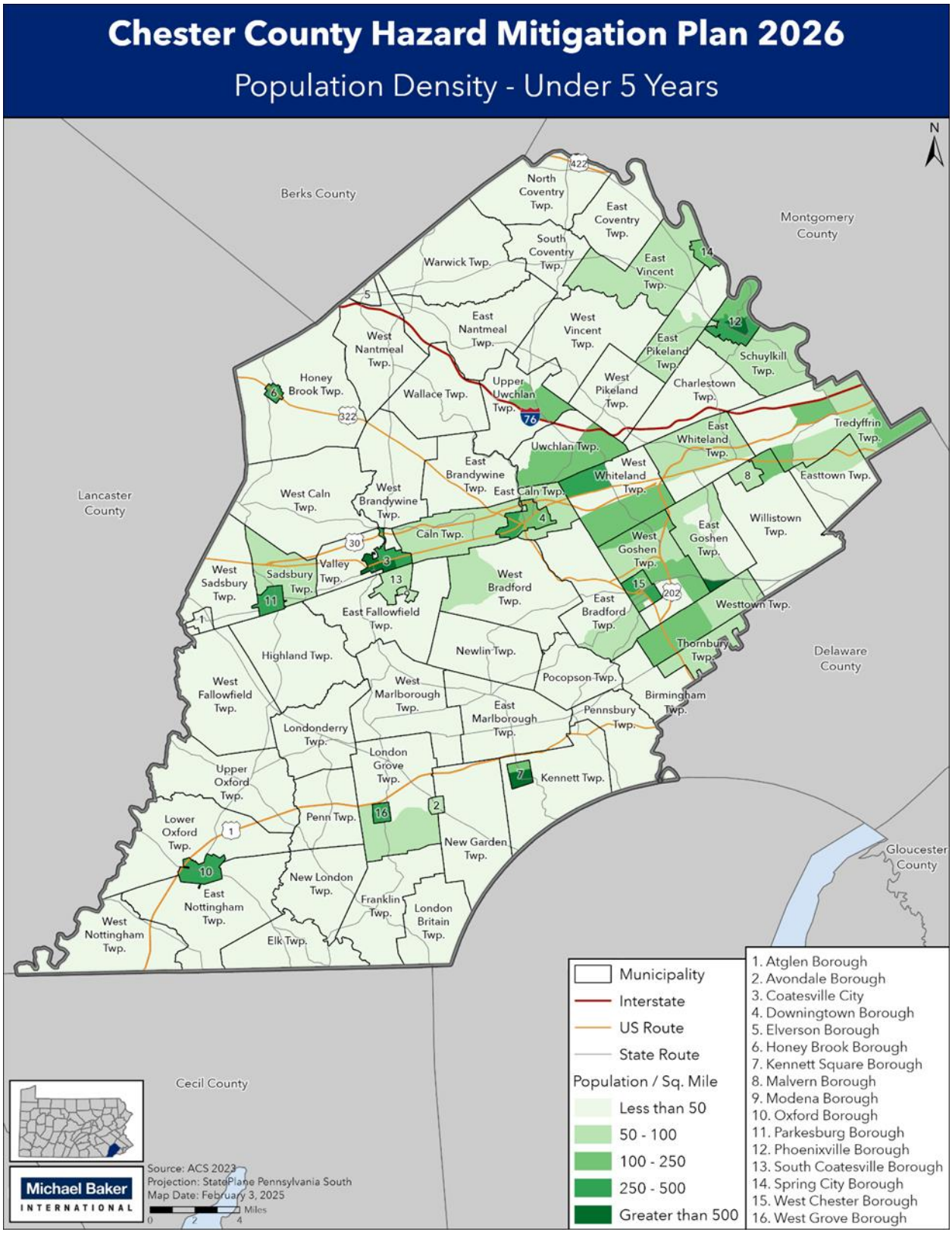
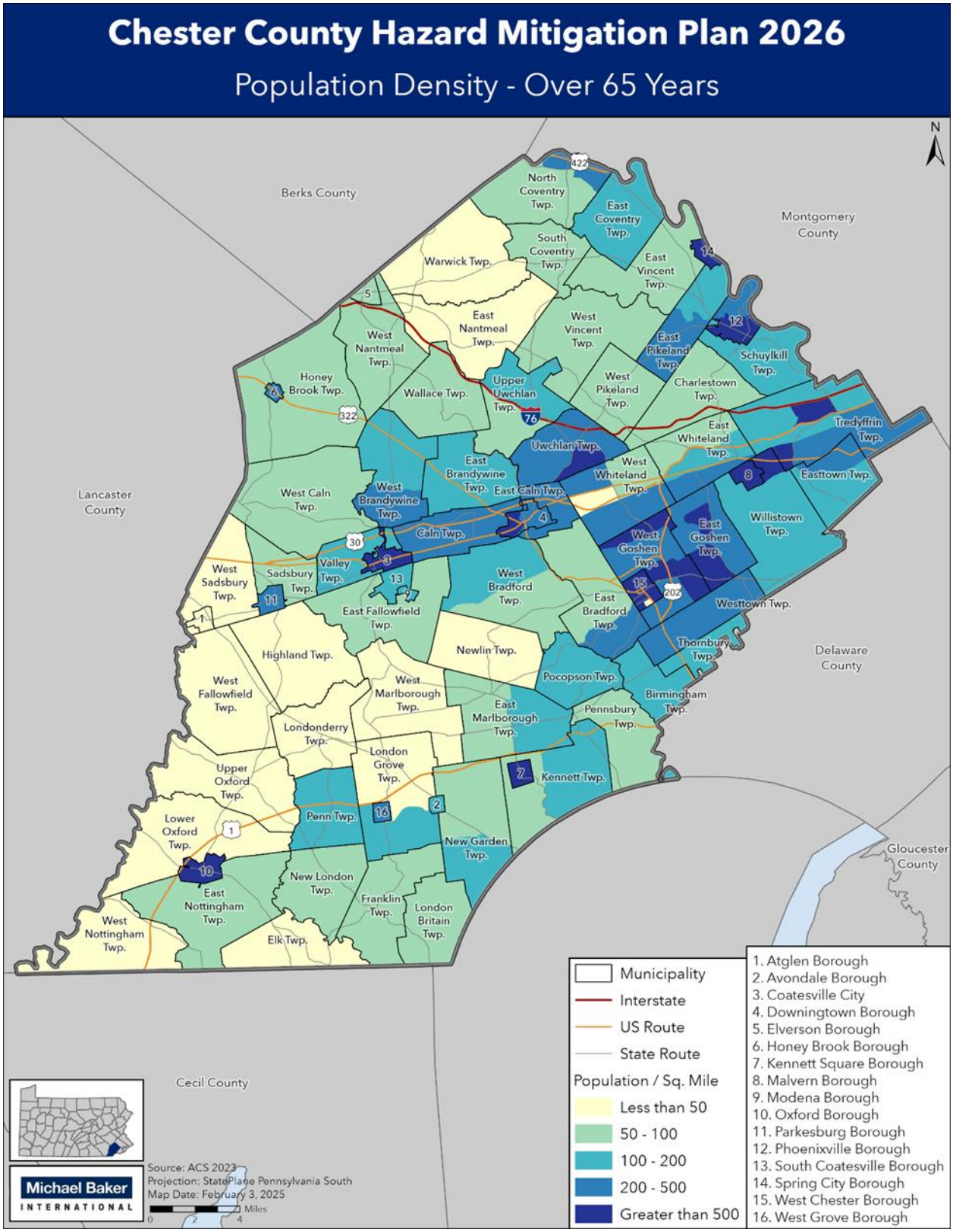


Figure 2.3-3 Population Density 65 Years and Older in Chester County



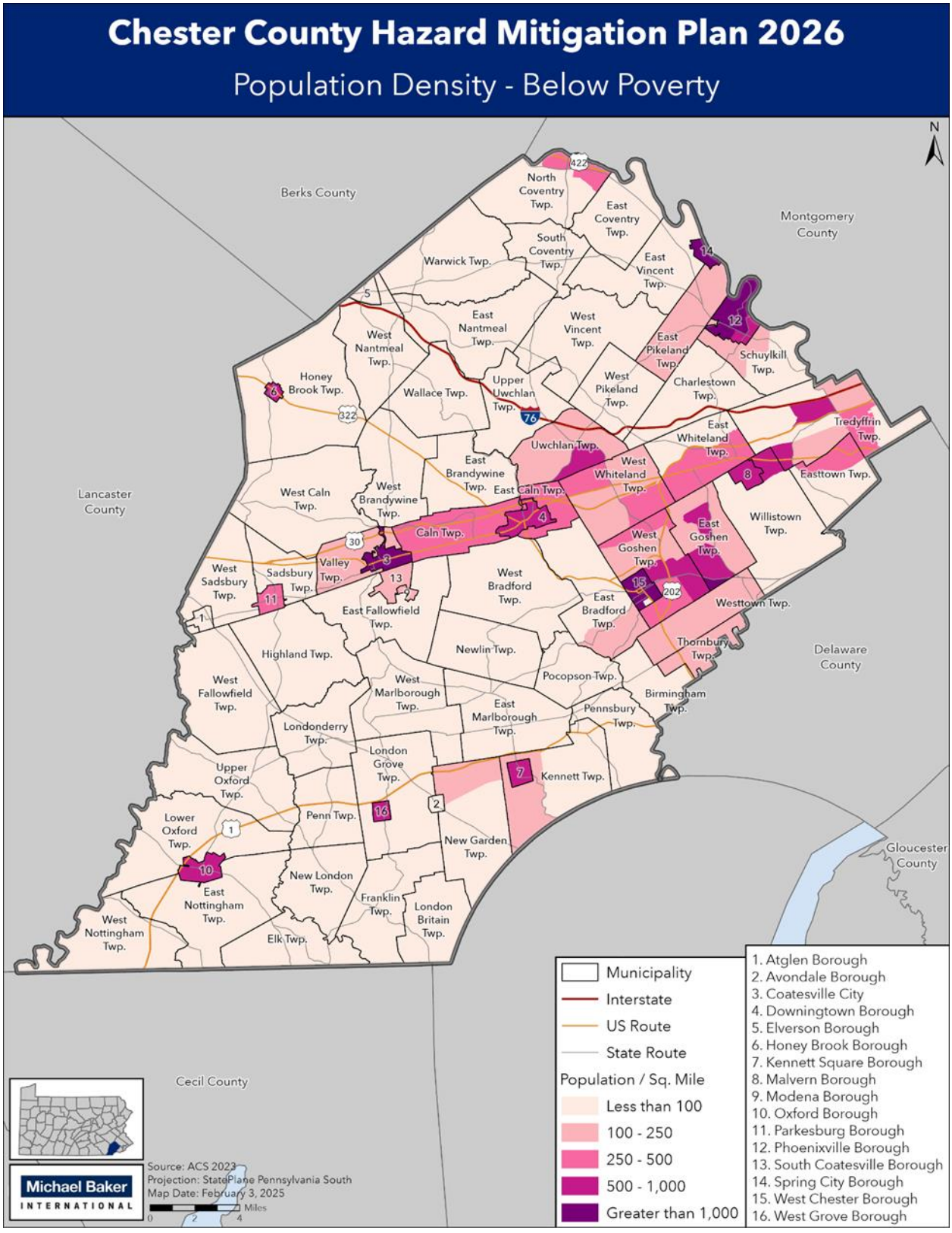
In 2023, the median household income in the county was $123,041, which was higher than the Commonwealth's estimated median household income ($76,081). The county's 2023 estimated per capita income of $62,011 was higher than the Commonwealth's 2023 estimated per capita income of $42,605. Approximately 5.9% of the population lives in poverty. Emergency responders may face challenges communicating with lower-income residents due to limited internet access and lower rates of smartphone ownership Additionally, some low-income families and individuals may not own vehicles and therefore could be more vulnerable during an evacuation. Table 2.3-4 summarizes economic characteristics of Chester County's population and population distribution of residents with poverty status. Figure 2.3-4 showcases the population density of individuals below the poverty line by municipality. Similar to findings in the maps above, boroughs in general, and boroughs and townships in the northeast of the county have higher densities of individuals experiencing poverty.

Table 2.3-4 Demographic Breakdown of Residents Experiencing Poverty Over Time (ACS, 2023)

YEAR	TOTAL POPULATION		CHILDREN (UNDER 18)		SENIORS (65 AND OVER)	
	#	%	#	%	#	%
2018	34,217	6.8%	9,969	8.2%	3,588	4.6%
2020	31,889	6.3%	8,649	7.4%	4,084	4.9%
2023	31,305	5.9%	8,914	7.4%	4,772	5.2%

According to the 2019-2023 American Community Survey, 13.3% of the county's population speaks a language other than English at home. Future hazard mitigation strategies should consider addressing language barriers to ensure that all residents can receive emergency instructions.

Figure 2.3-4 Population Density Below the Poverty Line in Chester County



2.4. EQUITY IN HAZARD MITIGATION PLANNING

When planning for natural disasters or other hazardous events, accounting for underserved communities through an equitable approach is critical for minimizing negative impacts. Underserved communities are those that have been marginalized and lack adequate access to essential services, resources, and opportunities, often including low-income neighborhoods, communities of color, and rural areas. An equitable approach ensures fair distribution of resources and support tailored to the unique needs of different groups

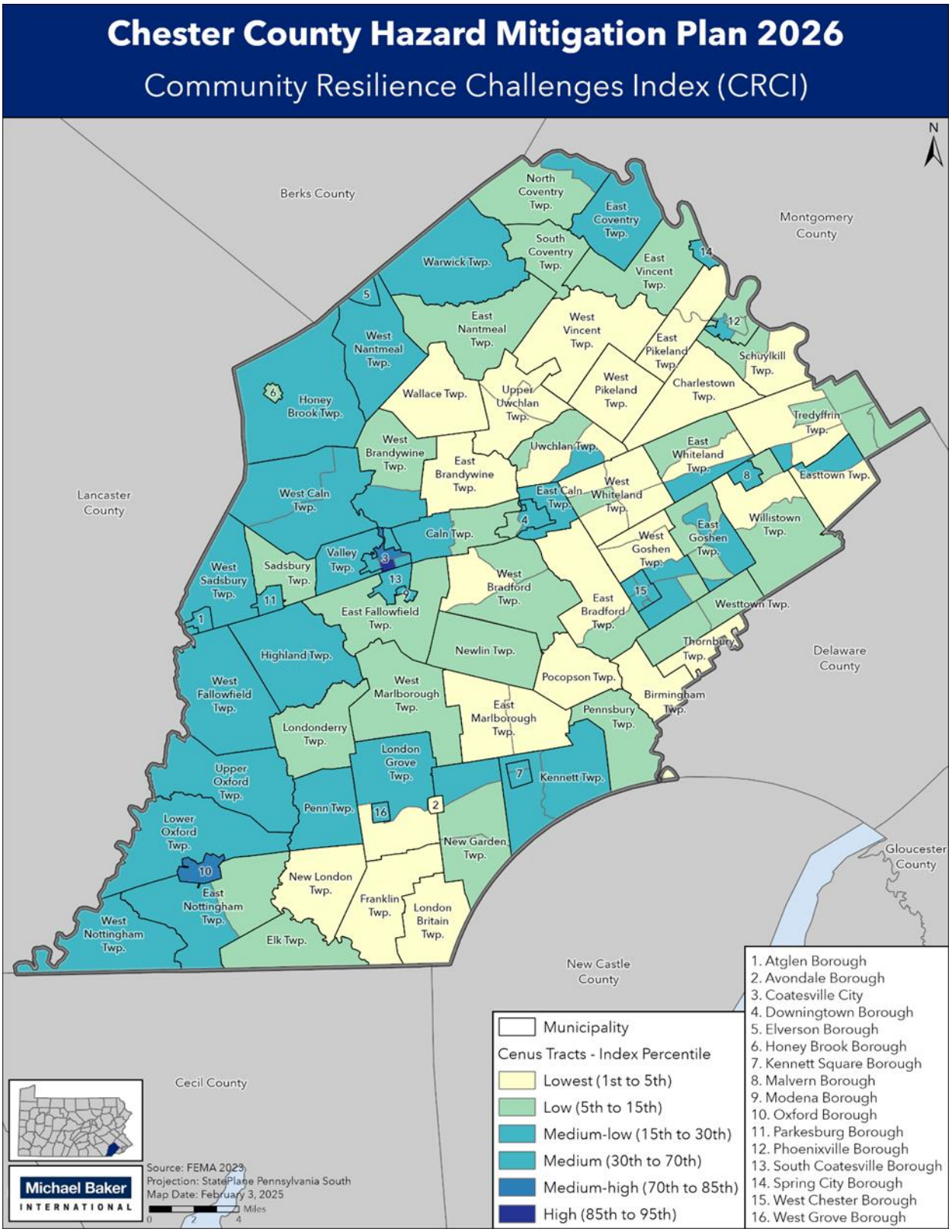
Incorporating equity into mitigation plans ensures that these vulnerable populations receive the attention and resources necessary to reduce their risk and enhance their resilience. This approach not only addresses existing social inequalities but also leads to more effective and sustainable disaster management outcomes, ensuring that all communities have the opportunity to thrive in the face of adversity.

Chester County has three census tracts that have medium-high challenges or are in the 70th or higher percentile for challenges, listed in Table 2.4-1. To adequately target these underserved communities, targeted outreach was a fundamental part of the County's hazard mitigation plan. The HMP's outreach strategy (Appendix H) discusses the Steering Committee's work to identify underserved communities using local knowledge and tools. Local knowledge, gained through work with representative groups, was used to identify stakeholders in underserved communities who later shared their input to help make the plan and mitigation strategy more inclusive. Equity tools published by FEMA simultaneously helped to corroborate findings from the outreach plan.

Table 2.4-1 Chester County Census Tracts in Medium-High to High Challenge Percentiles

CENSUS TRACT	MUNICIPALITY	PERCENTILE	CHALLENGE PERCENTILE
3055	Coatesville	78	Medium-High Challenges (70th-85th percentile)
3056	Coatesville	88	High Challenges (85th-95th percentile)
3080	Oxford	73	Medium-High Challenges (70th-85th percentile)

Figure 2.4-1 FEMA Community Resilience Challenges Index (CRCI) Census Tracts in Chester County (FEMA CRCI, 2024)

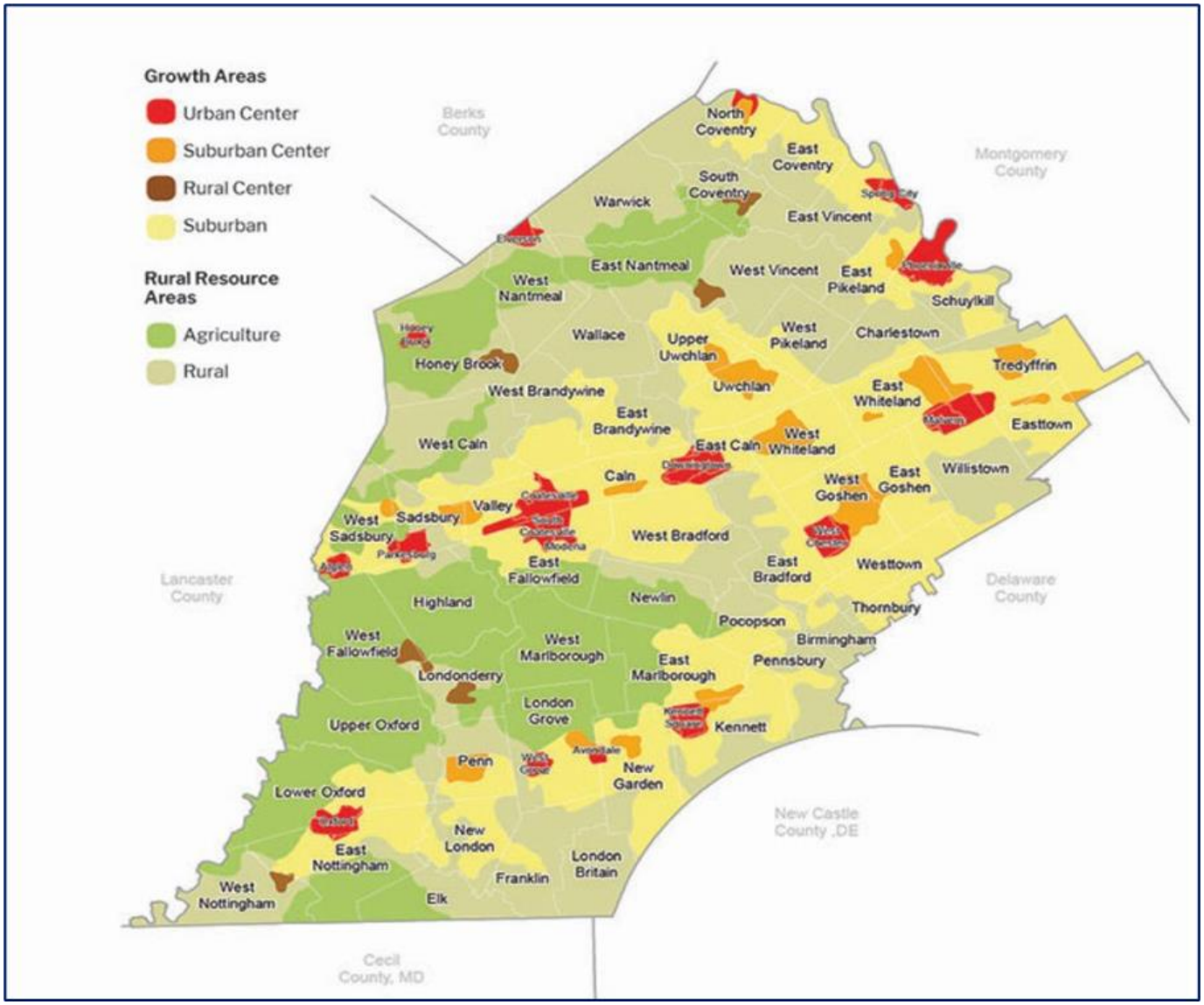


2.5. LAND USE AND DEVELOPMENT

Chester County's land use patterns are influenced by its topography and existing infrastructure. The existing land use pattern reflects suburban expansion from Philadelphia into eastern Chester County, making the eastern side into a more urban area. The rest of Chester County reflects the continued spread of residential development into rural areas, making them less more rural and more suburban in character. A good portion of Chester County is still used for agriculture, but the major portion of the county's economy is spread through the health care, professional, retail, finance, and manufacturing industries. Most development in Chester County is concentrated in the eastern part of the county and along Route 30 through the center of the county and along Route 1 in the south. There is a high density of employment in Tredyffrin, East Whiteland, Malvern, West Whiteland, Uwchlan, Downingtown, West Goshen, and West Chester. Outside of those areas, the county is composed of small towns and residential neighborhoods interspersed with farms, and forested lands.

Locations for development are primarily located along the major transportation corridors in more populated areas and underutilized properties to provide viable options to potential new businesses. Figure 2.5-1 illustrates potential growth areas in Chester County included in the 2018 Chester County Comprehensive Plan: Landscapes3. The Landscapes Map is the County's guide for growth and rural resource protection. Landscapes may be appropriate for multiple land uses, with the mix and intensity varying to reflect the character of the specific area.

Figure 2.5-1: Landscapes Map (Chester County Planning Commission, 2018)



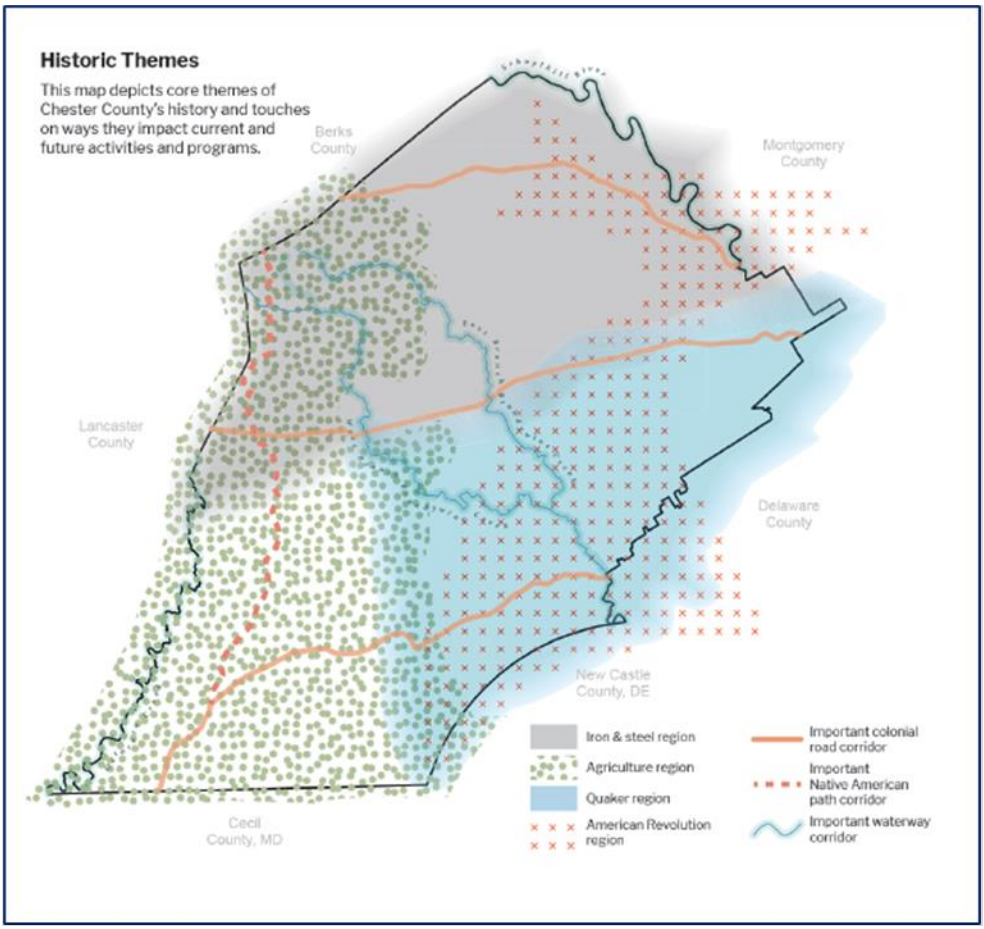
Landscapes3 establishes a balance of growth and preservation for the county, municipalities, the public, and the business community by guiding decision making and local municipal planning and implementation. The plan incorporates smart growth principles and promotes programs that build community and environmental resilience. Information on how hazard risk relates to these growth areas is discussed in Section 4.4.

Chester County's older and historic places make important contributions to its communities' overall quality of life, economy, and sense of place. In the wake of several disasters in recent years including hurricanes Sandy and Irene and Tropical Storm Lee, the Pennsylvania State Historic Preservation Office (PA SHPO) and the Pennsylvania Emergency Management Agency (PEMA) are encouraging counties to integrate historic preservation considerations into local hazard mitigation plans. By prioritizing historic resources for mitigation, local officials and hazard

mitigation planners can help preserve communities' historic built environments—and sense of place—for many years to come.

Figure 2.5-2, also from Landscapes3, identifies the historic themes of Chester County, including iron and steel regions, Quaker regions, and important corridors from the American Revolution and paths used by Native Americans.

Figure 2.5-2 Historic Themes (Chester County Planning Commission, 2018)



According to 2023 ACS 5-Year estimates, Chester County contains 210,730 housing units. These properties may be vulnerable to various natural hazards, particularly those located in defined hazard areas. Damage to residential properties is not only costly to repair or rebuild but devastating to the displaced residents.

Approximately 3.9% of the county's residential properties are vacant. Most vacancies are in the form of units available for rent. Vacant buildings are especially vulnerable to arson and other criminal activity. Because vacant properties are not inhabited year-round or may not be adequately maintained, many are structurally deficient and at risk of collapse.

Approximately 25.1% of the county's population live in rented homes. Because renters are more transient than homeowners, communicating with renters may be more difficult than communicating with homeowners. Similarly, communication with tourists would be more challenging during an emergency event. Communication strategies should be developed to ensure that these populations receive proper notifications.

Table 2.5-1 summarizes characteristics of the residential properties in Chester County.

Table 2.5-1 Housing Characteristics in Chester County (ACS, 2018; ACS 2023)

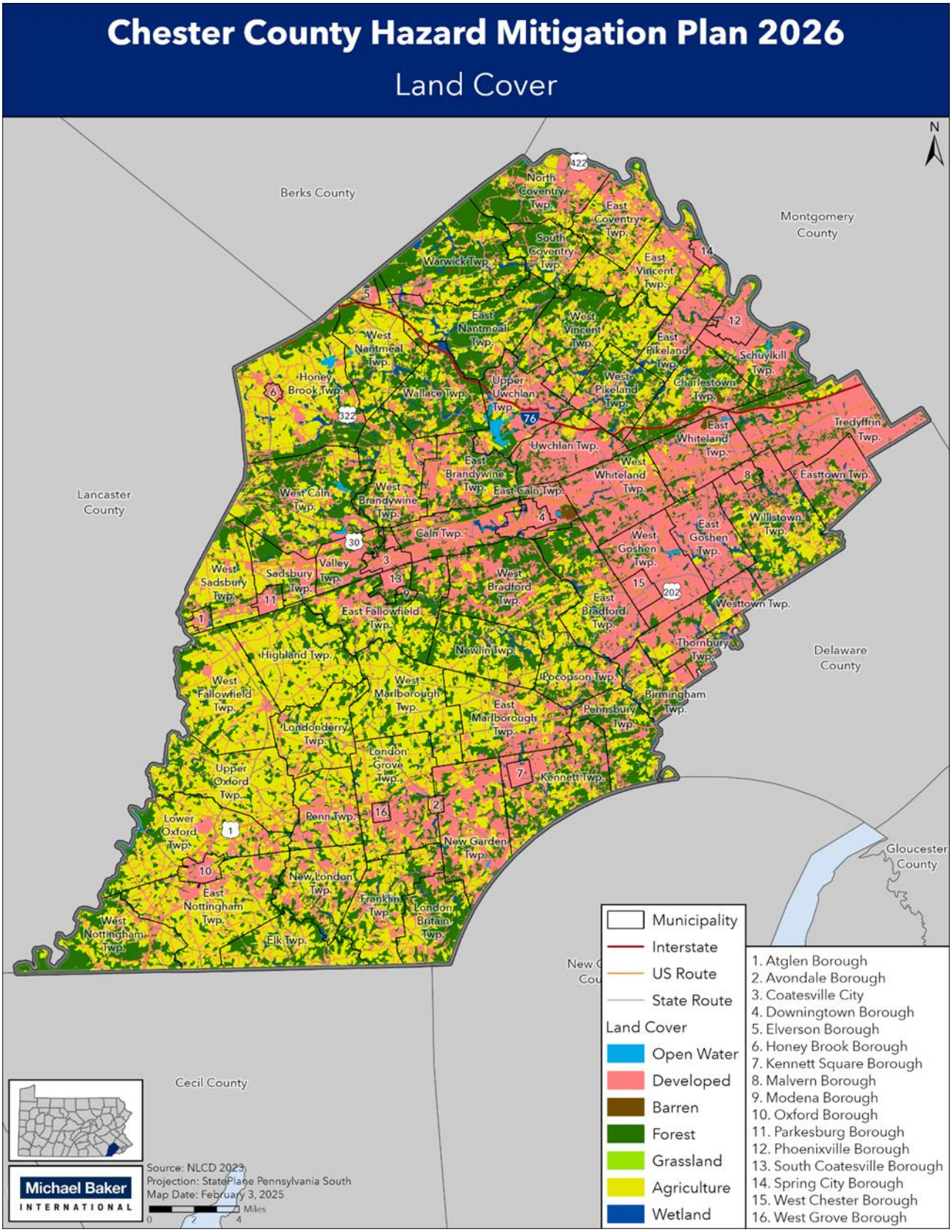
HOUSING CHARACTERISTICS	2018	2023
Owner-occupied housing units	142,649	202,405
Renter-occupied housing units	46,943	50,711
Vacant housing units	9,458	8,325
Total housing units	199,050	210,730
Median value (dollars)	$347,000	$461,800

According to the U.S. Geologic Survey's National Land Cover Dataset, the primary land cover classifications of Chester County are developed land (34.7% of area), agricultural land (33.5%), and wooded or forest land (28.5%). Figure 2.5-2 shows the county land use and land cover. In the 2021 HMP, agricultural land was reported as the most prominent land cover classification. Both agricultural land and forested land have declined slightly, while developed land has increased. The northern half of Chester County is primarily composed of forested land. Agricultural land is located in the southern part of the county and, while spread throughout the county residential land is concentrated in the center and eastern parts of the county, particularly along major roadways and in boroughs and villages.

The total sum of agricultural land and market value of products sold increased 3.3% from 2017 to 2022 (USDA, 2022). Using Chester County's agricultural land for agritourism can help small and family-owned farms remain profitable, retain jobs, and sustain the county's agricultural base.

Chester County's Agricultural Land Preservation Board (ALPB) was established in 1989. The ALPB administers the Commonwealth Agricultural Conservation Easement Purchase Program and the Chester County Challenge Grant Program. The easement programs ensure preservation of viable agricultural lands to protect the agricultural economy and resources of the County. The program is approved by the Pennsylvania Department of Agriculture and operates under the Agricultural Area Security Law (PA Act 43 of 1981).

Figure 2.5-3 Chester County Land Cover (NLCD, 2023)



2.6. DATA SOURCES

Gathering and analyzing new data about natural hazards and the community was critical to the process of updating the plan. The Chester County Geographic Information System (GIS) HUB provided many datasets to inform the plan: https://chester-county-s-gis-hub-chesco.hub.arcgis.com/.

Chester County's Effective Flood Insurance Rate Map (FIRM), issued September 29, 2017, was obtained from FEMA's Flood Map Service Center: https://msc.fema.gov/portal/home. This data provides flood frequency and elevation information used in the flood hazard risk assessment.

Additional spatial data was provided by the Pennsylvania Department of Conservation and Natural Resources (DCNR), the Pennsylvania Department of Transportation (PennDOT) and other state agencies. Numerous GIS datasets were obtained from the Pennsylvania Spatial Data Access (PASDA) website: http://www.pasda.psu.edu/. PASDA is the official public access geospatial information clearinghouse for the Commonwealth of Pennsylvania. PASDA was developed by Penn State as a service to the citizens, governments, and businesses of the Commonwealth. PASDA is a cooperative project of the Governor's Office of Administration, Office for Information Technology, Geospatial Technologies Office and the Penn State Institutes of Energy and the Environment of the Pennsylvania State University. The Pennsylvania Department of Environmental Protection (PA DEP) provided data utilized for radon summaries and maps.

Population and demographic data from the 2020 Decennial Census and 2019-2023 ACS five-year estimates were obtained from the U.S. Census Bureau. Throughout the course of the planning process, the Steering Committee continually sought additional data sources to augment the information included in the HMP. Additional information used to complete the risk assessment for this plan was taken from various government agency and non-government agency sources, such as the Chester County 2018 Comprehensive Plan (Landscapes3). Those sources are cited where appropriate throughout the plan and on each map with full references listed in Appendix A – Bibliography.

In order to assess the vulnerability of different jurisdictions to the hazards, hazard data from the National Centers for Environmental Information (NCEI) database was utilized. NCEI is a division of the US Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). Information on hazard events is compiled by NCEI from data gathered by the National Weather Service (NWS), another division of NOAA. NCEI then presents it on its website in various formats. The data used for this plan came from the U.S. Storm Events database, which "documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce" (NOAA, 2025). The database currently contains hazard event data from January 1950 to July 2025. Other federal datasets were sourced from USGS, the National Hurricane Center, and NOAA's Storm Prediction Center. High Hazard Potential Dam (HHPD) data was collected from PA DEP and USACE's National Dam Inventory (NDI) and incorporated into the

Dam Failure profile (Appendix H). PA DEP provided information on dams and the County provided information from Emergency Action Plans including risk and population vulnerability. Additional spatial data sources include the National Interagency Fire Center (NIFC) which provides current and historic wildfire origins information, and NOAA's tornado tracks and climate normals (1990-2020).

Hazus is a powerful risk assessment methodology for analyzing potential losses from floods, hurricane winds, and earthquakes. In Hazus, current scientific and engineering knowledge is coupled with the latest GIS technology to produce estimates of hazard-related damage before or after a disaster occurs. Version 6.1 of this software was used to estimate losses for floods in Chester County; this plan incorporates an enhanced analysis, meaning that county-specific data was incorporated into the model to make it more precise. In addition, the planning team developed a 1% annual chance flood depth grid based off of the effective Digital Flood Insurance Rate Map (DFIRM) to incorporate the most accurate and precise flood estimations. For more information about the methodology employed to prepare the Hazus model and estimate losses, see Appendix F.

Throughout the risk and vulnerability assessments included in Section 4 – Risk Assessment, descriptions of data indicate some areas in which the County and municipalities can improve their ability to identify vulnerable structures and improve loss estimates. As the County and municipal governments work to increase their overall technical capacity and implement comprehensive planning goals, they will also attempt to improve the ability to identify areas of increased vulnerability.

The plan describes the vulnerability of assets to the identified hazards and looks at the risk that makes them susceptible to damage from the identified hazards. Assets considered include:

- People (including underserved communities and socially vulnerable populations).
- Structures (including facilities, lifelines and critical infrastructure).
- Systems (including networks and capabilities).
- Natural, historic, and cultural resources.
- Activities that have value to the community.

Assets were identified using multiple methods. One of those methods was through reviewing FEMA's community lifelines. FEMA community lifelines are essential services that enable the continuous operation of critical government and business functions, which are crucial for human health, safety, and well-being. These lifelines, which are listed in Figure 2.6-1, form the backbone of a community's resilience to disasters. Additionally, community lifelines will serve as a focal point for assessing vulnerabilities and implementing strategies to minimize disruptions.

Figure 2.6-1 FEMA's Community Lifelines

 Law Enforcement/ Security, Fire Service, Search and Rescue, Government Service, Community Safety	 Food, Hydration, Shelter, Agriculture	 Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management	 Power Grid, Fuel
 Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch	 Highway/Roadway/ Motor Vehicle, Mass Transit, Railway, Aviation, Maritime	 Facilities, HAZMAT, Pollutants, Contaminants	 Potable Water Infrastructure, Wastewater Management

This 2026 HMP Update evaluates the vulnerability of the County's critical facilities. For the purposes of this plan, critical facilities are those entities that are essential to the health and welfare of the community. The list of critical facilities was developed in conjunction with Chester County Department of Emergency Services. Chester County has identified 21 types of critical facilities essential to community health and welfare. Table 2.6-1 summarizes the critical facilities in Chester County by type and data source. Table 2.6-2 provides a list of critical facility types with definitions. Table 2.6-3 lists the number of critical facilities by type in each municipality. For a complete listing of critical facilities and their vulnerability to individual hazards, please see Appendix E.

Several critical facility GIS datasets were obtained from the Department of Homeland Security's (DHS) Homeland Infrastructure Foundation-Level Data (HIFLD) Open data portal, and FEMA's Comprehensive Data Management System (CDMS). The HIFLD Open data portal aggregates data from hundreds of regional and local data providers to compile national datasets of essential assets and infrastructure. As of 2025, this data portal provided access to over 400 national geospatial data layers within the open public domain (DHS HIFLD, 2025). FEMA's

CDMS was used to gather geospatial data for additional types of critical facilities not compiled through the HIFLD Open Data portal. A component of FEMA's Hazus software, the CDMS allows users to export the default geospatial data that Hazus uses to estimate potential losses. This default geospatial data includes national data for essential facilities, high potential loss facilities, selected transportation and lifeline systems, agriculture, vehicles, and demographics. More information on the sources for the Hazus default data can be found at https://www.fema.gov/summary-databases-hazus-multi-hazard.

Table 2.6-1 Number of Critical Facilities in Chester County by Type and Data Source

TYPE	NUMBER IN COUNTY	DATA SOURCE
Airport	2	CDMS
Bridge	1,059	County
Communication Structure	6	CDMS
Court House	16	County
Dam	179	PA DEP
Day Care Center	216	HIFLD
EMS Station	24	County
Energy Facility	6	CDMS
EOC	4	CDMS, County
Fire Station	51	County
Medical Facility	11	CDMS
Misc.	5	County
Municipal	75	County
Nursing Home	25	HIFLD
Police Station	43	County
Prison	1	County
School	215	CDMS
Train Station	16	SEPTA, Amtrak
TRI	37	US EPA
Waste Water Facility	29	CDMS
Water Treatment Facility	7	CDMS

Table 2.6-2 Critical Facilities in Chester County by Type and Data Source

TYPE	DEFINITION	WHY IT IS CRITICAL
Airports	Facilities with paved runways, maintenance services, and often passenger terminals, supporting the movement of people and goods.	Important for the movement of people and goods and services.
Congregate Care Facilities	A facility licensed by the department or the Department of Human Services, including, but not limited to, a long-term care nursing facility, a skilled nursing facility, an	Provide shelter and continuous care for vulnerable populations requiring 24/7 monitoring

Table 2.6-2 Critical Facilities in Chester County by Type and Data Source

TYPE	DEFINITION	WHY IT IS CRITICAL
	assisted living facility, a personal care home, an independent long-term care facility or an intermediate care facility for individuals with intellectual disabilities.	
Dams	A barrier that stops or restricts the flow of surface water or underground streams.	Important infrastructure, providing flood protection, water supply reservoirs, hydroelectric power, and irrigation. Their failure may result in significant damage and loss of life.
Day Care Centers	An institution that provides supervision and care of infants and young children during the daytime.	Necessary for a community's economy by providing employment and for the day-to-day life for many families by providing care for children while parents go to work.
EMS Stations	A facility where emergency medical service (EMS) personnel are stationed or based out of, or where equipment that such personnel use in carrying out their jobs is stored for ready use.	Important for the storage and maintenance of EMS equipment.
Fire Stations	A facility where fire engines and other equipment of a fire department are housed.	Important for the storage and maintenance of firefighting equipment.
Jails	A place for the confinement of people accused or convicted of a crime.	Buildings where many people are present 24/7.
Medical Facilities	A place where sick or injured people are given care or treatment (as a hospital, urgent care center, or a clinic).	Buildings where people may be present 24/7, provide important care services, and may serve as a local shelter.
Police Stations	A building which serves to accommodate police officers, other members of police staff, and their equipment.	Important for the storage and maintenance of emergency response equipment.
Private Schools	A school supported by a private organization or private individuals rather than by the government.	Buildings where many people and young vulnerable populations are present during the day, may also serve as a local shelter.
Public Schools	A school supported by public funds.	Buildings where many people and young vulnerable populations are present during the day, may also serve as a local shelter.
Sewer	A facility that collects and treats	Provide an essential service

Table 2.6-2 Critical Facilities in Chester County by Type and Data Source

TYPE	DEFINITION	WHY IT IS CRITICAL
Treatment Plants	wastewater to make it appropriate for a specific end-use.	that promotes environmental and public health.
Shelters	A place giving temporary protection from bad weather or danger.	Provide physical safety from hazards, including place to sleep, meals, access to clean clothes, and/or medical care or counseling. A place where many people may gather during a hazard event.
Toxic Release Inventory (TRI) Facilities	A facility that stores toxic chemicals listed on the publicly available TRI database that may pose a threat to human health and the environment.	Provide safe storage of chemicals that are harmful to the environment and public health.
Water Treatment Plants	A facility that collects and treats water to make it appropriate for a specific end-use.	Provides water for safe drinking, industrial supply, irrigation, river flow maintenance, and other needs.
Wells - Conventional	A gas or oil well that uses standard drilling methods, such as drilling vertically into rock.	Provide energy resources while also presenting an environmental and public health risk from contamination.
Wells - Unconventional	A gas or oil well that uses technologically advanced drilling methods, such as fracking, to target energy reserves in harder to reach areas.	Provide energy resources while also presenting an environmental and public health risk from contamination.

Table 2.6-3 Critical Facilities by Type for Each Municipality

MUNICIPALITY	AIRPORT	BRIDGE	COMMUNICATION	COURT HOUSE	DAM	DAY CARE CENTER	EMS STATION	ENERGY FACILITY	EOC	FIRE STATION	MEDICAL FACILITY	MISCELLANEOUS	MUNICIPAL	NURSING HOME	POLICE STATION	PRISON	SCHOOL	TRAIN STATION	TRI SITE	WASTE WATER FACILITY	WATER TREATMENT FACILITY	TOTAL
Atglen Borough	0	7	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	8
Avondale Borough	0	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	5
Birmingham Township	0	5	0	0	3	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	11
Caln Township	0	32	0	0	0	12	0	0	0	2	1	0	1	1	1	0	5	1	1	0	0	57
Charlestown Township	0	22	0	0	3	1	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	29
Coatesville City	0	11	0	1	2	3	1	0	0	3	0	0	1	0	1	0	2	1	1	0	0	27
Downingtown Borough	0	15	0	0	2	4	1	0	0	3	1	0	1	0	1	0	9	2	2	0	0	41
East Bradford Township	0	25	1	0	6	4	1	0	0	1	0	0	1	1	0	0	2	0	0	1	0	43
East Brandywine Township	0	24	0	0	4	2	0	0	0	1	0	1	1	0	1	0	2	0	1	12	0	49
East Caln Township	0	16	0	1	2	4	0	0	0	0	1	0	1	2	0	0	1	0	0	0	0	28
East Coventry Township	0	23	0	0	2	1	0	0	0	1	0	0	1	1	1	0	2	0	2	0	0	34
East Fallowfield Township	0	15	0	0	5	2	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	26
East Goshen	0	14	0	1	6	3	2	0	0	1	0	0	1	1	0	0	2	0	1	0	0	32

Table 2.6-3 Critical Facilities by Type for Each Municipality

MUNICIPALITY	AIRPORT	BRIDGE	COMMUNICATION	COURT HOUSE	DAM	DAY CARE CENTER	EMS STATION	ENERGY FACILITY	EOC	FIRE STATION	MEDICAL FACILITY	MISCELLANEOUS	MUNICIPAL	NURSING HOME	POLICE STATION	PRISON	SCHOOL	TRAIN STATION	TRI SITE	WASTE WATER FACILITY	WATER TREATMENT FACILITY	TOTAL
Township																						
East Marlborough Township	0	11	0	0	4	4	0	0	0	1	0	0	1	0	1	0	3	0	0	0	0	25
East Nantmeal Township	0	11	0	0	3	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	16
East Nottingham Township	0	20	0	0	0	5	0	0	0	0	0	0	1	0	0	0	9	0	1	0	0	36
East Pikeland Township	0	11	1	0	3	3	0	0	0	1	0	0	1	1	1	0	0	0	1	0	0	23
East Vincent Township	0	14	0	0	2	4	0	0	0	0	1	0	1	1	1	0	4	0	0	0	0	28
East Whiteland Township	0	48	0	0	3	10	1	1	0	1	0	2	1	1	1	0	6	1	5	0	0	81
Easttown Township	0	6	0	0	6	10	1	0	0	1	0	0	1	0	1	0	6	2	0	1	0	35
Elk Township	0	11	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	12
Elverson Borough	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	4
Franklin Township	0	13	0	0	0	2	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	17
Highland Township	0	8	0	0	2	1	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	15
Honey Brook Borough	0	0	0	1	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	5
Honey Brook	0	10	0	0	4	1	0	0	0	0	0	0	1	2	0	0	12	0	1	0	0	31

Table 2.6-3 Critical Facilities by Type for Each Municipality

MUNICIPALITY	AIRPORT	BRIDGE	COMMUNICATION	COURT HOUSE	DAM	DAY CARE CENTER	EMS STATION	ENERGY FACILITY	EOC	FIRE STATION	MEDICAL FACILITY	MISCELLANEOUS	MUNICIPAL	NURSING HOME	POLICE STATION	PRISON	SCHOOL	TRAIN STATION	TRI SITE	WASTE WATER FACILITY	WATER TREATMENT FACILITY	TOTAL
Township																						
Kennett Square Borough	0	5	0	0	0	2	1	0	0	1	0	0	1	1	1	0	2	0	0	0	0	14
Kennett Township	0	28	0	0	5	2	1	0	0	1	0	0	1	1	1	0	2	0	0	2	0	44
London Britain Township	0	10	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	13
London Grove Township	0	27	0	0	1	2	1	0	0	0	0	0	1	1	0	0	5	0	0	0	0	38
Londonderry Township	0	7	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	9
Lower Oxford Township	0	23	1	0	4	2	0	0	0	0	0	0	1	0	0	0	4	0	0	1	0	36
Malvern Borough	0	2	0	0	2	0	1	0	0	1	0	0	1	0	1	0	1	1	0	0	0	10
Modena Borough	0	2	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	5
New Garden Township	1	17	0	2	9	6	1	0	0	1	0	0	1	0	1	0	3	0	1	1	0	44
New London Township	0	11	0	0	0	2	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	15
Newlin Township	0	16	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	18
North Coventry Township	0	18	1	0	5	3	1	0	1	1	0	2	1	0	1	0	2	0	0	0	1	37

Table 2.6-3 Critical Facilities by Type for Each Municipality

MUNICIPALITY	AIRPORT	BRIDGE	COMMUNICATION	COURT HOUSE	DAM	DAY CARE CENTER	EMS STATION	ENERGY FACILITY	EOC	FIRE STATION	MEDICAL FACILITY	MISCELLANEOUS	MUNICIPAL	NURSING HOME	POLICE STATION	PRISON	SCHOOL	TRAIN STATION	TRI SITE	WASTE WATER FACILITY	WATER TREATMENT FACILITY	TOTAL
Oxford Borough	0	3	0	1	0	3	1	0	0	1	0	0	2	1	1	0	3	0	0	0	1	17
Parkesburg Borough	0	7	0	1	1	1	1	0	0	1	0	0	1	0	1	0	0	1	0	0	0	15
Penn Township	0	12	0	0	1	3	0	0	0	1	1	0	1	1	0	0	3	0	1	1	0	25
Pennsbury Township	0	10	0	0	6	4	0	0	0	0	0	0	1	1	0	0	3	0	0	0	0	25
Phoenixville Borough	0	11	0	1	2	5	1	0	0	2	1	0	1	1	1	0	6	0	0	0	0	32
Pocopson Township	0	17	0	0	1	2	0	0	1	0	0	0	2	1	0	1	1	0	1	0	0	27
Sadsbury Township	0	12	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	0	2	0	0	18
Schuylkill Township	0	11	0	0	8	6	0	0	0	1	0	0	1	0	1	0	6	0	1	0	1	36
South Coatesville Borough	0	1	0	0	1	0	0	0	1	0	0	0	1	0	1	0	0	0	0	1	0	6
South Coventry Township	0	9	0	1	1	2	0	0	0	0	0	0	1	1	0	0	3	0	0	0	0	18
Spring City Borough	0	2	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	1	6
Thornbury Township	0	7	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	10
Tredyffrin	0	89	0	1	11	12	1	0	0	1	0	0	1	0	1	0	17	4	1	0	0	139

Table 2.6-3 Critical Facilities by Type for Each Municipality

MUNICIPALITY	AIRPORT	BRIDGE	COMMUNICATION	COURT HOUSE	DAM	DAY CARE CENTER	EMS STATION	ENERGY FACILITY	EOC	FIRE STATION	MEDICAL FACILITY	MISCELLANEOUS	MUNICIPAL	NURSING HOME	POLICE STATION	PRISON	SCHOOL	TRAIN STATION	TRI SITE	WASTE WATER FACILITY	WATER TREATMENT FACILITY	TOTAL
Township																						
Upper Oxford Township	0	16	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	18
Upper Uwchlan Township	0	12	0	0	2	3	0	1	0	0	0	0	1	0	1	0	5	0	1	0	1	27
Uwchlan Township	0	9	0	1	4	11	1	1	0	2	0	0	1	0	1	0	10	0	1	0	0	42
Valley Township	1	22	0	0	1	2	1	0	0	1	0	0	1	0	1	0	2	0	1	0	0	33
Wallace Township	0	13	0	0	2	1	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	19
Warwick Township	0	9	0	0	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	13
West Bradford Township	0	16	0	0	1	7	0	1	0	2	0	0	1	0	1	0	2	0	0	0	2	33
West Brandywine Township	0	18	1	0	0	5	0	0	0	0	0	0	1	1	2	0	1	0	1	0	0	30
West Caln Township	0	7	0	0	2	3	0	0	0	1	0	0	1	0	0	0	6	0	0	0	0	20
West Chester Borough	0	4	1	2	0	5	1	0	0	2	2	0	1	1	1	0	5	0	1	0	0	26
West Fallowfield Township	0	10	0	0	3	0	0	0	0	1	0	0	1	0	1	0	4	0	1	0	0	21
West Goshen Township	0	36	0	1	6	13	2	0	1	3	0	0	1	1	1	0	8	0	3	2	0	78

Table 2.6-3 Critical Facilities by Type for Each Municipality

MUNICIPALITY	AIRPORT	BRIDGE	COMMUNICATION	COURT HOUSE	DAM	DAY CARE CENTER	EMS STATION	ENERGY FACILITY	EOC	FIRE STATION	MEDICAL FACILITY	MISCELLANEOUS	MUNICIPAL	NURSING HOME	POLICE STATION	PRISON	SCHOOL	TRAIN STATION	TRI SITE	WASTE WATER FACILITY	WATER TREATMENT FACILITY	TOTAL
West Grove Borough	0	0	0	0	0	2	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	6
West Marlborough Township	0	16	0	0	1	1	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	21
West Nantmeal Township	0	17	0	0	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	21
West Nottingham Township	0	8	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	12
West Pikeland Township	0	16	0	0	2	0	0	0	0	0	0	0	2	0	1	0	1	0	0	0	0	22
West Sadsbury Township	0	8	0	0	0	2	0	0	0	0	0	0	1	0	1	0	3	0	1	0	0	16
West Vincent Township	0	13	0	0	5	2	0	1	0	1	0	0	1	0	1	0	1	0	0	0	0	25
West Whiteland Township	0	51	0	1	8	8	0	1	0	1	0	0	1	1	1	0	9	3	1	0	0	86
Westtown Township	0	9	0	0	3	7	0	0	0	0	0	0	1	0	1	0	7	0	0	0	0	28
Willistown Township	0	16	0	0	12	6	0	0	0	0	3	0	1	1	1	0	7	0	1	7	0	55
Total	2	1,059	6	16	179	216	24	6	4	51	11	5	75	25	43	1	215	16	37	29	7	2,027

3. PLANNING PROCESS

3.1. UPDATE PROCESS SUMMARY

The Chester County 2026 HMP Update was developed by the Chester County Department of Emergency Services in partnership with the Hazard Mitigation Planning Team (HMPT). This update also included representatives from the Chester County municipalities and other local and regional stakeholders. Specifically, the 2026 HMPT included stakeholders from the groups listed in Figure 3.1-1. A full list of stakeholders invited to participate is included in **Appendix C – Meeting and Other Participation Documentation**. The contact list in Appendix C specifies which stakeholder category (1 through 5 listed in Figure 3.1-1) each contact falls within.

Figure 3.1-1 Chester County HMP Stakeholder Types



All 73 municipalities in Chester County were considered in the vulnerability assessment and the development of the mitigation strategy to address vulnerabilities. Details on the members of the HMPT are included in Section 3.2 – The Planning Team.

To begin this process, the Chester County Department of Emergency Services hosted an internal kick-off meeting with the contract support to begin the update process on September 6, 2024. This established the Hazard Mitigation Steering Committee (HMSC) to lead the plan update process. During this meeting, attendees reviewed the Hazard Mitigation Planning process, as well as changes to that process and the requirements in FEMA's updated Local Mitigation Planning Policy Guide. Attendees also reviewed the goals and priorities from the 2021 plan update and made additional goals for the 2026 update. These goals and priorities included planning process goals like equity considerations, climate change considerations, and

existing and planned development. For this plan, the County also discussed new goals for full municipality participation and identifying new key stakeholders like the Brandywine Conservancy and the Chester Water Authority. Additionally, the attendees discussed the scheduling of HMSC, HMPT and public meetings and participation for the 2026 update process. Details on this and other meetings are included in Section 3.3 – Meetings and Documentation. Detailed information about stakeholder participation is included in **Section 3.4 – Public and Stakeholder Participation**. The municipal involvement in developing the 2026 HMP Update is detailed in **Section 3.5 – Multi-Jurisdictional Planning**.

The HMPT used several worksheets to gather information from each municipality and participant in the planning process. These worksheets were designed to inform the planning process, from gathering information about the hazards that affected the County and each of the municipalities to updating the mitigation strategy. The use of these forms is detailed in Section **3.3 – Meetings and Documentation** and the submitted forms are included in **Appendix C – Meeting and Other Participation Documentation.**

A Stakeholder Outreach and Engagement Plan was developed for the plan update to clearly identify and document an approach for the planning process. This strategy established methods for ongoing opportunities for input, collaboration, and feedback during the HMP Update. There are two main sections of the strategy. The Plan Participant Identification section focuses on target audiences, HMSC roles and responsibilities, building the HMPT, public involvement and identifying and including underserved communities. The Outreach and Engagement Methods section focuses on key meetings and touchpoints and leveraging different outreach tools. This strategy can be referenced in **Appendix H – Outreach and Engagement Plan.**

The Outreach and Engagement Plan is new to the 2025 planning process, and it significantly informed how outreach was approached. It was intentionally implemented throughout the planning process. Details on how the Outreach and Engagement Plan was implemented through the planning process is documented in **Section 3.2 – The Planning Team, Section 3.3 – Meetings and Documentation, Section 3.4 – Public & Stakeholder Participation, Section 3.5 – Multi-Jurisdictional Planning, and Appendix C – Meeting and Other Participation Documentation.**

3.2. THE PLANNING TEAM

The HMSC was assembled to guide the overall direction of the HMP Update and make day-to-day decisions pertaining to its completion. Table 3.2-1 details the members of the 2026 HMSC.

Table 3.2-1 Chester County Hazard Mitigation Plan Steering Committee (HMSC)

PARTICIPANT	TITLE
CHESTER COUNTY DEPARTMENT OF EMERGENCY SERVICES	
Kelly Tinsman	Deputy Director
Chris Christensen	Planning Coordinator

PARTICIPANT	TITLE
Scott McLaughlin	Health & Human Services Coordinator
MICHAEL BAKER INTERNATIONAL	
Bianca Panunto	Project Manager
Kyle Dool	Lead Planner

While the HMSC led the overall process, they assembled a HMPT that included representatives from Chester County, the Chester County municipalities, and additional stakeholders representing the groups identified in Figure 3.1-1. The stakeholders listed in Table 3.2-2 served on the HMPT and actively participated in the planning process by attending meetings, completing assessment surveys, or submitted comments. Participants representing multiple jurisdictions are listed with each jurisdiction they are affiliated with. Stakeholder and other participation documentation is provided in Appendix C – Meeting and Other Participation Documentation.

All 73 municipalities participated in the hazard mitigation planning process. A wide variety of stakeholders also participated in the process, covering all five types of stakeholders defined in Figure 3.1-1.

Table 3.2-1 HMPT Members

MUNICIPALITY OR ORGANIZATION	PARTICIPANT(S)	STAKEHOLDER TYPE (SEE FIGURE 3.1-1)
MUNICIPALITIES		
Atglen Borough	Cristi Hahn, Beckett Walters	1 & 2
Avondale Borough	Mayor Susan Rzucidlo, Ulises Aguilera	1 & 2
Birmingham Township	Tom Nelling, Michael Pisano	1 & 2
Caln Township	Ray Stackhouse	1 & 2
Charlestown Township	Chris Heleniak	1 & 2
Coatesville City	James Logan, Roberta Cosentino, Peter Huf	1 & 2
Downingtown Borough	Corinne Badman, Matthew Bush	1 & 2
East Bradford Township	Mandie Cantlin	1 & 2
East Brandywine Township	Matthew Vanlew, Derrick Claas	1 & 2
East Caln Township	Michael Obrien, Rich Hicks, Gary Sheridan	1 & 2
East Coventry Township	Jonathan Brackbill, Ray Kolb, Dave Rishel, Eugene C. Briggs, Jr.	1 & 2
East Fallowfield Township	Jim Reagan, Anthony Sirna	1 & 2
East Goshen Township	Derek Davis, Duane Brady Sr.	1 & 2
East Marlborough Township	Robert Clark	1 & 2
East Nantmeal Township	Fred Minahan	1 & 2

MUNICIPALITY OR ORGANIZATION	PARTICIPANT(S)	STAKEHOLDER TYPE (SEE FIGURE 3.1-1)
East Nottingham Township	John Reynolds, Jr.	1 & 2
East Pikeland Township	Michelle Major	1 & 2
East Vincent Township	Jason Mccann, Matthew Williams	1 & 2
East Vincent Township	Jason Mccann, Matthew Williams	1 & 2
East Whiteland Township	Loren Nafziger	1 & 2
Easttown Township	David Wildfeuer, Robert Schnorr, Joe O'leary	1 & 2
Elk Township	Milt Rudy	1 & 2
Elverson Borough	Barclay Hargreaves	1 & 2
Franklin Township	Harold Walls	1 & 2
Highland Township	Ted Jasinski	1 & 2
Honey Brook Borough	Bill Ford	1 & 2
Honey Brook Township	Steve Jones, Warren Obenski	1 & 2
Kennett Square Borough	Sonny Greco	1 & 2
Kennett Township	Theodore Otteni, Alison Dobbins, Kate Morgenstern	1 & 2
London Britain Township	Carolyn Matalon, Ryan Mullin	1 & 2
London Grove Township	Tim Shannon	1 & 2
Londonderry Township	Ted Jasinski	1 & 2
Lower Oxford Township	Deborah Kinney	1 & 2
Malvern Borough	Corinne Badman, Kyle Vaughn	1 & 2
Modena Borough	Jennifer Daywalt	1 & 2
New Garden Township	Kenny Reed, Chris Himes, Robert Weer	1 & 2
New London Township	David Flad	1 & 2
Newlin Township	Rich Hicks	1 & 2
North Coventry Township	Erica Batdorf, Katelyn Collemacine, Ron Contois, Robert Esposito	1 & 2
Oxford Borough	Pauline Garcia-Allen, John Reynolds, Jr., John Schaible	1 & 2
Parkesburg Borough	Scot Kreger	1 & 2
Penn Township	Karen Versuk, Martin Wilson, Ralph Churchill	1 & 2
Pennsbury Township	Michael Pisano, Dan Boyle	1 & 2
Phoenixville Borough	E. Jean Krack, Karin Williams, Eamon Brazunas	1 & 2
Pocopson Township	Neil D. Vaughn, Jordan Marzolf	1 & 2
Sadsbury Township	Tony Przychodzien	1 & 2
Schuylkill Township	Laurie Getz, Rafael Henin	1 & 2
South Coatesville Borough	Chris Corle	1 & 2
South Coventry Township	Amanda Shaner, Alison Tincher	1 & 2

MUNICIPALITY OR ORGANIZATION	PARTICIPANT(S)	STAKEHOLDER TYPE (SEE FIGURE 3.1-1)
Spring City Borough	Kisha Tyler	1 & 2
Thornbury Township	Sandy Lutz, Judy Lizza	1 & 2
Tredyffrin Township	Joseph O'leary, Michael Beaty	1 & 2
Upper Oxford Township	Ted Jasinski	1 & 2
Upper Uwchlan Township	Thomas Jones, Steven Hirsh, Byron Nickerson, Cathy Tomlinson, Tony Scheivert	1 & 2
Uwchlan Township	Bobby Kagel, Tara Giordano, Scott Alexander, Mike Holmes, Jack Corrigan	1 & 2
Valley Township	Joe Sciandra, Kris Lenhart	1 & 2
Wallace Township	Betty Randzin, Steve Senn, Paul Decarlo	1 & 2
Warwick Township	Colleen Patton	1 & 2
West Bradford Township	Dennis Dougherty, Joseph Dell'arciprete	1 & 2
West Brandywine Township	Dale Barnett	1 & 2
West Caln Township	Curt Martinez, Jason Cooper	1 & 2
West Chester Borough	Jon Brill, Donald Anderson, Donald Edwards, Sean Metrick	1 & 2
West Fallowfield Township	Gina Wheler	1 & 2
West Goshen Township	Bryan D. Kulakowsky, Andrea Testa	1 & 2
West Grove Borough	Gary Vinnacombe, Eric Felker, Tyler Simpson	1 & 2
West Marlborough Township	Hugh Lofting, William W. Wylie, Jr.	1 & 2
West Nantmeal Township	Barclay Hargreaves	1 & 2
West Nottingham Township	Ted Jasinski, Robert Russel, John Reynolds, Jr.	1 & 2
West Pikeland Township	Harold Hallman III	1 & 2
West Sadsbury Township	Jason Chapman, Scot Kreger	1 & 2
West Vincent Township	James Gooding	1 & 2
West Whiteland Township	Pamela Gural-Bear, Jennifer Keller , John Weller	1 & 2
Westtown Township	Gerald Dinunzio, L. Mila Carter	1 & 2
Willistown Township	Bill Hagan	1 & 2
NON-MUNICIPAL STAKEHOLDERS		
Alianzas De Phoenixville	Nina Guzman	5
American Red Cross	Lisa McGee, Marty Westerman	5
Berks County Department of	Donnie Swope	3

MUNICIPALITY OR ORGANIZATION	PARTICIPANT(S)	STAKEHOLDER TYPE (SEE FIGURE 3.1-1)
Emergency Services		
Brandywine Conservancy	Grant DeCosta	5
Brandywine Valley Active Aging (BVAA)	Bill Pierce	5
Cecil County, Maryland Department of Emergency Services	Michael Berth	3
Chester County Department of Aging Services	Heidi Carlson	1
Chester County Department of Community Development	Dolores Colligan, Kevin Murphy	2
Chester County Department of Human Services	Pat Bokovitz, Jennifer Brion	1
Chester County Department of Mental Health/Intellectual and Developmental Disabilities	Sarah Hill, Tyree Lewis	1
Chester County Department of Parks and Preservation	Emmett Henry, Patrick Bryan	2
Chester County Drug & Alcohol Services	Timothy Henshaw	1
Chester County First	Dave Miller	5
Chester County HAZMAT Team	Bob Stewart	1
Chester County Health Department	Casey Cummins, Suzanne Curtis, Emma Sharpe	1
Chester County Information & Referral Services	Joshua Bitler	1
Chester County Planning Commission	Carrie Conwell, Rachael Griffith	2
Chester County Veterans Affairs	Susanne Fink	1
Chester County Water Resources Authority	Seung Ah Byun, Kate Hutelmyer, Craig Thomas	1
Chester County Youth Center	Deb Maccariella	5
Downingtown Area	Herbert J. Mays	3

MUNICIPALITY OR ORGANIZATION	PARTICIPANT(S)	STAKEHOLDER TYPE (SEE FIGURE 3.1-1)
Regional Authority		
Downingtown Area School District	Tom Fortmann	4
Downingtown Resilience Fund	Barry Cassidy	5
Elverson-Honey Brook EMS	Matthew Welch	1
FEMA	Stacey Blankin, Matthew McCullough	1
Garage Community and Youth Center	Aaron Smith	5
Goshen EMS	Gary Weigel	1
Green Valleys Watershed Association	Victoria Laubach	5
Housing Partnership of Chester County	Ken Hutton	1
Kennett Area Community Service (KACS)	Leah Reynolds	5
Main Line Health / Paoli Hospital	Armand Alessi	4
Maternal and Child Health Consortium	Ronnie Fitton, Milena Lanz	5
Montgomery County Department of Public Safety	Brian McKown	3
National Alliance on Mental Illness (NAMI) Chester County	Cailey Crusemire, Sara Wein	5
Pennsylvania American Water Co.	Justin Brame	4
Philadelphia Office of Emergency Management	Noah Palau	3
Salvation Army of West Chester	Luke Rodgers	5
Serving, Inspiring, and Loving Others (SILO)	Melissa Pacella	5
Southern Chester County EMS Medic 94	Matt Collins	1
Tredyffrin/Easttown School District	Chris Groppe	4
Unionville-Chadds Ford School District	John Sanville	4
Uwchlan Ambulance	Jason Brooks	1

MUNICIPALITY OR ORGANIZATION	PARTICIPANT(S)	STAKEHOLDER TYPE (SEE FIGURE 3.1-1)
Corps		
Westtown School	Kate Donnelly	4
Westwood EMS	Joe Kennedy	1
White Clay Watershed Association	Shane Morgan	5

3.3. MEETINGS AND DOCUMENTATION

The following meetings were held during the plan update process. Meetings with an asterisk (*) were open to the public. Invitations, agendas, sign-in sheets, and minutes for these meetings are included in **Appendix C – Meeting and Other Participation Documentation**.

September 6, 2024 – Internal Kick-Off Meeting: This meeting was held virtually and was attended by County representatives and the consultant to review the planning process and major milestones including the schedule for HMPT meetings and anticipated HMP submission dates. The group also discussed goals and priorities, project management expectations, and engagement strategies.

October 11, 2024 – Chester County Stormwater Summit: The Stormwater Summit was held by the Chester County Water Resources Authority to convene municipalities and regional stakeholder regarding key flood and stormwater related projects and initiatives. Chester County DES and the consultant attended this meeting to introduce the HMP Update to attendees and advance conversations related to stormwater projects and partnerships. Topics included a Floodplain Management 101 presentation from PEMA, updates on the Brandywine Flood Study from the Brandywine Conservancy, the Chester County HMP Update, and upcoming Act 167 Planning Initiatives.

November 15, 2024 – Chester County Emergency Management Coordinator (EMC) Seminar: Chester County DES held the EMC seminar to provide County updates to EMCs, discuss technical support the County can provide municipalities, and hold a training session for EMCs. The HMSC attended this meeting to introduce the HMP Update to attendees and gather information on municipal and County capabilities.

December 6, 2024, and January 13, 2025 – Planning Team Kick-Off Meetings: County representatives, municipal representatives, regional stakeholders, and the consultant attended these virtual meetings. They included discussion of project scope, schedule, the planning process, roles and responsibilities, participation and engagement, and next steps. Email invitations were sent to each Chester County municipality, as well as other stakeholders spanning the five different types of required stakeholders (see Figure 3.1-1). Meeting attendees were asked to begin completing project forms, check out the project website and provide contact information for other stakeholders that should be included in the planning process.

December 20, 2024 – Meeting with PEMA and FEMA: The HMSC met with PEMA and FEMA to discuss the HMP Update process and timeline. Discussions covered data and considerations for the plan update, special district participation, analysis of substantial flood damage, and resources PEMA and FEMA can provide.

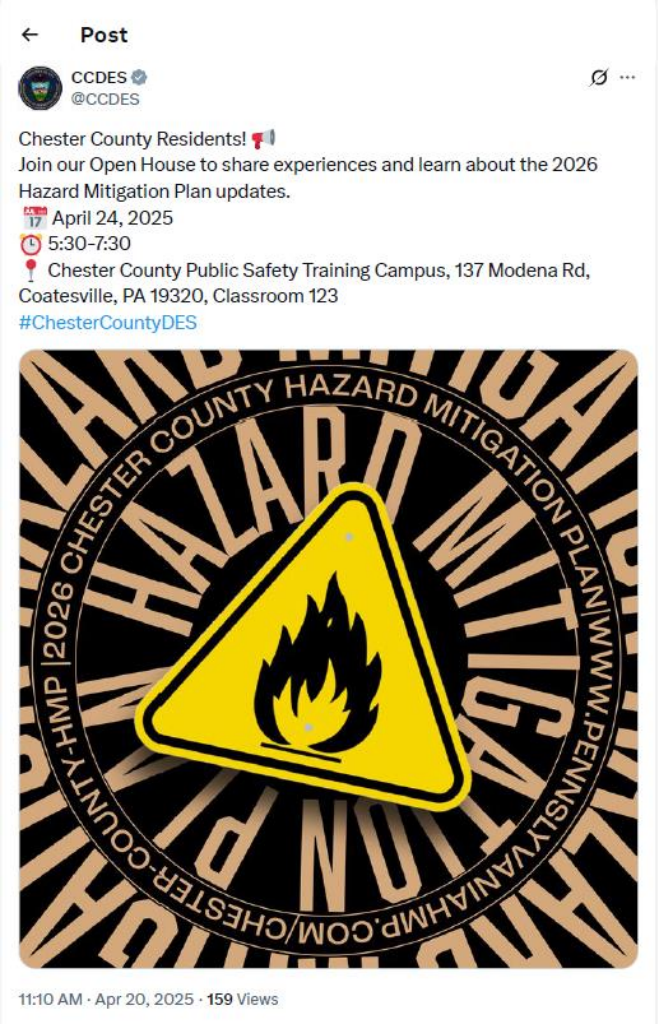
February 24, March 10, and March 13, 2025 – Regional Municipal Workshops: The HMSC hosted four hybrid meetings to solicit feedback from municipal participants for the HMP Update. These were held in different regions of the County to maximize participation. An overview of the 2026 HMP Update project was provided. Then, to provide context to the risk assessment section of the plan, some preliminary findings were presented. Time was taken to review and complete hazard risk forms. A brief overview of the type of information in the capability assessment was provided, which includes an evaluation of planning, regulatory, administrative, technical and financial capabilities, as well as participation in the National Flood Insurance Program (NFIP). Examples of each capability type were discussed. Participants were then provided with Mitigation Action Progress Report Forms so they can report on the status of their mitigation actions from the previous plan. A list of resources was provided for participants to review programs and identify opportunities that may align with their desired mitigation actions. Each meeting ended with a chance for municipalities to ask questions and establish action items for future meetings.

February 24, March 10, and March 13, 2025 – Stakeholder Workshops: Five topic-based stakeholder workshops were held to gather feedback from County and regional stakeholders involved in hazard mitigation, response, and recovery. A brief hybrid kick-off meeting was held on February 24th to introduce stakeholders to the workshop series, and the five hybrid workshops were held over March 10th and 13th. One workshop was held for each of the following topics: flood mitigation, health and human services, infrastructure, volunteer organizations active in disaster (VOADs), and the private sector. These meetings were an opportunity to discuss the populations and groups these organizations work with and the services that these organizations provide. Attendees were asked a series of questions regarding data collection and other analysis resources they use to understand and/or catalogue their risks. They were then asked more specifically about their own capabilities, such as plans, resource limitations, and partnership opportunities they can identify. Finally, they were asked to describe their vulnerabilities to hazards to begin thinking about how they can mitigate them through the development of mitigation actions to include in the plan. Attendees were encouraged to fill out the Non-Municipal Stakeholder Participation Worksheet to provide this information to the project team.

April 24, 2025 – Public Open House*: An open house was held in person to provide an opportunity for the public to review information on the plan, ask questions, and provide feedback. Resources were provided that detailed the hazard mitigation planning process, information on the current update, the schedule for upcoming Draft Plan Review Meetings, and more. A short looping presentation provided a general overview on the hazard mitigation plan and update process. Members of the HMSC attended to field questions and engage in

discussions. The open house was advertised on the project website, the Chester County website and social media accounts, the Chester County Commissioners' weekly newsletter, and County Commissioners' social media accounts. Municipalities spread the word by posting a flyer on their local websites and social media sites. Figure 3.3-1 shows a social media post from Chester County DES advertising the open house. Promotion for the open house is documented in **Appendix C – Meeting and Other Participation Documentation**.

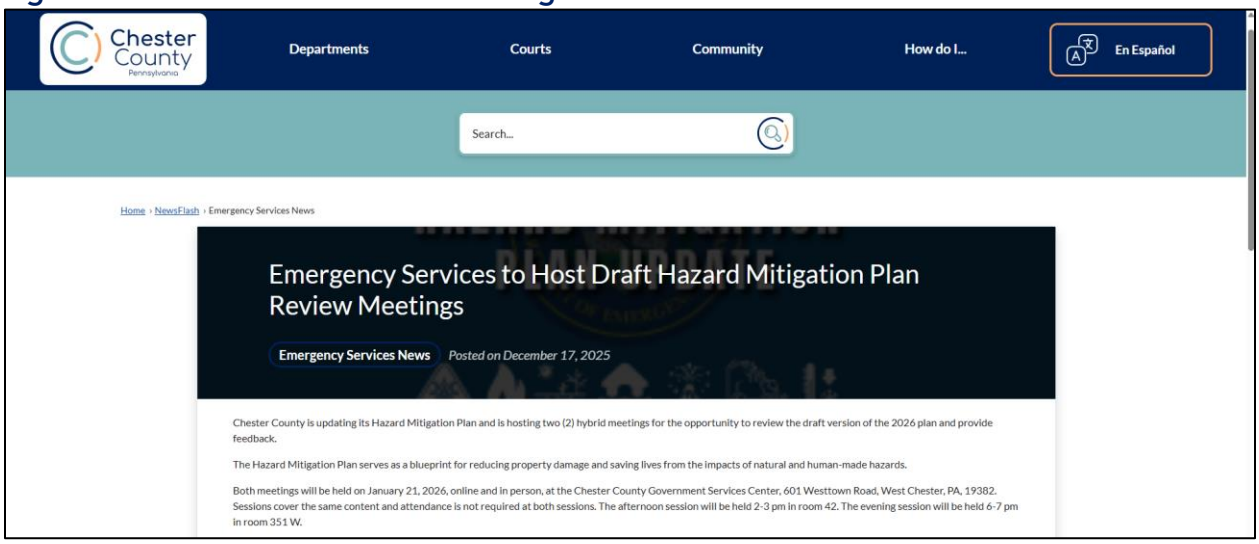
Figure 3.3-1 Social Media Post Advertising the Public Open House



March through July 2025 – Meetings and Calls with Municipalities Still Needing to Participate: Chester County DES worked to encourage participation through targeted phone calls and in-person meetings with municipalities that had not participated in the planning process up to this point. Meetings were focused on discussing the HMP Update process with local officials and working to complete HMP municipal participation forms. Through these phone calls and meetings, Chester County DES encouraged attendance at upcoming meetings and offered opportunities to meet participation requirements. This effort significantly bolstered the number of participating municipalities.

January 21, 2026 – Draft Plan Review Meetings*: Two hybrid virtual and in-person draft plan review meetings were held after the plan update was fully developed. The purpose of these final HMPT and public meetings was to provide information about the update process, evaluation, and findings in the HMP. Additionally, participants learned when and how to review the draft HMP as well as the timeline for the review and submission to PEMA and FEMA. Invitations were emailed to each municipality and stakeholder on the HMPT, as well as to community members who completed the Public Survey. The meetings were noticed on the Chester County website (see Figure 3.3-2). Meeting attendees were asked to provide feedback via the provided digital question/comment form or by sharing via email.

Figure 3.3-2 Draft Plan Review Meeting Website Advertisement



January 23, 2026 through February 22, 2026 – Public Review: The draft 2026 HMP Update was posted to the project website on January 23, 2026, so the public could obtain information about the draft, review the HMP, and ask questions or provide comments and feedback. The availability of planning materials and Draft HMP review were advertised on the project website. A question/comment form was available to provide feedback.

October 2024 – July 2026 – HMSC Meetings: Virtual HMSC meetings were held throughout the update process to review progress on the HMP Update and manage the day-to-day project items and timeline. Meeting topics included engagement activities, municipal and stakeholder participation, resources for the 2026 HMP Update, hazards to include in the 2026 HMP Update, draft plan updates, mitigation goals and objectives, the process for submittal to PEMA and FEMA review, and more.

3.4. PUBLIC AND STAKEHOLDER PARTICIPATION

Stakeholders and the public were given multiple opportunities to participate in the HMP Update process:

- Invitation to meetings listed in Section 3.3. The public was invited to meetings with an asterisk (*).
- Reviewing risk assessment results and mitigation actions.
- Submitting feedback through the Community Hazard Mitigation Survey.
- Commenting on a final draft of the 2026 HMP Update.

Opportunities open to the public were advertised on the project website, on the County's website and through County and municipal social media accounts. The tools listed below were available on the HMP Update website to solicit information, data, and comments from local municipalities, regional stakeholders, and the public in Chester County. These forms were also distributed in-person at the HMPT meetings identified and by email correspondence at different touchpoints throughout the planning process. Responses to these worksheets and surveys are

included in **Appendix C – Meeting and Other Participation Documentation.** Information provided in these forms was incorporated throughout the plan. The sections they informed are outlined in the descriptions below.

Evaluation of Identified Hazards and Risk Worksheet: Collected information from the HMPT on whether there have been changes to the frequency of occurrence, magnitude of impact, or geographic extent of hazards identified in the 2021 Plan. In addition, the form asked respondents to identify any additional hazards they believe should be considered in the 2026 Plan. This form informed **Section 4 – Risk Assessment.**

Jurisdictional Hazard Risk Ranking Form: Collected information on the perceived risk of hazards in each municipality compared to the ranked hazards for the County. Communities listed whether the jurisdictional risk is greater, equal to, or less than the County's risk. This form informed **Section 4 – Risk Assessment.**

Critical Facilities Review Worksheet: Provided an opportunity for municipalities to review the critical facilities identified in their community. Critical facilities were initially collected from state and national datasets. This worksheet allowed for more local and accurate input. This form informed **Section 4 – Risk Assessment, Section 6 – Mitigation Strategy, and Appendix E – Critical Facilities.**

Community Lifelines Form: Collected information on the FEMA Community Lifelines in Chester County. Communities listed assets in their community that fall within the different lifeline categories. This form informed **Section 4 – Risk Assessment, Section 6 – Mitigation Strategy, and Appendix E – Critical Facilities.**

Capability Assessment Survey: Collected information on local planning, regulatory, administrative, technical, fiscal, political, and resiliency capabilities that can be included in the plan's capability assessment. This form informed **Section 5 – Capability Assessment.**

NFIP Survey: Collected community-level NFIP capabilities. This form informed **Section 5 – Capability Assessment.**

Mitigation Action Progress Form: This form is specific to each jurisdiction and included all actions for that jurisdiction in the 2021 HMP. Space was provided to note the status of each action and to document any progress made. This form informed **Section 6 – Mitigation Strategy.**

New Mitigation Action Form: Allowed communities to submit new mitigation actions for the HMP Update. This form collected details about the action, including priority, responsible parties, potential funding sources, implementation timeframe, and more. This form informed **Section 6 – Mitigation Strategy.**

Plan Comment Form: Provided an opportunity for communities and the public to comment on the plan during the review period.

Community participation and comment was encouraged throughout the planning process, particularly through the project website: https://www.pennsylvaniahmp.com/chester-county-hmp. Figure 3.3-2 shows an image of the draft plan meeting announcement on the project website's home page. The website was available at the beginning of the planning process and acted as a document and information repository throughout the planning process. The website houses presentations, agendas, minutes, and worksheets from each meeting as well as promulgated meeting dates and important announcements.

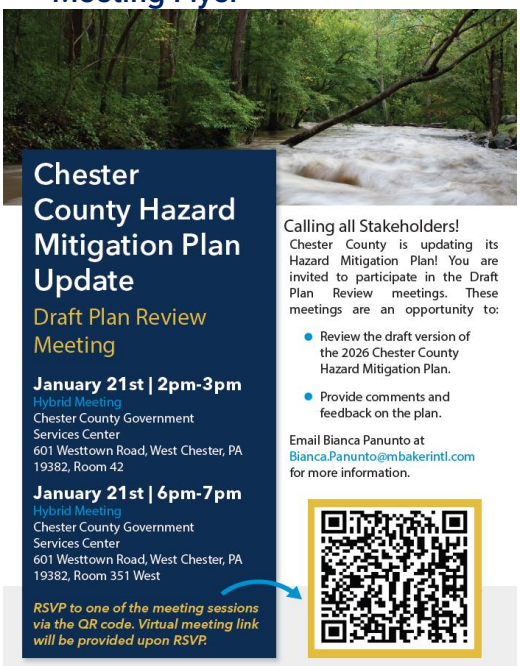
The HMSC also developed a Community Hazard Mitigation Survey intended to solicit public input regarding the understanding of hazard risk. It was posted to the website and shared with communities to post to their social media accounts. Figure 3.4-1 shows the flyer developed by Chester County DES to advertise the public survey. The survey received 1,101 responses while it was open to the public between December 1, 2024, and May 31, 2025. Findings are analyzed in Section 4.4.5 Community Survey.

Chester County posted the 2026 Draft HMP Update on the plan update website (www.pennsylvaniahmp.com/Chester-county-hmp) for review and comment on January 23, 2026 for a 30-day comment period. The invitation to the public to review and comment on the draft plan was posted on the project website and was emailed to local officials with a flyer to share with the public advertising the Draft Plan Review Meetings (Figure 3.4-2). An email was also sent to members of the public who completed the Public Survey and provided their email address in their response (496 people).

Figure 3.4-1 Public Survey Flyer



Figure 3.4-2 Draft Plan Review Meeting Flyer



The HMSC asked commenters to submit comments via the online comment form or to Bianca Panunto, consultant project manager, by email. Copies of all comments received are in **Appendix C – Meeting and Other Participation Documentation.**

3.5. MULTI-JURISDICTIONAL PLANNING

This HMP was developed using a multi-jurisdictional approach. Although County level departments have resources such as technical expertise and data which local jurisdictions may lack, involvement from local municipalities is critical to the collection of local knowledge related to hazard events. Local municipalities also have the legal authority to enforce compliance with land use planning and development issues. The HMSC was committed to getting municipal participation. Table 3.5-1 lists jurisdictional participation in this update. All 73 municipalities participated in the planning process, achieving 100% participation.

To maximize participation, HMPT meetings were held in hybrid format, at different locations throughout the County, and at different days of the week and times of day. Stakeholders were emailed invitations and reminders to all meetings. This included all neighboring counties: Berks County, Delaware County, Lancaster County, Montgomery County, and Philadelphia County in PA, New Castle County, DE, and Cecil County, MD. Surveys and forms were provided at meetings, posted to the project website, emailed, or dropped off in person to jurisdictions. There was also targeted outreach to municipalities through email and phone calls. Forms and materials were shared with municipalities prior to and after each meeting.

Table 3.5-1 2026 Chester County HMP Stakeholder Participation

MUNICIPALITY	COUNTY HMP MEETINGS					WORKSHEETS AND EXERCISES									
	PLAN KICK-OFF MEETINGS	REGIONAL	OPEN HOUSE	DRAFT PLAN REVIEW MEETING	COUNTY PHONE CALLS AND IN-PERSON MEETINGS	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING EVALUATION	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	DRAFT PLAN COMMENT FORM	MISCELLANEOUS WRITTEN FEEDBACK
Atglen Borough	X					X	X		X						
Avondale Borough					X	X	X		X						
Birmingham Township					X	X	X		X	X					
Caln Township					X	X	X		X	X	X	X	X		
Charlestown Township	X					X	X	X	X	X		X			
Coatesville City	X	X				X	X		X						
Downingtown Borough	X	X				X									
East Bradford Township		X				X	X	X	X	X	X	X			
East Brandywine Township	X	X				X	X	X	X	X	X	X	X		
East Caln Township	X	X				X	X	X	X	X	X	X			X
East Coventry Township	X				X	X	X		X	X	X				
East Fallowfield Township			X		X		X					X			
East Goshen Township	X	X				X	X								
East Marlborough Township					X		X								
East Nantmeal Township					X	X	X		X		X				
East Nottingham Township	X	X				X	X		X	X					
East Pikeland Township	X	X				X	X		X						
East Vincent Township	X					X	X		X						
East Whiteland Township	X	X				X	X	X	X	X		X	X		
Easttown Township	X					X	X		X						
Elk Township	X					X	X		X	X					

Table 3.5-1 2026 Chester County HMP Stakeholder Participation

MUNICIPALITY	COUNTY HMP MEETINGS					WORKSHEETS AND EXERCISES									
	PLAN KICK-OFF MEETINGS	REGIONAL	OPEN HOUSE	DRAFT PLAN REVIEW MEETING	COUNTY PHONE CALLS AND IN-PERSON MEETINGS	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING EVALUATION	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	DRAFT PLAN COMMENT FORM	MISCELLANEOUS WRITTEN FEEDBACK
Elverson Borough	X					X	X		X	X					
Franklin Township		X				X	X		X	X	X	X	X		
Highland Township	X	X				X	X								
Honey Brook Borough	X				X	X	X		X	X					
Honey Brook Township		X			X	X	X	X	X	X	X	X			
Kennett Square Borough	X	X				X	X	X	X		X	X			
Kennett Township	X					X	X		X		X				
London Britain Township	X	X				X	X	X	X	X	X				
London Grove Township	X	X				X	X		X			X			
Londonderry Township	X	X				X	X								
Lower Oxford Township					X	X	X		X	X	X				
Malvern Borough		X				X	X		X	X	X				
Modena Borough					X	X			X						
New Garden Township	X	X				X									
New London Township	X	X				X	X		X	X					
Newlin Township		X				X	X	X	X	X	X	X			
North Coventry Township	X					X	X	X	X						
Oxford Borough	X	X					X	X		X		X	X		
Parkesburg Borough					X	X	X		X						
Penn Township		X								X	X				
Pennsbury Township					X	X	X		X	X					

Table 3.5-1 2026 Chester County HMP Stakeholder Participation

MUNICIPALITY	COUNTY HMP MEETINGS					WORKSHEETS AND EXERCISES									
	PLAN KICK-OFF MEETINGS	REGIONAL	OPEN HOUSE	DRAFT PLAN REVIEW MEETING	COUNTY PHONE CALLS AND IN-PERSON MEETINGS	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING EVALUATION	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	DRAFT PLAN COMMENT FORM	MISCELLANEOUS WRITTEN FEEDBACK
Phoenixville Borough	X					X	X		X						
Pocopson Township	X	X	X			X	X	X	X	X	X	X	X		
Sadsbury Township	X					X	X		X				X		
Schuylkill Township	X					X	X		X	X					
South Coatesville Borough					X			X			X	X			
South Coventry Township					X	X									
Spring City Borough	X					X	X	X	X	X	X	X			
Thornbury Township		X				X	X		X	X	X				
Tredyffrin Township	X	X				X	X		X	X					
Upper Oxford Township	X	X				X	X								
Upper Uwchlan Township	X	X	X			X	X		X	X	X	X			
Uwchlan Township	X	X				X	X		X	X	X				
Valley Township	X					X	X		X	X			X		
Wallace Township	X					X	X								
Warwick Township					X	X									
West Bradford Township	X	X				X	X	X	X	X	X	X			
West Brandywine Township	X					X	X								
West Caln Township	X					X	X	X	X	X			X		
West Chester Borough	X	X				X	X	X	X	X	X	X	X		
West Fallowfield Township					X	X	X		X	X	X				
West Goshen Township					X	X	X		X						

Table 3.5-1 2026 Chester County HMP Stakeholder Participation

MUNICIPALITY	COUNTY HMP MEETINGS					WORKSHEETS AND EXERCISES									
	PLAN KICK-OFF MEETINGS	REGIONAL	OPEN HOUSE	DRAFT PLAN REVIEW MEETING	COUNTY PHONE CALLS AND IN-PERSON MEETINGS	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING EVALUATION	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	DRAFT PLAN COMMENT FORM	MISCELLANEOUS WRITTEN FEEDBACK
West Grove Borough		X				X									
West Marlborough Township	X					X	X		X	X	X		X		
West Nantmeal Township	X					X	X		X	X			X		
West Nottingham Township	X	X				X	X								
West Pikeland Township			X			X		X		X		X			
West Sadsbury Township	X				X	X	X		X	X	X		X		
West Vincent Township					X	X	X			X	X				
West Whiteland Township					X	X			X		X		X		
Westtown Township	X					X	X								
Willistown Township		X				X	X	X	X	X	X	X	X		

Table 3.5-2 Chester County HMP Stakeholder Participation

AGENCY / ORGANIZATION	COUNTY HMP MEETINGS					WORKSHEETS AND EXERCISES		
	PLAN KICK-OFF MEETINGS	STAKEHOLDER WORKSHOPS	OPEN HOUSE	DRAFT PLAN REVIEW MEETING	OTHER MEETINGS/ ENGAGEMENT	NON-MUNICIPAL STAKEHOLDER FORM	DRAFT PLAN COMMENT FORM	MISCELLANEOUS WRITTEN FEEDBACK
Alianzas De Phoenixville						X		
American Red Cross	X	X						
Berks County Department of Emergency Services	X							
Brandywine Conservancy		X						
Brandywine Valley Active Aging (BVAA)	X							
Cecil County Maryland Department of Emergency Services	X							
Chester County Department of Aging Services		X				X		
Chester County Department of Community Development	X	X						
Chester County Department of Human Services	X	X						
Chester County Department of Mental Health/Intellectual and Developmental Disabilities		X						
Chester County Department of Parks and Preservation	X							
Chester County Drug & Alcohol Services		X						
Chester County First		X						
Chester County HAZMAT Team	X							
Chester County Health Department	X	X				X		
Chester County Information & Referral Services		X						
Chester County Planning Commission	X	X				X		
Chester County Veterans Affairs		X						
Chester County Water Resources Authority	X	X				X		
Chester County Youth Center		X						
Downingtown Area Regional Authority		X						

Table 3.5-2 Chester County HMP Stakeholder Participation

AGENCY / ORGANIZATION	COUNTY HMP MEETINGS					WORKSHEETS AND EXERCISES		
	PLAN KICK-OFF MEETINGS	STAKEHOLDER WORKSHOPS	OPEN HOUSE	DRAFT PLAN REVIEW MEETING	OTHER MEETINGS/ ENGAGEMENT	NON-MUNICIPAL STAKEHOLDER FORM	DRAFT PLAN COMMENT FORM	MISCELLANEOUS WRITTEN FEEDBACK
Downingtown Area School District	X							
Downingtown Resilience Fund		X				X		
Elverson-Honey Brook EMS	X							
FEMA	X	X						
Garage Community and Youth Center	X							
Goshen EMS	X							
Green Valleys Watershed Association	X							
Housing Partnership of Chester County						X		
Kennett Area Community Service (KACS)	X	X				X		
Main Line Health / Paoli Hospital	X							
Maternal and Child Health Consortium						X		
Montgomery County Department of Public Safety	X							
National Alliance on Mental Illness (NAMI) Chester County	X	X						
Pennsylvania American Water Co.	X							
Philadelphia Office of Emergency Management	X							
Salvation Army of West Chester		X						
Serving, Inspiring, And Loving Others (SILO)		X						
Southern Chester County EMS Medic 94	X							
Tredyffrin/Easttown School District	X							
Unionville-Chadds Ford School District	X							
Uwchlan Ambulance Corps	X							
Westtown School	X							

Table 3.5-2 Chester County HMP Stakeholder Participation

AGENCY / ORGANIZATION	COUNTY HMP MEETINGS					WORKSHEETS AND EXERCISES		
	PLAN KICK-OFF MEETINGS	STAKEHOLDER WORKSHOPS	OPEN HOUSE	DRAFT PLAN REVIEW MEETING	OTHER MEETINGS/ ENGAGEMENT	NON-MUNICIPAL STAKEHOLDER FORM	DRAFT PLAN COMMENT FORM	MISCELLANEOUS WRITTEN FEEDBACK
Westwood EMS	X							
White Clay Watershed Association	X							

4. RISK ASSESSMENT

4.1. UPDATE PROCESS SUMMARY

This risk assessment provides a factual basis for activities proposed by the county in its Mitigation Strategy. Hazards that may affect Chester County are identified and defined in terms of location and geographic extent, magnitude of impact, previous events and likelihood of future occurrence. Information from the previous plan has been included or updated, as appropriate, in this plan update unless otherwise indicated. Chester County's risk assessment is organized into the following sections:

- Section 4.2 outlines the hazard identification process for both natural and human-caused hazards.
- Section 4.3 profiles the hazards of concern (location and extent, range of magnitude, past occurrence, and future occurrence) and assesses vulnerability.
- Section 4.4 summarizes the risk assessment methodology, ranking results, potential losses, and future development and vulnerability.

Hazard profiles in the 2026 HMP include the following Natural and Human-Made Hazards:

- Drought
- Earthquakes
- Extreme Temperatures
- Flood, Flash Flood, & Ice Jam
- Hurricane, Tropical Storm, & Nor'easter
- Invasive Species
- Pandemic & Infectious Disease
- Radon Exposure
- Tornado & Windstorm
- Wildfire
- Winter Storm
- Cyber Terrorism
- Dam Failure
- Environmental Hazards – Gas and Liquid Pipelines
- Environmental Hazards - Hazardous Materials Release
- Nuclear Incidents
- Substance Use Disorder
- Terrorism
- Transportation Incidents
- Urban Fire and Explosion
- Utility Interruption

The Steering Committee and Planning Team evaluated the hazards identified in the 2021 HMP by examining the events that have taken place in the county since the last plan update and by reviewing the Commonwealth's 2023 HMP. For consistency, a number of hazards were renamed to match the state's hazard list: "Opioid Epidemic" became "Substance Use Disorder"; "Pandemic" became "Pandemic and Infectious Disease," and "Transportation Accidents" became "Transportation Incidents." "Structural Fires" became "Urban Fire and Explosion," and "Utility Failure" became "Utility Interruption." Finally, the "Environmental Hazards" and "Pipeline Incidents" sections were changed to the "Environmental Hazards – Hazardous Material Release" and "Environmental Hazards – Gas and Liquid Pipelines."

Then, the Steering Committee and Planning Team added their perspective via Evaluation of Identified Hazards and Risk Worksheet. The worksheet listed hazards profiled in the 2021 HMP and requested that participants identify whether the frequency of occurrence, magnitude of

impact, and/or geographic extent of each hazard increased, decreased, or did not change since the 2021 HMP. The worksheet also provided the opportunity to assess hazards not profiled in

the 2021 HMP to determine if any should be included as part of the update. The Steering Committee reviewed responses to identify a list of hazards to profile in the 2026 HMP. Appendix H includes copies of the completed worksheets.

For this plan update, each profile has two new subsections. One discusses the effect of climate change on vulnerability. The second is an "Equity in Vulnerable Communities" section, which expands on how certain socioeconomic factors can result in hazards having a disproportionate impact on certain populations or communities. This assessment allows the County and its municipalities to focus mitigation and preparedness efforts by allocating resources more fairly, improving emergency responses, and enhancing overall community resilience.



Finally, each hazard profile now identifies the community lifelines that may be affected by each hazard. The community lifelines are defined in Figure 2.6-1 and listed to the right. Appendix E – Critical Facilities and Community Lifelines also includes insights from the Community Lifelines Forms that were completed by communities. The appendix includes a table for each lifeline listing the assets that were identified as being a part of each lifeline per municipality.

4.2. HAZARD IDENTIFICATION

4.2.1. Presidential Disaster Declarations

This section summarizes previous disaster and emergency declarations related to Chester County's hazards of concern.

In evaluating hazards for inclusion in the 2026 HMP, the Steering Committee and Planning Team reviewed recent information and historical records from a wide range of sources. This section discusses the Presidential Disaster and Emergency Declarations, Gubernatorial Disaster Declarations or Proclamations, and Small Business Administration Disaster Declarations on record that have affected Chester County.

Presidential Disaster and Emergency Declarations are issued when it has been determined that state and local governments need assistance in responding to a disaster event. Since 1955, declarations have been issued for hazard events, including hurricanes or tropical storms, severe

winter storms, and flooding. A unique Presidential Emergency Declaration, Emergency Declaration 3235, was issued in September 2005. Through this declaration, President George W. Bush declared a state of emergency for the Commonwealth of Pennsylvania and ordered federal aid to supplement Commonwealth and local response efforts to help people evacuate from their homes due to Hurricane Katrina, though the Commonwealth was not directly impacted by Hurricane Katrina.

Table 4.2.1-1 identifies Presidential Disaster and Emergency Declarations issued between 1955 through 2025 that have affected Chester County. After the publication of this plan, newer declarations can be found on FEMA's website at: https://www.fema.gov/disasters/disaster-declarations.

Table 4.2.1-1 Presidential Disaster and Emergency Declarations for Chester County.

DECLARATION NUMBER	DATE	TYPE	EVENT
4618	9/10/2021	Major Disaster Declaration	Remnants of Hurricane Ida
3441	3/13/2020	Emergency Declaration	COVID-19
4506	3/30/2020	Major Disaster Declaration	COVID-19 Pandemic
4267	3/23/2016	Major Disaster Declaration	Severe Winter Storm and Snowstorm
3367	2/6/2014	Emergency Declaration	Severe Winter Storm
3356	10/29/2012	Emergency Declaration	Hurricane Sandy
3339	8/29/2011	Emergency Declaration	Hurricane Irene
4025	9/3/2011	Major Disaster Declaration	Hurricane Irene
3340	9/8/2011	Emergency Declaration	Remnants of Tropical Storm Lee
4030	9/12/2011	Major Disaster Declaration	Tropical Storm Lee
1898	4/16/2010	Major Disaster Declaration	Severe Winter Storms and Snowstorms
1649	6/30/2006	Major Disaster Declaration	Severe Storms, Flooding, and Mudslides
3235	9/10/2005	Emergency Declaration	Hurricane Katrina
1557	9/19/2004	Major Disaster Declaration	Tropical Depression Ivan
1555	9/19/2004	Major Disaster Declaration	Severe Storms and Flooding associated with Tropical Depression Frances
3180	3/14/2003	Emergency Declaration	Snow
1497	9/26/2003	Major Disaster Declaration	Tropical Storms Henri and Isabel and Related Severe Storms and Flooding
1485	8/23/2003	Major Disaster Declaration	Severe Storms, Tornadoes, and Flooding
1294	9/18/1999	Major Disaster Declaration	Hurricane Floyd Major Disaster Declarations
1085	1/13/1996	Major Disaster Declaration	Blizzard of 96
1093	1/21/1996	Major Disaster Declaration	Severe Storms and Flooding

Table 4.2.1-1 Presidential Disaster and Emergency Declarations for Chester County.

DECLARATION NUMBER	DATE	TYPE	EVENT
1015	3/10/1994	Major Disaster Declaration	Severe Winter Storms
3105	3/16/1993	Emergency Declaration	Severe Snowfall & Winter Storm
400	7/17/1973	Major Disaster Declaration	Severe Storms and Flooding
340	6/23/1972	Major Disaster Declaration	Tropical Storm Agnes
312	9/18/1971	Major Disaster Declaration	Floods
206	8/18/1965	Major Disaster Declaration	Water Shortage
89	1/23/1959	Major Disaster Declaration	Floods
61	8/9/1956	Major Disaster Declaration	Storm
58	5/21/1956	Major Disaster Declaration	Severe Storm
51	3/15/1956	Major Disaster Declaration	Flood
40	8/20/1955	Major Disaster Declaration	Floods and Rains

In addition to these Presidentially declared events, some events warranted Gubernatorial Disaster Declarations or Proclamations that included Chester County. Table 4.2.1-2 lists these Proclamations that have been issued for the Commonwealth of Pennsylvania and that have impacted Chester County between 2018 and 2025.

These proclamations and declarations occurring after 2025 can be found on the Pennsylvania

Table 4.2.1-2 Gubernatorial Disaster Declarations or Proclamations affecting Chester County.

DATE	EVENT	DESCRIPTION
August 9, 2024	Tropical Storm Debby	Heavy rain event causing severe flooding.
April 15, 2021	Civil Disturbance	Political and social disturbances in response to the murder of George Floyd.
February 1, 2021	Winter Storm	Severe winter weather event causing dangerous conditions including snow, ice accumulation, and high winds.
December 15, 2020	Winter Storm	Severe winter weather event causing snow, ice accumulation, and flooding.
August 31, 2021	Hurricane Ida	Heavy rainfall event causing threat of flooding and flash flooding.
March 6, 2020	COVID-19	Public health emergency caused by the outbreak of the COVID-19 spread to the United States.
January 18, 2019	Winter Storm	Severe winter weather event causing snow, ice accumulation, and flooding.
August 17, 2018	Storm	Slow-moving storms caused record-breaking rainfall and subsequent flooding.
January 10, 2018	Opioid Crisis	Public health emergency identifying opioid overdoses, deaths, and emergencies in a state of disaster.

Chester County has also received Small Business Administration Disaster Assistance for a number of disaster events. A Small Business Administration Disaster Declaration qualifies communities for affordable, timely, and accessible financial assistance. Table 4.2.1-3 lists Small Business Administration Disaster Declarations issued for Chester County from 1989 through 2025 (PEMA 2020), in addition those declarations for which Chester County was included as an adjacent county.

Table 4.2.1-3 Small Business Administration Disaster Declarations affecting Chester County.

DATE	EVENT
August 2024	Tropical Storm Debby
August 2024	Flooding, Flash Flooding, and Rain

4.2.2. Summary of Hazards

Based on all available information and input from the municipalities and the process described in Section 4.1, the Steering Committee and Planning Team selected the following natural and non-natural hazards for consideration in this plan:

Natural Hazards:

- Drought
- Earthquakes
- Extreme Temperatures
- Flood, Flash Flood, & Ice Jam
- Hurricane, Tropical Storm, & Nor'easter
- Invasive Species
- Pandemic & Infectious Disease
- Radon Exposure
- Tornado & Windstorm
- Wildfire
- Winter Storm

Human-made Hazards:

- Cyber-Terrorism
- Dam Failure
- Environmental Hazards – Gas and Liquid Pipelines
- Environmental Hazards - Hazardous Materials Release
- Nuclear Incidents
- Substance Use Disorder
- Terrorism
- Transportation Incidents
- Urban Fire and Explosion
- Utility Interruption

These hazards have been profiled individually in Section 4.3 of this plan.

Table 4.2.2-1 List and description of natural and manmade hazards profiled in the 2020 hazard mitigation plan update. (PA 2020 Standard Operating Guide)

HAZARD	HAZARD DESCRIPTION
NATURAL HAZARDS	
	Drought is defined as a deficiency of precipitation experienced over an extended period of time, usually a season or more. Droughts increase the risk of other hazards, like wildfires, flash floods, and landslides or debris flows. This hazard is of particular concern in Pennsylvania due to the prevalence of farms and other water-dependent industries, water-dependent recreation uses, and residents who depend on wells for drinking water. (National Drought Mitigation Center, 2025; Ready.gov 2025).
	An earthquake is the motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons and disrupt the social and economic functioning of the affected area (Ready.gov, 2025).
	Extreme heat often results in the highest number of annual deaths of all weather-related hazards. In most of the United States, extreme heat is defined as a long period (2 to 3 days) of high heat and humidity with temperatures above 90 degrees. (Ready.gov, 2018). Extremely cold air comes every winter in at least part of the country and affects millions of people across the United States. The arctic air, together with brisk winds, can lead to dangerously cold wind chill values. People exposed to extreme cold are susceptible to frostbite and hypothermia in a matter of minutes (Ready.gov, 2025).
	Flooding is the temporary condition of partial or complete inundation of normally dry land, and it is the most frequent and costly of all natural hazards in Pennsylvania (PEMA, 2020). Flash flooding is usually a result of heavy localized precipitation falling in a short time period over a given location, often along mountain streams and in urban areas where much of the ground is covered by impervious surfaces. Winter flooding can include ice jams which occur when warm temperatures and heavy rain cause snow to melt rapidly. Snow melt combined with heavy rains can cause frozen rivers to swell, which breaks the ice layer on top of a river. The ice layer often breaks into large chunks, which float downstream, piling up in narrow passages and near other obstructions such as bridges and dams. (NESEC, 2025).
	Hurricanes, tropical storms, and nor'easters are classified as cyclones and are any closed circulation developing around a low-pressure center in which the winds rotate counterclockwise (in the Northern Hemisphere) and whose diameter averages 10-30 miles across. Potential threats from hurricanes include powerful winds, heavy rainfall, storm surges, coastal and inland flooding, rip currents, tornadoes, and landslides. In inland areas like Chester County, the primary concerns are wind, heavy rainfall and flooding. The Atlantic hurricane season runs from June 1 to November 30. (Ready.gov, 2025).

HAZARD	HAZARD DESCRIPTION
	An invasive species is a species that is not indigenous to the ecosystem under consideration and whose introduction causes or is likely to cause economic, environmental, or human harm. These species can be any type of organism: amphibian, plant, fish, invertebrate, mammal, bird, disease, or pathogen. The magnitude of an invasive species threat is generally amplified when the ecosystem or host species is already stressed, such as in times of drought or after a wildfire, as the already weakened state of the native ecosystem causes it to succumb to an infestation more easily (Flory, et. al, 2022).
	A pandemic is a global outbreak of disease that occurs when a new virus emerges in the human population, spreading easily in a sustained manner, and causing serious illness. An epidemic describes a smaller-scale infectious outbreak, within a region or population, that emerges at a disproportional rate. Infectious disease outbreaks may be widely dispersed geographically, impact large numbers of the population, and could arrive in waves lasting several months at a time. (FEMA, 2025).
	Radon is a radioactive gas produced by the breakdown of uranium in soil and rock that can lead to lung cancer in people exposed over a long period of time. Most exposure comes from breathing in radon gas that enters homes and buildings through foundation cracks and other openings. According to the DEP, approximately 40% of Pennsylvania homes have elevated radon levels (PA DEP, 2025c).
	A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. About 1,250 tornadoes hit the U.S. each year, with about 16 hitting Pennsylvania. Damaging winds exceeding 50-60 miles per hour can occur during tornadoes, severe thunderstorms, winter storms, or coastal storms. These winds can have severe impacts on buildings, pulling off the roof covering, roof deck, or wall siding and pushing or pulling off the windows (NOAA, 2025).
	A wildfire is an unplanned fire that burns in a natural area. Wildfires can cause injuries or death and can ruin homes in their path. Wildfires can be caused by humans or lightning, and can happen anytime, though the risk increases in period of little rain. In Pennsylvania, 98% of wildfires are caused by people (Ready.gov, 2025 and PA DCNR, 2025).

HAZARD	HAZARD DESCRIPTION
	A winter storm is a storm in which the main types of precipitation are snow, sleet, or freezing rain. A winter storm can range from a moderate snowfall or ice event over a period of a few hours to blizzard conditions with wind-driven snow that lasts for several days. Most deaths from winter storms are not directly related to the storm itself, but result from traffic accidents on icy roads, medical emergencies while shoveling snow, or hypothermia from prolonged exposure to cold. (NOAA, 2025).
HUMAN MADE HAZARDS	
	Cyber terrorism refers to acts of terrorism committed using computers, networks, and the Internet. The most widely cited definition comes from Denning's Testimony before the Special Oversight Panel on Terrorism: "Cyberterrorism…is generally understood to mean unlawful attacks and threats of attack against computers, networks, and the information stored therein when done to intimidate or coerce a government or its people in furtherance of political or social objectives. Further, to qualify as cyberterrorism, an attack should result in violence against persons or property, or at least cause enough harm to generate fear" (Denning, 2000).
	Dam failure is the uncontrolled release of water (and any associated wastes) from a dam. This hazard often results from a combination of natural and human causes, and can follow other hazards such as hurricanes, earthquakes, and landslides. The consequences of dam failures can include property and environmental damage and loss of life (ASDSO, 2025).
	Pipeline failures are low-probability, potentially high-consequence events. Although gas and liquid pipeline failures are infrequent, the hazardous and inflammable materials released by these events can pose a significant threat to public safety and the built and natural environment. Explosions associated with pipeline failures, for example, can cause severe injury to nearby residents and destroy homes and other property.
	Hazardous material releases can contaminate air, water, and soils and have the potential to cause injury or death. Dispersion can take place rapidly when transported by water and wind. While often accidental, releases can occur because of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary events (PA DEP, 2025b).

HAZARD	HAZARD DESCRIPTION
	Nuclear incidents can cause significant damage and casualties from blast, heat, and radiation. The primary concern following a nuclear accident or nuclear attack is the extent of radiation, inhalation, and ingestion of radioactive isotopes which can cause acute health effects (e.g. death, burns, severe impairment), chronic health effects (e.g. cancer), and psychological effects (EPA, 2025; Ready.gov, 2025).
	Substance Use Disorder occurs when an individual becomes physically dependent on opioids, which include opiates and narcotics. Opioids are a synthetic substance found in certain prescription pain medications: morphine, codeine, methadone, oxycodone, hydrocodone, fentanyl, and hydromorphone, and street drugs like heroin. Opioids block the body's ability to feel pain and can create a sense of euphoria. Individuals often build a tolerance to opioid drugs, which leads them to take more of the medication than originally prescribed (Pennsylvania Department of Drug and Alcohol Programs, 2025).
	Terrorism can be defined by two categories: international terrorism, which are violent, criminal acts committed by individuals and/or groups who are inspired by, or associated with, designated foreign terrorist organizations or nations (state-sponsored) or domestic terrorism, which are violent, criminal acts committed by individuals and/or groups to further ideological goals stemming from domestic influences, such as those of a political, religious, social, racial, or environmental nature (FBI, 2025).
	Transportation incidents are manmade hazards involving the nation's system of land, sea, and air transportation infrastructure. A flaw or breakdown in any component of this system can and often does result in a major disaster involving loss of life, injuries, property and environmental damage, and economic consequences (FEMA, 2018). For Chester County, the primary concerns are vehicular, rail, and air travel incidents.
	Urban fire and explosion hazards include 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. Cooking was the leading cause of fire to residential buildings in 2023, causing 48.7% of reported fires in 2023 (US Fire Administration, 2023).

HAZARD	HAZARD DESCRIPTION
	Utility interruption hazards are hazards that impair the functioning of important utilities in the energy, telecommunications, public works, and information network sectors. Utility interruption hazards include the following: • Geomagnetic Storms • Fuel or Resource Shortage • Electromagnetic Pulse • Information Technology Failure • Ancillary Support Equipment • Public Works Failure • Telecommunications System Failure • Transmission Facility or Linear Utility Accident • Major Energy, Power, Utility Failure (Bonner, 2017)

4.3. HAZARD PROFILES AND VULNERABILITY ANALYSIS
NATURAL HAZARDS

4.3.1. Drought



4.3.1.1. Location and Extent

Drought is defined as the consequence of a natural reduction in the amount of precipitation expected over an extended period, usually a season or more in length. Droughts are regional climatic events, so they typically impact all communities in a relatively uniform fashion with only minor localized variations in rainfall events. Droughts often occur across county boundaries, affecting large areas of Pennsylvania at the same time. Therefore, a drought would affect all of Chester County, with the largest impact being on areas of the County with extensive agricultural uses.

Locations of droughts nationwide are monitored continuously by USGS, and the PA DEP monitors conditions throughout the state. Maps showing locations currently experiencing drought conditions are posted on various websites (including http://waterwatch.usgs.gov) and show locations where stream flow is below normal and where drought conditions exist or are emerging. As this plan was being developed in 2025, several locations in Pennsylvania were experiencing drought.

Water supplies are vulnerable to effects of drought and thus can impact the severity of a drought, particularly at locations where citizens rely on wells for drinking water. Residents depending on well water can more easily handle short-term droughts without major inconveniences than can populations that rely on surface water. However, longer-term droughts inhibit groundwater aquifers from recharging and can thus extend the problems of well owners for an indeterminate amount of time. Chester County residents who depend on private domestic wells have this greater "hidden vulnerability" to droughts. According to the Pennsylvania Department of Environmental Protection, the 2022 average daily domestic self-supplied groundwater withdrawals of fresh water in Chester County was 14.36 million gallons (Mgal) per day (PADEP, 2024).

Table 4.3.1-6, located in Section 4.3.1.5, lists the number of reported domestic wells within each municipality of Chester County. Well data was obtained from the Pennsylvania Groundwater Information System (PaGWIS). PaGWIS is maintained by PA DCNR and relies on voluntary submissions of well record data by well drillers; as a result, it is not a complete database of all domestic wells in the county. It is, however, the most complete dataset of domestic wells available.

In addition to domestic wells in the county, some residents also receive their water from municipal water providers. There are 16 water purveyors providing water to residents in the County. Primary water sources include Octorara and Schuylkill Rivers, the east and west branches of the Brandywine Creek, and Pickering Creek. AQUA Pennsylvania Inc. is the largest public water provider, with private wells being the second most common water source for

County residents. Additional municipal water providers include Pennsylvania-American Water Company and Chester Water Authority.

Jurisdictions designated for agricultural use are particularly vulnerable to drought. Agriculture is over one-third of all land used in the county. A total of 1,267 acres of land in the county needs to be irrigated (USDA, 2022). In Chester County, the following municipalities have large portions zoned for agricultural use: Elk Township, Highland Township, Honey Brook Township, Londonderry Township, Upper Oxford Township, West Caln Township, and West Fallowfield Township. Areas designated for agricultural use are illustrated in Figure 2.5-2 in Section 2.

4.3.1.2. Range of Magnitude

Droughts can have varying effects, depending on the month in which they occur, as well as the severity, duration, and location of the event. Even short-term droughts can be devastating, especially in conjunction with extreme temperatures.

Hydrologic drought events result in a reduction of stream flows, reduction of lake/reservoir storage, and a lowering of groundwater levels. These events have adverse impacts on public 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, conditions conducive to wildfire events, and water for navigation and recreation.

The Commonwealth uses five parameters to assess drought conditions:

1. Stream flows compared to benchmark records.
2. Precipitation, measured as the departure from normal, 30-year average precipitation.
3. Reservoir storage levels in a variety of locations.
4. Groundwater elevations in a number of counties, comparing to past month, past year, and historic record.
5. The Palmer Drought Severity Index (PDSI), a soil moisture algorithm calibrated for relatively homogeneous regions which measures dryness based on recent precipitation and temperature (see Table 4.3.1-1).

The Palmer Drought Severity Index (PDSI) is used to describe abnormally wet to abnormally dry conditions. Zero represents normal rainfall and temperature conditions; drought condition indices are described in the table below.

Table 4.3.1-1 Palmer Drought Severity Index (PSDI) Classifications (NOAA, 2005)

INDEX	DESCRIPTION OF CONDITIONS
4.0 or more	Extremely moist
3.0 to 3.9	Very moist spell
2.0 to 2.9	Unusual moist spell
-1.9 to 1.9	Near normal
-2.0 to -2.9	Moderate drought
-3.0 to -3.9	Severe drought
-4.0 or less	Extreme drought

PADEP and Pennsylvania Emergency Management Agency (PEMA) manage water supply droughts according to the following four conditions of drought, as defined in the Commonwealth of Pennsylvania 2023 Standard Hazard Mitigation Plan (PA HMP):

- Drought Watch: This is a period to alert government agencies, public water suppliers, water users, and the public regarding potential for future drought-related problems. The focus is on increased monitoring, awareness, and preparation for response in the event that conditions worsen. A request for voluntary water conservation is issued with the objective of reducing water use by 5-10 percent within the affected areas. Because of varying conditions, individual water suppliers or municipalities may propose more stringent conservation actions.
- Drought Warning: This is a drought stage involving a coordinated response to imminent drought conditions and potential water supply shortages through concerted voluntary conservation measures to avoid or reduce shortages, relieve stressed sources, develop new sources, and, if possible, forestall the need to impose mandatory water use restrictions. The objective of voluntary water conservation measures during a drought warning is to reduce overall water use by 10 to 15 percent within the affected areas. Because of varying conditions, individual water suppliers or municipalities may propose more stringent conservation actions.
- Drought Emergency: During this drought stage, water management entities assemble all available resources to respond to actual emergency conditions, avoid depletion of water sources, ensure at least minimum water supplies are available to protect public health and safety, support essential and high- priority water uses, and avoid unnecessary economic upsets. If deemed necessary and if ordered by the Governor during this stage, imposition of mandatory restrictions on nonessential water usage could occur as provided for in 4 Pa. Code Chapter 119. Objectives of water use restrictions (mandatory or voluntary) and other conservation measures during a drought emergency are to reduce consumptive water use within the affected areas by up to 25 percent, and to reduce total use to the extent necessary to preserve public water system supplies, avoid or mitigate local or area shortages, and ensure equitable sharing of limited supplies.
- Local Water Rationing: This fourth condition of drought is not defined as a drought stage. Local municipalities may, with the approval of the PEMA Council, implement local

water rationing to share a rapidly dwindling or severely depleted water supply within designated service areas. These individual water rationing plans, authorized through provisions of 4 Pa. Code Chapter 120, 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 practices, procedures are specified for granting variances in consideration of individual hardships and economic dislocations (PEMA, 2023).

Availability and management of water supply are discussed in the 2022 Pennsylvania State Water Plan, a joint effort by the Statewide Water Resources Committee and PADEP. In 2022, the PADEP Secretary approved an updated State Water Plan to guide management of Pennsylvania's water resources over a 15-year planning horizon. As a functional planning tool for all Pennsylvania municipalities, counties, and regional planning partnerships, the State Water Plan profiles drought and resource constraints and encourages implementation of new technology and use policies to facilitate reduced water uses and resource demands at critical peak times. The State Water Plan provides inventories of water availability, and an assessment of current and future water use demands and trends. It also offers strategies for improving management of water resources and waterway corridors that aim to reduce damage from extreme drought and flooding conditions (PA DEP, 2022). In 2023, it was reported that an average of 29 million gallons per day was produced from two prominent sources: the Octoraro Reservoir and the Susquehanna River. (Chester County Water Resources Authority, 2023).

Environmental impacts of drought include:

- Hydrologic effects: Lower water levels in reservoirs, lakes, and ponds; reduced streamflow; loss of wetlands; estuarine impacts; groundwater depletion and land subsidence; effects on water quality such as increases in salt concentration and water temperature.
- Damage to 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 fires.
- Reduced soil quality.
- Air quality effects such as dust and pollutants.
- Loss of quality in landscape.
- Loss of water for navigation and recreation.
- Increase in nitrate levels which can have health impacts on pregnant women and children.

These impacts vary depending on drought severity, timing, duration, and location. Some droughts may exert their greatest impact on agriculture, while others may have stronger effects

on water supply or recreational activities. Droughts can adversely affect the following significantly:

- Public water supplies for human consumption
- Rural water supplies for livestock consumption and agricultural operations
- Water quality
- Natural soil water or irrigation water for agriculture
- Water for forests and for fighting forest fires
- Water for navigation and recreation

Drought and water supply deficiencies can also affect many sectors of the economy and can reach beyond an area undergoing physical drought. Because water is essential for producing goods and providing services, drought can reduce crop yield, increase fire hazard, lower water levels, and damage wildlife and fish habitats. Further consequences include reductions in crop yields, rangeland, and forest productivity that may lower incomes of farmers and agribusinesses; increase in prices of food and timber; increase in unemployment; reduction of tax revenues as expenditures decline; increase in crime, foreclosures, and migration; and depletion of disaster relief funds. The many impacts of drought can be categorized as economic, environmental, or social. Community lifelines most impacted by droughts are listed in Table 4.3.1-2.

The potential impacts of drought on community lifelines are as follows:

Table 4.3.1-2 Most Likely Lifelines Impacted by Drought

LIFELINES	NOTES
	Drought will require significant personnel in response, and some in recovery, and mitigation.
	Crops may be lost and there are water regulation concerns.
	Food and water shortages could exacerbate health challenges, especially for food-vulnerable populations.

4.3.1.3. Past Occurrence

Historical information has been drawn from many sources regarding previous occurrences and losses associated with drought events throughout Pennsylvania and Chester County. Note that loss and impact information pertaining to many events can vary depending on the source. Therefore, accuracy of cited monetary values is based only on the available information identified during research for this plan.

Declared drought status for Chester County from November 1980 to July 2025 is listed in Table 4.3.1-3. Descriptions for drought status categories (i.e. watch, warning, and emergency) are included in Section 4.3.1.2. Between 1930 and 2025, the Commonwealth of Pennsylvania experienced seven significant droughts extending from 1930-1934, 1939-1942, 1953-1955, 1961-1967, 1980-1983, 1991-1992 and 1999-2003. These were considered emergency events. The 1980-1983 event resulted in $196,000,000 in damages to crops across the Commonwealth. Below average rainfall created water shortages in many municipalities in 1988, 1989, 1991, 1995, 1998, and early 1999. In addition to these events, between 1980 and 2025, PADEP indicated that Chester County has undergone 21 drought watch declarations, 18 drought warning declarations, and 14 drought emergency declarations (PADEP, 2025a).

Table 4.3.1-3 Drought Status for Chester County from 1980 to 2025 (PA DEP, 2025a).

DATE	DROUGHT STATUS
November 18, 1980 – April 20, 1982	Emergency
November 10, 1982- March 28, 1983	Warning
January 23, 1985 – April 26, 1985	Warning
April 26, 1985 – December 19, 1985	Emergency
July 7, 1988 – December 12, 1988	Watch
March 3, 1989 – May 15, 1989	Warning
September 13, 1991 – June 23, 1992	Warning
June 23, 1992 – January 15, 1993	Watch
September 1, 1995 – September 20, 1995	Warning
September 20, 1995 – December 18, 1995	Emergency
October 27, 1997 – January 16, 1998	Warning
January 16, 1998 – Spring 1998	Watch
December 3, 1998 – December 14, 1998	Watch
December 14, 1998 – March 15, 1999	Warning
March 15, 1999 – June 10, 1999	Watch
June 10, 1999 – July 20, 1999	Warning
July 20, 1999 – September 30, 1999	Emergency
September 30, 1999 – May 5, 2000	Watch
August 24, 2001 – November 6, 2001	Watch
November 6, 2001 – February 12, 2002	Warning
February 12, 2002 – December 19, 2002	Emergency
December 19, 2002 – January 8, 2003	Watch
April 11, 2006 – June 30, 2006	Watch
October 5, 2007 – January 11, 2008	Watch
September 16, 2010 – November 10, 2010	Watch
August 5, 2011 – September 2, 2011	Watch
September 6, 2016 – April 6, 2017	Watch
June 15, 2023 – October 20, 2023	Watch
November 1, 2024 – July 2, 2025	Watch

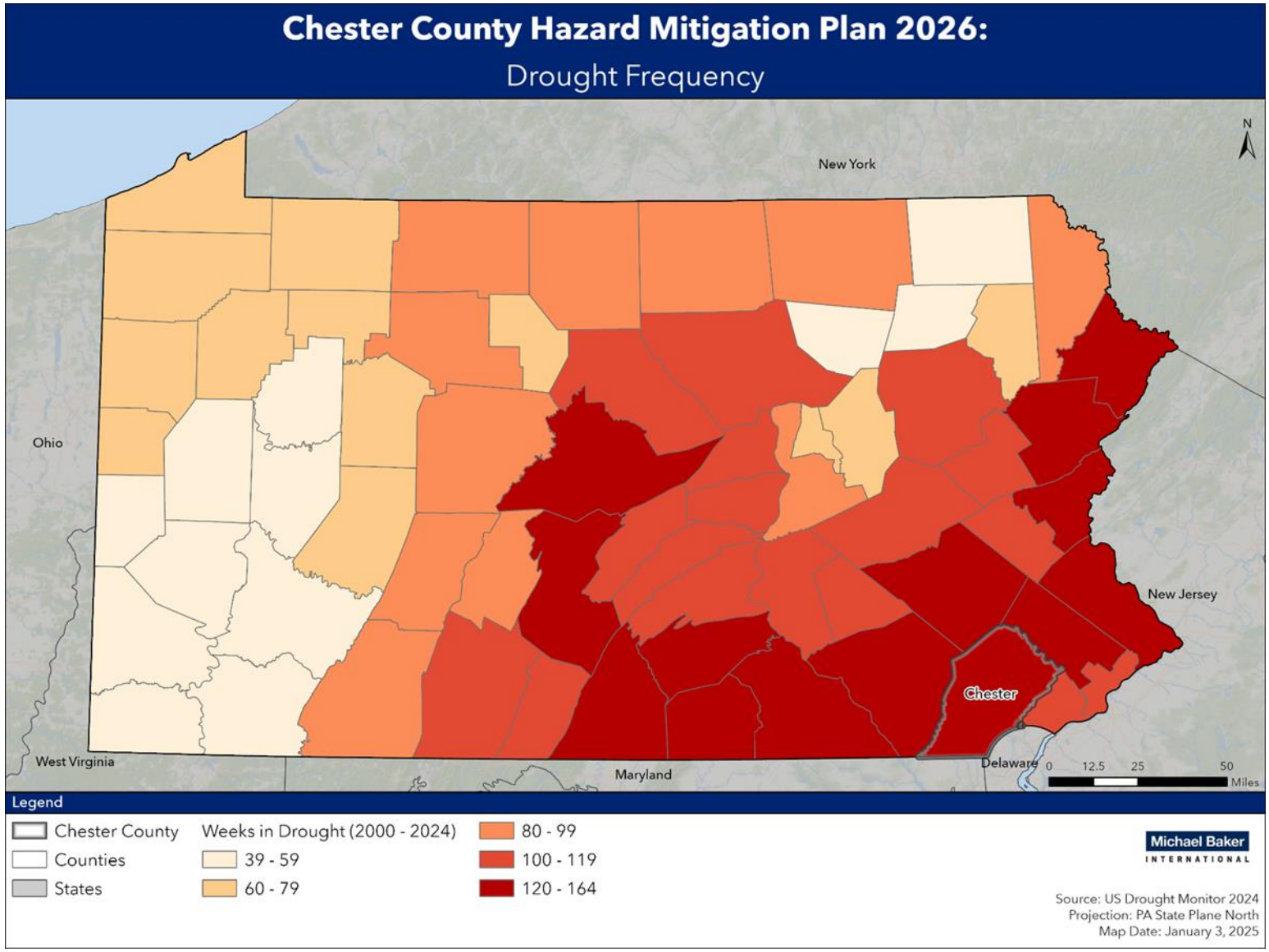
Table 4.3.1-4 lists the crop loss insurance payments on claims from Chester County caused by drought events since 2020.

Table 4.3.1-4 Crop Loss Insurance Compensation Due to Drought (USDA, 2025)

CROP YEAR	INDEMNITY AMOUNT
2020	$238,505
2021	$207,319
2022	$428,563
2023	$330,940
2024	$726,958

Figure 4.3.1-2 shows drought frequency for counties in Pennsylvania from the US Drought Monitor. This data shows that Chester County has experienced drought at a higher rate than most counties in the state.

Figure 4.3.1-1 Drought Frequency in Chester County (US Drought Monitor, 2024)



4.3.1.4. Future Occurrence

The frequency of droughts is difficult to forecast. Based on the history of drought in the county, future occurrences of drought events are considered likely, as defined by the Risk Factor Methodology probability criteria (described in Section 4.4.1).

Additionally, drought was rated as one of the top five hazards facing Chester County in the public survey administered for this plan update, showing the general concern people have for drought events.

According to PEMA, uncertainty regarding the future occurrence of droughts exists due to the potential impacts of climate change. The 2021 update to the Pennsylvania Climate Impacts Assessment suggests that the likelihood for drought will slightly increase through the 21st century. While average and extreme precipitation are projected to increase, higher temperatures and an increase in days without rain could reduce water availability (PA DEP, 2021).

The Climate Mapping for Resilience and Adaptation (CMRA) Tool provides county-level assessment reports for certain hazards, including drought. Figure 4.3.1-3 shows the report for drought in Chester County. The future climate indicators that may contribute to drought include precipitation and temperature thresholds. According to this tool, the number of days per year with no precipitation may increase slightly depending on emission scenarios, even if the total annual precipitation is expected to increase. In addition, the annual number of days above 90 degrees Fahrenheit is expected to significantly increase in the future under all emission scenarios.

Table 4.3.1-5 Drought Frequency in Chester County (US Drought Monitor, 2024)



Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Average annual total precipitation	**45"** 44 - 47	**48"** 44 - 53	**48"** 43 - 53	**48"** 45 - 56	**49"** 46 - 55	**49"** 45 - 56	**51"** 45 - 58
Days per year with precipitation (wet days)	**185 days** 180 - 190	**184 days** 173 - 196	**184 days** 170 - 195	**184 days** 169 - 197	**183 days** 166 - 196	**184 days** 170 - 196	**182 days** 154 - 201
Days per year with no precipitation (dry days)	**180 days** 175 - 185	**181 days** 169 - 192	**181 days** 170 - 195	**181 days** 168 - 196	**182 days** 169 - 199	**181 days** 169 - 195	**184 days** 164 - 212
Maximum number of consecutive dry days	**12 days** 11 - 13	**12 days** 10 - 14	**12 days** 10 - 14	**12 days** 10 - 15	**12 days** 11 - 15	**12 days** 11 - 14	**13 days** 11 - 17
Temperature thresholds:							
Annual days with maximum temperature > 90 °F	**11 days** 11 - 17	**32 days** 17 - 44	**34 days** 19 - 48	**41 days** 22 - 59	**50 days** 25 - 69	**50 days** 26 - 75	**82 days** 36 - 107
Annual days with maximum temperature > 100 °F	**0 days** 0 - 0	**2 days** 0 - 5	**2 days** 0 - 5	**3 days** 1 - 10	**5 days** 1 - 15	**5 days** 1 - 10	**19 days** 2 - 47

N/A = Data Not Available for the selected area

4.3.1.5. Vulnerability Assessment

All of Chester County has been identified as being in the drought hazard area. There are no anticipated impacts on structures, as negative impacts of drought would be experienced by the population and agricultural interests. That said, structures could become vulnerable due to increased risks associated with wildfire if prolonged droughts lead to more favorable conditions for wildfires to occur. Droughts may also result in decreased firefighting capacity as water is scarce.

The entire population of Chester County is considered vulnerable to drought. The most vulnerable populations include children, the elderly, and those that are sick due to their age and health conditions.

Chester County residents that use private domestic wells are also vulnerable to droughts because their wells can dry up. Table 4.3.1-6 lists the number of domestic wells in each municipality. There are over 23,000 domestic wells in Chester County. West Caln Township is the only municipality with over 1,000 wells, while West Bradford Township (879) and West Brandywine Township (800) are the only others with at least 800.

Table 4.3.1-6 Domestic Wells by Municipality (PaGWIS, 2025)

MUNICIPALITY	Number of Wells
Atglen Borough	10
Avondale Borough	27
Birmingham Township	240
Caln Township	346
Charlestown Township	514
Coatesville City	20
Downingtown Borough	30
East Bradford Township	507
East Brandywine Township	578
East Caln Township	54
East Coventry Township	558
East Fallowfield Township	585
East Goshen Township	291
East Marlborough Township	722
East Nantmeal Township	214
East Nottingham Township	532
East Pikeland Township	451
Easttown Township	422
East Vincent Township	285
East Whiteland Township	138
Elk Township	181
Elverson Borough	58
Franklin Township	424
Highland Township	171

Table 4.3.1-6 Domestic Wells by Municipality (PaGWIS, 2025)

MUNICIPALITY	Number of Wells
Honey Brook Borough	490*
Honey Brook Township	
Kennett Township	650
Kennett Square Borough	36
London Britain Township	546
Londonderry Township	165
London Grove Township	512
Lower Oxford Township	470
Malvern Borough	15
Modena Borough	36
New Garden Township	596
Newlin Township	299
New London Township	378
North Coventry Township	593
Oxford Borough	18
Parkesburg Borough	38
Penn Township	372
Pennsbury Township	410
Phoenixville Borough	81
Pocopson Township	345
Sadsbury Township	257
Schuylkill Township	184
South Coatesville Borough	10
South Coventry Township	298
Spring City Borough	9
Thornbury Township	193
Tredyffrin Township	238
Upper Oxford Township	282
Upper Uwchlan Township	637
Uwchlan Township	245
Valley Township	238
Wallace Township	556
Warwick Township	310
West Bradford Township	879
West Brandywine Township	800
West Caln Township	1,031
West Chester Borough	141
West Fallowfield Township	229
West Goshen Township	417
West Grove Borough	17
West Marlborough Township	159
West Nantmeal Township	295
West Nottingham Township	249

Table 4.3.1-6 Domestic Wells by Municipality (PaGWIS, 2025)

MUNICIPALITY	Number of Wells
West Pikeland Township	443
West Sadsbury Township	335
Westtown Township	253
West Vincent Township	531
West Whiteland Township	316
Willistown Township	415
Unknown	35
TOTAL	**23,410**
*Wells reported as "Honey Brook"	

Prolonged drought would affect the 1,558 farms located in Chester County, which sold approximately $736,075,000 in agricultural products in 2022. Most sales to date have come from crop sales, which amounted to $608,174,000 or about 83% of the total market value sold. Livestock sales made up the remaining 17% (USDA, 2022). Figure 2.5-2 in the Community Profile shows land use across Chester County.

Table 4.3.1-7 below lists the expected annual losses to drought by census tract in Chester County.

Table 4.3.1-7 Expected Annual Losses to Drought by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3001.01	Tredyffrin Township	$0.00	No Expected Annual Losses
3001.03	Tredyffrin Township	$0.00	No Expected Annual Losses
3001.04	Tredyffrin Township	$0.00	No Expected Annual Losses
3001.06	Tredyffrin Township	$0.00	No Expected Annual Losses
3001.07	Tredyffrin Township	$407.65	Relatively Low
3001.08	Tredyffrin Township	$0.00	No Expected Annual Losses
3001.09	Tredyffrin Township	$0.00	No Expected Annual Losses
3002.01	Easttown Township	$0.00	No Expected Annual Losses
3002.02	Easttown Township	$1,916.28	Relatively Low
3003.01	Willistown Township	$32,602.44	Relatively Moderate
3003.02	Willistown Township	$14,578.89	Relatively Moderate
3003.03	Willistown Township	$0.00	No Expected Annual Losses
3004	Malvern Borough	$0.00	No Expected Annual Losses
3005.01	Schuylkill Township	$4,595.93	Relatively Low
3005.02	Schuylkill Township	$4,739.92	Relatively Low

Table 4.3.1-7 Expected Annual Losses to Drought by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3006	Phoenixville	$56.20	Very Low
3007	Phoenixville	$0.00	No Expected Annual Losses
3008	Phoenixville	$589.98	Relatively Low
3009	Phoenixville	$0.00	No Expected Annual Losses
3010.01	East Pikeland Township	$17,940.13	Relatively Moderate
3010.02	East Pikeland Township	$42,824.88	Relatively Moderate
3011	Spring City Borough	$3,933.15	Relatively Low
3013	East Coventry Township	$65,749.65	Relatively Moderate
3014.01	North Coventry Township	$13,371.33	Relatively Low
3014.02	North Coventry Township	$38,826.89	Relatively Moderate
3015	South Coventry Township	$33,207.99	Relatively Moderate
3016	Warwick Township	$107,366.49	Relatively Moderate
3017	East Nantmeal Township	$151,104.97	Relatively High
3018	West Vincent Township	$146,472.66	Relatively Moderate
3019	West Pikeland Township	$29,855.55	Relatively Moderate
3020	Charlestown Township	$10,955.40	Relatively Low
3021.02	East Whiteland Township	$4,555.79	Relatively Low
3021.03	East Whiteland Township	$482.30	Relatively Low
3021.04	East Whiteland Township	$10,167.98	Relatively Low
3022.03	West Whiteland Township	$0.00	No Expected Annual Losses
3022.04	West Whiteland Township	$0.00	No Expected Annual Losses
3022.05	West Whiteland Township	$58,508.71	Relatively Moderate
3022.06	West Whiteland Township	$477.50	Relatively Low
3022.07	West Whiteland Township	$0.00	No Expected Annual Losses
3023	West Chester Borough	$0.00	No Expected Annual Losses
3024	West Chester Borough	$0.00	No Expected Annual Losses
3025	West Chester Borough	$0.00	No Expected Annual Losses
3026	West Chester Borough	$0.00	No Expected Annual Losses
3027.02	West Goshen Township	$0.00	No Expected Annual Losses
3027.03	West Goshen Township	$383.40	Very Low
3027.04	West Goshen Township	$1,050.72	Relatively Low
3027.05	West Goshen Township	$0.00	No Expected Annual Losses
3027.06	West Goshen Township	$0.00	No Expected Annual Losses
3028.02	East Goshen Township	$1,717.79	Relatively Low

Table 4.3.1-7 Expected Annual Losses to Drought by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3028.03	East Goshen Township	$0.00	No Expected Annual Losses
3028.04	East Goshen Township	$0.00	No Expected Annual Losses
3028.06	East Goshen Township	$0.00	No Expected Annual Losses
3028.07	East Goshen Township	$573.12	Relatively Low
3029.01	Westtown Township	$7,167.82	Relatively Low
3029.02	Westtown Township	$19,041.92	Relatively Moderate
3030	Thornbury Township	$5,850.80	Relatively Low
3031	Birmingham Township	$14,641.16	Relatively Moderate
3033.01	Kennett Township	$12,474.74	Relatively Low
3033.02	Kennett Township	$31,263.17	Relatively Moderate
3034.01	Kennett Square Borough	$1.32	Very Low
3034.02	Kennett Square Borough	$0.00	No Expected Annual Losses
3035.01	East Marlborough Township	$40,018.04	Relatively Moderate
3035.02	East Marlborough Township	$142,741.94	Relatively Moderate
3038.01	West Bradford Township	$50,139.19	Relatively Moderate
3038.03	West Bradford Township	$5,628.28	Relatively Low
3038.04	West Bradford Township	$24,666.62	Relatively Moderate
3039.01	East Bradford Township	$6,405.39	Relatively Low
3039.02	East Bradford Township	$47,915.51	Relatively Moderate
3040	East Caln Township	$0.00	No Expected Annual Losses
3041.01	Dowingtown Borough	$0.00	No Expected Annual Losses
3041.02	Dowingtown Borough	$0.00	No Expected Annual Losses
3042.01	Caln Township	$10,933.82	Relatively Low
3043	East Brandywine Township	$47,682.88	Relatively Moderate
3044.03	Uwchlan Township	$4,731.71	Relatively Low
3044.04	Uwchlan Township	$0.00	No Expected Annual Losses
3044.05	Uwchlan Township	$392.97	Relatively Low
3044.06	Uwchlan Township	$33,596.46	Relatively Moderate
3045.02	Upper Uwchlan Township	$11,182.96	Relatively Low
3045.03	Upper Uwchlan Township	$17,022.42	Relatively Moderate
3045.04	Upper Uwchlan Township	$14,029.47	Relatively Low
3046	Wallace Township	$59,705.67	Relatively Moderate
3049	Honey Brook Township	$646,302.80	Relatively High

Table 4.3.1-7 Expected Annual Losses to Drought by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3050	Honey Brook Borough	$2,720.03	Relatively Low
3051.01	West Caln Township	$169,155.69	Relatively High
3051.02	West Caln Township	$129,782.43	Relatively Moderate
3053	Valley Township	$16,144.33	Relatively Moderate
3054	Coatesville City	$0.00	No Expected Annual Losses
3055	Coatesville City	$0.00	No Expected Annual Losses
3056	Coatesville City	$0.00	No Expected Annual Losses
3057	Coatesville City	$2.43	Very Low
3060	East Fallowfield Township, Modena Borough	$100,008.26	Relatively Moderate
3063	West Grove Borough	$0.00	No Expected Annual Losses
3065.01	New Garden Township	$31,543.62	Relatively Moderate
3065.03	New Garden Township	$12,297.43	Relatively Low
3065.04	New Garden Township	$33,376.76	Relatively Moderate
3066	London Britain Township	$63,468.88	Relatively Moderate
3067	Franklin Township	$168,024.19	Relatively High
3068	Elk Township	$229,642.89	Relatively High
3069	New London Township	$184,987.33	Relatively High
3070	Penn Township	$256,255.15	Relatively High
3071	Londonderry Township	$338,487.49	Relatively High
3072	Highland Township	$747,280.31	Relatively High
3073	Parkesburg Borough	$134,272.37	Relatively Moderate
3074	Sadsbury Township	$7,170.34	Relatively Low
3077	West Fallowfield Township	$913,417.71	Relatively High
3078	Upper Oxford Township	$780,963.77	Relatively High
3079	Lower Oxford Township	$715,231.34	Relatively High
3080	Oxford Borough	$21,713.62	Relatively Moderate
3081.01	East Nottingham Township	$240,088.74	Relatively High
3081.02	East Nottingham Township	$525,604.89	Relatively High
3082	West Nottingham Township	$293,545.20	Relatively High
3110	East Vincent Township	$113,993.94	Relatively Moderate
3111	Pennsbury Township	$18,254.32	Relatively Moderate
3112	Newlin Township, West Marlborough Township	$315,078.99	Relatively High
3113	Pocopson Township	$34,184.21	Relatively Moderate

Table 4.3.1-7 Expected Annual Losses to Drought by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3114.01	Caln Township	$3,232.19	Relatively Low
3114.03	West Brandywine Township	$25,278.13	Relatively Moderate
3114.04	West Brandywine Township	$117,133.61	Relatively Moderate
3115	West Nantmeal Township, Elverson Borough	$318,488.90	Relatively High
3116	South Coatesville Borough	$1,126.89	Relatively Low
3117.01	London Grove Township	$285,859.74	Relatively High
3117.02	London Grove Township, Avondale Borough	$36,938.36	Relatively Moderate
3118	West Sadsbury Township, Atglen Borough	$429,485.67	Relatively High
9800	West Chester Borough	$0.00	No Expected Annual Losses
TOTAL		**$9,866,790.90**	

4.3.1.6. Equity in Vulnerable Communities

Communities within Chester County with higher concentrations of low-income households could be more susceptible to drought. This includes West Chester Borough, City of Coatesville, and Oxford Borough as they have areas with the highest percentage of population below the poverty level. These households are more likely to live in housing structures with lower-quality infrastructure and higher water bills relative to income.

4.3.2. Earthquake

4.3.2.1. Location and Extent

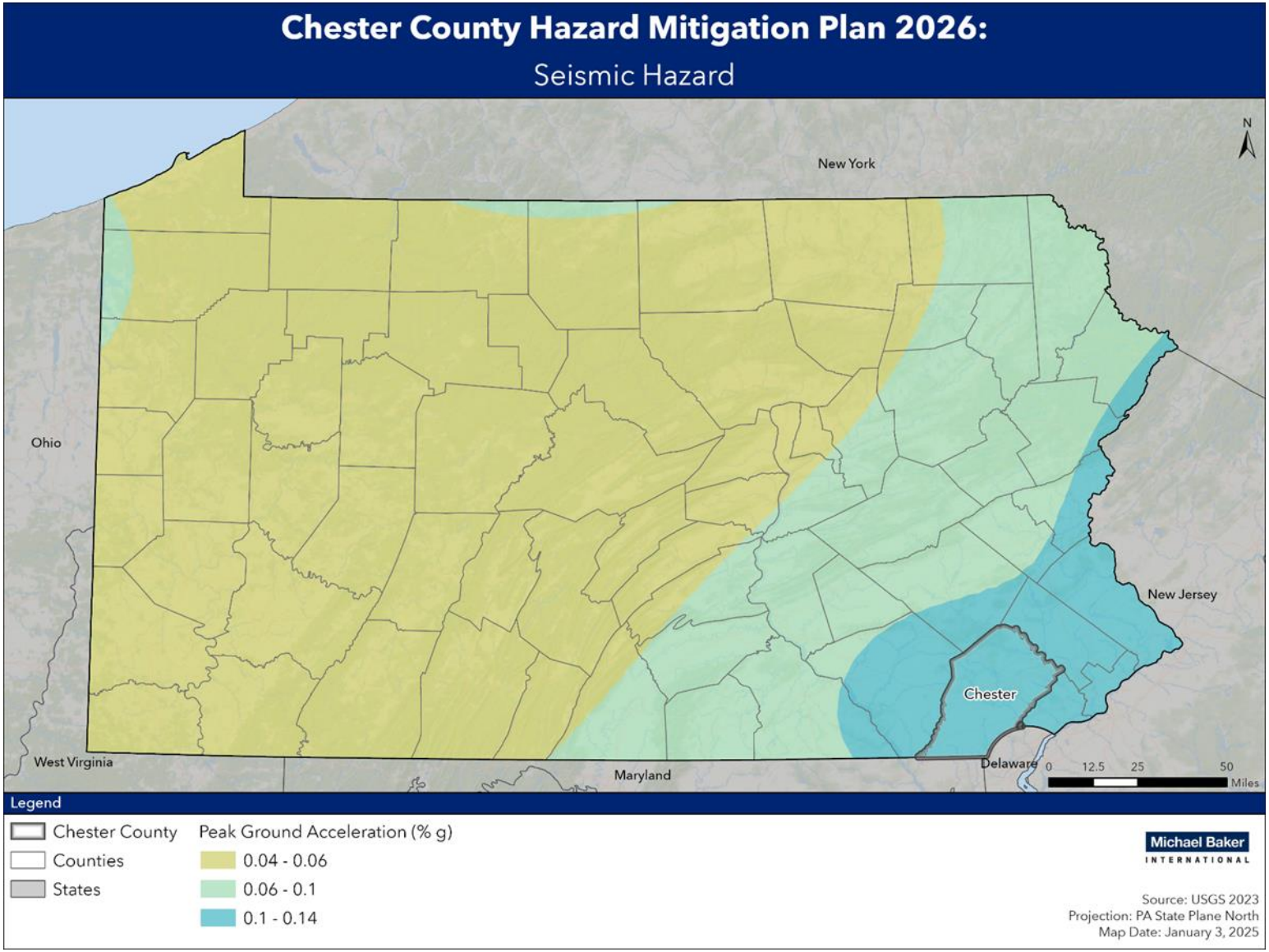


An earthquake is the motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. They can also result from human activity like mine blasts and nuclear experiments. The closest active fault line that might contribute to an earthquake in Chester County is the Mid-Atlantic Ridge, which is approximately 2,000 miles to the east of Pennsylvania (DCNR, 2003).

As regional hazards, an earthquake would affect all of Chester County. Earthquakes can cause damage to buildings and other rigid superstructures, depending on factors like earthquake magnitude, distance of local areas to the earthquake epicenter, and local geologic conditions. It remains incredibly difficult to predict when and where an earthquake will occur in the northeast U.S. and Pennsylvania.

Earthquake events in Pennsylvania typically do not impact areas greater than 100 km (62 miles) from the epicenter, and earthquake epicenters in Chester County are rare. The area is generally not known for seismicity, and USGS downgraded the probabilistic seismic hazard for much of Pennsylvania in 2014. Figure 4.3.2-1 shows the earthquake hazard in Pennsylvania and Chester County, expressed as the two-percent probability of exceedance in 50 years of peak ground acceleration (g). The following map was digitized from the National Seismic Hazard report. Chester County is in the 0.1 zone, indicating that the hazard is moderate. However, earthquakes originating outside Pennsylvania can affect Chester County, though they are not expected to cause significant damage. This was the most current data available at the time this plan was updated.

Figure 4.3.2-1 Approximate USGS Seismic Hazard for Pennsylvania, 2023



4.3.2.2. *Range of Magnitude*

There are several different ways of describing the magnitude of an earthquake. One method measures peak ground acceleration. Peak ground acceleration is the maximum horizontal ground acceleration measured in centimeters per second per second (cm/sec2) (USGS, 2019). Peak ground acceleration can range from zero for an earthquake that is noticed by very few people to 350, which would be categorized as a catastrophic event. A peak ground acceleration of 10 cm/sec2 means that the shaking is equivalent to about one percent of the acceleration due to gravity. Generally, ground acceleration must exceed 15 cm/sec2 for significant damage to occur.

Earthquake magnitude is also often measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake (DCNR, 2003). Table 4.3.2-1 summarizes Richter Scale Magnitudes as they relate to the spatial extent of impacted areas. Pennsylvania has not experienced any earthquakes with a magnitude greater than 6.0.

Table 4.3.2-1 Richter scale magnitudes and associated earthquake size effects.

RICHTER MAGNITUDES	EARTHQUAKE EFFECTS
Less than 3.5	Generally, not felt but recorded.
3.5-5.4	Often felt but rarely causes damage.
Under 6.0	At most, slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1-6.9	Can be destructive in areas where people live up to about 100 kilometers across.
7.0-7.9	Major earthquake. Can cause serious damage over large areas.
8.0 or greater	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

The Richter Scale does not give any indication of the impact or damage of an earthquake, although it can be inferred that higher magnitude events cause more damage. Therefore, another way of measuring the intensity of an earthquake is the Modified Mercalli Intensity Scale (DCNR, 2003). Measures on this scale range from I, an earthquake that is not generally noticeable, to XII, an earthquake that causes complete destruction. Table 4.3.2-2 summarizes Modified Mercalli Intensity Scale impacts of earthquake events, measured in terms of earthquake intensity.

Table 4.3.2-2 Modified Mercalli Intensity Scale with associated impacts

SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
I	Instrumental	Detected only on seismographs.	<4.2
II	Feeble	Some people feel it.	<4.2
III	Slight	Felt by people resting; like a truck rumbling by.	<4.2
IV	Moderate	Felt by people walking.	<4.2
V	Slightly Strong	Sleepers awake; church bells ring.	<4.8
VI	Strong	Trees sway; suspended objects swing; objects fall off shelves.	<5.4
VII	Very Strong	Mild alarm, walls crack, plaster falls.	<6.1
VIII	Destructive	Moving cars uncontrollable, masonry fractures, poorly constructed buildings damaged.	<6.9
IX	Ruinous	Some houses collapse, ground cracks, pipes break open.	<6.9
X	Disastrous	Ground cracks profusely, many buildings destroyed, liquefaction and landslides widespread.	<7.3
XI	Very Disastrous	Most buildings and bridges collapse, roads, railways, pipes, and cables destroyed, general triggering of other hazards.	<8.1
XII	Catastrophic	Total destruction, trees fall, ground rises and falls in waves.	>8.1

Recent earthquakes in Pennsylvania have been measured from IV to VI on the Modified Mercalli Intensity Scale. However, since the worst earthquake recorded in Pennsylvania was a magnitude 5.2, a worst-case scenario for this hazard would be if an earthquake of similar magnitude occurred in or around Chester County near a populated area.

The USGS Earthquake Hazards Program defines earthquake hazards as any disruption associated with an earthquake that may affect residents' normal activities. This includes surface faulting, ground motion (shaking), landslides, liquefaction, tectonic deformation, and seiches.

Each of these terms is defined below (USGS, 2025a):

- Surface Faulting: Displacement that reaches the Earth's surface during a slip along a fault. This commonly occurs with shallow earthquakes, those with an epicenter of less than 20 kilometers (km).
- Ground Motion (Shaking): Movement of the Earth's surface from earthquakes. Ground motion or shaking is produced by waves generated by a sudden slip on a fault and the waves travel through the Earth and along its surface.
- Landslide: Movement of surface material down a slope.

- Liquefaction: A process by which water-saturated sediment temporarily loses strength and acts as a fluid, like the wet sand near the water at the beach. Earthquake shaking can cause this effect.
- Tectonic Deformation: Change in the original shape of a material caused by stress and strain.
- Seiche: Sloshing of a closed body of water, such as a lake or bay, from earthquake shaking.

The available history of earthquake events in the US covers a period of less than 300 years, which is a relatively short period of time for an examination of earthquakes. Large earthquakes may only affect a location every several centuries or millennia. Environmental impacts of earthquakes can be numerous, widespread and devastating, particularly if indirect impacts are considered. Some secondary hazards caused by earthquakes may include fire, hazardous material release, landslides, flash flooding, avalanches, tsunamis, and dam failure. These secondary events could also result in disruptions to natural ecosystems, poor water quality, damage to vegetation, and the release of toxic materials and sewage. Impacts to infrastructure could include train derailments, pipeline failures, and utility interruptions. A very large earthquake affecting Chester County might cause structural damage in dilapidated structures or structures that do not meet current building codes. Thus, the impact of an earthquake might range from negligible to catastrophic. Based on historical data for Chester County, damage is likely to be minimal. The potential impacts of earthquakes on community lifelines are as follows:

Table 4.3.2-3 Most Likely Lifelines Impacted by Earthquakes

LIFELINES	NOTES
	Shelters may be affected depending on severity. Higher earthquake building standards can aid in mitigation.
	Personnel will likely be overutilized in response and recovery, leading to potential gaps in capability.
	Pipelines may be affected. Mitigation includes requiring earthquake-resistant maintenance, design and construction standards.

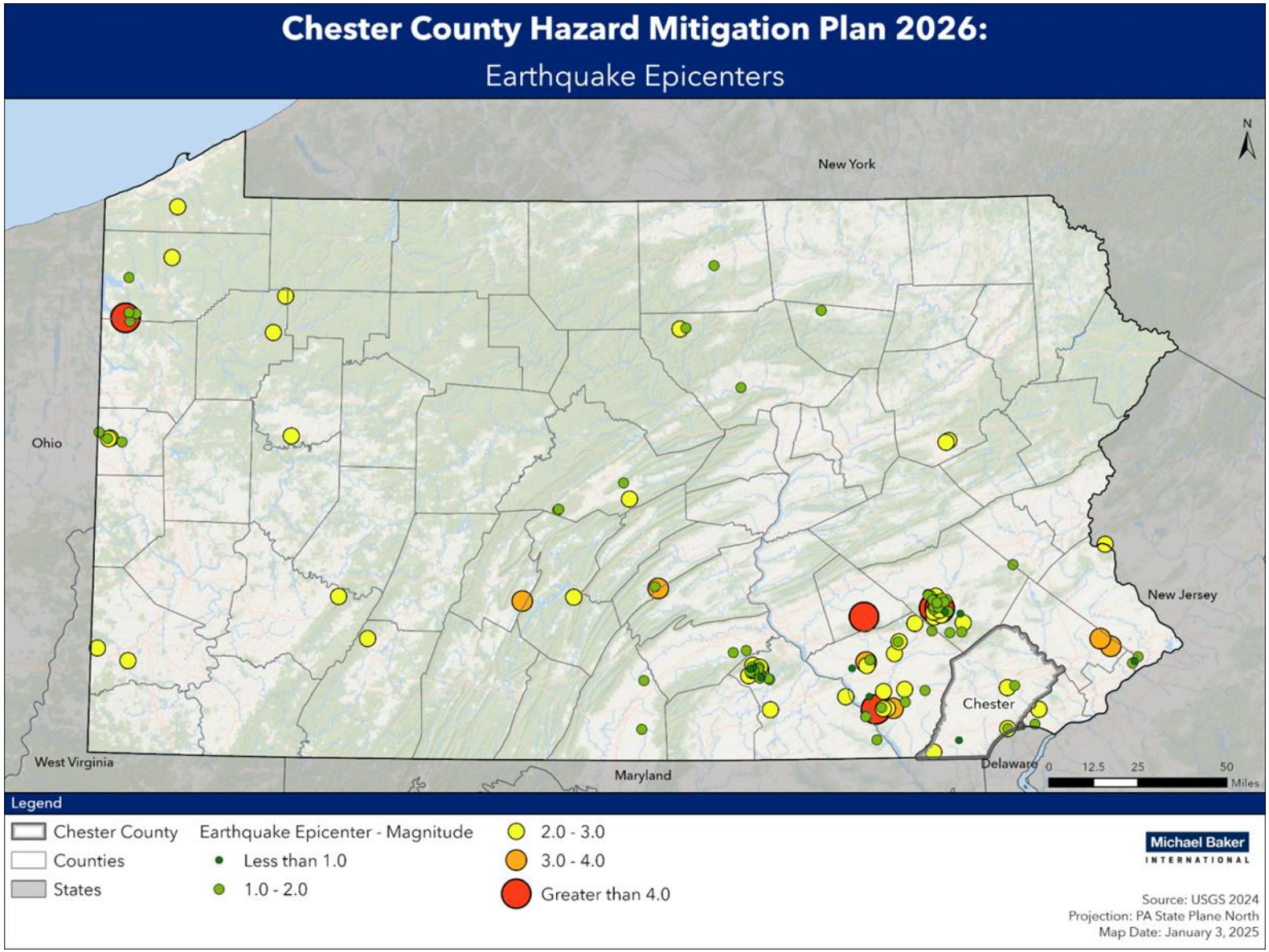
4.3.2.3. Past Occurrence

According to records maintained by the Pennsylvania Department of Conservation and Natural Resources (DCNR), there have been six earthquakes with epicenters in Chester County between 1724 and 2024, shown in Figure 4.3.2-2. Two of these earthquakes had a magnitude over 2.5 on the Richter scale. The lowest magnitude was a 0.6 magnitude earthquake on July 25, 2019, and the largest magnitude was a 3.6 magnitude earthquake on December 17, 1752 (USGS, 2025b). However, parts of the county have likely experienced shock waves from some minor earthquakes that have occurred around the region as shown in Figure 4.3.2-2.

PEMA's Pennsylvania Disaster History list includes no significant earthquake events in Pennsylvania, and no Federal Emergency Management Agency (FEMA) major disaster (DR)/emergency declarations (EM) have occurred for significant earthquake events in Pennsylvania.

The USGS operates a global network of seismic stations to monitor seismic activity. While no seismic stations are within Chester County, a nearby station is found in State College, Pennsylvania. The USGS provides the website Did You Feel It? (http://earthquake.usgs.gov/data/dyfi/) for citizens to report earthquake experiences and to share information regarding the earthquake and its effects. The website is intended to gather citizens' experiences during an earthquake and incorporate the information into detailed maps to illustrate shaking intensity and damage assessments (USGS, 2025c).

Figure 4.3.2-2 Map of earthquake epicenters in Pennsylvania



4.3.2.4. Future Occurrence

The probability of an earthquake occurring in Chester County is low. Chester County does not sit on any fault lines; therefore, it is reasonable to believe that the County will not experience earthquake damage anytime soon. Based on available historical data, future occurrences of earthquake events can be considered possible as defined by the Risk Factor Methodology probability criteria (see Section 4.4).

Secondary impacts of earthquakes could be magnified by climate change. Soils saturated by repetitive storms could undergo liquefaction during seismic activity as a result of the increased saturation. Droughts and the associated pumping of groundwater from underground aquifers can also impact the stress loads on the Earth's crust. Dams storing increased volumes of water, as a result of changes in the hydrograph, could fail during seismic events. No current models are available to estimate these impacts.

4.3.2.5. Vulnerability Assessment

All structures and infrastructure in Chester County are equally at risk of experiencing an earthquake. However, in a mild earthquake of the magnitude typically experienced in Pennsylvania, no structural damage is anticipated. In other cases, damages are expected to be limited, and examples of anticipated damages are broken dishes and windows and toppled file cabinets.

All existing structures have the potential to experience an earthquake; however, older structures are potentially at higher risk of damage due to an earthquake. 66,729 housing units in Chester County are at least 55 years old (built in 1969 or earlier) (US Census Bureau, 2023). Table 4.3.2-4 lists the number of housing units 55 years or older by municipality.

Table 4.3.2-4 Housing Units At Least 55 Years Old by Municipality (U.S. Census Bureau, ACS, 2023)

Municipality	Units	Percent of total units
Atglen Borough	126	31.1%
Avondale Borough	338	67.1%
Birmingham Township	214	13.7%
Caln Township	1,596	28.2%
Charlestown Township	320	15.0%
Coatesville City	3,280	61.4%
Downingtown Borough	2,118	57.9%
East Bradford Township	502	13.7%
East Brandywine Township	571	16.5%
East Caln Township	399	14.9%
East Coventry Township	877	32.4%
East Fallowfield Township	581	21.7%
East Goshen Township	1,316	14.4%
East Marlborough Township	687	23.6%
East Nantmeal Township	248	38.9%

Table 4.3.2-4 Housing Units At Least 55 Years Old by Municipality (U.S. Census Bureau, ACS, 2023)

Municipality	Units	Percent of total units
East Nottingham Township	449	15.5%
East Pikeland Township	1,156	33.4%
Easttown Township	2,124	52.6%
East Vincent Township	843	33.2%
East Whiteland Township	1,363	24.7%
Elk Township	153	25.8%
Elverson Borough	173	28.0%
Franklin Township	211	12.3%
Highland Township	225	48.1%
Honey Brook Borough	368	47.1%
Honey Brook Township	547	17.4%
Kennett Township	712	19.5%
Kennett Square Borough	1,646	70.1%
London Britain Township	214	20.0%
Londonderry Township	157	16.7%
London Grove Township	474	16.1%
Lower Oxford Township	320	26.7%
Malvern Borough	744	42.5%
Modena Borough	130	90.3%
New Garden Township	703	17.1%
Newlin Township	164	35.0%
New London Township	259	12.1%
North Coventry Township	1,850	51.5%
Oxford Borough	840	36.6%
Parkesburg Borough	601	38.5%
Penn Township	171	7.6%
Pennsbury Township	339	23.9%
Phoenixville Borough	4,601	49.2%
Pocopson Township	259	23.1%
Sadsbury Township	435	25.9%
Schuylkill Township	1,487	47.0%
South Coatesville Borough	409	53.5%
South Coventry Township	356	32.2%
Spring City Borough	1,618	77.3%
Thornbury Township	203	17.2%
Tredyffrin Township	5,742	44.4%
Upper Oxford Township	268	30.8%
Upper Uwchlan Township	154	3.7%
Uwchlan Township	1,354	17.5%
Valley Township	1,104	36.8%
Wallace Township	295	24.2%

Table 4.3.2-4 Housing Units At Least 55 Years Old by Municipality (U.S. Census Bureau, ACS, 2023)

Municipality	Units	Percent of total units
Warwick Township	592	54.0%
West Bradford Township	1,031	20.1%
West Brandywine Township	548	18.3%
West Caln Township	604	17.7%
West Chester Borough	4,324	58.7%
West Fallowfield Township	297	34.6%
West Goshen Township	3,266	34.5%
West Grove Borough	463	49.6%
West Marlborough Township	333	72.5%
West Nantmeal Township	248	31.3%
West Nottingham Township	322	28.0%
West Pikeland Township	333	24.0%
West Sadsbury Township	293	34.2%
Westtown Township	1,487	33.9%
West Vincent Township	419	16.7%
West Whiteland Township	1,863	22.7%
Willistown Township	1,912	42.0%
TOTAL	66,729	

All future structures will also have the potential to experience an earthquake. However, given that new structures must also meet current building codes and given the expected magnitude of earthquakes in the county, any future property damage is expected to be low and focused on contents, not structural damage.

Table 4.3.2-5 below shows the Expected Annual Losses for each census tract in the county according to FEMA's National Risk Index.

Table 4.3.2-5 Expected Annual Losses to Earthquake by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3001.01	Tredyffrin Township	$12,051.13	Very Low
3001.03	Tredyffrin Township	$4,699.82	Very Low
3001.04	Tredyffrin Township	$11,972.02	Very Low
3001.06	Tredyffrin Township	$10,909.83	Very Low
3001.07	Tredyffrin Township	$14,625.51	Relatively Low
3001.08	Tredyffrin Township	$18,479.43	Relatively Low
3001.09	Tredyffrin Township	$8,623.18	Very Low

Table 4.3.2-5 Expected Annual Losses to Earthquake by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3002.01	Easttown Township	$13,254.20	Relatively Low
3002.02	Easttown Township	$18,766.56	Relatively Low
3003.01	Willistown Township	$16,876.04	Relatively Low
3003.02	Willistown Township	$15,821.32	Relatively Low
3003.03	Willistown Township	$7,829.51	Very Low
3004	Malvern Borough	$5,435.93	Very Low
3005.01	Schuylkill Township	$11,725.58	Very Low
3005.02	Schuylkill Township	$8,280.04	Very Low
3006	Phoenixville	$6,105.85	Very Low
3007	Phoenixville	$6,591.35	Very Low
3008	Phoenixville	$5,709.56	Very Low
3009	Phoenixville	$4,426.24	Very Low
3010.01	East Pikeland Township	$9,181.30	Very Low
3010.02	East Pikeland Township	$7,648.65	Very Low
3011	Spring City Borough	$4,455.73	Very Low
3013	East Coventry Township	$15,876.70	Relatively Low
3014.01	North Coventry Township	$7,542.67	Very Low
3014.02	North Coventry Township	$10,833.92	Very Low
3015	South Coventry Township	$6,862.12	Very Low
3016	Warwick Township	$6,241.45	Very Low
3017	East Nantmeal Township	$9,219.97	Very Low
3018	West Vincent Township	$20,249.32	Relatively Low
3019	West Pikeland Township	$11,098.43	Very Low
3020	Charlestown Township	$16,181.02	Relatively Low
3021.02	East Whiteland Township	$14,253.59	Relatively Low
3021.03	East Whiteland Township	$35,260.46	Relatively Low
3021.04	East Whiteland Township	$27,766.13	Relatively Low
3022.03	West Whiteland Township	$9,693.47	Very Low
3022.04	West Whiteland Township	$12,739.23	Very Low
3022.05	West Whiteland Township	$16,390.30	Relatively Low
3022.06	West Whiteland Township	$14,174.41	Relatively Low
3022.07	West Whiteland Township	$11,215.89	Very Low
3023	West Chester Borough	$10,428.74	Very Low
3024	West Chester Borough	$11,589.14	Very Low

Table 4.3.2-5 Expected Annual Losses to Earthquake by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3025	West Chester Borough	$14,969.74	Relatively Low
3026	West Chester Borough	$15,006.62	Relatively Low
3027.02	West Goshen Township	$23,372.79	Relatively Low
3027.03	West Goshen Township	$24,960.17	Relatively Low
3027.04	West Goshen Township	$11,081.00	Very Low
3027.05	West Goshen Township	$5,721.61	Very Low
3027.06	West Goshen Township	$23,919.22	Relatively Low
3028.02	East Goshen Township	$32,504.89	Relatively Low
3028.03	East Goshen Township	$6,724.11	Very Low
3028.04	East Goshen Township	$12,323.10	Very Low
3028.06	East Goshen Township	$3,438.51	Very Low
3028.07	East Goshen Township	$9,506.39	Very Low
3029.01	Westtown Township	$9,090.73	Very Low
3029.02	Westtown Township	$13,989.21	Relatively Low
3030	Thornbury Township	$10,858.20	Very Low
3031	Birmingham Township	$10,315.27	Very Low
3033.01	Kennett Township	$16,991.40	Relatively Low
3033.02	Kennett Township	$17,745.22	Relatively Low
3034.01	Kennett Square Borough	$8,663.33	Very Low
3034.02	Kennett Square Borough	$7,418.85	Very Low
3035.01	East Marlborough Township	$16,669.55	Relatively Low
3035.02	East Marlborough Township	$17,572.93	Relatively Low
3038.01	West Bradford Township	$8,946.11	Very Low
3038.03	West Bradford Township	$5,869.58	Very Low
3038.04	West Bradford Township	$10,675.05	Very Low
3039.01	East Bradford Township	$14,579.62	Relatively Low
3039.02	East Bradford Township	$13,286.58	Relatively Low
3040	East Caln Township	$13,932.14	Relatively Low
3041.01	Downingtown Borough	$10,986.69	Very Low
3041.02	Downingtown Borough	$6,303.08	Very Low
3042.01	Caln Township	$19,417.68	Relatively Low
3043	East Brandywine Township	$19,224.20	Relatively Low
3044.03	Uwchlan Township	$13,072.72	Relatively Low
3044.04	Uwchlan Township	$13,994.85	Relatively Low

Table 4.3.2-5 Expected Annual Losses to Earthquake by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3044.05	Uwchlan Township	$23,202.76	Relatively Low
3044.06	Uwchlan Township	$24,712.39	Relatively Low
3045.02	Upper Uwchlan Township	$11,706.96	Very Low
3045.03	Upper Uwchlan Township	$11,304.27	Very Low
3045.04	Upper Uwchlan Township	$7,376.91	Very Low
3046	Wallace Township	$10,921.46	Very Low
3049	Honey Brook Township	$22,396.28	Relatively Low
3050	Honey Brook Borough	$5,485.42	Very Low
3051.01	West Caln Township	$9,026.79	Very Low
3051.02	West Caln Township	$5,997.19	Very Low
3053	Valley Township	$20,365.53	Relatively Low
3054	Coatesville City	$6,279.66	Very Low
3055	Coatesville City	$5,708.00	Very Low
3056	Coatesville City	$3,905.79	Very Low
3057	Coatesville City	$3,034.36	Very Low
3060	East Fallowfield Township, Modena Borough	$17,087.99	Relatively Low
3063	West Grove Borough	$5,106.14	Very Low
3065.01	New Garden Township	$16,426.23	Relatively Low
3065.03	New Garden Township	$19,258.91	Relatively Low
3065.04	New Garden Township	$27,026.73	Relatively Low
3066	London Britain Township	$8,133.24	Very Low
3067	Franklin Township	$14,151.07	Relatively Low
3068	Elk Township	$8,324.26	Very Low
3069	New London Township	$21,046.14	Relatively Low
3070	Penn Township	$17,517.40	Relatively Low
3071	Londonderry Township	$6,820.32	Very Low
3072	Highland Township	$6,661.82	Very Low
3073	Parkesburg Borough	$8,777.86	Very Low
3074	Sadsbury Township	$6,950.31	Very Low
3077	West Fallowfield Township	$10,944.73	Very Low
3078	Upper Oxford Township	$10,480.77	Very Low
3079	Lower Oxford Township	$16,222.31	Relatively Low
3080	Oxford Borough	$11,542.59	Very Low
3081.01	East Nottingham Township	$11,463.13	Very Low

Table 4.3.2-5 Expected Annual Losses to Earthquake by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3081.02	East Nottingham Township	$11,488.02	Very Low
3082	West Nottingham Township	$6,231.25	Very Low
3110	East Vincent Township	$18,412.36	Relatively Low
3111	Pennsbury Township	$16,539.86	Relatively Low
3112	Newlin Township, West Marlborough Township	$10,035.24	Very Low
3113	Pocopson Township	$15,888.72	Relatively Low
3114.01	Caln Township	$17,956.43	Relatively Low
3114.03	West Brandywine Township	$7,415.05	Very Low
3114.04	West Brandywine Township	$8,864.59	Very Low
3115	West Nantmeal Township, Elverson Borough	$12,331.73	Very Low
3116	South Coatesville Borough	$6,724.72	Very Low
3117.01	London Grove Township	$10,434.99	Very Low
3117.02	London Grove Township, Avondale Borough	$27,862.96	Relatively Low
3118	West Sadsbury Township, Atglen Borough	$17,030.20	Relatively Low
9800	West Chester Borough	$35,418.04	Relatively Low
TOTAL		$1,592,216.73	

4.3.2.6. Equity in Vulnerable Communities

Communities within Chester County with a large renter population may be more at risk during an earthquake due to a lack of control over the seismic safety of their buildings. This includes West Chester Borough, West Whiteland Township, City of Coatesville, Oxford Borough, City of Phoenixville, Downingtown Borough, East Goshen Township, Kennett Square Borough, Uwchlan Township, Spring City Borough, and North Coventry Township. All of these jurisdictions have census tracts where less than 50 percent of housing units are owner-occupied. Renter protections may also be affected due to a lack of renter protections or access to temporary housing after an earthquake. Low-income communities may also be at greater risk as these households often live in older or poorly constructed housing, which is more likely to sustain damage during an earthquake. People with disabilities or limited mobility also face greater challenges in evacuation during an earthquake and accessing post-disaster services. The City of Coatesville and Spring City Borough have census tracts where more than 20 percent of the population has a disability. In terms of emergency notification, households without smartphones and lack of access to the internet will affect how people get emergency communications. This includes Honey Brook Township, West Fallowfield Township, Oxford Borough, Penn Township, Lower Oxford Township, and City of Coatesville. Ensuring equitable

access to such technologies and providing information in multiple languages and formats is critical.

4.3.3. Extreme Temperature

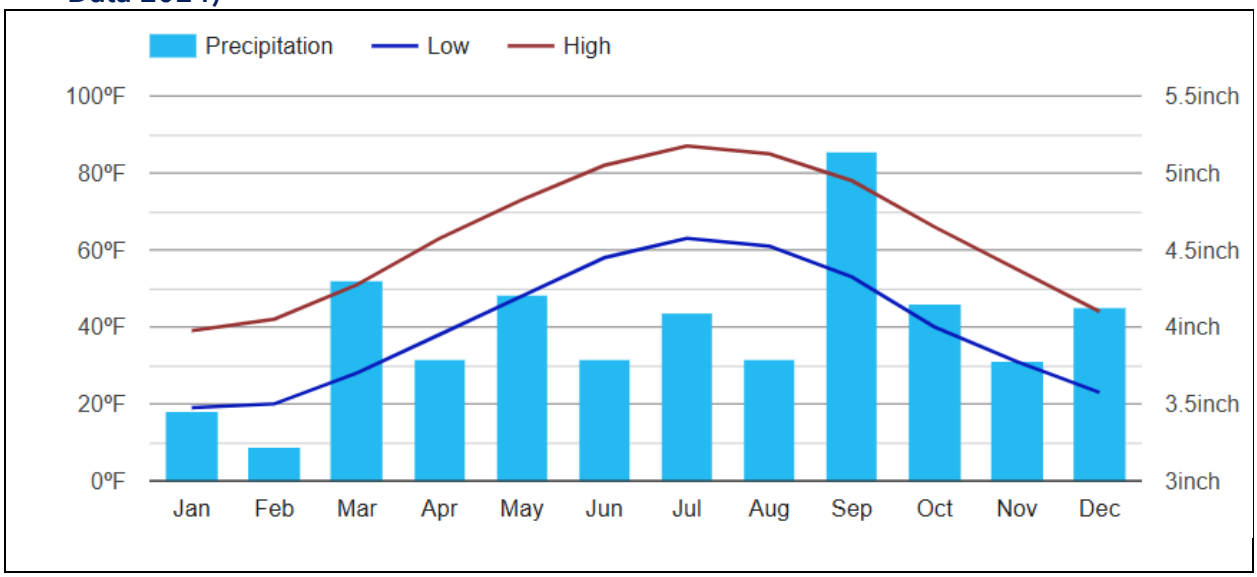
4.3.3.1. Location and Extent



Extreme temperatures include both extreme heat and cold events, which can have a significant impact to human health, commercial/agricultural businesses and primary and secondary effects to infrastructure (i.e., burst pipes, power failure, etc.). What constitutes "extreme heat" or "extreme cold" can vary across different areas of the county based on the conditions the population is accustomed to.

Chester County is susceptible to extreme temperatures in the summer and winter seasons, and they can occur anywhere in the county. The average low temperature in January is 19°F, and the average high temperature in July is 87°F (U.S. Climate Data 2024).

Figure 4.3.3-1 Average Temperatures at West Chester 2 NW PA, US (U.S. Climate Data 2024)



Extreme cold events are when temperatures drop well below normal in an area. In regions relatively unaccustomed to winter weather, near-freezing temperatures are considered "extreme cold." Extreme cold temperatures are generally characterized in temperate zones by the ambient air temperature dropping to approximately 0°F or below (CDC, 2013). Extremely cold temperatures often accompany a winter storm, which can cause power failures and icy roads. Although staying indoors as much as possible can help reduce the risk of car crashes and falls on the ice, individuals may also face indoor hazards. Many homes will be too cold—either due to a power failure or because the heating system is not adequate for the weather. The use of space heaters and fireplaces to keep warm increases the risk of household fires and carbon monoxide poisoning (CDC, 2024a).

Conditions of extreme heat are defined as summertime temperatures that are substantially hotter and/or more humid than average for a location at that time of year (CDC, 2024b). An

extended period of extreme heat of three or more consecutive days is typically called a heat wave and is often accompanied by high humidity (NWS, n.d). "Heat wave" has no universal definition because the term is relative to the usual weather in a particular area. The term heat wave is applied both to routine weather variations and to extraordinary spells of heat that may occur only once per century. A basic definition of a heat wave implies that it is an extended period of unusually high atmosphere-related heat stress, which causes temporary lifestyle modifications, and which may have adverse health consequences for the affected population (UNDRR, 2020). A heat wave is defined as three consecutive days of temperatures ≥90°F.

The term "heat island" describes built-up areas that are hotter than nearby rural areas. The annual mean air temperature of a city with more than 1 million people can be between 1.8 °F and 5.4°F warmer than its surrounding areas. In the evening, the difference in air temperatures can be as high as 22°F. Heat islands occur on the surface and in the atmosphere. On a hot, sunny day, the sun can heat dry, exposed urban surfaces to temperatures 50°F-90°F hotter than the air. Heat islands can affect communities by increasing peak energy demand during the summer, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and death, and water quality degradation (EPA, 2024a).

Figure 4.3.3-2 below illustrates an urban heat island profile. The graphic demonstrates that heat islands are typically most intense over dense urban areas. Further, vegetation and parks within a downtown area may help reduce heat islands (EPA, 2024a). Figure 4.3.3-3 shows the average annual maximum temperature in Chester County while Figure 4.3.3-4 shows the average annual minimum temperature.

Figure 4.3.3-2 Urban Heat Island Profile (EPA, 2024a)

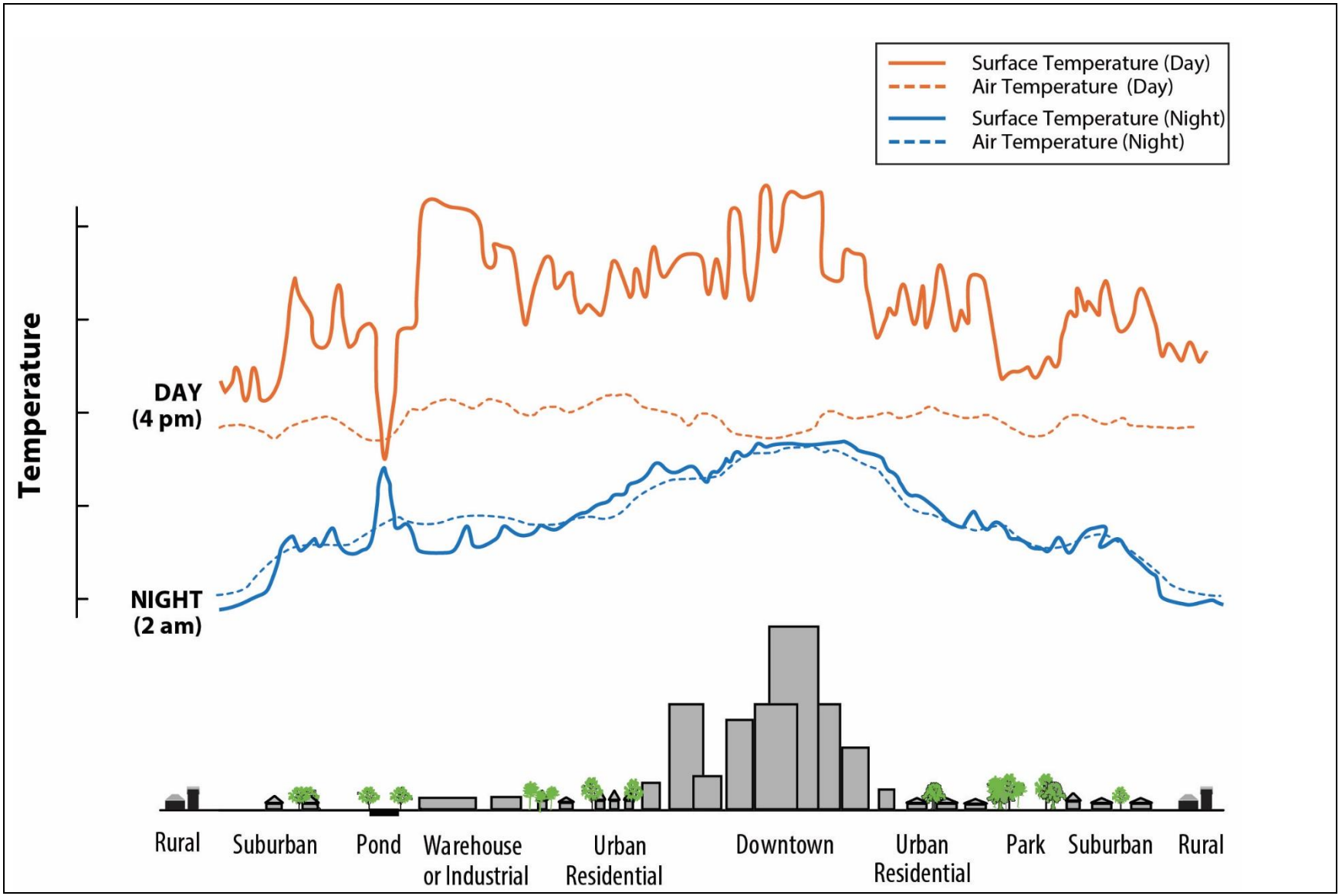


Figure 4.3.3-3 Average Maximum Temperature in Chester County, 2021

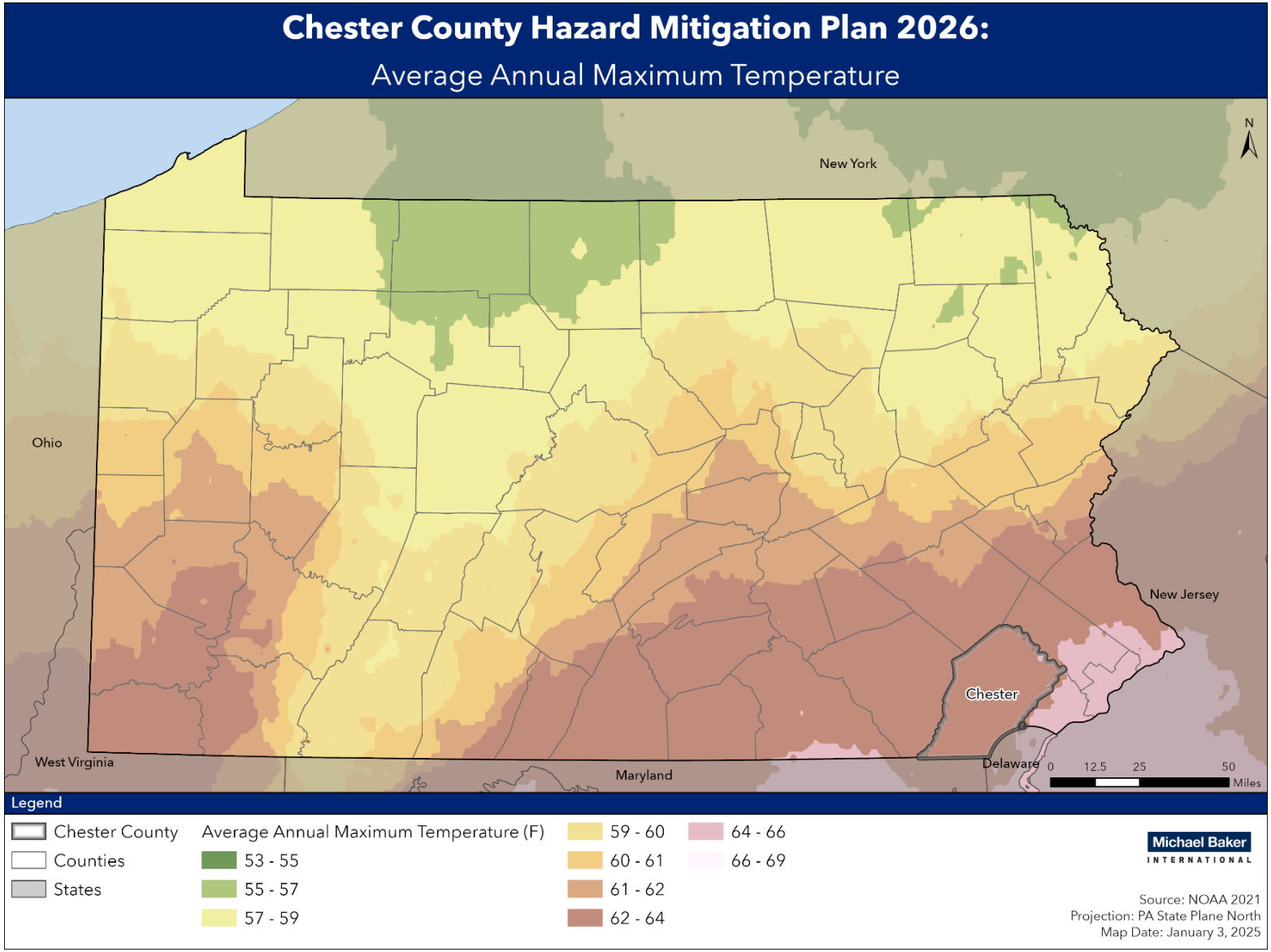
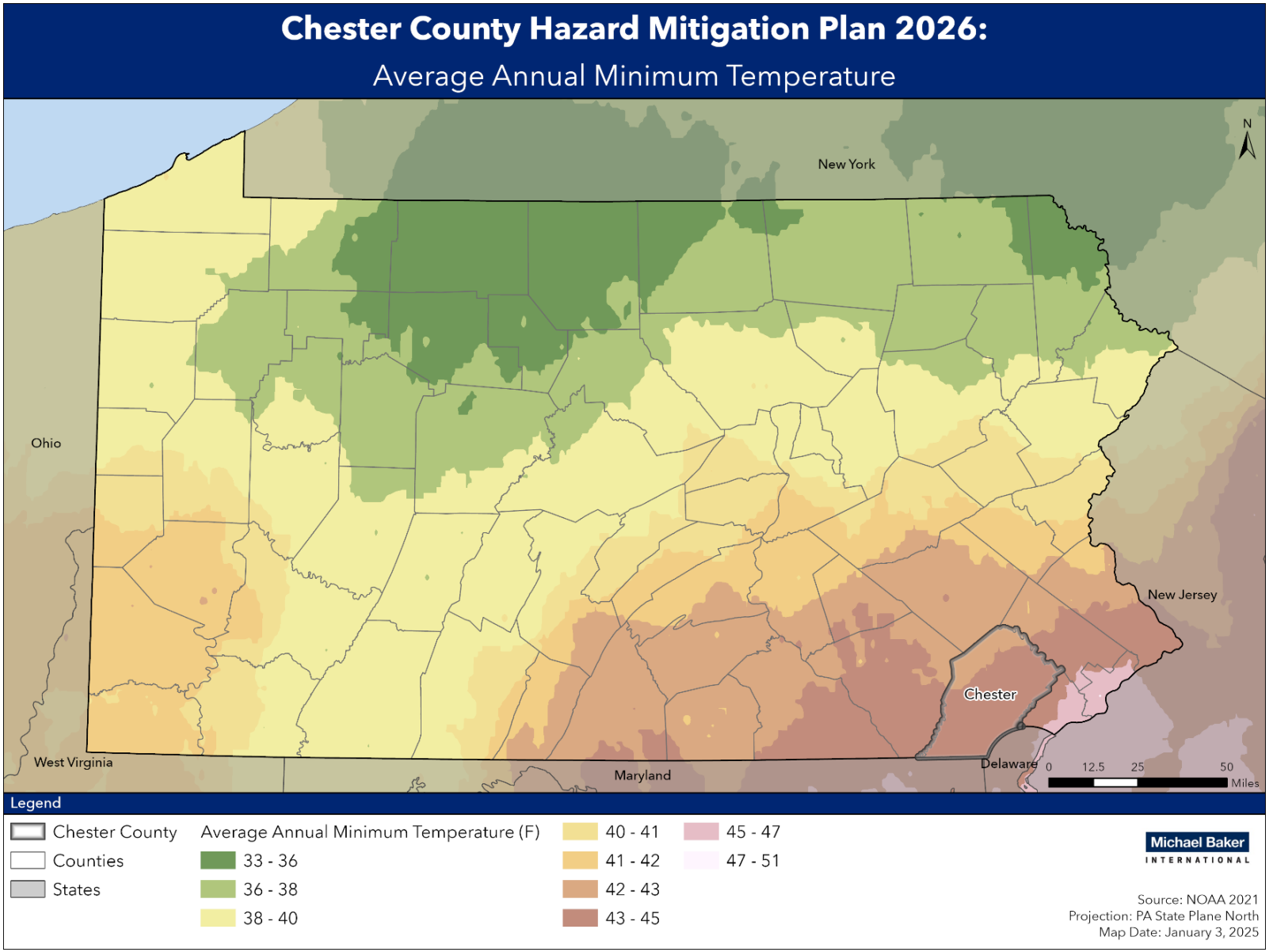


Figure 4.3.3-4 Average Minimum Temperature in Chester County, 2021



4.3.3.2. Range of Magnitude

Extreme temperatures can cause a range of impacts to communities including impacts to health, transportation, agriculture, and energy. Meteorologists can accurately forecast extreme temperature event development and the severity of the associated conditions with several days lead time. These forecasts provide an opportunity for public health and other officials to notify vulnerable populations.

The following impacts can be observed in conjunction with extreme temperature events:

- Health Impacts: Both extreme cold and extreme heat can cause severe health impacts. The impacts of severe cold include hypothermia and frostbite from prolonged exposure. Cold weather also raises the risk of injuries from falls, traffic incidents, carbon monoxide poisoning, and house fires. Health impacts of extreme heat include heat stroke and dehydration. The health impacts of extreme cold are greater in terms of mortality in humans, but often after more prolonged exposure versus a cold snap. Extreme heat waves, however, can prove more deadly over a shorter duration. Both extreme heat and extreme cold are most likely to impact the elderly, low-income individuals, residents with disabilities and pre-existing medical conditions, and laborers and farm workers.
- Transportation: Cold weather can impact automotive engines, possibly stranding motorists; limit or prevent travel by pedestrians, bicyclists, and users of public transportation; and stress metal bridge structures. Highways and railroad tracks can become distorted in high heat. Disruptions to the transportation network and accidents due to extreme temperatures represent an additional risk.
- Agriculture: Absolute temperature and duration of extreme cold can have devastating effects on trees and winter crops. Livestock is especially vulnerable to heat. Crop yields can be impacted by heat waves or cold snaps that occur during key development stages, even at levels that do not impact most of the population.
- Energy: Energy consumption rises significantly during extreme cold weather, and any fuel shortages or utility failures that prevent the heating of a dwelling place residents in extreme danger. Extreme heat also can result in utility interruptions, and sagging transmission lines due to the heat can lead to shorting out.

The range of these impacts, especially health effects, can be mitigated through improved forecasts, warnings, community preparedness, and appropriate community response. A worst-case event for Chester County would include extreme cold temperatures combined with an interruption in energy supplies and loss of access to medical care from snow or ice impacting travel. Medical afflictions could result from direct influence on the coronary circulation system and the respiratory system; influenza and other infectious diseases would be secondary impacts.

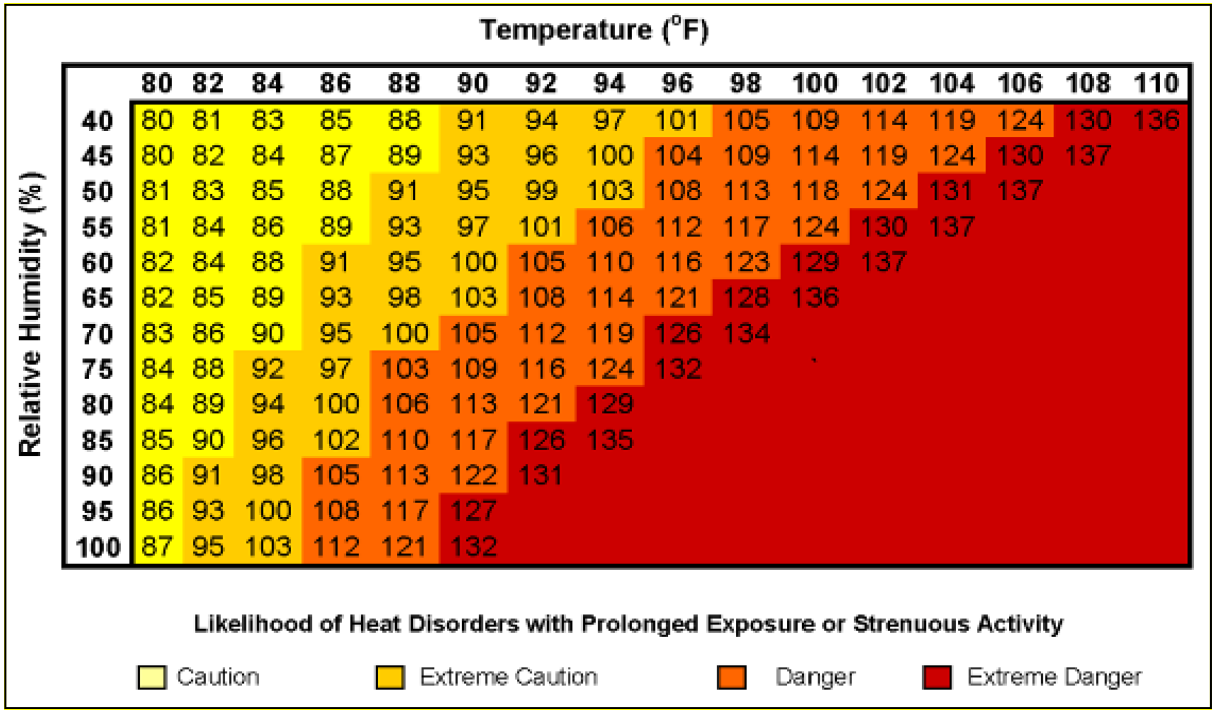
Temporary periods of extreme hot or cold temperatures typically do not have significant environmental impacts. However, prolonged periods of hot temperatures could be associated with drought conditions and can damage or destroy vegetation, dry up rivers and streams, and

reduce water quality. Prolonged exposure to extremely cold temperatures can kill wildlife and vegetation (PEMA, 2018).

Extreme Heat

NOAA's heat alert procedures are based mainly on heat index values. The heat index is given in degrees Fahrenheit. The heat index is a measure of how hot it really feels when relative humidity is factored in with the actual air temperature. To find the heat index temperature, the temperature and relative humidity need to be known. Once both values are known, the heat index will be the corresponding number with both values (Figure 4.3.3-5). The heat index indicates the temperature the body feels. It is important to know that the heat index values are devised for shady, light wind conditions. Exposure to full sunshine can increase heat index values by up to 15°F. Strong winds, particularly with very hot dry air, can also be extremely hazardous (NWS, 2024).

Figure 4.3.3-5 NWS Heat Index Chart (NWS, 2024)



Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
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										

For heat events, the NWS issues excessive heat outlooks when the potential exists for an excessive heat event in the next three to seven days. Watches are issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. Excessive heat warning/advisories are issued when an excessive heat event is expected in the next 36 hours (NWS, n.d.).

Extremely high temperatures cause heat stress. Major health risks for these temperatures include heat cramps, heat syncope, heat exhaustion, heatstroke, and death. The impacts of high

temperatures will vary from person to person based on age, health, and other factors. The elderly and very young are most vulnerable to health-related impacts of extreme temperatures (CDC, 2023).

Extreme heat is the number one weather-related cause of death in the United States. In a 30-year average of weather fatalities across the nation from 1988 to 2017, excessive heat claimed more lives each year than floods, lightning, tornadoes, and hurricanes. In 2023, heat claimed 555 lives nationally, with one fatality occurring in Pennsylvania (NWS, 2023).

Extreme Cold

The extent (severity or magnitude) of extreme cold temperatures is generally measured through the wind chill temperature (WCT) index. WCT is the temperature that people and animals feel when outside, and it is based on the rate of heat loss from exposed skin by the effects of wind and cold. As the wind increases, the body is cooled at a faster rate causing the skin's temperature to drop (NWS, n.d.).

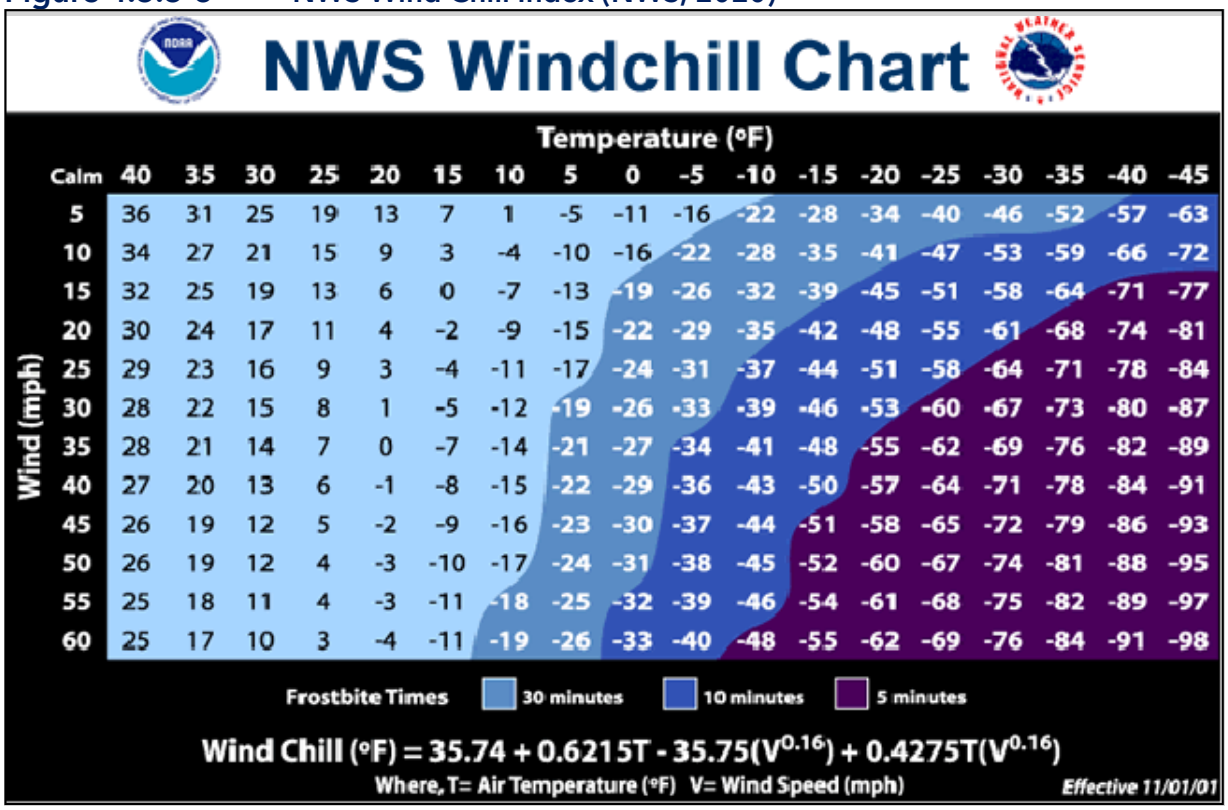
On November 1, 2001, the NWS implemented a new WCT index. It was designed to calculate how cold air feels on human skin more accurately. The table below shows the new WCT index. The WCT index includes a frostbite indicator, showing points where temperature, wind speed, and exposure time will produce frostbite to humans. Figure 4.3.3-6 shows three shaded areas of frostbite danger. Each shaded area shows how long a person can be exposed before frostbite develops (NWS, n.d.).

In Pennsylvania, wind chill warnings are issued when wind chills drop to -25°F or lower. While this threshold applies to the entire state, the threshold for advisories vary based on regions. Wind chill advisories are issued in the southeast and western sections of Pennsylvania when wind chill values drop to -10°F. South-central to northern sections of the Commonwealth when wind chills drop to -15°F (NWS, 2015).

The NWS issues the nation's Freeze Watch, Warning, and Frost Advisory (NWS, 2020):

- Hard Freeze Warning: NWS issues a hard freeze warning when temperatures are expected to drop below 28°F for an extended period of time, killing most types of commercial crops and residential plants.
- Freeze Warning: When temperatures are forecasted to go below 32°F for a long period of time, NWS issues a freeze warning. This temperature threshold kills some types of commercial crops and residential plants.
- Freeze Watch: NWS issues a freeze watch when there is a potential for significant, widespread freezing temperatures within the next 24-36 hours. A freeze watch is issued in the autumn until the end of the growing season and in the spring at the start of the growing season.
- Frost Advisory: A frost advisory means areas of frost are expected or occurring, posing a threat to sensitive vegetation.

Figure 4.3.3-6 NWS Wind Chill Index (NWS, 2020)



NWS Windchill Chart

Temperature (°F)

Wind (mph)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

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 wind drawing heat from the body under cold temperatures. These values represent what temperatures actually feel like to humans and animals under cold, windy conditions. Similar to high temperatures, the effect of cold temperatures will vary by individual (CDC, 2013).

The potential impacts of extreme temperature on community lifelines are as follows:

Table 4.3.3-1 Most Likely Lifelines Affected by Extreme Temperature

LIFELINES	NOTES
Safety and Security	Government operations and facilities, including police and fire, will be needed for response and recovery. Landlords and utility companies will need to respond to infrastructure issues for residents.

Table 4.3.3-1 Most Likely Lifelines Affected by Extreme Temperature

LIFELINES	NOTES
	Medical care will be needed in extreme events, and the facilities themselves will need effective heating and cooling infrastructure.
	Extreme temperatures will lead to a larger strain on the power grid due to an increased usage of heating and cooling utilities in response.

4.3.3.3. Past Occurrence

Many sources provided historical information regarding previous occurrences and losses associated with extreme temperature events throughout Chester County. Note that loss and impact information for many events varies depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

Based on data from the National Centers for Environmental Information (NCEI), Table 4.3.3-2 presents the number of extreme cold (minimum) and heat (maximum) temperature records for the weather stations located in Chester County between January 2013 and December 2024. In this period, Chester County experienced 48 extreme temperature events (NOAA-NCEI, 2024a). However, details for all events were not readily available.

Table 4.3.3-2 Previous Temperature Extremes Impacting Chester County, 2013-2024 (NOAA NCEI, 2024a)

DATE	EVENT	TEMPERATURE (HEAT INDEX AND WIND CHILL)	DEATHS	INJURIES	PROPERTY DAMAGE RECORDED	CROP DAMAGE RECORDED
7/6/2013	Excessive Heat	Mid 90s° F (heat index 96-101)	0	0	$0.00	$0.00
7/6/2013	Heat	Mid 90s° F (heat index 96-101)	0	0	$0.00	$0.00
7/15/2013	Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
7/15/2013	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
7/18/2013	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
9/11/2013	Heat	Low 90s° F (heat index 100 - 105)	0	0	$0.00	$0.00
9/11/2013	Heat	Low 90s° F (heat index 100 - 105)	0	0	$0.00	$0.00
1/4/2014	Extreme Cold/Wind Chill	-5° F(with wind chill)	0	0	$0.00	$0.00
1/4/2014	Extreme Cold/Wind Chill	-5° F(with wind chill)	0	0	$0.00	$0.00
1/7/2014	Cold/Wind Chill	-21°F (with wind chill)	0	0	$0.00	$0.00
1/7/2014	Cold/Wind Chill	-21°F (with wind chill)	0	0	$0.00	$0.00
1/22/2014	Cold/Wind Chill	-1°F (with wind chill)	0	0	$0.00	$0.00
1/22/2014	Cold/Wind Chill	-1°F (with wind chill)	0	0	$0.00	$0.00
6/17/2014	Heat	93°F (heat index mid 90s)	0	0	$0.00	$0.00
7/2/2014	Heat	94°F (heat index 100 - 105)	0	0	$0.00	$0.00
7/2/2014	Heat	94°F (heat index 100 - 105)	0	0	$0.00	$0.00
1/7/2015	Cold/Wind Chill	-6°F (with wind chill)	0	0	$0.00	$0.00
1/7/2015	Cold/Wind Chill	-6°F (with wind chill)	0	0	$0.00	$0.00
2/13/2015	Cold/Wind Chill	-25°F (with wind chill)	0	0	$0.00	$0.00
2/13/2015	Cold/Wind Chill	-25°F (with wind chill)	0	0	$0.00	$0.00
2/15/2015	Cold/Wind Chill	-15°F (with wind chill)	0	0	$0.00	$0.00
2/15/2015	Cold/Wind Chill	-15°F (with wind chill)	0	0	$0.00	$0.00
2/15/2015	Cold/Wind Chill	-20°F (with wind chill)	0	0	$0.00	$0.00
2/15/2015	Cold/Wind Chill	-20°F (with wind chill)	0	0	$0.00	$0.00
2/19/2015	Cold/Wind Chill	-20°F (with wind chill)	0	0	$0.00	$0.00
2/19/2015	Cold/Wind Chill	-20°F (with wind chill)	0	0	$0.00	$0.00
2/24/2015	Cold/Wind Chill	-12°F (with wind chill)	0	0	$0.00	$0.00
2/24/2015	Cold/Wind Chill	-12°F (with wind chill)	0	0	$0.00	$0.00
6/23/2015	Heat	93°F (heat index mid 100s)	0	0	$0.00	$0.00

Table 4.3.3-2 Previous Temperature Extremes Impacting Chester County, 2013-2024 (NOAA NCEI, 2024a)

DATE	EVENT	TEMPERATURE (HEAT INDEX AND WIND CHILL)	DEATHS	INJURIES	PROPERTY DAMAGE RECORDED	CROP DAMAGE RECORDED
7/19/2015	Excessive Heat	93°F (heat index mid 100s)	0	0	$0.00	$0.00
7/19/2015	Heat	93°F (heat index mid 100s)	0	0	$0.00	$0.00
2/14/2016	Cold/Wind Chill	-13°F (with wind chill)	0	0	$0.00	$0.00
7/1/2018	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
7/3/2018	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
8/11/2021	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
8/11/2021	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
8/9/2022	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
12/23/2022	Cold/Wind Chill	-10°F (with wind chill)	0	0	$0.00	$0.00
12/23/2022	Cold/Wind Chill	-15°F (with wind chill)	0	0	$0.00	$0.00
6/22/2024	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
6/22/2024	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
7/5/2024	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
7/5/2024	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
7/9/2024	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
7/9/2024	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
7/10/2024	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
8/2/2024	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00
8/2/2024	Excessive Heat	Upper 90s° F (heat index 105 - 109)	0	0	$0.00	$0.00

Between 1954 and 2024, Pennsylvania was not included in major disaster (DR) or emergency (EM) declarations from extreme temperatures as declared by FEMA and state emergency management agencies (FEMA, 2024). Agriculture-related disaster declarations are quite common. One-half to two-thirds of the counties in the United States have been designated as disaster areas in each of the past several years. The U.S. Department of Agriculture (USDA) Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and in counties that are contiguous to a designated county. Between 2012 and 2018, Pennsylvania has been included in 26 USDA declarations related to extreme temperatures. Chester County has not been included in these declarations

4.3.3.4. Future Occurrence

Extreme temperature events occur each year throughout Chester County. It is estimated that the county will continue to experience temperature extremes annually that may come with secondary hazards such as potential snow, hail, ice or windstorms, thunderstorms, drought, human health impacts, utility failures, and transportation accidents.

For this HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of extreme temperature events for Chester County. Information from NOAA-NCEI storm events database and MRCC were used to identify the number of extreme temperature events that occurred between 1950 and 2024. Using these sources ensures the most accurate probability estimates possible.

Both globally and at the local scale, climate change has the potential to alter the prevalence and severity of extremes such as temperature extremes. While predicting changes of extreme temperature events under a changing climate is difficult, understanding vulnerabilities to potential changes is a critical part of estimating future climate change impacts on human health, society, and the environment (US EPA, 2024b). Figure 4.3.3-7 shows these statistics as well as the annual average number of events and the estimate percent chance of an incident occurring in a given year. Based on these statistics, there is an estimated 27 percent chance of an extreme temperature event occurring in any given year in Chester County.

Based on available historical data and potential future conditions, the future occurrence of extreme temperatures can be considered possible as defined by the Risk Factor Methodology Probability criteria (see Section 4.4).

Figure 4.3.3-7 Chester County Extreme Heat Hazard Assessment Report (CRMA,2024)



Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Temperature thresholds:							
Annual days with maximum temperature > 90°F	3 days 3 - 7	13 days 5 - 29	15 days 6 - 28	20 days 7 - 43	27 days 10 - 49	28 days 9 - 60	58 days 19 - 93
Annual days with maximum temperature > 95°F	0 days 0 - 1	3 days 0 - 11	3 days 1 - 10	5 days 1 - 22	9 days 1 - 24	9 days 1 - 33	28 days 4 - 67
Annual days with maximum temperature > 100°F	0 days 0 - 0	0 days 0 - 2	0 days 0 - 4	1 days 0 - 7	2 days 0 - 13	2 days 0 - 7	11 days 0 - 45
Annual days with maximum temperature > 105°F	0 days 0 - 0	0 days 0 - 0	0 days 0 - 1	0 days 0 - 1	0 days 0 - 5	0 days 0 - 3	4 days 0 - 28
Annual temperature:							
Annual single highest maximum temperature °F	92 °F 91 - 93	96 °F 93 - 99	96 °F 94 - 101	98 °F 94 - 103	99 °F 95 - 106	99 °F 95 - 106	104 °F 95 - 114
Annual highest maximum temperature averaged over a 5-day period °F	88 °F 87 - 88	91 °F 88 - 95	91 °F 89 - 95	93 °F 89 - 98	94 °F 90 - 101	94 °F 90 - 101	99 °F 91 - 110
Cooling degree days (CDD)	459 degree-days 405 - 502	718 degree-days 550 - 969	758 degree-days 564 - 1,024	875 degree-days 618 - 1,241	1,018 degree-days 729 - 1,389	1,041 degree-days 667 - 1,559	1,629 degree-days 1,003 - 2,394

N/A = Data Not Available for the selected area

4.3.3.5. Vulnerability Assessment

Extreme temperatures generally occur for a short period of time but can cause a range of impacts, particularly to vulnerable populations that may not have access to adequate cooling or heating. This natural hazard can also cause impacts to agriculture (crops and animals), infrastructure (i.e., burst pipes associated with freezing, power failure), and the economy.

For the purposes of this HMP, the entire population of Chester County is considered exposed to extreme temperature events. The County Profile (Section 2) of this HMP provides population statistics regarding each participating municipality and a summary of the more vulnerable populations (over the age of 65 and individuals living below the U.S. Census poverty threshold). According to the CDC, populations most at risk to extreme cold and heat events include the following (CDC, 2024b):

- The elderly, who are less able to withstand temperature extremes due to their age, health conditions, and limited mobility to access shelters.
- Infants and children up to 4 years of age.
- Individuals with chronic medical conditions (e.g., heart disease, high blood pressure).
- Low- income persons that cannot afford proper heating and cooling.
- The general public who may overexert during work or exercise during extreme heat events or experience hypothermia during extreme cold events.

Table 4.3.3-2 below shows the populations aged five or younger in each municipality, along with the population percentage. The municipalities with the largest populations of those aged five and younger are West Whiteland Township, Tredyffrin Township, Phoenixville Borough, and West Goshen Township. Other municipalities with over 10 percent of their population aged five or younger are Elverson Borough, East Vincent Borough, Atglen Borough, West Fallowfield Borough, and Oxford Borough.

Table 4.3.3-3 Population Aged 5 or Younger by Municipality (U.S. Census, 2023)

MUNICIPALITY	Population 5 or Under	PERCENT OF POPULATION
Atglen Borough	146	11.1%
Avondale Borough	73	5.7%
Birmingham Township	165	4.0%
Caln Township	727	5.0%
Charlestown Township	171	2.8%
Coatesville City	937	7.0%
Downingtown Borough	532	6.5%
East Bradford Township	419	4.0%
East Brandywine Township	467	4.7%
East Caln Township	292	5.3%
East Coventry Township	451	6.3%
East Fallowfield Township	366	4.7%

Table 4.3.3-3 Population Aged 5 or Younger by Municipality (U.S. Census, 2023)

MUNICIPALITY	Population 5 or Under	PERCENT OF POPULATION
East Goshen Township	705	3.8%
East Marlborough Township	335	4.4%
East Nantmeal Township	78	4.7%
East Nottingham Township	417	4.6%
East Pikeland Township	446	5.3%
Easttown Township	367	3.3%
East Vincent Township	859	11.4%
East Whiteland Township	630	4.4%
Elk Township	68	3.9%
Elverson Borough	168	12.1%
Franklin Township	153	3.5%
Highland Township	62	5.1%
Honey Brook Borough	178	8.5%
Honey Brook Township	360	4.3%
Kennett Township	367	4.2%
Kennett Square Borough	446	7.3%
London Britain Township	205	6.4%
Londonderry Township	159	6.3%
London Grove Township	720	8.1%
Lower Oxford Township	199	3.6%
Malvern Borough	115	3.4%
Modena Borough	19	5.5%
New Garden Township	470	4.1%
Newlin Township	41	3.4%
New London Township	214	3.7%
North Coventry Township	230	2.7%
Oxford Borough	604	10.5%
Parkesburg Borough	382	9.8%
Penn Township	86	1.5%
Pennsbury Township	178	4.6%
Phoenixville Borough	1,166	6.1%
Pocopson Township	165	3.7%
Sadsbury Township	409	9.6%
Schuylkill Township	515	5.8%
South Coatesville Borough	115	6.2%
South Coventry Township	103	3.7%
Spring City Borough	185	5.2%
Thornbury Township	262	8.2%
Tredyffrin Township	1,485	4.7%
Upper Oxford Township	236	9.3%
Upper Uwchlan Township	748	5.9%
Uwchlan Township	1,211	6.3%

Table 4.3.3-3 Population Aged 5 or Younger by Municipality (U.S. Census, 2023)

MUNICIPALITY	Population 5 or Under	PERCENT OF POPULATION
Valley Township	268	3.4%
Wallace Township	148	4.0%
Warwick Township	41	1.6%
West Bradford Township	685	4.7%
West Brandywine Township	335	4.4%
West Caln Township	564	6.3%
West Chester Borough	453	2.4%
West Fallowfield Township	266	10.9%
West Goshen Township	1,110	4.8%
West Grove Borough	205	7.3%
West Marlborough Township	30	3.4%
West Nantmeal Township	104	4.7%
West Nottingham Township	252	9.0%
West Pikeland Township	174	4.3%
West Sadsbury Township	217	8.4%
Westtown Township	866	7.7%
West Vincent Township	457	6.8%
West Whiteland Township	1,538	7.7%
Willistown Township	732	6.5%

Table 4.3.3-3 below shows the populations aged 65 or older in each municipality, along with the population percentage. The municipalities with the largest populations are East Goshen Township, Tredyffrin Township, and West Goshen Township. Both East Goshen Township and Elverson Borough have at least one-third of their population aged 65 or older.

Table 4.3.3-4 Population Aged 65 or Older by Municipality (U.S. Census, 2023)

MUNICIPALITY	Population 65 or older	PERCENT OF POPULATION
Atglen Borough	94	7.1%
Avondale Borough	128	10.0%
Birmingham Township	853	20.9%
Caln Township	2,615	18.0%
Charlestown Township	870	14.1%
Coatesville City	1,493	11.2%
Downingtown Borough	1,182	14.5%
East Bradford Township	1,835	17.3%
East Brandywine Township	1,309	13.2%
East Caln Township	952	17.3%
East Coventry Township	1,255	17.6%
East Fallowfield Township	993	12.8%

Table 4.3.3-4 Population Aged 65 or Older by Municipality (U.S. Census, 2023)

MUNICIPALITY	Population 65 or older	PERCENT OF POPULATION
East Goshen Township	6,429	35.0%
East Marlborough Township	1,872	24.7%
East Nantmeal Township	525	31.8%
East Nottingham Township	1211	13.4%
East Pikeland Township	1,675	19.9%
Easttown Township	1,992	18.1%
East Vincent Township	1,160	15.4%
East Whiteland Township	1,739	12.0%
Elk Township	271	15.7%
Elverson Borough	460	33.0%
Franklin Township	746	16.8%
Highland Township	220	18.0%
Honey Brook Borough	233	11.2%
Honey Brook Township	2,428	29.2%
Kennett Township	2,316	26.4%
Kennett Square Borough	909	14.9%
London Britain Township	543	17.0%
Londonderry Township	539	21.3%
London Grove Township	1,053	11.9%
Lower Oxford Township	517	9.3%
Malvern Borough	746	21.8%
Modena Borough	39	11.2%
New Garden Township	1,719	15.0%
Newlin Township	330	27.0%
New London Township	612	10.5%
North Coventry Township	1,589	18.9%
Oxford Borough	1,027	17.8%
Parkesburg Borough	481	12.4%
Penn Township	1,739	30.8%
Pennsbury Township	915	23.6%
Phoenixville Borough	2,438	12.8%
Pocopson Township	937	21.0%
Sadsbury Township	549	12.9%
Schuylkill Township	1,183	13.4%
South Coatesville Borough	212	11.5%
South Coventry Township	442	15.8%
Spring City Borough	458	12.9%
Thornbury Township	411	12.9%
Tredyffrin Township	5,707	17.9%
Upper Oxford Township	430	16.9%
Upper Uwchlan Township	1,376	10.8%
Uwchlan Township	3,298	17.1%

Table 4.3.3-4 Population Aged 65 or Older by Municipality (U.S. Census, 2023)

MUNICIPALITY	Population 65 or older	PERCENT OF POPULATION
Valley Township	1,129	14.2%
Wallace Township	730	19.5%
Warwick Township	677	26.1%
West Bradford Township	2,022	13.9%
West Brandywine Township	2,249	29.9%
West Caln Township	1,916	21.4%
West Chester Borough	1,840	9.6%
West Fallowfield Township	362	14.9%
West Goshen Township	4,638	19.9%
West Grove Borough	278	10.0%
West Marlborough Township	242	27.2%
West Nantmeal Township	473	21.5%
West Nottingham Township	433	15.4%
West Pikeland Township	544	13.5%
West Sadsbury Township	453	17.6%
Westtown Township	2,143	19.1%
West Vincent Township	936	13.9%
West Whiteland Township	2,574	12.9%
Willistown Township	2,948	26.1%

Table 4.3.3-4 below shows the disabled populations in each municipality, along with the population percentage. The municipalities with the largest populations of persons with disabilities are East Goshen Township, Tredyffrin Township, and Coatesville City

Table 4.3.3-5 Disabled Population by Municipality (U.S. Census, 2023)

MUNICIPALITY	Disabled population	PERCENT OF POPULATION
Atglen Borough	156	11.8%
Avondale Borough	116	9.0%
Birmingham Township	201	4.9%
Caln Township	1,838	12.6%
Charlestown Township	407	6.6%
Coatesville City	2,283	17.1%
Downingtown Borough	852	10.4%
East Bradford Township	750	7.1%
East Brandywine Township	582	5.9%
East Caln Township	345	6.3%
East Coventry Township	750	10.5%
East Fallowfield Township	1,172	15.1%
East Goshen Township	2,495	13.6%

Table 4.3.3-5 Disabled Population by Municipality (U.S. Census, 2023)

MUNICIPALITY	Disabled population	PERCENT OF POPULATION
East Marlborough Township	591	7.8%
East Nantmeal Township	179	10.8%
East Nottingham Township	823	9.1%
East Pikeland Township	870	10.3%
Easttown Township	709	6.4%
East Vincent Township	792	10.5%
East Whiteland Township	1,204	8.3%
Elk Township	131	7.6%
Elverson Borough	253	18.2%
Franklin Township	253	5.7%
Highland Township	150	12.2%
Honey Brook Borough	215	10.3%
Honey Brook Township	1,267	15.2%
Kennett Township	789	9.0%
Kennett Square Borough	701	11.5%
London Britain Township	198	6.2%
Londonderry Township	252	10.0%
London Grove Township	1,253	14.1%
Lower Oxford Township	506	9.1%
Malvern Borough	305	8.9%
Modena Borough	66	19.0%
New Garden Township	1,044	9.1%
Newlin Township	82	6.7%
New London Township	372	6.4%
North Coventry Township	976	11.6%
Oxford Borough	904	15.7%
Parkesburg Borough	494	12.7%
Penn Township	531	9.4%
Pennsbury Township	359	9.3%
Phoenixville Borough	1,803	9.5%
Pocopson Township	213	4.8%
Sadsbury Township	265	6.2%
Schuylkill Township	869	9.9%
South Coatesville Borough	282	15.3%
South Coventry Township	252	9.0%
Spring City Borough	656	18.5%
Thornbury Township	183	5.8%
Tredyffrin Township	2,383	7.5%
Upper Oxford Township	223	8.8%
Upper Uwchlan Township	596	4.7%
Uwchlan Township	1,351	7.0%
Valley Township	1,169	14.7%

Table 4.3.3-5 Disabled Population by Municipality (U.S. Census, 2023)

MUNICIPALITY	Disabled population	PERCENT OF POPULATION
Wallace Township	153	4.1%
Warwick Township	233	9.0%
West Bradford Township	1,204	8.3%
West Brandywine Township	895	11.9%
West Caln Township	1,176	13.2%
West Chester Borough	1,955	10.2%
West Fallowfield Township	168	6.9%
West Goshen Township	1,687	7.2%
West Grove Borough	300	10.7%
West Marlborough Township	65	7.3%
West Nantmeal Township	65	3.0%
West Nottingham Township	333	11.9%
West Pikeland Township	200	5.0%
West Sadsbury Township	214	8.3%
Westtown Township	1,014	9.1%
West Vincent Township	454	6.7%
West Whiteland Township	1,069	5.4%
Willistown Township	766	6.8%

All the building stock in the county is exposed to extreme temperatures. Refer to Section 2, which summarizes the building inventory in Chester County. Extreme heat generally does not impact buildings. Losses may be associated with the overheating of heating, ventilation, and air conditioning (HVAC) systems. Extreme cold temperature events can damage buildings through freezing/bursting pipes and freeze/thaw cycles. Additionally, manufactured homes and antiquated or poorly constructed facilities may have inadequate capabilities to withstand extreme temperatures.

All critical facilities in the county are exposed to the extreme temperature hazard. Impacts to critical facilities are the same as described for general building stock. Additionally, it is essential that critical facilities remain operational during natural hazard events. Extreme heat events can sometimes cause short periods of utility failures, commonly referred to as "brown-outs," due to increased usage from air conditioners and other appliances. Similarly, heavy snowfall and ice storms associated with extreme cold temperature events can cause power interruption as well. Backup power is recommended for critical facilities and infrastructure. Critical facilities can serve as cooling and warming shelters for communities when utility interruptions occur during extreme heat or cold events.

The agricultural industry is most at risk in terms of economic impact and damage due to extreme temperature events. Extreme heat events can result in drought and dry conditions and directly impact livestock and crop production. Based on the 2022 Census of Agriculture, 1,558 farms were operating in Chester County, with a total of 143,442 acres of farmland. The average farm

size was between 92 acres. Chester County's farms had a total market value of products sold of over $736,075,000. (USDA, 2022).

4.3.3.6. Equity in Vulnerable Communities

Low-income households and renter households may be at greater risk during extreme weather risks. Energy bills may be disproportionately expensive regarding income in these households and in the event of heating and cooling system malfunctions, renters may be unable to make key decisions. Elderly populations (those 65+ and older) will need extra consideration as they are more susceptible to negative health effects related to extreme temperatures. According to FEMA's CRCI indicator data, areas with high percentage of renters are more susceptible, which includes West Chester Borough, West Whiteland Township, City of Coatesville, Oxford Borough, Phoenixville Borough, Downingtown Borough, East Goshen Township, Kennett Square Borough, Uwchlan Township, Spring City Borough, and North Coventry Township. East Goshen Township, Kennett Township, West Brandywine Township, and Willistown Township may be particularly vulnerable due to the presence of census tracts where over one-third of the population is aged 65 or older. Meteorologists can accurately forecast extreme heat event development and the severity of the associated conditions with several days of lead time. These forecasts provide an opportunity for public health and other officials to notify vulnerable populations, implement short-term emergency response actions and focus on surveillance and relief efforts on those at greatest risk. Adhering to extreme temperature warnings can significantly reduce the risk of temperature-related deaths.

4.3.4. Flood, Flash Flood, Ice Jam



4.3.4.1. Location and Extent

Floods are one of the most common natural hazards in the United States and are the most prevalent type of natural disaster occurring in Pennsylvania. Over 94 percent of the Commonwealth's municipalities have been designated as flood-prone areas, and respondents to the Hazard Identification survey ranked floods in the top five hazards threatening Chester County. Both seasonal and flash floods have been causes of millions of dollars in annual property damage, loss of lives, and disruption of economic activities (Pennsylvania Emergency Management Agency [PEMA], 2023).

Flooding is the temporary condition of partial or complete inundation on normally dry land. It is the most frequent and costly of all natural hazards in Pennsylvania. Like most of Pennsylvania, Chester County experiences three kinds of flooding.

Riverine flooding happens when the water level in a waterway rises and flows onto neighboring lowlands called floodplains. It is the most common type of flooding in Pennsylvania. Riverine flooding can be caused by prolonged rainfall or snow melt. Snow melt combined with heavy rain can also cause frozen rivers to swell and break the ice layer on top of a river. If this occurs, large chunks can float downstream, piling up in narrow passages and near other obstructions such as bridges and dams. These are called ice jams.

Flash flooding happens when intense rainfall overwhelms drainage systems, causing flooding outside of floodplains and waterways. Flash flooding may come from heavy, intense rainfall or from a small amount of rain in locations where water cannot infiltrate the ground. This includes when soil is frozen or saturated from a previous wet period or if the rain concentrates in an area with impervious surfaces like large parking lots, paved roadways, or other densely developed areas. In addition, if an ice jam were to break, it could cause a flash flood.

Stormwater flooding is caused by local drainage issues and high groundwater levels. Heavy precipitation may produce flooding in areas other than delineated floodplains or along recognizable channels. According to PEMA, since 1993, 96 percent of flooding reported to the NWS in Pennsylvania occurred outside of the 1-percent annual chance floodplain. If local conditions cannot accommodate intense precipitation through a combination of infiltration and surface runoff, water may accumulate and cause flooding problems. During winter and spring, frozen ground and snow accumulations may contribute to inadequate drainage and localized ponding. Stormwater flooding issues generally occur in areas with flat gradients and increase with urbanization. Urbanization speeds the accumulation of floodwater because of impervious areas.

Increased water runoff due to urban development and drainage systems causes urban drainage flooding. Drainage systems are designed to remove surface water from developed areas as quickly as possible to prevent localized flooding on streets and other urban areas. They make use of a closed conveyance system that channels water away from an urban area to surrounding

streams. This bypasses the natural processes of water filtration through the ground, containment, and evaporation of excess water. Since drainage systems reduce the amount of time the surface water takes to reach surrounding streams, flooding in those streams can occur more quickly and reach greater depths than those prior to development in that area (FEMA, 2007).

Flooding can also be caused by sudden snowmelt, landslides, or dam failures. In Pennsylvania, flooding usually occurs in the summer; however, it has occurred during the winter months as well. Chester County's greatest riverine flooding threat is along the Schuylkill and Brandywine Rivers. Other major waterways within the county include the White Clay, French, Octorara, Red Clay, and Elk. All jurisdictions can experience flash flooding under the right conditions, and stormwater and shallow flooding are often seen more in urbanized areas that have higher proportions of impervious surfaces or have stormwater systems that do not meet current capacity needs.

Additionally, as described in the Dam Failure Hazard Profile in Appendix G, Chester County has 17 high-hazard dams located within the County. If any one of these dams were to fail, there could be loss of life and property damage resulting from flooding within the dam inundation areas.

All municipalities in Chester County can experience flooding, though the type and magnitude will vary. Community development of the floodplain has resulted in frequent flooding. For inland areas like Chester County, excess water from snowmelt or rainfall accumulates and overflows onto stream banks and adjacent floodplains. According to Chester County Water Resources Authority (CCWRA), Chester County's historic annual average for total rainfall is 47.11 inches (CCWRA, 2025).

Table 4.3.4-1 lists total land areas within the 1-percent and 0.2-percent annual chance flood zones calculated via a spatial analysis referencing FEMA's 2017 Digital Flood Insurance Rate Map (DFIRM). The 1-percent annual chance flood area is known as the Special Flood Hazard Area (SFHA). Avondale and Modena Boroughs have the largest proportion of land in the 1-percent and 0.2-percent annual chance flood areas. Two communities, Honey Brook and West Grove Boroughs, have no land in the FEMA flood zones.

Table 4.3.4-1 Land Areas Within Flood Hazard Areas By Municipality

JURISDICTION	NFIP-PARTICIPATING COMMUNITY	TOTAL AREA (ACRES)	1% ANNUAL CHANCE FLOOD HAZARD AREA		0.2% ANNUAL CHANCE FLOOD HAZARD AREA	
			AREA (ACRES)	% OF TOTAL	AREA (ACRES)	% OF TOTAL
Atglen Borough	Yes	564.6	85.7	15%	90.0	16%
Avondale Borough	Yes	317.2	105.2	33%	117.6	37%

Table 4.3.4-1 Land Areas Within Flood Hazard Areas By Municipality

JURISDICTION	NFIP-PARTICIPATING COMMUNITY	TOTAL AREA (ACRES)	1% ANNUAL CHANCE FLOOD HAZARD AREA		0.2% ANNUAL CHANCE FLOOD HAZARD AREA	
			AREA (ACRES)	% OF TOTAL	AREA (ACRES)	% OF TOTAL
Birmingham Township	Yes	4,115.2	642.0	16%	657.9	16%
Caln Township	Yes	5,705.5	479.4	8%	598.4	10%
Charlestown Township	Yes	8,015.4	316.3	4%	324.1	4%
Coatesville City	Yes	1,168.7	107.5	9%	139.2	12%
Downingtown Borough	Yes	1,423.3	269.9	19%	306.6	22%
East Bradford Township	Yes	9,699.2	1,309.4	14%	1,334.2	14%
East Brandywine Township	Yes	7,203.0	413.6	6%	443.4	6%
East Caln Township	Yes	2,356.3	132.8	6%	140.1	6%
East Coventry Township	Yes	6,983.1	967.4	14%	1,121.4	16%
East Fallowfield Township	Yes	9,993.4	553.5	6%	623.8	6%
East Goshen Township	Yes	6,504.3	727.2	11%	776.6	12%
East Marlborough Township	Yes	9,948.2	562.8	6%	580.5	6%
East Nantmeal Township	Yes	10,484.9	845.0	8%	845.1	8%
East Nottingham Township	Yes	12,892.1	648.0	5%	648.0	5%
East Pikeland Township	Yes	5,692.2	499.0	9%	666.3	12%
East Vincent Township	Yes	8,736.2	930.2	11%	961.1	11%
East Whiteland Township	Yes	7,041.5	326.6	5%	326.7	5%
Easttown Township	Yes	5,291.4	224.5	4%	283.2	5%
Elk Township	Yes	6,480.2	418.5	6%	418.5	6%
Elverson Borough	Yes	643.4	15.9	2%	15.9	2%
Franklin Township	Yes	8,410.6	606.4	7%	607.5	7%

Table 4.3.4-1 Land Areas Within Flood Hazard Areas By Municipality

JURISDICTION	NFIP-PARTICIPATING COMMUNITY	TOTAL AREA (ACRES)	1% ANNUAL CHANCE FLOOD HAZARD AREA		0.2% ANNUAL CHANCE FLOOD HAZARD AREA	
			AREA (ACRES)	% OF TOTAL	AREA (ACRES)	% OF TOTAL
Highland Township	Yes	10,998.6	328.9	3%	340.6	3%
Honey Brook Borough	Yes	307.2	0.0	0%	0.0	0%
Honey Brook Township	Yes	16,111.7	1,501.1	9%	1,528.3	9%
Kennett Square Borough	Yes	685.9	46.4	7%	57.6	8%
Kennett Township	Yes	9,908.2	750.1	8%	862.4	9%
London Britain Township	Yes	6,263.2	550.9	9%	550.9	9%
London Grove Township	Yes	11,041.0	797.7	7%	873.1	8%
Londonderry Township	Yes	7,269.7	415.8	6%	420.4	6%
Lower Oxford Township	Yes	11,835.0	910.0	8%	910.0	8%
Malvern Borough	Yes	810.6	22.0	3%	22.0	3%
Modena Borough	Yes	225.9	58.6	26%	63.5	28%
New Garden Township	Yes	10,424.0	480.7	5%	489.1	5%
New London Township	Yes	7,513.9	530.6	7%	530.6	7%
Newlin Township	Yes	7,757.7	977.5	13%	1,025.9	13%
North Coventry Township	Yes	8,646.3	689.9	8%	740.4	9%
Oxford Borough	Yes	1,257.5	34.8	3%	34.8	3%
Parkesburg Borough	Yes	815.4	33.6	4%	43.0	5%
Penn Township	Yes	6,176.2	236.1	4%	237.1	4%
Pennsbury Township	Yes	6,435.6	492.5	8%	523.2	8%
Phoenixville Borough	Yes	2,379.8	328.2	14%	419.2	18%
Pocopson Township	Yes	5,327.8	771.9	14%	797.2	15%

Table 4.3.4-1 Land Areas Within Flood Hazard Areas By Municipality

JURISDICTION	NFIP-PARTICIPATING COMMUNITY	TOTAL AREA (ACRES)	1% ANNUAL CHANCE FLOOD HAZARD AREA		0.2% ANNUAL CHANCE FLOOD HAZARD AREA	
			AREA (ACRES)	% OF TOTAL	AREA (ACRES)	% OF TOTAL
Sadsbury Township	Yes	3,965.5	346.2	9%	348.8	9%
Schuylkill Township	Yes	5,703.4	648.5	11%	704.8	12%
South Coatesville Borough	Yes	1,129.1	75.6	7%	103.6	9%
South Coventry Township	Yes	4,862.0	311.6	6%	315.9	6%
Spring City Borough	Yes	525.3	101.5	19%	130.1	25%
Thornbury Township	Yes	2,473.8	285.7	12%	296.1	12%
Tredyffrin Township	Yes	12,704.6	413.8	3%	451.1	4%
Upper Oxford Township	Yes	10,710.0	567.7	5%	567.7	5%
Upper Uwchlan Township	Yes	7,502.1	1,050.1	14%	1,063.8	14%
Uwchlan Township	Yes	6,691.1	76.5	1%	85.5	1%
Valley Township	Yes	3,819.1	144.5	4%	172.1	5%
Wallace Township	Yes	7,761.3	501.0	6%	551.7	7%
Warwick Township	Yes	12,093.5	983.5	8%	999.2	8%
West Bradford Township	Yes	11,900.7	491.0	4%	1,126.3	9%
West Brandywine Township	Yes	8,483.7	482.7	6%	491.3	6%
West Caln Township	Yes	14,029.1	793.2	6%	856.6	6%
West Chester Borough	Yes	1,181.7	48.0	4%	56.4	5%
West Fallowfield Township	Yes	11,681.8	417.4	4%	417.4	4%
West Goshen Township	Yes	7,680.5	584.4	8%	620.7	8%
West Grove Borough	Yes	416.6	0.0	0%	0.0	0%

Table 4.3.4-1 Land Areas Within Flood Hazard Areas By Municipality

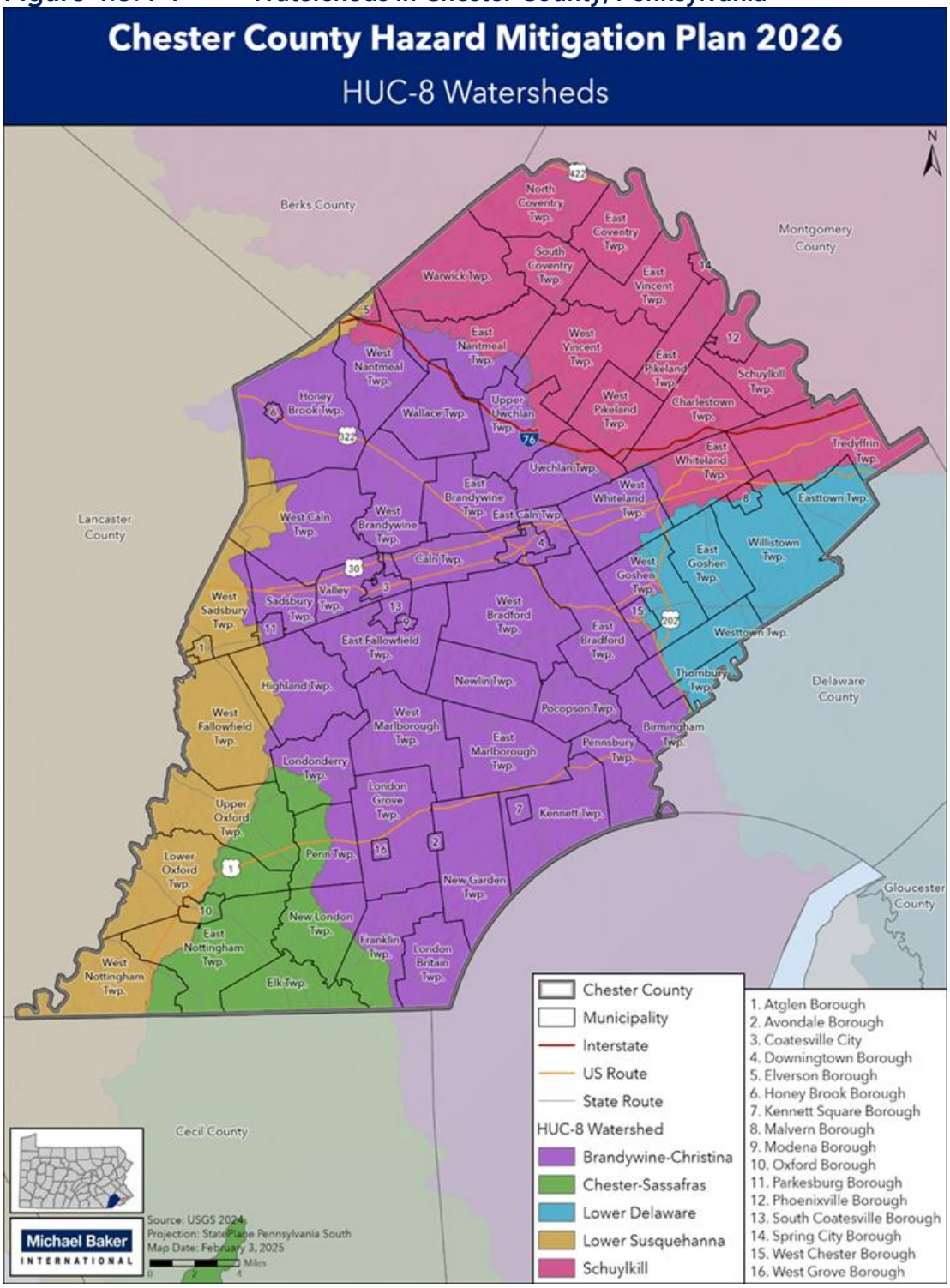
JURISDICTION	NFIP-PARTICIPATING COMMUNITY	TOTAL AREA (ACRES)	1% ANNUAL CHANCE FLOOD HAZARD AREA		0.2% ANNUAL CHANCE FLOOD HAZARD AREA	
			AREA (ACRES)	% OF TOTAL	AREA (ACRES)	% OF TOTAL
West Marlborough Township	Yes	10,930.2	904.3	8%	927.0	8%
West Nantmeal Township	Yes	8,666.6	705.2	8%	733.2	8%
West Nottingham Township	Yes	8,948.3	726.9	8%	726.9	8%
West Pikeland Township	Yes	6,373.9	573.5	9%	596.0	9%
West Sadsbury Township	Yes	6,817.2	551.7	8%	558.8	8%
West Vincent Township	Yes	11,418.0	478.7	4%	482.6	4%
West Whiteland Township	Yes	8,271.2	806.7	10%	880.4	11%
Westtown Township	Yes	5,592.2	321.8	6%	485.8	9%
Willistown Township	Yes	11,692.8	900.4	8%	956.2	8%

Chester County has a stormwater management plan in accordance with the 1978 Pennsylvania Stormwater Management Act (Act 167). Act 167 plans provide for improved management of stormwater impacts associated with land development. These plans address ways to reduce stormwater runoff and flooding outside the SFHA. Chester County's most recent integrated water resources plan, Watersheds 2045, is also the County's Act 167 plan. It promotes watershed-based planning and management. The plan also serves as the county's stormwater management plan in accordance with Act 167. The main seven goals of the plan are as follows:

- Engage and educate individuals, communities, businesses, and governments to promote scientifically based watershed stewardship.
- Expand water-based recreational opportunities and access to local water features.
- Conserve and protect the County's natural resources for clean water.
- Improve surface water and groundwater quality.
- Reduce stormwater runoff and mitigate the impacts of flooding.
- Promote the integration of water resources, natural resources protection, and land use planning.
- Ensure Safe, Sustainable Water Supply and Wastewater Disposal Systems.

Figure 4.3.4-1 shows PADEP-designated watersheds in Chester County.

Figure 4.3.4-1 Watersheds in Chester County, Pennsylvania

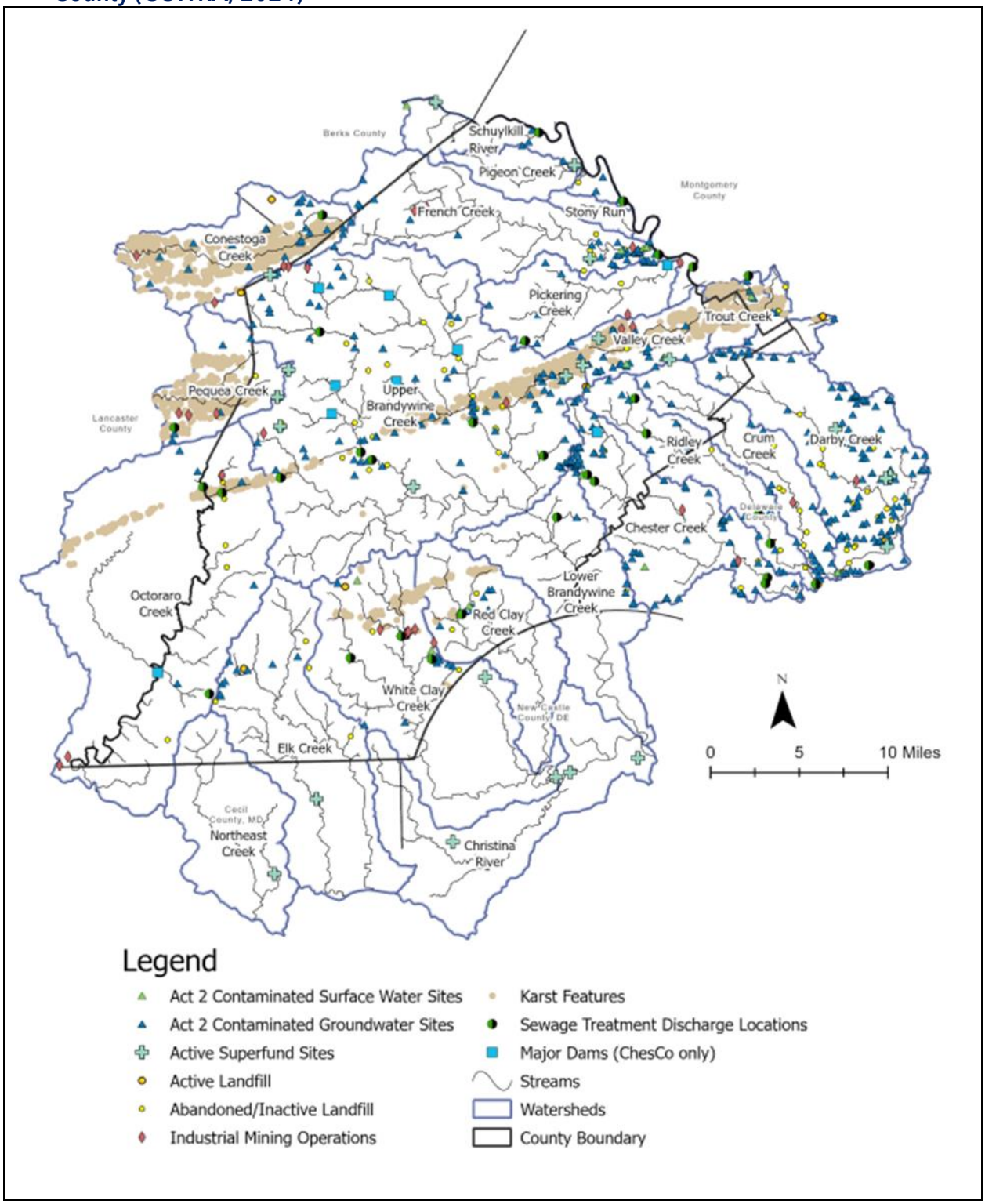


The 2017 FEMA Flood Insurance Study (FIS) for Chester County also documents the major flooding problems in the county. According to the report, flooding is not a widespread problem for the county; this may be attributable to the physical features of the watersheds and stream channels. In addition, residents have limited development in low-lying stream banks and floodplains.

In January 2024, the County released the Watersheds 2045 plan, as noted above. The plan identifies specific problem areas related to flooding and water quality and resources, listed below and shown in Figure 4.3.4-2.

- Pennsylvania Act 2 contaminated sites: Found under the PA Land Recycling Program. These areas include contaminated commercial and industrial sites.
- Active Superfund sites: Sites listed on the National Priorities List for contaminated site remediation under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, informally known as the Superfund program.
- Active and inactive landfills: Sites may become environmental hazards if they are improperly contained or managed.
- Industrial mining operations: Sites within the study area that are for non-coal surface mining, such as rock quarries.
- Karst features and documented sinkholes: Locations that are more prone to subsidence and sinkholes.
- Sewage treatment discharge locations.
- Major dams that serve flood control and/or public water supply functions within Chester County Watersheds.

Figure 4.3.4-2 Known Hazards and Potential Water Resource Concerns in Chester County (CCWRA, 2024)



The report also identifies the following flooding hotspots in each watershed, shown in Figure 4.3.4-3 and listed in Table 4.3.4-2.

Figure 4.3.4-3 Reported Flooding Hotspots in Chester County (CCWRA, 2024)

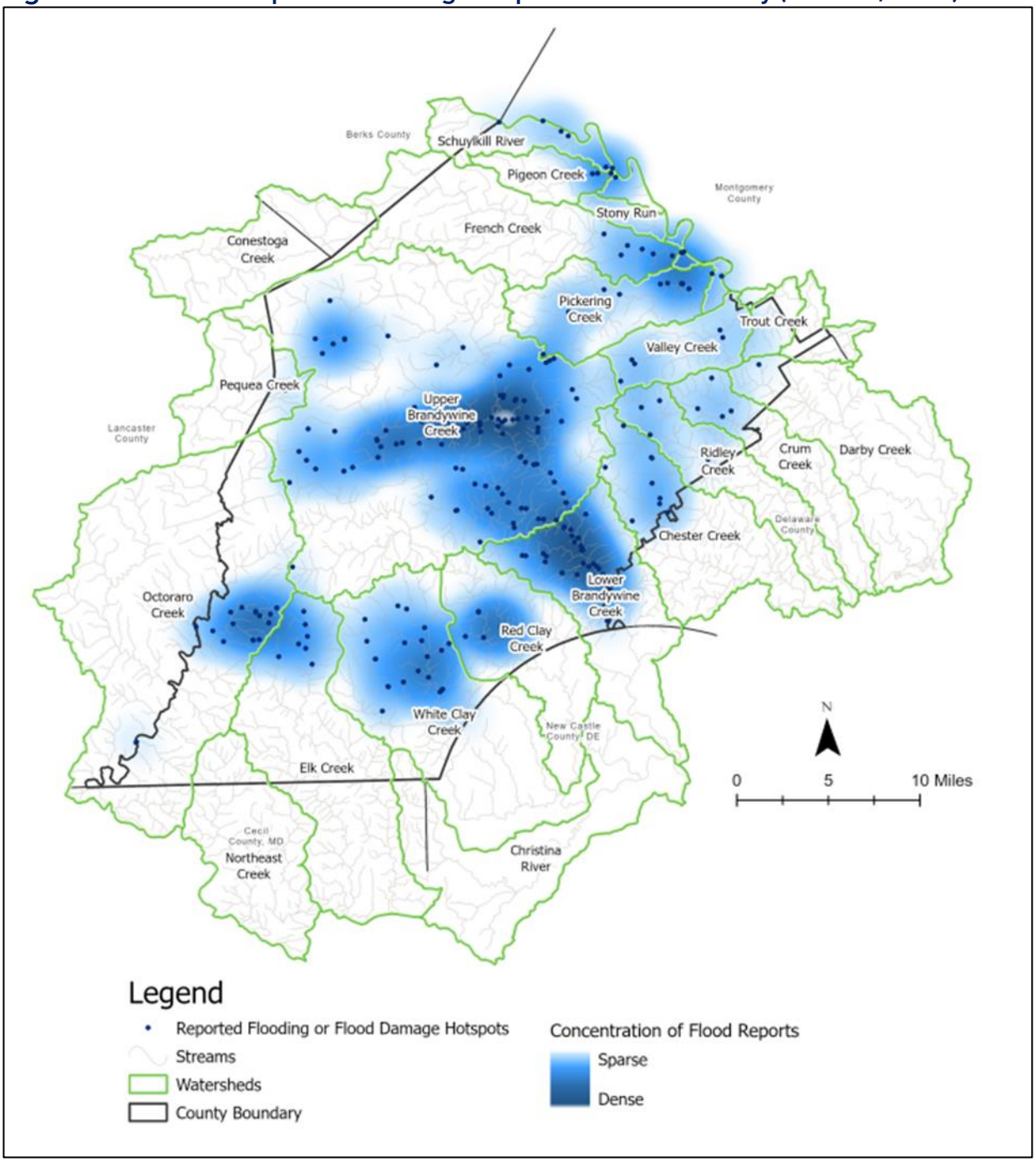


Table 4.3.4-2 Reported Flooding Hotspots in Chester County (CCWRA, 2024)

Watershed	Flooding Hotspots
Chester Creek	Several locations in West Chester Borough, and along the Chester Creek in East Goshen, Westtown, and Thornbury Townships.
Christina River	Along streams in White Horse Pike.
Darby Creek	Outside of Berwyn in Easttown Township.
Elk Creek	Along the East Branch Big Elk Creek and Forest Manor Road in Upper Oxford, and along the West Branch at Penns Grove Road
French Creek	Along the lower French Creek at Phoenixville, Rapps Dam Road, and Hares Hill Road.
Lower Brandywine Creek	Around Chadds Ford, and at multiple locations along Creek Road and Route 52.
Octoraro Creek	Multiple locations along Rattlesnake Run east of Glenville Road, and along Catamount Road.
Pequea Creek	Along Indian Spring Run at Cambridge Road.
Pickering Creek	Along Pickering Creek at Horseshoe Trail Road, Route 29 and Creek Road, and around Pickering Creek Reservoir.
Pigeon Creek	Along Pigeon Creek at Saylors Mill Road, Zeiber Road, and Route 724.
Red Clay Creek	In Kennett Square around Kennett Community Park and along the West Branch at Route 1
Ridley Creek	Along the East Branch at Line Road, at Greenhill Road and Hershey Mill Road, and at Garrett Mill Road above Route 3.
Schuylkill River Tributaries	North Coventry along Riverside Road and at East Schuylkill Road and Vaughn Road; Wells Road above Route 724; in Phoenixville at Bridge Street; along Pawlings Road.
Trout Creek	Along Trout Creek at Walker Road.
Upper Brandywine Creek	Numerous locations: along the Route 30 corridor between Parkesburg and Downingtown, along Route 322 below Downingtown, at Harvey's Bridge Road, along Broad Run, above Crump Road in Lionville, and at Beaver Dam and Birdell Road.
Valley Creek	Along Church Road below Conestoga Road; along the creek at Old Morehall Road; along Little Valley Creek at Mill Road.
White Clay Creek	In Avondale Borough and along the Route 41, Route 841, and Baltimore Pike corridors.

Anywhere it can rain, it can flood. However, the National Flood Insurance Program (NFIP), for which the Flood Insurance Rate Map (FIRM) is published, maps the risk associated with the 1-percent-annual-chance flood. This 1-percent-annual chance flood event is used to delineate the SFHA and to identify Base Flood Elevations (BFE), terms identified in Figure 4.3.4-4. FEMA delineates floodplains on its maps by the recurrence interval of a given flood. Flood recurrence intervals are explained in more detail in Section 4.3.4.4. However, in assessing the spatial extent of flooding it is important to know that a floodplain associated with a 1-percent annual chance of occurring in a given year is smaller than the floodplain associated with a flood that has a 0.2-percent annual chance of occurring.

The SFHA serves as the primary regulatory boundary used by FEMA, the Commonwealth, and the County when determining flood risk. Chester County's FIRMs are available on the FEMA Flood Map Service Center (https://msc.fema.gov/portal). At the time of publication, the March 2017 DFIRMs were considered the best available and were used for the risk analysis. Figure 4.3.4-5 illustrates NFIP flood zones in Chester County. Maps of each municipality's flood zones are shown in Appendix D.

Figure 4.3.4-4 Diagram identifying Special Flood Hazard Area, 1 percent-annual-chance floodplain (SFHA), floodway and flood fringe (PA DEP, 2023).

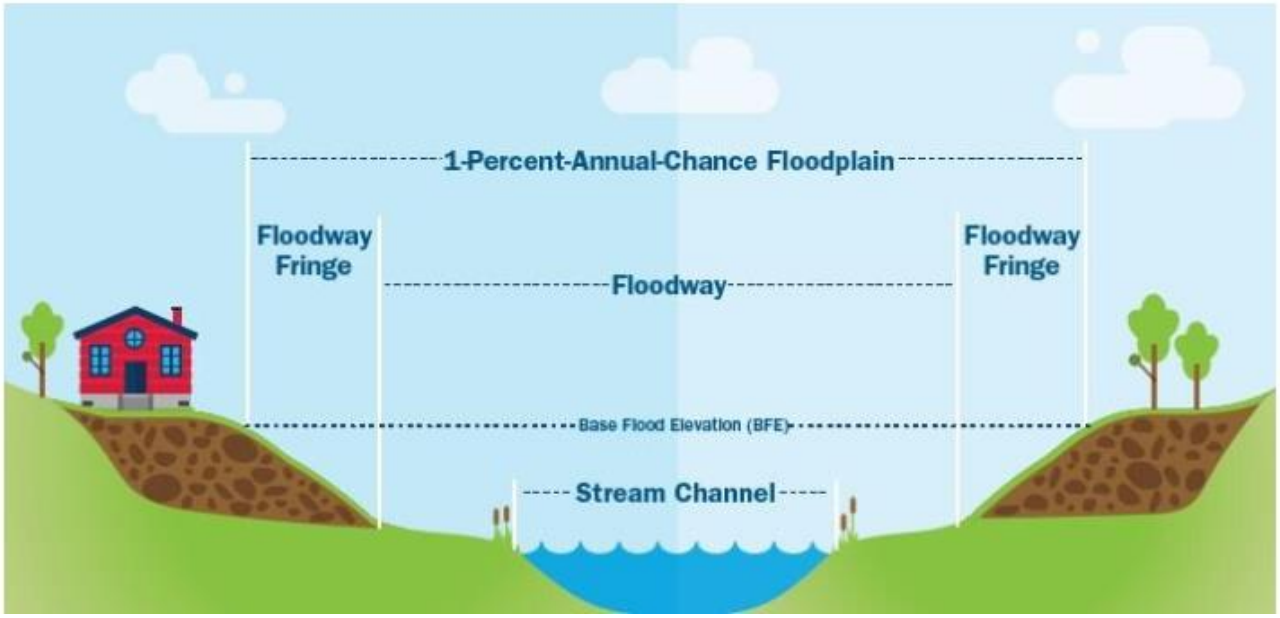
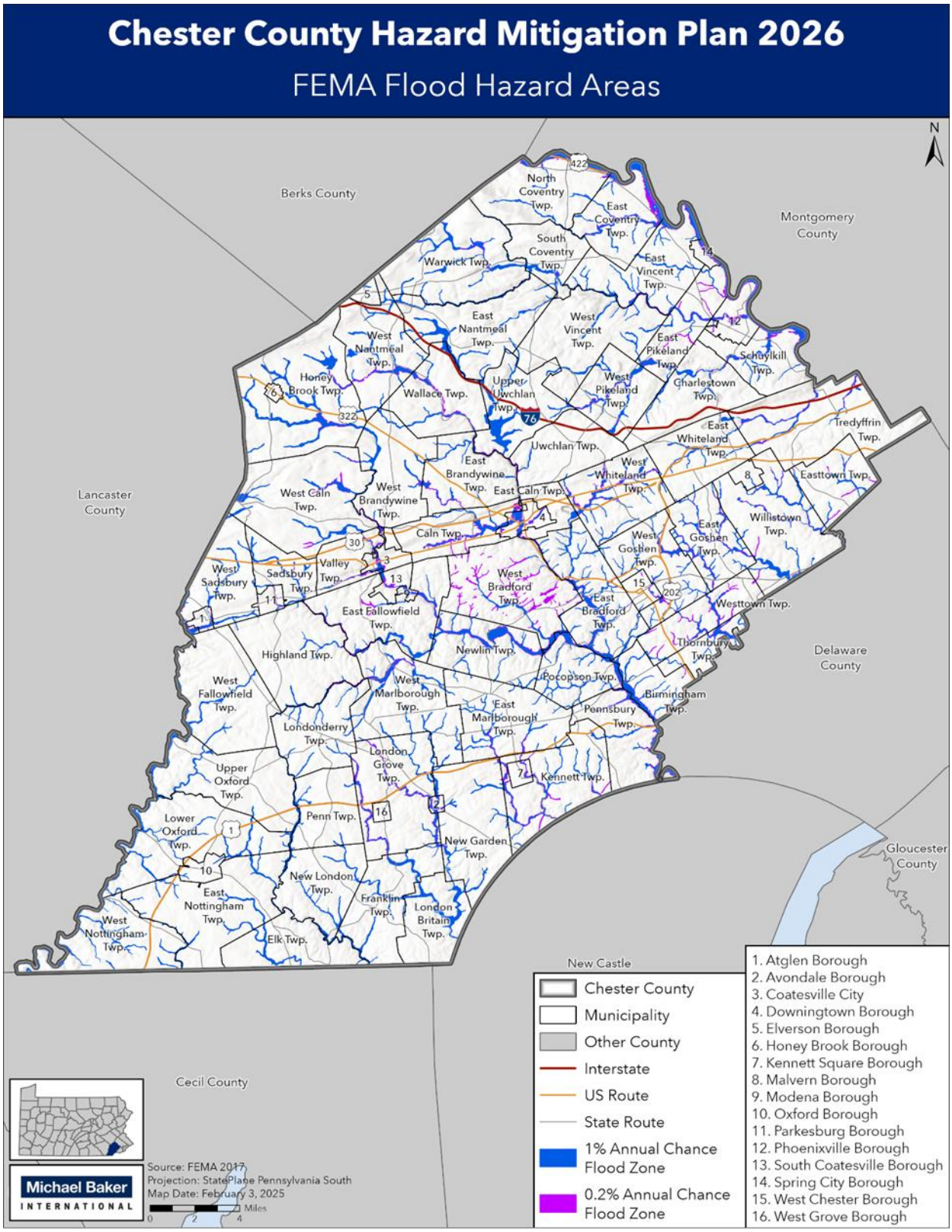


Figure 4.3.4-5 FEMA Flood Hazard Areas in Chester County



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 when bacteria and disease spread by floodwaters (Doocy et al., 2013). Most property damage results from inundation by sediment-filled water. Generally, flash floods cause greater loss of life while riverine floods cause greater loss of property (USGS, 2025).

Several factors determine severity of floods, including 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. Many areas in Chester County have moderate and steep slopes that promote quick surface water runoff. Most storms in the region track from west to east; however, some originate in the Great Lakes or the Atlantic Ocean. Rainfall in Pennsylvania is about average for the eastern United States. The American Meteorological Society classifies rainfall intensity into three categories (2012):

- Light rain – when precipitation rate is .01 to .10 inches/hour
- Moderate rain – when precipitation rate is .11 to .30 inches/hour
- Heavy rain – when precipitation rate is > .30 inches/hour

While significant flood events are typically associated with heavy rain, rainfall events of lesser intensity may also cause flooding given sufficient duration and on-the-ground conditions. Flood effects can be volume- or force-related, although both play a factor in all flooding events. Flood events that occur along larger streams with wide floodplains tend to result in large-scale inundations, causing widespread damage through soaking and silt deposits in homes, businesses, and industrial plants. The impacts of these events are typically a function of how much water was involved instead of the force of that moving water. On the other hand, flash floods resulting from bursts of heavy rainfall happen suddenly and powerfully as they sweep vehicles away, uproot trees, damage buildings and structures, and more (The Weather Channel, 2015).

Flash floods are often unpredictable and can cause major panic and loss of life due to low visibility, particularly if they occur at night (Špitalar et al., 2014). These events are common in hilly regions where runoff paths are steep, allowing water to reach higher velocity as it flows over the ground. Frozen or very dry surfaces where water cannot infiltrate can increase normal runoff velocities as well, particularly in small drainage areas (Chen et al., 2017). In addition to slopes and frozen ground, ice and debris jams in channels and culverts can lead to quick-rising floods if they significantly obstruct the flow of water (NOAA NWS, n.d.).

Ice jams and snowmelt trigger flash floods. A deep snowpack increases runoff produced by melting snow. Heavy spring rains falling on melting snowpack can produce flash flooding. Melting snowpack may also contribute to floods produced by ice jams (NOAA NSSL, n.d.). As ice or debris moves downstream, it may get caught on any sort of obstruction to the water flow. When this occurs, water can be held back, causing upstream flooding. When the jam finally

breaks, flash flooding can occur downstream. Ice jams are common during the winter and spring along rivers, streams, and creeks (NOAA NWS, n.d.).

Several factors determine the severity of floods, including rainfall intensity and duration, topography, ground cover, and rate of snowmelt (Doocy et al., 2013). When urbanization removes native vegetation and agricultural land and replaces them with impervious surfaces, there is a drastic reduction in stormwater infiltration rates. This forces rainfall to run off into nearby surfaces (Polk, 2024). If mismanaged, this runoff can accumulate quickly and create hazardous conditions. Stormwater runoff may contain and transport harmful pollutants such as fertilizers or pesticides from agricultural/residential applications, bacteria from livestock and pet waste, oil from vehicles, and other pollutants. These contaminants may infiltrate drinking water supply or swimming areas. When excess nitrogen and phosphorus are flushed into the surface water from fertilizers, algal blooms can occur which degrade living conditions for fish and other organisms (Yencha, 2022).

Historically, the most severe Chester County flooding incident occurred in September 2021 as remnants of Hurricane Ida reached the region. Heavy rain as high as five to ten inches caused significant flash flooding in southeastern Pennsylvania, resulting in widespread property damage and several fatalities, one of which occurred in Downingtown Borough. A major disaster declaration was issued on September 10, 2021, for this event. In Chester County, there was widespread flash flooding causing many road closures and some vehicles to be stranded. Numerous waterways in the County flooded, including the Schuylkill River, the West Branch of the Brandywine Creek, the East Branch of the Brandywine Creek, White Clay Creek, Red Clay Creek, French Creek, and Valley Creek. There were many reports of water entering buildings and homes. $40 million in property damage and $1 million in crop damage were reported in Chester County for this incident (NOAA NCEI, 2025). Historic stream flows were recorded on stream gauges in Chester County during this event (CCWRA, 2024).

Although floods can cause damage to property and loss of life, floods are naturally occurring events that benefit riparian systems. Such benefits include groundwater recharge and the introduction of nutrient rich sediment improving soil fertility (USDA, 2024). However, the destruction of riparian buffers through development, changes to land use and land cover throughout a watershed, and the introduction of chemical or biological contaminants which often accompany human presence cause environmental harm when floods occur. Hazardous material facilities are potential sources of contamination during flood events. Other negative environmental impacts of flooding include water-borne diseases due to polluted drinking water, heavy siltation, damage or loss of crops, and drowning of both humans and animals (FEMA, 2024).

Dams, levees, and reservoirs act as flood protection measures. Please refer to the Dam Failure hazard profile in Appendix G for more information on dams.

Table 4.3.4-3 Most Likely Lifelines Impacted by Floods, Flash Foods, and Ice Jams

LIFELINES	NOTES
	Government operations and facilities, including police, fire, and search and rescue are needed for response and recovery.
	Significant risk to buildings is posed and can create issues for food and water access.
	Transportation routes will be affected due to direct damage from flooding and potential compounding hazards like landslides.
	Floods may affect hazardous materials storage due to damage to facilities.

4.3.4.3. Past Occurrence

Chester County has a long history of flooding events. While flooding is often localized to streets and small neighborhoods, the county has historically experienced periodic storm events that affect multiple communities over a large area. Past building practices often resulted in homes being constructed in the FEMA-designated floodplains, exacerbating flooding problems within certain communities.

A gauge at Chadds Ford (CDFP1) monitors conditions on the Brandywine Creek and a gauge at Pottstown (PTNP1) monitors conditions on the Schuylkill River. A gauge below Downingtown (DWNP1) monitors conditions on the East Brandywine Creek. The NWS uses flood categories as forecast points that describe the severity of flood impacts in the river/stream reach. Table 4.3.4-4 summarizes the flood categories in feet at each of these gauges. Table 4.3.4-5 summarizes the top historic crests at these locations. Note that all three gauges experienced historic crests in September 2021 from the remnants of Hurricane Ida.

Table 4.3.4-4 Flood Categories at the Brandywine Creek at Chadds Ford (CDFP1), Schuylkill River at Pottstown (PTNP1), and East Brandywine Creek Below Downingtown (DWNP1) Gauges (CCWRA, 2025) (NWS, 2025)

Flood Category	Flood Category Definition	Brandywine at Chadds Ford (in feet)	Schuylkill River at Pottstown (in feet)	East Brandywine Creek Below DowningTown(in feet)
Major Flood Stage	Life-threatening and extensive inundation of structures and roads; significant evacuations are expected at this stage.	13	22	11
Moderate Flood Stage	Inundation of buildings usually begins at this stage; roads are likely to be closed and some areas cut off (evacuations may be necessary).	11	18	9
Flood Stage	Gauge height above which a rise in water surface level begins to create a hazard to lives, property or commerce; issuance of flood warning is linked to flood stage.	9	12.5	7
Action Stage	Level where the NWS needs to take same type of mitigation action in preparation for possible significant hydrologic activity.	8	11	6

Table 4.3.4-5 Historic Crests at the Brandywine Creek at Chadds Ford (CDFP1), Schuylkill River at Pottstown (PTNP1), and East Brandywine Creek Below Downingtown (DWNP1) Gauges

Brandywine at Chadds Ford		Schuylkill at Pottstown		East Branch Brandywine Creek Below Downingtown	
Feet	Date	feet	date	feet	date
21.04	09/02/2021	29.97	06/23/1972	19.11	09/02/2021
17.15	09/17/1999	21.00	02/28/1902	14.79	09/16/1999
16.56	06/22/1972	20.84	06/29/2006	14.38	06/28/2006
16.05	05/01/2014	20.15	05/23/1942	13.73	08/28/2011
15.23	08/28/2011	19.20	08/24/1933	13.59	08/04/2022
15.00	03/05/1920	18.27	09/09/2011	13.56	09/15/2003
14.80	08/09/1942	18.21	01/25/1979	13.50	05/01/2014
14.70	08/04/1915	17.98	08/19/1955	13.22	06/20/2003
14.64	08/19/1955	17.88	01/27/1976	13.00	10/01/2010
14.35	01/25/1979	16.79	09/02/2021	12.83	09/28/2004

According to the National Oceanic and Atmospheric Administration's National Centers for Environmental Education (NOAA NCEI) storm event database, Chester County experienced 199 flash flood and 69 flood events between January 1, 1996, and August 21, 2025 (the date range of data availability). These 268 events resulted in two fatalities and over $56.3 million in property damage and $1 million in crop damage. Due to the large number of flood events that have occurred in Chester County, Table 4.3.4-6 contains only the last 10 years of flood incidents. Event details are captured by location, so there may be multiple lines in the table for the same flood event. Historically, there have only been three known ice jam events.

Table 4.3.4-6 Past Flood and Flash Flood Events In Chester County 2015-2025 (NOAA NCEI, 2025)

DATE	LOCATION	EVENT TYPE	DETAILS	REPORTED PROPERTY DAMAGE*	REPORTED CROP DAMAGE*
3/10/2015	Brandamore	Flood	The combination of rain and snowmelt caused minor flooding along the West Branch Brandywine Creek from the late evening of the 10th through the early morning of the 11th. The West Branch Brandywine Creek at Honey Brook was above its 7.0-foot flood stage from 1125 p.m. EDT on the 10th through 3:20 a.m. EDT on the 11th, and it crested at 7.23 feet at 115 a.m. EDT on the 11th. Event precipitation totals included 0.73 inches in West Grove, 0.68 inches in Nottingham, and 0.66 inches in Chadds Ford and Unionville.	$0	$0
6/26/2015	Phoenixville	Flash Flood	Thunderstorms with torrential downpours caused flash flooding in and around Phoenixville. A mesonet site within Phoenixville had an event total of 3.50 inches of rain.	$0	$0
2/16/2016	Harmony Hill	Flood	Heavy rain and snowmelt caused the East Branch of the Brandywine Creek below Downingtown to exceed flood stage for several hours Tuesday evening, February 16th, resulting in minor flooding. The creek crested at 8.01 feet at 5:00 p.m. EST. Flood stage at Downingtown is 7.0 feet.	$0	$0
2/16/2016	Brandamore	Flood	Heavy rain and snowmelt caused the West Branch of the Brandywine Creek to exceed flood stage at Honey Brook for a couple of hours Tuesday evening, February 16th, resulting in minor flooding. The creek crested at 7.41 feet at 4:45 p.m. EST. Flood stage at Honey Brook is 7.0 feet.	$0	$0
2/24/2016	Wawaset	Flood	Brandywine flooding near route 842 in West Chester.	$0	$0
3/31/2017	Downingtown	Flood	The East Branch rose above flood stage at Downingtown.	$0	$0
7/14/2017	Hayesville	Flood	Several roads were closed in lower Oxford township.	$0	$0
7/22/2017	Phoenixville	Flood	Flooding reported on Bridge Street.	$0	$0
7/23/2017	Chatwood	Flash Flood	A vehicle was stuck at Gay and Montgomery due to flooding.	$0	$0
7/23/2017	Rosedale	Flash Flood	A vehicle was stuck in high water near the intersection of Bayard and Rosedale.	$0	$0
7/23/2017	Mendenhall	Flash Flood	Burrows Run Road was flooded.	$0	$0
5/17/2018	Thorndale	Flash Flood	Flash flooding occurred along the East Branch of the Brandywine Creek in West Bradford Township and East Bradford Township. There was moderate flooding	$0	$0

Table 4.3.4-6 Past Flood and Flash Flood Events In Chester County 2015-2025 (NOAA NCEI, 2025)

DATE	LOCATION	EVENT TYPE	DETAILS	REPORTED PROPERTY DAMAGE*	REPORTED CROP DAMAGE*
			around the river gauge below Downingtown. The creek level at that location reached 9.07 feet at 7:15 a.m. EST.		
6/10/2018	Chester Springs	Flash Flood	Flooding occurred along Clover Mill Road and Pikeland Road in East Pikeland Township and West Pikeland Township.	$0	$0
6/10/2018	Phoenixville	Flash Flood	French Creek exceeded its flood stage of 8 feet at Phoenixville.	$0	$0
6/10/2018	Chesterbrook	Flash Flood	Water rescues took place along Richards Road at Gulph Road and at Glenhardie Road in Tredyffrin Township. A home was flooded to the first floor near Yellow Spring Road and Well Springs Lane in Tredyffrin Township. Also, there was roadway flooding in Valley Forge.	$0	$0
6/10/2018	Chesterbrook	Flood	Flooding on U.S. Highway 202 between Valley Forge Road and State Highway 29.	$0	$0
6/11/2018	Chester Springs	Flash Flood	Flooding on Clover Mill Road and Pikeland Road between Kimberton Road and Wildlife Drive. All Lanes Closed.	$0	$0
6/11/2018	Coventryville	Flood	Heavy rain and flooding downed a tree into power lines on State Highway 23 between Old Ridge Road and Pottstown Pike. All lanes closed.	$0	$0
6/11/2018	Chesterbrook	Flood	Flooding caused debris to collect on the roadway on Yellow Springs Road between Wilson Road and Glen Alexander Drive. Lane restrictions in place.	$0	$0
7/3/2018	Berwyn	Flash Flood	There was widespread roadway flooding in Berwyn and Devon.	$0	$0
7/22/2018	Upland	Flash Flood	Multiple vehicles were trapped in rapidly rising flood waters in West Marlborough Township. Several water rescues took place.	$0	$0
7/22/2018	Homeville	Flash Flood	One person was rescued from a vehicle trapped in high water in Upper Oxford Township.	$0	$0
7/22/2018	Coatesville	Flash Flood	Numerous roads were closed in western Chester County due to flooding. Many vehicles became trapped in the rising flood waters. There were 27 water rescues.	$0	$0
7/22/2018	Coatesville	Flash Flood	Two vehicles were trapped in flood waters in Caln Township. A water rescue took place at Foundry Street and North 11th Avenue, and another water rescue occurred on the Lincoln Highway at North Caln Road.	$0	$0
7/22/2018	Harmony Hill	Flash	Moderate flooding occurred along the east branch of the Brandywine Creek below	$0	$0

Table 4.3.4-6 Past Flood and Flash Flood Events In Chester County 2015-2025 (NOAA NCEI, 2025)

DATE	LOCATION	EVENT TYPE	DETAILS	REPORTED PROPERTY DAMAGE*	REPORTED CROP DAMAGE*
		Flood	Downingtown.		
8/13/2018	Landenberg	Flash Flood	Widespread roadway flooding in New Garden Township. Many roads were impassable including Penn Green Road and Broad Run Road.	$0	$0
8/13/2018	Rock Run	Flash Flood	Flash flooding resulted in the need for a water rescue at the intersection of Manor Road and Butterworth Road in Coatesville.	$0	$0
8/13/2018	Hayti	Flash Flood	Minor flooding occurred along the West Branch of the Brandywine Creek at Coatesville.	$0	$0
8/13/2018	Modena	Flash Flood	Moderate flooding occurred along the West Branch of the Brandywine Creek at Modena.	$0	$0
8/13/2018	Planebrook	Flash Flood	Flash flooding resulted in the need for a water rescue on Church Road in East Whiteland Township where it intersected the Chester Valley Trail.	$0	$0
8/13/2018	Green Tree	Flash Flood	Flash flooding resulted in the need for several water rescues in Willistown Township.	$0	$0
8/13/2018	Strickersville	Flash Flood	Minor flooding occurred along the White Clay Creek near Strickersville.	$0	$0
8/13/2018	Berwyn	Flash Flood	At least three water rescues took place in Tredyffrin Township due to flash flooding.	$0	$0
8/13/2018	Phoenixville	Flash Flood	Minor flooding occurred along French Creek in Phoenixville.	$0	$0
8/13/2018	Marshallton	Flash Flood	Major flooding occurred along the East Branch of the Brandywine Creek below Downingtown.	$0	$0
8/13/2018	Valley Forge	Flash Flood	Minor flooding occurred along Valley Creek at Valley Forge.	$0	$0
8/13/2018	Five Pts	Flash Flood	Minor flooding occurred along the Red Clay Creek at Kennett Square.	$0	$0
8/13/2018	Suplee	Flash Flood	Moderate flooding occurred along the West Branch of the Brandywine Creek below Honey Brook.	$0	$0
8/21/2018	Phoenixville	Flash Flood	Minor flooding occurred along French Creek in Phoenixville.	$0	$0

Table 4.3.4-6 Past Flood and Flash Flood Events In Chester County 2015-2025 (NOAA NCEI, 2025)

DATE	LOCATION	EVENT TYPE	DETAILS	REPORTED PROPERTY DAMAGE*	REPORTED CROP DAMAGE*
8/31/2018	Hayesville	Flash Flood	Flash flooding made Scroggy Road and Cream Road in Lower Oxford Township impassable.	$0	$0
11/2/2018	Brandamore	Flash Flood	Moderate flooding occurred along the West Branch of the Brandywine Creek below Honey Brook.	$0	$0
6/13/2019	Westtown	Flash Flood	Fast moving water covered Dilworthtown Road near Westtown Road in Thornbury Township.	$0	$0
6/20/2019	Chester Springs	Flash Flood	Clover Mill Road was closed near Pike Springs Road in West Pikeland Township due to flash flooding.	$0	$0
6/20/2019	Howellville	Flash Flood	Moderate flooding occurred along the Valley Creek in the Chesterbrook area. The flooding resulted in the closure of PA Route 252 downstream in the Valley Forge area.	$0	$0
6/20/2019	West Chester	Flash Flood	Moderate flooding occurred along the East Branch of the Brandywine Creek below Downingtown.	$0	$0
7/11/2019	Honey Brook	Flash Flood	Multiple water rescues took place along Twin County Road in Honey Brook Township.	$0	$0
7/11/2019	Conestoga	Flash Flood	A water rescue took place at the intersection of Chestnut Tree Road and Pond View Drive in West Nantmeal Township.	$0	$0
7/11/2019	Kenilworth	Flash Flood	A water rescue took place at the intersection of Miller Road and East Cedarville Road in North Coventry Township.	$0	$0
7/11/2019	Downingtown	Flash Flood	A water rescue took place along Lancaster Avenue in East Caln Township.	$0	$0
7/11/2019	Oppermans Corners	Flash Flood	A water rescue took place along Upper Pine Creek Road near Davis Road in West Pikeland Township. Flash flooding occurred along Pickering Creek in West Pikeland Township with flood waters reaching Conestoga Road and Kimberton Road.	$0	$0
7/11/2019	Harmony Hill	Flash Flood	Moderate flooding occurred along the East Branch of the Brandywine Creek below Downingtown.	$0	$0
7/11/2019	Phoenixville	Flash Flood	Minor flooding occurred along the French Creek in the Phoenixville area.	$0	$0
7/18/2019	Chatwood	Flash	Widespread roadway flooding occurred in West Goshen Township and in West	$0	$0

Table 4.3.4-6 Past Flood and Flash Flood Events In Chester County 2015-2025 (NOAA NCEI, 2025)

DATE	LOCATION	EVENT TYPE	DETAILS	REPORTED PROPERTY DAMAGE*	REPORTED CROP DAMAGE*
		Flood	Chester. There were water rescues on Gay Street and on Montgomery Avenue.		
7/18/2019	West Chester Airport	Flash Flood	The East Branch of Chester Creek overflowed its banks in East Goshen Township. Flash flooding occurred on East Strasburg Road in the vicinity of Reservoir Road.	$0	$0
8/14/2019	Glenloch	Flash Flood	Parts of Lancaster Avenue in East Whiteland Township were closed due to flash flooding. Several vehicles became trapped in the flood waters.	$0	$0
8/14/2019	Berwyn	Flash Flood	US Route 30 was closed near Lakeside Avenue in Easttown Township due to flash flooding.	$0	$0
11/1/2019	Brandamore	Flash Flood	Minor flooding occurred along the West Branch of the Brandywine Creek in Honey Brook Township.	$0	$0
11/1/2019	Harmony Hill	Flash Flood	Minor flooding occurred along the East Branch of the Brandywine Creek in West Bradford Township and East Bradford Township.	$0	$0
7/6/2020	Chesterbrook	Flash Flood	A water rescue took place on Richards Road in Tredyffrin Township.	$0	$0
7/6/2020	Cedar Hollow Station	Flash Flood	Flood water washed rocks onto Valley Road in Paoli near the intersection with Lancaster Avenue.	$0	$0
7/6/2020	Planebrook	Flash Flood	Planebrook Road at US Route 202 was closed due to flooding in East Whiteland Township.	$0	$0
8/4/2020	Lewisville	Flash Flood	PA Route 841 was closed near Lewisville Road in Elk Township due to flooding.	$0	$0
8/4/2020	Cochranville	Flash Flood	PA Route 926 was closed near PA Route 10 in Upper Oxford Township due to flooding.	$0	$0
8/4/2020	Valley Forge	Flash Flood	Moderate flooding occurred along Valley Creek in the Valley Forge area.	$0	$0
8/4/2020	Oakbourne	Flash Flood	Birmingham Road was closed near Riflery Drive in East Bradford Township due to flooding.	$0	$0
8/4/2020	Reeceville	Flash Flood	Swinehart Road was closed near Beaver Creek Road in West Brandywine Township due to flooding.	$0	$0
8/4/2020	Kaolin	Flash Flood	Minor flooding occurred along the Red Clay Creek in the Kennett Square area.	$0	$0

Table 4.3.4-6 Past Flood and Flash Flood Events In Chester County 2015-2025 (NOAA NCEI, 2025)

DATE	LOCATION	EVENT TYPE	DETAILS	REPORTED PROPERTY DAMAGE*	REPORTED CROP DAMAGE*
8/4/2020	Modena	Flash Flood	Minor flooding occurred along the West Branch of the Brandywine Creek in the Modena area.	$0	$0
8/4/2020	Harmony Hill	Flash Flood	Major flooding occurred on the East Branch of the Brandywine Creek, downstream from Downingtown.	$0	$0
8/4/2020	Exton	Flash Flood	Several roads in Exton were closed due to flooding, including sections of Business US Route 30 and PA Route 100.	$0	$0
8/4/2020	Strickersville	Flash Flood	Major flooding occurred along the White Clay Creek in the Strickersville area.	$0	$0
8/4/2020	Downingtown	Flash Flood	US Route 30 was closed near the Lancaster Avenue interchange in East Caln Township due to flooding.	$0	$0
8/4/2020	Cromby	Flash Flood	Minor flooding occurred along French Creek in Phoenixville.	$0	$0
8/4/2020	Lionville	Flash Flood	North Ship Road was closed at Newcomen Road in Uwchlan Township due to flooding.	$0	$0
8/4/2020	Bucktown	Flash Flood	PA Route 23 was closed at PA Route 100 in South Coventry Township due to flooding.	$0	$0
8/4/2020	Cedarville	Flash Flood	Several water rescues took place in North Coventry Township.	$0	$0
8/7/2020	Parkesburg	Flash Flood	A water rescue took place on Maple Street at South Culvert Street in Parkesburg.	$0	$0
8/7/2020	Kaolin	Flash Flood	Kaolin Road was closed at Caldwell Lane in Kennett Township due to flooding. A water rescue took place on West Hillendale Road at Chandler Mill Road in Kennett Township.	$0	$0
8/7/2020	Kennett Square	Flash Flood	A vehicle was trapped in flood waters on West South Street at Harvey Circle in Kennett Square.	$0	$0
8/7/2020	London Grove	Flash Flood	A water rescue took place on McCue Road at Woodview Road in London Grove Township.	$0	$0
8/7/2020	Toughkenamon	Flash Flood	Bancroft Road was under water at Crestview Drive in New Garden Township. Broad Run Road was closed at Newark Road in New Garden Township due to flooding.	$0	$0

Table 4.3.4-6 Past Flood and Flash Flood Events In Chester County 2015-2025 (NOAA NCEI, 2025)

DATE	LOCATION	EVENT TYPE	DETAILS	REPORTED PROPERTY DAMAGE*	REPORTED CROP DAMAGE*
8/7/2020	Five Pts	Flash Flood	Minor flooding occurred along the Red Clay Creek downstream from Kennett Square.	$0	$0
8/7/2020	Strickersville	Flash Flood	Moderate flooding occurred along the White Clay Creek near Strickersville.	$0	$0
8/12/2020	Downingtown Memorial Airport	Flash Flood	A water rescue took place on Lincoln Avenue at Bailey Road in Caln Township. Another water rescue took place on Park Drive at G.O. Carlson Boulevard in Caln Township.	$0	$0
8/12/2020	Lincoln University	Flash Flood	Several roads in Lower Oxford Township were impassable due to flooding.	$0	$0
6/8/2021	Coatesville	Flash Flood	Widespread roadway flooding occurred in Valley Township, Coatesville and South Coatesville. There were numerous water rescues. Minor flooding occurred along the West Branch of the Brandywine Creek in and around Coatesville and South Coatesville.	$0	$0
6/8/2021	Reeceville	Flash Flood	Widespread roadway flooding occurred in East Brandywine Township and Caln Township. There were numerous water rescues.	$0	$0
6/8/2021	Parkesburg	Flash Flood	Widespread roadway flooding occurred in Parkesburg and Sadsburyville. There were numerous water rescues.	$0	$0
6/8/2021	Downingtown	Flash Flood	A water rescue took place at the intersection of Jefferson Avenue and Green Street in Downingtown.	$0	$0
6/8/2021	Modena	Flash Flood	Moderate flooding occurred along the West Branch of the Brandywine Creek in Modena and East Fallowfield Township.	$0	$0
6/8/2021	Harmony Hill	Flash Flood	Major flooding occurred along the East Branch of the Brandywine Creek below Downingtown in West Bradford Township and East Bradford Township.	$0	$0
8/18/2021	Phoenixville	Flash Flood	Two vehicles were stranded in flood waters at the intersection of Madison Avenue and Tyler Avenue in Phoenixville.	$0	$0
8/18/2021	Lyndell	Flash Flood	A water rescue took place on the Pennsylvania Turnpike near Little Conestoga Road in Upper Uwchlan Township.	$0	$0
8/18/2021	Frazier	Flash Flood	Widespread roadway flooding occurred in East Whiteland Township, including Conestoga Road, North Bacton Hill Road and Planebrook Road.	$0	$0

Table 4.3.4-6 Past Flood and Flash Flood Events In Chester County 2015-2025 (NOAA NCEI, 2025)

DATE	LOCATION	EVENT TYPE	DETAILS	REPORTED PROPERTY DAMAGE*	REPORTED CROP DAMAGE*
8/18/2021	Glenloch	Flash Flood	A water rescue took place on US Route 202 near the US Route 30 Bypass in West Whiteland Township. Valley Road was under water at Valley Creek. Several vehicles were trapped in flood waters on the Lincoln Highway near the Pottstown Pike in West Whiteland Township. Rocks and debris were washed onto Cockerham Lane by flood waters.	$0	$0
8/18/2021	Chatwood	Flash Flood	Three water rescues took place in West Chester. One was at the intersection of East Gay Street and Montgomery Avenue, another was at the intersection of South Bolmar Street and Union Street, and a final one was at the intersection of Union Street and South Franklin Street.	$0	$0
8/18/2021	Sugartown	Flash Flood	A water rescue took place at the intersection of Grubb Road and Davis Road in Willistown Township.	$0	$0
8/18/2021	Paoli	Flash Flood	Three water rescues took place in Paoli, one at the intersection of East Lancaster Avenue and Leopard Road, another at the intersection of Maple Avenue and Agnew Lane, and a final one at the intersection of Paoli Pike and Rustic Lane.	$0	$0
8/18/2021	Cedar Hollow Station	Flash Flood	A water rescue took place at the intersection of US Route 202 and North Valley Road in Tredyffrin Township. Another water rescue took place at the intersection of Old Eagle School Road and Wallace Drive. A third water rescue took place at the intersection of Duportail Road and Mill Road in Tredyffrin Township.	$0	$0
8/18/2021	Harmony Hill	Flash Flood	Minor flooding occurred along the East Branch of the Brandywine Creek between West Bradford Township and East Bradford Township.	$0	$0
8/19/2021	Chesterbrook	Flash Flood	Moderate flooding occurred along Valley Creek near Valley Forge.	$0	$0
9/1/2021	Nottingham	Flash Flood	Widespread flash flooding occurred in Chester County with many road closures and vehicles stranded due to the remnants of Hurricane Ida. There was a flood related fatality in Downingtown. Numerous waterways in the county flooded, including the Schuylkill River, the West Branch of the Brandywine Creek, the East Branch of the Brandywine Creek, White Clay Creek, Red Clay Creek, French Creek and Valley Creek. There were many reports of water entering buildings and homes.	$40,000,000	$1,000,000
9/23/2021	Rock Run	Flash Flood	A water rescue from a stranded vehicle took place near the intersection of Manor Road and Butterworth Road in Coatesville. Several roads in the Coatesville area	$0	$0

Table 4.3.4-6 Past Flood and Flash Flood Events In Chester County 2015-2025 (NOAA NCEI, 2025)

DATE	LOCATION	EVENT TYPE	DETAILS	REPORTED PROPERTY DAMAGE*	REPORTED CROP DAMAGE*
			were closed due to flooding, including Wagontown Road and Caln Road.		
9/23/2021	Modena	Flash Flood	The occupants of a vehicle were rescued from flood waters in Caln Township.	$0	$0
9/23/2021	Harmony Hill	Flash Flood	Minor flooding occurred along the East Branch of the Brandywine Creek along the border between West Bradford Township and East Bradford Township.	$0	$0
9/23/2021	Phoenixville	Flash Flood	Minor flooding occurred along French Creek at Phoenixville.	$0	$0
7/2/2022	Glen Roy	Flash Flood	A water rescue took place in West Nottingham Township.	$0	$0
9/6/2022	West Chester	Flash Flood	East Barnard Street in West Chester was closed between South Matlack Street and South Franklin Street due to flooding. South Adams Street in West Chester was closed between East Market Street and East Miner Street due to flooding.	$0	$0
6/27/2023	Chatwood	Flash Flood	East Gay Street was closed due to flooding at Montgomery Avenue along the West Chester and West Goshen Township line.	$0	$0
6/27/2023	Exton	Flash Flood	Widespread roadway flooding around the Exton Square Mall in Exton with some water rescues taking place.	$0	$0
6/27/2023	Glenloch	Flash Flood	Flooding led to a water rescue on the US Route 30 eastbound ramp onto US Route 202 northbound in West Whiteland Township.	$0	$0
6/27/2023	Harmony Hill	Flash Flood	Moderate flooding occurred along the East Branch of the Brandywine Creek in West Bradford Township and East Bradford Township.	$0	$0
7/7/2023	Whitford	Flash Flood	Widespread roadway flooding occurred in West Whiteland Township with many roads becoming impassable. Numerous vehicles were trapped in flood waters, with some motorists needing assistance on Spackmans Lane and on Whitford Road.	$0	$0
7/8/2023	Green Tree	Flash Flood	Paoli Pike in Malvern was closed between South Warren Avenue and Devon Road due to flooding.	$0	$0
7/8/2023	Cedar Hollow Station	Flash Flood	Cedar Hollow Road was closed around Jacqueline Drive in Paoli due to flooding.	$0	$0
7/8/2023	Guthriesville	Flash Flood	Sections of US Route 202 in West Whiteland Township south of US Route 30 became impassable due to flooding.	$0	$0

Table 4.3.4-6 Past Flood and Flash Flood Events In Chester County 2015-2025 (NOAA NCEI, 2025)

DATE	LOCATION	EVENT TYPE	DETAILS	REPORTED PROPERTY DAMAGE*	REPORTED CROP DAMAGE*
7/8/2023	Planebrook	Flash Flood	Church Road in East Whiteland Township was closed at Sweetwater Way due to flooding.	$0	$0
7/9/2023	Honey Brook	Flash Flood	A vehicle became trapped in flood waters on PA Route 10 at Poplar Road in Honey Brook Township, necessitating a water rescue.	$0	$0
7/9/2023	Lionville	Flash Flood	Flood waters from Pine Creek reached some buildings in Uwchlan Township.	$0	$0
7/9/2023	Marshallton	Flash Flood	Moderate flooding occurred along the East Branch of the Brandywine Creek between West Bradford Township and East Bradford Township.	$0	$0
7/25/2023	Phoenixville	Flash Flood	Minor flooding occurred along French Creek in Phoenixville.	$0	$0
7/25/2023	Anselma	Flash Flood	Widespread roadway flooding occurred in West Pikeland Township with several roads becoming impassable. Pickering Creek overflowed its banks resulting in roadway flooding around Jacques Circle.	$0	$0
7/25/2023	Lionville	Flash Flood	A vehicle became trapped in flood waters at the intersection of Uwchlan Avenue and Sheree Boulevard in Uwchlan Township, necessitating a water rescue.	$0	$0
7/25/2023	Cornog	Flash Flood	Widespread roadway flooding and road closures in Upper Uwchlan Township, including PA Route 100 near the Pennsylvania Turnpike.	$0	$0
7/25/2023	Downingtown	Flash Flood	Creek Road was closed due to flooding in East Brandywine Township and in Caln Township, between Dowlin Forge Road and Norwood Road.	$0	$0
7/25/2023	Downingtown	Flash Flood	Widespread roadway flooding and road closures occurred in West Whiteland Township, with multiple water rescues.	$0	$0
7/25/2023	Morstein	Flash Flood	Widespread roadway flooding and road closures occurred in East Whiteland Township, with at least one water rescue.	$0	$0
7/25/2023	Harmony Hill	Flash Flood	Moderate to major flooding occurred along the East Branch of the Brandywine Creek in West Bradford Township and East Bradford Township. The flooding resulted in the closure of a section of US Route 322.	$0	$0
12/18/2023	Strickersville	Flood	Across southeast Pennsylvania and northern Delaware, flooding occurred on the Brandywine River, the Schuylkill River, the Christina River, Red Clay Creek, and White Clay Creek. Four major roads were closed in Chester County during the	$0	$0

Table 4.3.4-6 Past Flood and Flash Flood Events In Chester County 2015-2025 (NOAA NCEI, 2025)

DATE	LOCATION	EVENT TYPE	DETAILS	REPORTED PROPERTY DAMAGE*	REPORTED CROP DAMAGE*
			course of the flooding. PA-82 in Coatesville and West Marlborough Township was closed for a period starting at 945 AM Dec 18. PA 282 east bound in East Brandywine township and PA 842 in East Bradford Township were closed for a period beginning around Noon on December 18.		
12/27/2023	Chatwood	Flood	Montgomery Avenue flooded near Chester County Hospital.	$0	$0
12/28/2023	Chadds Ford Jct	Flood	Across southeast Pennsylvania and northern Delaware, flooding occurred on the Brandywine River, the Schuylkill River, the Christina River, Red Clay Creek, and White Clay Creek. The Coochs Bridge gauge crested at 12.03 ft. The Langhorne gauge crested at 9.50 ft. The Downingtown gauge crested at 10.34 ft. The Newark gauge crested at 13.25 ft. The Chadds Ford gauge crested at 10.25 ft. The Wooddale gauge crested at 6.95 ft. The Graterford gauge crested at 16.30 ft. The Chester gauge crested at 8.19 ft. The Philadelphia gauge crested at 11.27 ft. The Norristown gauge crested at 14.94 ft. The Langhorne gauge crested at 13.87 ft. All these crests are above flood stage.	$0	$0
12/28/2023	Valley Forge	Flood	Pawlings Road at the Schuylkill River was flooded.	$0	$0
1/9/2024	Glen Roy	Flood	Across southeast Pennsylvania and northern Delaware, flooding occurred on the Brandywine River, the Schuylkill River, the Christina River, Red Clay Creek, and White Clay Creek. The Coochs Bridge gauge crested at 12.52 ft. The Langhorne gauge crested at 13.91 ft. The Downingtown gauge crested at 11.41 ft. The Newark gauge crested at 15.14 ft. The Chadds Ford gauge crested at 12.84 ft. The Wooddale gauge crested at 9.03 ft. The Graterford gauge crested at 16.30 ft. The Chester gauge crested at 12.55 ft. The Philadelphia gauge crested at 12.13 ft. The Pottstown gauge crested at 13.65 ft. The Norristown gauge crested at 16.29 ft. The Wilmington gauge crested at 17.39 ft. All these crests are above flood stage.	$0	$0
8/8/2024	Landenberg	Flash Flood	Roads around Landenberg were flooded to the point of being impassable.	$0	$0
8/8/2024	Toughkenamon	Flash Flood	A road in Toughkenamon was flooded with water approximately 1 foot deep. Picture shared through social media.	$0	$0
8/8/2024	Rosedale	Flash Flood	Broadcast media shows multiple roads in Kennett Square were closed due to flash flooding. Time estimated from radar.	$0	$0

Table 4.3.4-6 Past Flood and Flash Flood Events In Chester County 2015-2025 (NOAA NCEI, 2025)

DATE	LOCATION	EVENT TYPE	DETAILS	REPORTED PROPERTY DAMAGE*	REPORTED CROP DAMAGE*
8/8/2024	Modena	Flash Flood	Multiple water rescues occurred due to vehicles becoming stuck in high water in multiple locations around Coatesville. Time estimated based on radar.	$50,000	$0
5/16/2025	Modena	Flash Flood	Water Rescues occurred on Union Street.	$10,000	$0
5/16/2025	Downingtown Memorial Airport	Flash Flood	Water Rescues reported in Caln and Thorndale Townships.	$20,000	$0
5/16/2025	West Chester	Flash Flood	Several water rescues in West Chester.	$15,000	$0
5/16/2025	Harmony Hill	Flash Flood	Dowlin Forge Road flooded.	$0	$0

**Reported damages may be underestimated and do not necessarily reflect total loss.*

Between 1954 and 2025, the Commonwealth of Pennsylvania had 52 FEMA-declared, flood-related disaster and emergency declarations classified as one or a combination of the following disaster types where the primary impact was flooding: flood, hurricane, severe storm, and tropical storm. Of these, Chester County received 13 disaster declarations and four emergency declarations. The most recent disaster declaration was for the remnants of Hurricane Ida in September 2021.

Figure 4.3.4-6 illustrates the locations of NWS flash flood reports in Chester County, while Figure 4.3.4-7 depicts the locations of ice jams.

Figure 4.3.4-6 Flash Flood Reports in Chester County

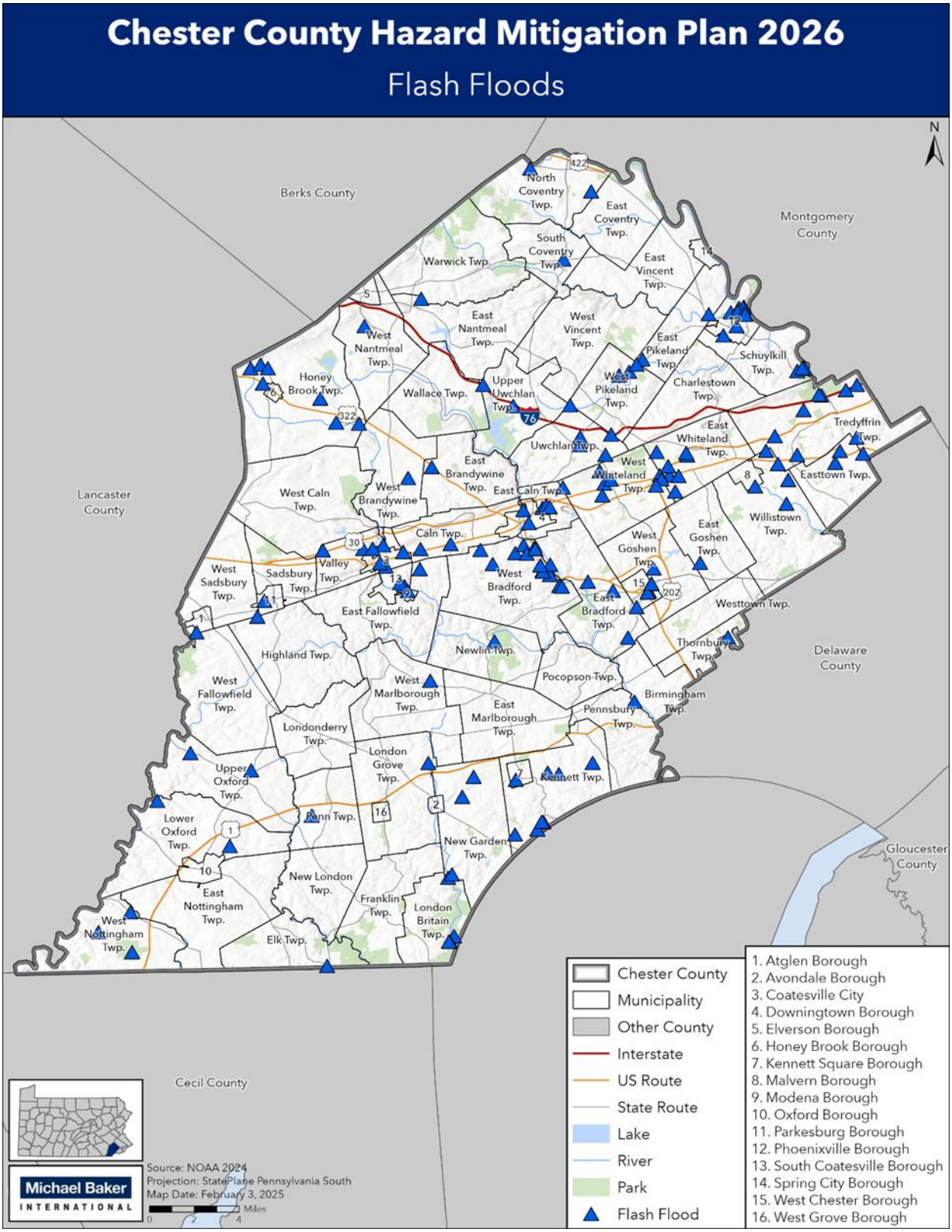
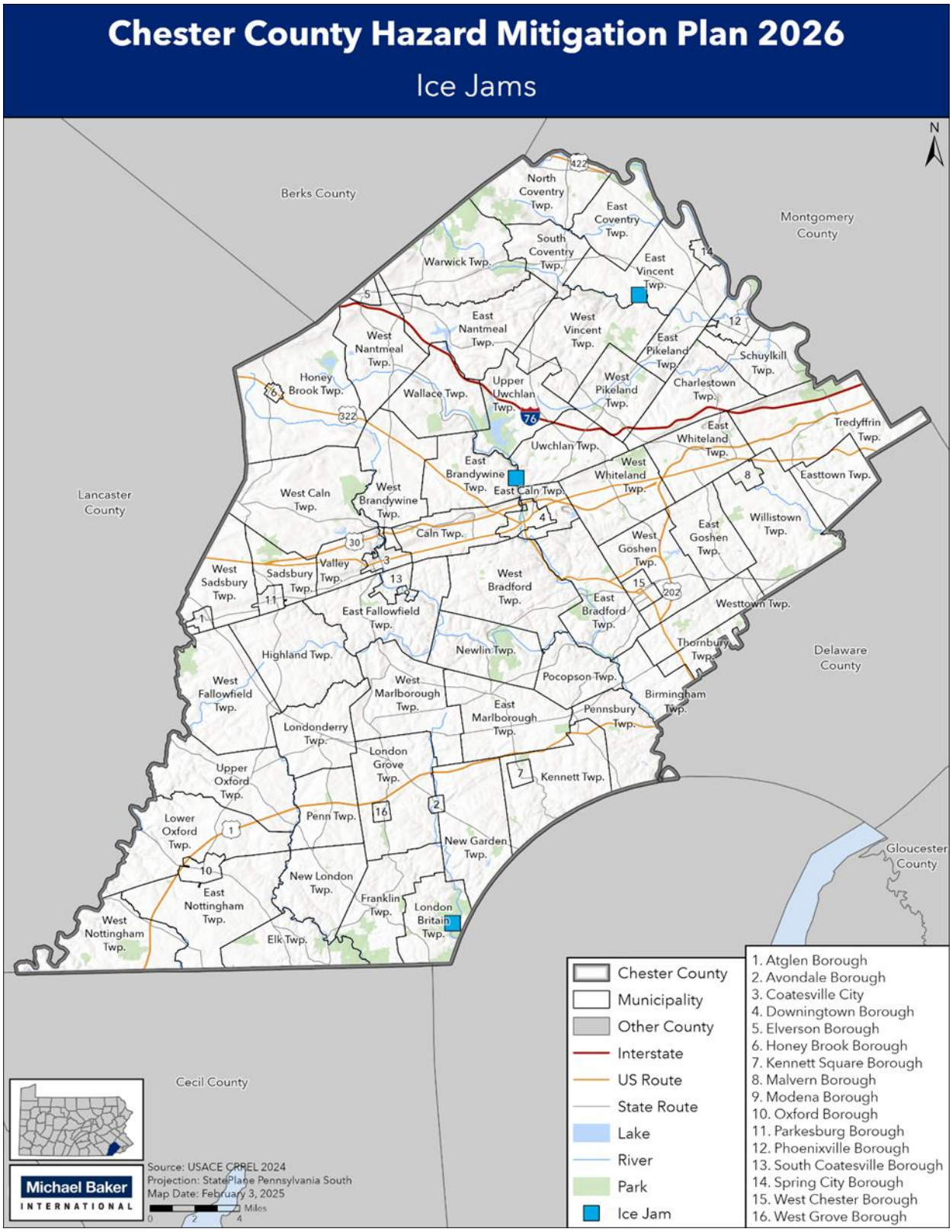


Figure 4.3.4-7 Ice Jams in Chester County



In addition to the past flood events, the NFIP identifies properties that experience frequent flooding and can be used to determine areas of higher risk. These properties are identified through the NFIP when they receive more than one payment for flood damages. The NFIP defines a Repetitive Loss (RL) property as "any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling ten-year period, since 1978". The RL data provided in Table 4.3.4-7 represents the NFIP's definition of RL.

Under FEMA's Hazard Mitigation Assistance (HMA), in regard to mitigation grant funding, RL is defined as a structure that:

- Is covered by a contract for flood insurance made available under the NFIP; and
- Has incurred flood-related damage on two occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and
- At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage (ICC). (Note: Homes are eligible for ICC coverage after the first loss, however the cost for ICC is part of all policies.).

A Severe Repetitive Loss property is a structure that:

- Is covered under a contract for flood insurance made available under the NFIP; and
- Has incurred flood related damage (i) For which four or more separate claims payments have been made under flood insurance coverage with the amount of each such claim exceeding $5,000, and with the cumulative amount of such claims payments exceeding $20,000; or (ii) For which at least two separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

RL and SRL data at the County level were provided by PEMA in December 2025. Chester County has 219 total RL properties and 37 SRL properties that recorded 749 losses. The total building payments are $15.6 million while contents payments are $5.9 million.

Table 4.3.4-7 displays repetitive loss and severe repetitive loss properties by jurisdiction in Chester County as of December 2025. This is the most up-to-date information available at the jurisdiction level and unfortunately does not include structure type. Municipalities with no RL or SRL properties are not included. The County will work with FEMA to obtain more recent data that may help guide mitigation work in the future.

Using the 2025 data, Downingtown Borough has the most repetitive loss properties (57) and the most total number of losses (194). East Bradford Township has the most severe repetitive loss properties (nine).

Table 4.3.4-7 Total RL and SRL Properties in Chester County

MUNICIPALITY	RL PROPERTIES	SRL PROPERTIES	LOSSES	BUILDING PAYMENTS	CONTENTS PAYMENTS	TOTAL PAYMENTS
AVONDALE, BOROUGH OF (421473)	12	2	34	$3,155,886.31	$118,899.84	$3,274,786.15
BIRMINGHAM, TOWNSHIP OF (421474)	2	-	4	$588,244.85	$28,200.00	$616,444.85
CALN, TOWNSHIP OF (422247)	4	-	11	$131,453.08	$21,676.28	$153,129.36
CHARLESTOWN, TOWNSHIP OF (421475)	1	-	3	$15,553.19	$2,094.54	$17,647.73
COATESVILLE, CITY OF (420274)	5	-	11	$87,896.06	$13,329.71	$101,225.77
DOWNINGTOWN, BOROUGH OF (420275)	57	7	194	$2,730,734.70	$207,507.61	$2,938,242.31
EAST BRADFORD TOWNSHIP OF (420276)	19	9	99	$1,205,123.87	$476,358.83	$1,681,482.70
EAST CALN, TOWNSHIP OF (421477)	4	-	8	$358,101.11	$412,353.37	$770,454.48
EAST COVENTRY, TOWNSHIP OF (421478)	3	1	13	$396,377.75	$151,141.75	$547,519.50
EAST GOSHEN, TOWNSHIP OF (420277)	1	-	2	$75,801.84	$0.00	$75,801.84
EAST PIKELAND, TOWNSHIP OF (421483)	3	-	6	$26,674.63	$291.43	$26,966.06
EAST VINCENT, TOWNSHIP OF (420278)	5	1	11	$266,919.14	$19,363.42	$286,282.56
EAST WHITELAND, TOWNSHIP OF (420279)	3	-	10	$101,708.10	$0.00	$101,708.10
KENNETT SQUARE, BOROUGH OF (420280)	2	-	5	$192,143.88	$7,281.96	$199,425.84
KENNETT, TOWNSHIP OF (422586)	4	1	15	$242,966.37	$31,000.00	$273,966.37
MODENA, BOROUGH OF (420282)	2	-	5	$41,809.04	$230,524.97	$272,334.01
NEWLIN, TOWNSHIP OF (421486)	1	-	2	$8,018.51	$1,545.00	$9,563.51
NORTH COVENTRY, TOWNSHIP OF (420283)	18	-	39	$371,200.87	$32,176.51	$403,377.38
PENNSBURY, TOWNSHIP OF (420285)	1	1	4	$158,576.28	$16,611.97	$175,188.25
PHOENIXVILLE, BOROUGH OF (420287)	2	-	5	$342,185.00	$200,000.00	$542,185.00
POCOPSON, TOWNSHIP OF (420286)	25	4	87	$1,876,208.36	$412,144.62	$2,288,352.98
SCHUYLKILL, TOWNSHIP OF (421489)	2	-	6	$256,468.04	$6,368.05	$262,836.09
THORNBURY, TOWNSHIP OF (420290)	1	-	2	$10,440.81	$0.00	$10,440.81
TREDYFFRIN, TOWNSHIP OF (420291)	15	3	44	$1,438,874.06	$303,565.23	$1,742,439.29
UPPER UWCHLAN, TWP OF (421491)	2	1	7	$112,589.49	$40,725.89	$153,315.38
UWCHLAN, TOWNSHIP OF (421492)	1	-	2	$41,123.05	$10,600.00	$51,723.05
VALLEY, TOWNSHIP OF (421206)	2	1	9	$93,135.97	$247,407.73	$340,543.70
WEST BRADFORD, TOWNSHIP OF (421495)	1	-	3	$36,194.69	$0.00	$36,194.69

MUNICIPALITY	RL PROPERTIES	SRL PROPERTIES	LOSSES	BUILDING PAYMENTS	CONTENTS PAYMENTS	TOTAL PAYMENTS
WEST CHESTER, BOROUGH OF (420292)	10	4	62	$546,039.44	$2,811,144.92	$3,357,184.36
WEST GOSHEN, TOWNSHIP OF (420293)	2	-	8	$81,929.53	$5,882.75	$87,812.28
WEST WHITELAND, TOWNSHIP OF (420295)	9	2	34	$586,041.86	$82,167.65	$668,209.51
WESTTOWN, TOWNSHIP OF (420294)	1	-	2	$1,235.97	$9,395.95	$10,631.92
WILLISTOWN, TOWNSHIP OF (422282)	1	-	2	$11,960.93	$0.00	$11,960.93
TOTAL	**221**	**37**	**749**	**$15,589,616.78**	**$5,899,759.98**	**$21,489,376.76**

Floods are the most common and costly natural catastrophe in the United States. In terms of economic disruption, property damage, and loss of life, floods are "nature's number-one disaster" (FEMA, 2019). For that reason, flood insurance is a critical way for citizens to protect their property against flood loss. Home and business owners can purchase flood insurance through private insurers or through the National Flood Insurance Program.

Congress established the NFIP in 1968 to help control the growing cost of federal disaster relief (FEMA, 2019). The NFIP, administrated through FEMA, offers federally backed flood insurance at discounted rates when communities adopt and enforce effective floodplain management ordinances to reduce future flood losses based on flood maps. The NFIP is based on voluntary participation of communities but is required for communities to receive federal disaster relief funding.

Table 4.3.4-8 lists the Chester County municipalities participating in the NFIP.

The minimum floodplain management requirements to be a community in good standing in the NFIP include:

- Review and permit all development in the Special Flood Hazard Area (SFHA);
- Elevate new and substantially improved residential structures above the Base Flood Elevation;
- Elevate or dry floodproof new and substantially improved non-residential structures;
- Limit development in floodways;
- Locate or construct all public utilities and facilities to minimize or eliminate flood damage; and
- Anchor foundation or structure to resist floatation, collapse, or lateral movement.

Table 4.3.4-8 Chester County Municipal Participation in the National Flood Insurance Program

MUNICIPALITY	PARTICIPATION STATUS	CID	CURRENT EFFECTIVE MAP DATE
Atglen Borough	Participating	420273C	9/29/2017
Avondale Borough	Participating	421473C	9/29/2017
Birmingham Township	Participating	421474C	9/29/2017
Caln Township	Participating	422247C	9/29/2017
Charlestown Township	Participating	421475C	9/29/2017
Coatesville City	Participating	420274C	9/29/2017
Downingtown Borough	Participating	420275C	9/29/2017
East Bradford Township	Participating	420276C	9/29/2017
East Brandywine Township	Participating	421476C	9/29/2017
East Caln Township	Participating	421477C	9/29/2017
East Coventry Township	Participating	421478C	9/29/2017

MUNICIPALITY	PARTICIPATION STATUS	CID	CURRENT EFFECTIVE MAP DATE
East Fallowfield Township	Participating	421479C	9/29/2017
East Goshen Township	Participating	420277C	9/29/2017
East Marlborough Township	Participating	421480C	9/29/2017
East Nantmeal Township	Participating	421481C	9/29/2017
East Nottingham Township	Participating	421482C	9/29/2017
East Pikeland Township	Participating	421483C	9/29/2017
Easttown Township	Participating	420278C	9/29/2017
East Vincent Township	Participating	420279C	9/29/2017
East Whiteland Township	Participating	422600C	9/29/2017
Elk Township	Participating	422286C	9/29/2017
Elverson Borough	Participating	422287C	9/29/2017
Franklin Township	Participating	422288C	9/29/2017
Highland Township	Participating	422289C	9/29/2017
Honey Brook Borough	Participating	422692C	(No SFHA)
Honey Brook Township	Participating	422290C	9/29/2017
Kennett Township	Participating	422586C	9/29/2017
Kennett Square Borough	Participating	420280C	9/29/2017
London Britain Township	Participating	422273C	9/29/2017
Londonderry Township	Participating	421484C	9/29/2017
London Grove Township	Participating	420273C	9/29/2017
Lower Oxford Township	Participating	421485C	9/29/2017
Malvern Borough	Participating	420281C	9/29/2017
Modena Borough	Participating	420282C	9/29/2017
New Garden Township	Participating	422275C	9/29/2017
Newlin Township	Participating	421486C	9/29/2017
New London Township	Participating	422276C	9/29/2017
North Coventry Township	Participating	420283C	9/29/2017
Oxford Borough	Participating	420284C	9/29/2017
Parkesburg Borough	Participating	422277C	9/29/2017
Penn Township	Participating	421487C	9/29/2017
Pennsbury Township	Participating	420285C	9/29/2017
Phoenixville Borough	Participating	420287C	9/29/2017
Pocopson Township	Participating	420286C	9/29/2017
Sadsbury Township	Participating	421488C	9/29/2017
Schuylkill Township	Participating	421489C	9/29/2017
South Coatesville Borough	Participating	420288C	9/29/2017
South Coventry Township	Participating	421490C	9/29/2017
Spring City Borough	Participating	420289C	9/29/2017
Thornbury Township	Participating	420290C	9/29/2017
Tredyffrin Township	Participating	420291C	9/29/2017

MUNICIPALITY	PARTICIPATION STATUS	CID	CURRENT EFFECTIVE MAP DATE
Upper Oxford Township	Participating	422278C	9/29/2017
Upper Uwchlan Township	Participating	421491C	9/29/2017
Uwchlan Township	Participating	421492C	9/29/2017
Valley Township	Participating	421206C	9/29/2017
Wallace Township	Participating	421493C	9/29/2017
Warwick Township	Participating	421494C	9/29/2017
West Bradford Township	Participating	421495C	9/29/2017
West Brandywine Township	Participating	421496C	9/29/2017
West Caln Township	Participating	421497C	9/29/2017
West Chester Borough	Participating	420292C	9/29/2017
West Fallowfield Township	Participating	422602C	9/29/2017
West Goshen Township	Participating	420293C	9/29/2017
West Grove Borough	Participating	422279C	9/29/2017
West Marlborough Township	Participating	421498C	9/29/2017
West Nantmeal Township	Participating	422280C	9/29/2017
West Nottingham Township	Participating	421151C	9/29/2017
West Pikeland Township	Participating	422281C	9/29/2017
West Sadsbury Township	Participating	421499C	9/29/2017
West Vincent Township	Participating	420295C	9/29/2017
West Whiteland Township	Participating	420294C	9/29/2017
Westtown Township	Participating	422282C	9/29/2017
Willistown Township	Participating	420273C	9/29/2017

4.3.4.4. Future Occurrence

In this plan, the term "SFHA" is used rather than floodplain to clarify that the area under considerations is identified on the FIRM as having at least a 1-percent chance of flooding in any given year. Historically, the area with a 1-percent chance of flooding in any given year has been called the "100-year floodplain" or the "base flood" and the area with a 0.2-percent chance of flooding in any given year has been called the "500-year floodplain." As these terms can be misleading by suggesting that there will be a flood only every 100 or 500 years respectively, they are not used in this plan. The 1- and 0.2- percent annual chance floods are delineated on the Chester County FIRM. Areas subject to 2- and 10-percent annual chance events are not shown on FIRMs, but water surface elevations associated with these events are included in the flood source profiles in the FIS Report. The most recent FIS for each county in Pennsylvania is available from the FEMA Map Service Center (https://msc.fema.gov/portal/home)

Table 4.3.4-9 shows a range of flood recurrence intervals and associated probabilities of occurrence.

Table 4.3.4-9 Recurrence Intervals and Associated Probabilities of Occurrence (USGS, 2024)

RECURRENCE INTERVAL	CHANCE OF OCCURRENCE IN ANY GIVEN YEAR (%)
10 year	10
50 year	2
100 year	1
500 year	0.2

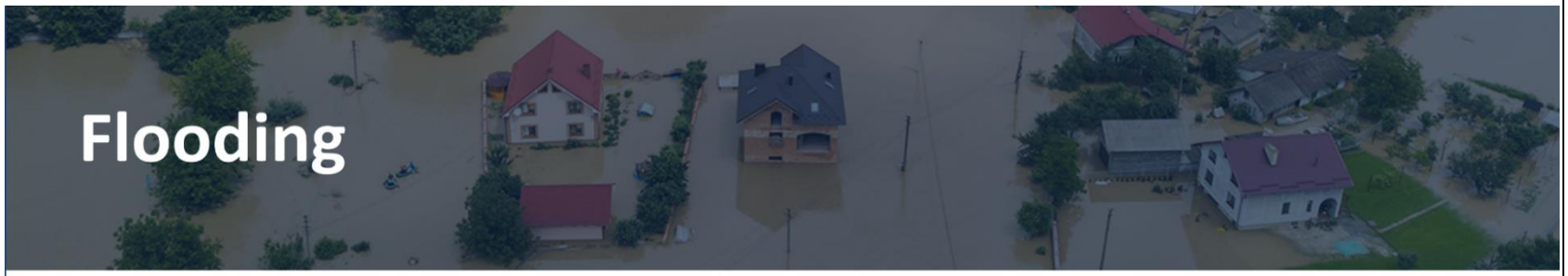
In Chester County, flooding occurs commonly and can take place during any season of the year. Based on Table 4.3.4-6, events in the last ten years have been clustered in June, July, and August. The possibility of flooding is greatly reduced during the winter months. Although most severe floods are attributable to rainfall alone, the spring floods can be compounded by snowmelt and moving ice. The major floods in the late summer and fall are often associated with tropical storms moving up the Atlantic coastline. Within the flood-susceptible areas in Chester County, it is expected that the character of flooding will remain essentially unchanged from what has been experienced for many years. However, some increase in the severity and frequency of flooding may result due to planned or recent development within the floodplains of the various streams, as well as increased intensity and frequency of rain events. Therefore, the future occurrence of floods in Chester County can be characterized as highly likely as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1).

It is important to note that FEMA's flood maps do not project future flooding based on changing climate patterns. They are based on historical data, so they are not a future projection of flood risk. However, changing weather patterns have made many types of disasters more frequent and extreme. As the probability of frequent and intense rainfall increases, Pennsylvania is seeing more severe flooding across the State. In general, hazardous precipitation events are increasing in this region. This can also lead to higher instances of flash flooding and river overflow. According to the Fifth National Climate Assessment, the Northeast region has had the largest increase in the number of extreme precipitation days (defined as the top 1% of heaviest precipitation events) with an increase of around 60% between 1958 to 2021. Along with this, the Northeast region has also experienced the greatest increase in five-year maximum daily precipitation (+18%) and in the annual maximum daily precipitation (+14%) compared to the rest of the nation (Marvel et. al, 2023).

The Climate Mapping for Resilience and Adaptation (CRMA) Tool provides a county-level assessment report for flooding, shown in Figure 4.3.4-8 below. According to CRMA, the average annual precipitation is expected to increase while the number of days per year with precipitation may decrease. The annual days that exceed the 99th percentile precipitation is projected to increase as well. These projections (more precipitation on fewer days and more precipitation) combine to show that future precipitation may be more intense. Lastly, the number of days with a maximum temperature below 32 degrees Fahrenheit is projected to decrease, meaning

precipitation in the winter months will be less likely to turn into snow. This could push more flooding into the winter months.

Figure 4.3.4-8 Chester County Flooding Hazard Assessment Report (CRMA, 2025)



Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Annual average total precipitation	**45"** 44 - 47	**48"** 44 - 53	**48"** 43 - 53	**48"** 45 - 56	**49"** 46 - 55	**49"** 45 - 56	**51"** 45 - 58
Days per year with precipitation (wet days)	**185 days** 180 - 190	**184 days** 173 - 196	**184 days** 170 - 195	**184 days** 169 - 197	**183 days** 166 - 196	**184 days** 170 - 196	**182 days** 154 - 201
Maximum period of consecutive wet days	**11 days** 10 - 13	**12 days** 10 - 13	**12 days** 10 - 13	**12 days** 10 - 13	**12 days** 10 - 14	**12 days** 10 - 14	**12 days** 9 - 15
Annual days with:							
Annual days with total precipitation > 1inch	**6 days** 6 - 7	**7 days** 6 - 9	**7 days** 6 - 9	**7 days** 6 - 9	**8 days** 6 - 9	**8 days** 6 - 10	**9 days** 7 - 11
Annual days with total precipitation > 2 inches	**1 days** 0 - 1	**1 days** 1 - 1	**1 days** 0 - 1	**1 days** 0 - 1	**1 days** 1 - 1	**1 days** 1 - 1	**1 days** 1 - 2
Annual days with total precipitation > 3 inches	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0
Annual days that exceed 99th percentile precipitation	**6 days** 5 - 7	**7 days** 6 - 8	**8 days** 7 - 9	**8 days** 7 - 9	**8 days** 7 - 10	**9 days** 7 - 10	**10 days** 9 - 11
Days with maximum temperature below 32 °F	**17 days** 15 - 19	**11 days** 4 - 16	**11 days** 5 - 16	**9 days** 2 - 13	**7 days** 3 - 12	**7 days** 1 - 11	**3 days** 0 - 8

N/A = Data Not Available for the selected area

4.3.4.5. Vulnerability Assessment

Chester County is vulnerable to flooding that causes loss of lives, property damage, and road closures. For purposes of assessing vulnerability, the County focused on community assets that are in the 1-percent annual chance floodplain. While greater and smaller floods are possible, information about the extent and depths for this floodplain is available for all municipalities countywide, thus providing a consistent basis for analysis. Flood vulnerability maps for each local municipality showing the 1-percent annual chance flood hazard area, critical facilities impacted, and transportation routes are included in Appendix D - Local Municipality Flood Vulnerability Maps.

Flood risk is compounded in Chester County by a lack of proactive measures; only 4.3% of respondents from the Chester County Hazard Mitigation Plan Public Survey reported having flood insurance. This sharply contrasts with the 89.3% of respondents that have homeowners' insurance, which closely aligns with the 88.6% who indicated they own their home. This disparity highlights a critical vulnerability for both homeowners and renters who may face substantial out-of-pocket costs in the event of a flood, whether or not they live in a designated floodplain. Survey comments emphasized the need for greater public education on insurance coverage, particularly around the limitations of standard policies and the nuances of flood insurance. One respondent noted confusion about what is covered, especially regarding basement protection, and called for clearer guidance on how to safeguard both people and property.

Table 4.3.4-10 displays the number of addressable structures, critical facilities, and populations intersecting the SFHA along with the total number of addressable structures, critical facilities, and population in each municipality. This was calculated by overlaying the addressable structures and critical facilities with the SFHA as shown on the FIRM. Similarly, the estimated population in the SFHA was calculated by overlaying the centroids of Census blocks with the SFHA; while this is an estimate, using the block centroid helps to minimize overestimation of flood-prone populations.

Overall, one percent of the structures, two percent of the critical facilities, and 37 percent of the population of Chester County are most at risk of flooding from the 1-percent annual chance flood. The following municipalities have the highest number of structures in the SFHA: North Coventry Township (239), West Whiteland Township (150), and Downingtown Borough (136). Modena Borough and Avondale Borough have the highest percentage of structures in the SFHA (17% and 12% respectively). Downingtown Borough, East Marlborough Township, East Whiteland Township, and East Goshen Township have the highest number of critical facilities in the SFHA (705, 605, 556, and 507 respectively). Modena Borough, Avondale Borough, and Atglen Borough have the highest percentages of critical facilities in the SFHA (38%, 36%, and 22% respectively). Based on this analysis, 23 of 73 Chester County communities have more than 50 percent of their populations living in the SFHA.

Table 4.3.4-11 shows the number of structures in the SFHA by generalized land use type. Most vulnerable structures (1,752) are residential properties. Floods also have a significant impact on

agricultural crops; especially communities with extensive farmlands. Not only are crops lost in the immediate flood event, but often the remaining crops are of lesser quality, resulting in further losses. Additionally, there is the cost of replacing livestock feed lost to flooding. Many industries and residents may have prepared emergency plans and some have established floodproofing procedures in the aftermath of previous significant flooding events.

In 2023, there were 1,144 NFIP policies in force across Chester County. A total of 1,944 NFIP claims have been made since 1978 for flood damages and structures. In total, NFIP flood payments for flood damages in the County have exceeded $36.8 million (PEMA, 2023).

Table 4.3.4-10 Community Flood Vulnerability in Chester County, 2025

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN SFHA	PERCENT STRUCTURES IN SFHA	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN SFHA	PERCENT CRITICAL FACILITIES IN SFHA	TOTAL ESTIMATED 2020 POPULATION	POPULATION IN SFHA	PERCENT POPULATION IN SFHA
Atglen Borough	577	7	1%	1,313	287	22%	8	5	63%
Avondale Borough	405	49	12%	1,274	454	36%	5	3	60%
Birmingham Township	1,624	35	2%	4,082	23	1%	11	8	73%
Caln Township	4,701	68	1%	14,432	225	2%	57	15	26%
Charlestown Township	2,266	8	0%	6,001	0	0%	29	13	45%
Coatesville City	2,732	21	1%	13,350	0	0%	27	6	22%
Downingtown Borough	2,291	136	6%	7,892	705	9%	41	7	17%
East Bradford Township	3,658	85	2%	10,339	326	3%	43	25	58%
East Brandywine Township	3,683	28	1%	9,738	94	1%	49	18	37%
East Caln Township	1,269	5	0%	5,384	8	0%	28	6	21%
East Coventry Township	3,563	73	2%	7,068	95	1%	34	20	59%
East Fallowfield Township	3,944	34	1%	7,626	71	1%	26	8	31%
East Goshen Township	5,665	56	1%	18,410	507	3%	32	17	53%
East Marlborough Township	3,571	30	1%	7,306	605	8%	25	7	28%
East Nantmeal Township	1,508	25	2%	1,832	47	3%	16	11	69%

Table 4.3.4-10 Community Flood Vulnerability in Chester County, 2025

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN SFHA	PERCENT STRUCTURES IN SFHA	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN SFHA	PERCENT CRITICAL FACILITIES IN SFHA	TOTAL ESTIMATED 2020 POPULATION	POPULATION IN SFHA	PERCENT POPULATION IN SFHA
East Nottingham Township	4,885	28	1%	8,982	168	2%	36	15	42%
East Pikeland Township	3,552	23	1%	8,260	209	3%	23	11	48%
East Vincent Township	3,727	86	2%	7,433	75	1%	28	13	46%
East Whiteland Township	4,029	28	1%	13,917	556	4%	81	28	35%
Easttown Township	4,401	29	1%	10,984	152	1%	35	7	20%
Elk Township	1,367	14	1%	1,698	36	2%	12	9	75%
Elverson Borough	584	0	0%	1,330	0	0%	4	0	0%
Franklin Township	2,456	33	1%	4,433	118	3%	17	9	53%
Highland Township	1,307	11	1%	1,259	0	0%	15	5	33%
Honey Brook Borough	732	0	0%	1,892	0	0%	5	0	0%
Honey Brook Township	4,909	54	1%	8,274	33	0%	31	15	48%
Kennett Square Borough	1,751	20	1%	5,936	96	2%	14	4	29%
Kennett Township	3,867	28	1%	8,289	196	2%	44	19	43%
London Britain Township	1,782	19	1%	3,179	26	1%	13	8	62%
London Grove	4,078	25	1%	8,797	126	1%	38	17	45%

Table 4.3.4-10 Community Flood Vulnerability in Chester County, 2025

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN SFHA	PERCENT STRUCTURES IN SFHA	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN SFHA	PERCENT CRITICAL FACILITIES IN SFHA	TOTAL ESTIMATED 2020 POPULATION	POPULATION IN SFHA	PERCENT POPULATION IN SFHA
Township									
Londonderry Township	1,692	12	1%	2,476	5	0%	9	6	67%
Lower Oxford Township	2,579	22	1%	5,436	48	1%	36	21	58%
Malvern Borough	1,066	0	0%	3,419	0	0%	10	2	20%
Modena Borough	201	35	17%	541	203	38%	5	1	20%
New Garden Township	5,451	49	1%	11,363	146	1%	44	10	23%
New London Township	2,921	8	0%	5,810	17	0%	15	10	67%
Newlin Township	1,193	60	5%	1,358	101	7%	18	12	67%
North Coventry Township	4,288	239	6%	8,441	410	5%	37	11	30%
Oxford Borough	1,704	3	0%	5,736	0	0%	17	1	6%
Parkesburg Borough	1,371	9	1%	3,862	0	0%	15	3	20%
Penn Township	2,901	6	0%	5,644	195	3%	25	9	36%
Pennsbury Township	1,712	18	1%	3,876	11	0%	25	10	40%
Phoenixville Borough	4,731	66	1%	18,602	29	0%	32	8	25%
Pocopson Township	1,757	61	3%	4,455	50	1%	27	15	56%

Table 4.3.4-10 Community Flood Vulnerability in Chester County, 2025

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN SFHA	PERCENT STRUCTURES IN SFHA	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN SFHA	PERCENT CRITICAL FACILITIES IN SFHA	TOTAL ESTIMATED 2020 POPULATION	POPULATION IN SFHA	PERCENT POPULATION IN SFHA
Sadsbury Township	1,987	37	2%	4,125	137	3%	18	10	56%
Schuylkill Township	4,096	46	1%	8,780	0	0%	36	10	28%
South Coatesville Borough	506	21	4%	1,601	0	0%	6	1	17%
South Coventry Township	1,653	10	1%	2,796	14	1%	18	7	39%
Spring City Borough	1,199	17	1%	3,494	12	0%	6	1	17%
Thornbury Township	1,060	11	1%	3,177	24	1%	10	4	40%
Tredyffrin Township	9,617	39	0%	31,927	136	0%	139	27	19%
Upper Oxford Township	2,109	31	1%	2,560	77	3%	18	10	56%
Upper Uwchlan Township	3,909	35	1%	12,275	4	0%	27	9	33%
Uwchlan Township	5,805	11	0%	19,161	4	0%	42	4	10%
Valley Township	2,926	35	1%	7,985	147	2%	33	9	27%
Wallace Township	2,065	5	0%	3,711	8	0%	19	11	58%
Warwick Township	2,192	37	2%	2,590	47	2%	13	10	77%
West Bradford Township	5,801	26	0%	14,316	16	0%	33	11	33%

Table 4.3.4-10 Community Flood Vulnerability in Chester County, 2025

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN SFHA	PERCENT STRUCTURES IN SFHA	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN SFHA	PERCENT CRITICAL FACILITIES IN SFHA	TOTAL ESTIMATED 2020 POPULATION	POPULATION IN SFHA	PERCENT POPULATION IN SFHA
West Brandywine Township	4,141	23	1%	7,331	13	0%	30	17	57%
West Caln Township	6,070	51	1%	8,910	30	0%	20	7	35%
West Chester Borough	3,147	47	1%	18,671	183	1%	26	0	0%
West Fallowfield Township	2,226	10	0%	2,459	12	0%	21	9	43%
West Goshen Township	8,075	99	1%	23,040	330	1%	78	16	21%
West Grove Borough	964	0	0%	2,770	0	0%	6	0	0%
West Marlborough Township	983	32	3%	819	53	6%	21	14	67%
West Nantmeal Township	1,832	20	1%	2,251	256	11%	21	12	57%
West Nottingham Township	2,014	36	2%	2,748	0	0%	12	5	42%
West Pikeland Township	2,050	47	2%	4,024	76	2%	22	14	64%
West Sadsbury Township	1,915	30	2%	2,436	12	0%	16	5	31%
West Vincent Township	3,127	38	1%	6,668	220	3%	25	12	48%
West Whiteland	5,656	150	3%	19,632	324	2%	86	33	38%

Table 4.3.4-10 Community Flood Vulnerability in Chester County, 2025

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN SFHA	PERCENT STRUCTURES IN SFHA	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN SFHA	PERCENT CRITICAL FACILITIES IN SFHA	TOTAL ESTIMATED 2020 POPULATION	POPULATION IN SFHA	PERCENT POPULATION IN SFHA
Township									
Westtown Township	3,838	13	0%	11,154	129	1%	28	10	36%
Willistown Township	5,275	95	2%	11,273	178	2%	55	20	36%
Total	**214,689**	**2,698**	**1%**	**534,413**	**8,895**	**2%**	**2,027**	**746**	**37%**

Table 4.3.4-11 Vulnerability by Structure Type

MUNICIPALITY	TOTAL STRUCTURES	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Atglen Borough	577	0	0	4	0	0	3	0	0	7
Avondale Borough	405	4	8	4	0	3	30	0	0	49
Birmingham Township	1,624	0	6	1	4	0	24	0	0	35
Caln Township	4,701	0	11	5	0	0	50	2	0	68
Charlestown Township	2,266	0	0	2	0	0	6	0	0	8
Coatesville City	2,732	0	3	1	0	13	4	0	0	21
Downingtown Borough	2,291	4	16	24	1	1	90	0	0	136
East Bradford Township	3,658	2	13	5	4	0	60	0	1	85
East Brandywine Township	3,683	0	18	0	0	0	10	0	0	28
East Caln Township	1,269	0	0	2	0	2	1	0	0	5

Table 4.3.4-11 Vulnerability by Structure Type

MUNICIPALITY	TOTAL STRUCTURES	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
East Coventry Township	3,563	1	23	1	8	0	40	0	0	73
East Fallowfield Township	3,944	0	0	0	2	0	32	0	0	34
East Goshen Township	5,665	0	6	3	4	0	43	0	0	56
East Marlborough Township	3,571	0	5	0	3	0	22	0	0	30
East Nantmeal Township	1,508	0	0	0	5	0	20	0	0	25
East Nottingham Township	4,885	0	0	0	4	0	24	0	0	28
East Pikeland Township	3,552	0	5	1	0	0	17	0	0	23
East Vincent Township	3,727	0	1	11	8	0	64	1	1	86
East Whiteland Township	4,029	0	6	9	2	0	10	0	1	28
Easttown Township	4,401	0	1	2	3	0	23	0	0	29
Elk Township	1,367	0	0	1	7	0	5	1	0	14
Elverson Borough	584	0	0	0	0	0	0	0	0	0
Franklin Township	2,456	0	2	1	1	0	29	0	0	33
Highland Township	1,307	0	0	0	7	0	4	0	0	11
Honey Brook Borough	732	0	0	0	0	0	0	0	0	0
Honey Brook Township	4,909	0	1	4	8	0	41	0	0	54
Kennett Square Borough	1,751	0	7	7	0	0	6	0	0	20
Kennett Township	3,867	0	4	0	0	0	23	0	1	28
London Britain Township	1,782	0	0	5	0	0	14	0	0	19
London Grove Township	4,078	0	8	1	1	0	15	0	0	25
Londonderry Township	1,692	0	1	0	5	0	6	0	0	12

Table 4.3.4-11 Vulnerability by Structure Type

MUNICIPALITY	TOTAL STRUCTURES	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Lower Oxford Township	2,579	0	1	3	2	0	16	0	0	22
Malvern Borough	1,066	0	0	0	0	0	0	0	0	0
Modena Borough	201	2	6	0	0	9	18	0	0	35
New Garden Township	5,451	0	18	4	2	0	25	0	0	49
New London Township	2,921	0	0	0	0	0	8	0	0	8
Newlin Township	1,193	0	8	0	6	0	44	0	2	60
North Coventry Township	4,288	1	26	25	2	1	180	4	0	239
Oxford Borough	1,704	0	0	0	2	0	1	0	0	3
Parkesburg Borough	1,371	0	8	0	0	0	1	0	0	9
Penn Township	2,901	0	2	0	0	0	4	0	0	6
Pennsbury Township	1,712	0	3	2	0	0	13	0	0	18
Phoenixville Borough	4,731	3	40	7	4	1	11	0	0	66
Pocopson Township	1,757	0	1	0	7	0	52	0	1	61
Sadsbury Township	1,987	0	7	5	6	0	18	1	0	37
Schuylkill Township	4,096	1	5	8	0	4	15	0	13	46
South Coatesville Borough	506	0	13	0	0	8	0	0	0	21
South Coventry Township	1,653	0	1	0	2	0	6	0	1	10
Spring City Borough	1,199	0	9	1	0	6	1	0	0	17
Thornbury Township	1,060	0	0	2	0	0	9	0	0	11
Tredyffrin Township	9,617	0	0	2	0	0	37	0	0	39
Upper Oxford Township	2,109	0	0	1	7	0	22	1	0	31

Table 4.3.4-11 Vulnerability by Structure Type

MUNICIPALITY	TOTAL STRUCTURES	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Upper Uwchlan Township	3,909	0	0	3	0	0	32	0	0	35
Uwchlan Township	5,805	0	0	0	0	0	11	0	0	11
Valley Township	2,926	2	4	1	2	5	20	1	0	35
Wallace Township	2,065	0	0	0	0	0	5	0	0	5
Warwick Township	2,192	0	6	0	2	0	29	0	0	37
West Bradford Township	5,801	0	1	3	4	0	18	0	0	26
West Brandywine Township	4,141	0	0	10	3	0	10	0	0	23
West Caln Township	6,070	0	1	3	21	0	23	1	2	51
West Chester Borough	3,147	0	15	3	0	6	23	0	0	47
West Fallowfield Township	2,226	0	0	0	5	0	5	0	0	10
West Goshen Township	8,075	0	12	14	0	3	70	0	0	99
West Grove Borough	964	0	0	0	0	0	0	0	0	0
West Marlborough Township	983	0	2	0	7	0	23	0	0	32
West Nantmeal Township	1,832	0	4	0	2	0	14	0	0	20
West Nottingham Township	2,014	0	3	3	12	0	18	0	0	36
West Pikeland Township	2,050	0	5	8	4	0	30	0	0	47
West Sadsbury Township	1,915	0	3	0	9	0	18	0	0	30
West Vincent Township	3,127	0	0	5	5	0	28	0	0	38
West Whiteland Township	5,656	11	25	13	0	3	97	0	1	150
Westtown Township	3,838	0	0	3	0	0	10	0	0	13
Willistown Township	5,275	0	2	3	18	0	71	1	0	95

Table 4.3.4-11 Vulnerability by Structure Type

MUNICIPALITY	TOTAL STRUCTURES	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Total	**214,689**	31	376	226	211	65	1,752	13	24	2,698

The flood vulnerability of mobile homes in Chester County is shown in Table 4.3.4-12. Those living in mobile homes in the SFHA are often at the greatest risk of flooding, especially when structures are improperly anchored. In order to estimate the number of mobile home structures in the SFHA, addressable structures that fall within parcels with the land use "mobile home" were selected, then the structures were intersected with the SFHA. A total of 55 municipalities in Chester County have structures coded as mobile homes. Of those municipalities, 14 contain mobile homes in the SFHA. Overall, the number of mobile homes in the SFHA is low – only 2% of all structures of this type. North Coventry Township has the most mobile homes in the SFHA (9) followed by West Nottingham Township (8), while West Marlborough Township has by far the highest percentage of mobile homes in the SFHA at 50%.

Table 4.3.4-12 Mobile Home Flood Vulnerability in Chester County

MUNICIPALITY	TOTAL MOBILE HOMES	# MOBILE HOMES IN SFHA	% MOBILE HOMES IN SFHA
Atglen Borough	3	0	0%
Avondale Borough	6	1	17%
Birmingham Township	0	0	0%
Caln Township	8	0	0%
Charlestown Township	2	0	0%
Coatesville City	0	0	0%
Downingtown Borough	1	0	0%
East Bradford Township	2	0	0%
East Brandywine Township	2	0	0%
East Caln Township	4	0	0%
East Coventry Township	20	0	0%
East Fallowfield Township	33	3	9%
East Goshen Township	0	0	0%
East Marlborough Township	4	1	25%
East Nantmeal Township	9	0	0%
East Nottingham Township	143	2	1%
East Pikeland Township	12	0	0%
East Vincent Township	19	0	0%
East Whiteland Township	0	0	0%
Easttown Township	0	0	0%
Elk Township	71	0	0%
Elverson Borough	4	0	0%
Franklin Township	26	1	4%
Highland Township	15	0	0%
Honey Brook Borough	17	0	0%

Table 4.3.4-12 Mobile Home Flood Vulnerability in Chester County

MUNICIPALITY	TOTAL MOBILE HOMES	# MOBILE HOMES IN SFHA	% MOBILE HOMES IN SFHA
Honey Brook Township	166	3	2%
Kennett Square Borough	0	0	0%
Kennett Township	4	0	0%
London Britain Township	1	0	0%
London Grove Township	51	1	2%
Londonderry Township	30	0	0%
Lower Oxford Township	96	0	0%
Malvern Borough	1	0	0%
Modena Borough	8	0	0%
New Garden Township	85	2	2%
New London Township	33	0	0%
Newlin Township	19	2	11%
North Coventry Township	33	9	27%
Oxford Borough	24	0	0%
Parkesburg Borough	2	0	0%
Penn Township	47	0	0%
Pennsbury Township	0	0	0%
Phoenixville Borough	0	0	0%
Pocopson Township	0	0	0%
Sadsbury Township	22	2	9%
Schuylkill Township	2	0	0%
South Coatesville Borough	2	0	0%
South Coventry Township	16	0	0%
Spring City Borough	2	0	0%
Thornbury Township	0	0	0%
Tredyffrin Township	0	0	0%
Upper Oxford Township	53	3	6%
Upper Uwchlan Township	0	0	0%
Uwchlan Township	14	0	0%
Valley Township	81	0	0%
Wallace Township	17	0	0%
Warwick Township	22	0	0%
West Bradford Township	22	0	0%
West Brandywine Township	68	0	0%
West Caln Township	346	0	0%

Table 4.3.4-12 Mobile Home Flood Vulnerability in Chester County

MUNICIPALITY	TOTAL MOBILE HOMES	# MOBILE HOMES IN SFHA	% MOBILE HOMES IN SFHA
West Chester Borough	0	0	0%
West Fallowfield Township	29	0	0%
West Goshen Township	0	0	0%
West Grove Borough	6	0	0%
West Marlborough Township	6	3	50%
West Nantmeal Township	52	0	0%
West Nottingham Township	118	8	7%
West Pikeland Township	0	0	0%
West Sadsbury Township	95	0	0%
West Vincent Township	0	0	0%
West Whiteland Township	7	0	0%
Westtown Township	0	0	0%
Willistown Township	0	0	0%
TOTAL	1,981	41	2%

The storage of hazardous materials in the floodplain is another vulnerability concern, as their release during a flood could amplify environmental damage. The United States Environmental Protection Agency's (EPA) Toxics Release Inventory (TRI) tracks the management of certain toxic chemicals that may pose a threat to human health and the environment. Facilities releasing and/or managing these chemicals through recycling, energy recovery, and treatment must report annual amounts used to the EPA. There are no TRI facilities within the SFHA in Chester County.

4.3.4.6. Equity in Vulnerable Communities

In terms of equity, residents living within mobile homes or other manufactured homes will experience risks associated with floods, flash floods, and ice jams at a disproportionate rate, especially if they are unanchored or improperly installed. These structures also tend to be sited on less desirable, more flood-prone land to begin with. While Table 4.3.4-12 highlights mobile homes in the SFHA, any community with high number of mobile homes may be more vulnerable. For example, West Nottingham Township has over 40 percent of housing units that are mobile homes, more than 20 percent more than West Caln Township which has the next highest concentration. People currently experiencing homelessness are highly susceptible to flooding as they lack secure shelter. Equitable policies must ensure access to emergency shelters, temporary housing, and long-term housing solutions for people displaced by flooding. In terms of evacuation, households without vehicles or with people who have disabilities will need assistance. According to the American Community Survey, the highest proportions of zero-car households in Chester County are in Modena Borough, West Sadsbury Township,

Honey Brook Township, and West Fallowfield Township – all municipalities where over 15% of households do not have access to a vehicle (ACS 2023 5-year estimates).



4.3.5. Hurricane, Tropical Storm, Nor'easter

4.3.5.1. Location and Extent

Tropical storms impacting Chester County develop in tropical or sub-tropical waters found in the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea. Cyclones with maximum sustained winds of less than 39 miles per hour are called tropical depressions. A tropical storm is a cyclone with maximum sustained winds between 39 and 74 mph. These storms sometimes develop into hurricanes with wind speeds in excess of 74 mph. Although Chester County is located over 100 miles inland from the Atlantic Coast, tropical storms and hurricanes can track inland causing heavy rainfall and strong winds.

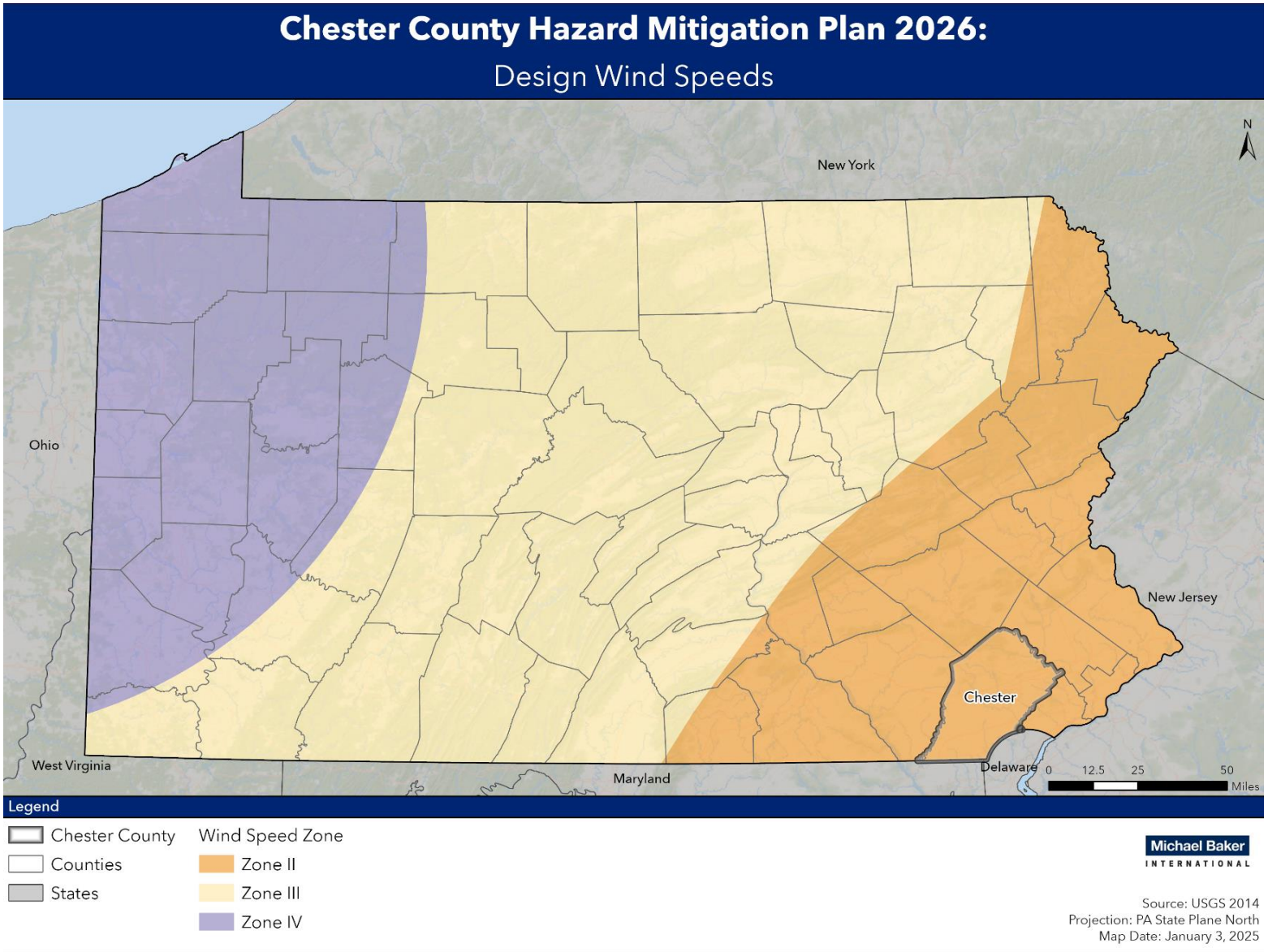
Nor'easters are extra-tropical storms which typically develop from low-pressure centers off the Atlantic Coast between Georgia and New Jersey during the winter months (NOAA NWS, 2024b). Extra-tropical is a term used to describe a hurricane or tropical storm that has lost its 'tropical' characteristics due to being fueled by cold air instead of warm; while the name has changed, the storm system may still have tropical storm or hurricane force winds (Morgan, 2014).

Hurricanes, tropical storms, and nor'easters are regional events that can impact areas as large as hundreds or thousands of miles across through the life of the storm. Therefore, all communities within Chester County are equally subject to the impacts of hurricanes, tropical storms, and nor'easters that track through or near the region. Areas in Chester County that are subject to flooding, wind, and winter storm damage are particularly vulnerable in these situations.

Figure 4.3.5-1 shows wind speed zones developed by the American Society of Civil Engineers. This information is based on 40 years of tornado history and over 100 years of hurricane history. It identifies wind speeds that could occur across the United States to be used as the basis for design and evaluation of the structural integrity of shelters and critical facilities.

Chester County falls in Zone II, which is classified as a 160-mph wind zone. This means wind speeds for shelters and critical facilities should be able to withstand a three second gust of up to 160 mph, regardless of whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm event. In Chester County, all new residential and commercial structures are required to be constructed per the International Building Code, which requires structures to be designed to a 90-mph wind speed.

Figure 4.3.5-1 Wind Speed Zones in Chester County



4.3.5.2. Range of Magnitude

The impacts associated with hurricanes and tropical storms are primarily wind damage and flooding. It is not uncommon for tornadoes to develop during these events. Historical tropical storm and hurricane events have brought intense rainfall that can lead to damaging floods, and northeast winds, which, when combined with waterlogged soils can cause trees and utility poles to fall. Nor'easters can also bring damaging rain and wind but because they often occur during the winter months, they bring the additional threat of snow and ice associated with winter storms. Heavy snow can cause roof collapse in older homes, and ice presents a threat of slipping and tree branch collapse. More information on the range of magnitude of winter storms can be found in Section 4.3.11.

The impact tropical storm or hurricane events have on an area is typically measured in terms of wind speed. Expected damage from hurricane force winds is measured using the Saffir-Simpson Scale. The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential (characteristic of tropical storms and hurricanes), which are combined to estimate potential damage. Table 4.3.5-1 lists Saffir-Simpson Scale categories with associated wind speeds and expected damages. Categories 3, 4, and 5 are classified as "major" hurricanes. While major hurricanes comprise only 20 percent of all tropical cyclones making landfall, they account for over 70 percent of the damage in the United States.

Table 4.3.5-1 Saffir-Simpson Scale Categories with associated wind speeds and damages (NOAA, 2025)

STORM CATEGORY	WIND SPEED (MPH)	DESCRIPTION OF DAMAGES
1	74-95	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	111-129	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4	130-156	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted, and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be

Table 4.3.5-1 Saffir-Simpson Scale Categories with associated wind speeds and damages (NOAA, 2025)

STORM CATEGORY	WIND SPEED (MPH)	DESCRIPTION OF DAMAGES
		uninhabitable for weeks or months.
5	>157	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

The likelihood of this damage occurring in Chester County is assessed in Section 4.3.5.4, Future Occurrence. It is important to recognize the potential for flooding events during hurricanes, tropical storms, and nor'easters; the risk assessment and associated impact for these events is included in Section 4.3.4. Environmental impacts associated with hurricanes and tropical storms are consistent with the impacts described for flooding in Section 4.3.4.2 and tornadoes and windstorms in Section 4.3.9.2. Wind impacts in Chester County generally include downed trees and utility poles, which can result in widespread utility interruptions. Wind impacts are particularly an issue for mobile homes and other manufactured housing; these structures are often not well-anchored and are highly susceptible to wind damage in a hurricane, tropical storm, or nor'easter. The impact of severe winter weather which sometimes occurs during nor'easter events is discussed in Section 4.3.11.2.

The potential impacts of hurricanes, tropical storms, or a Nor'easter on community lifelines are as follows:

Table 4.3.5-2 Most Likely Lifelines Impacted by Hurricanes, Tropical Storms, or Nor'easter

LIFELINES	NOTES
	Government operations and facilities, including police, fire, and search and rescue are needed for response and recovery.
	Severe storms present a significant risk to buildings and infrastructure and can create issues for food and water access.
	Impacts on the power grid and issues with fuel availability either due to direct damage or increased usage.
	Transportation corridors may be affected due to direct damage from storm conditions, and potential impacts of other compounding hazards such as flooding and transportation incidents.
	Damage to facilities and other storage areas from storm or flooding damage may affect hazardous materials.

4.3.5.3. Past Occurrence

NOAA's Coastal Services Center maintains records of all coastal storms occurring in the United States since the 1850s. Table 4.3.5-3 lists all coastal storms having centers of circulation to pass through or within 30 nautical miles of Chester County since 1950. There were an additional nine unnamed storms in this category from 1863 – 1945.

Table 4.3.5-3 Previous Tropical Storms in or near Chester County (NOAA, 2025)

YEAR	EVENT
1952	Hurricane Able
1955	Hurricane Diane
1988	Hurricane Chris
1992	Tropical Storm Danielle
1996	Hurricane Bertha

Table 4.3.5-3 Previous Tropical Storms in or near Chester County (NOAA, 2025)

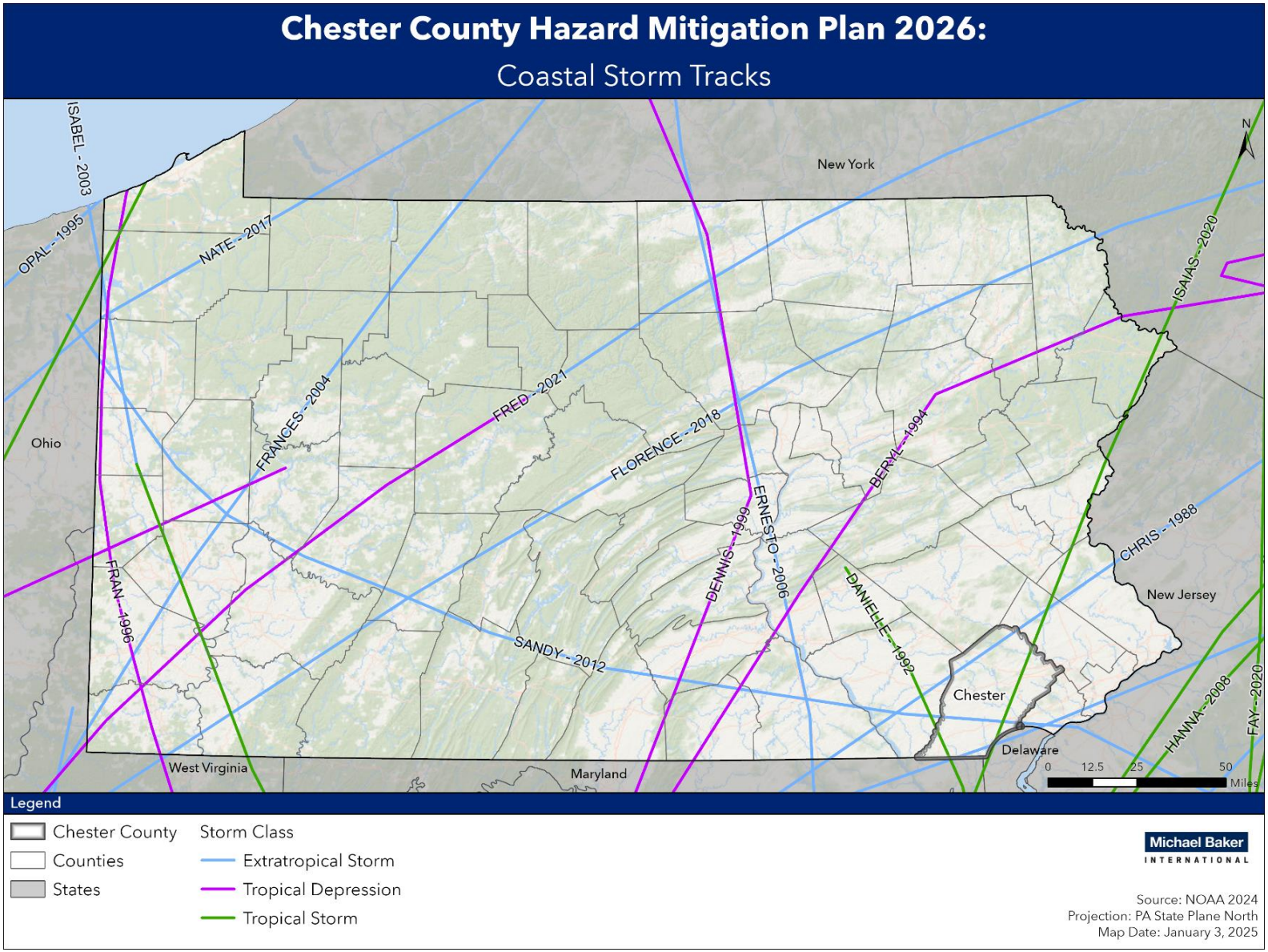
YEAR	EVENT
2012	Hurricane Ernesto
2012	Hurricane Sandy
2020	Hurricane Isaias
2021	Hurricane Ida

Figure 4.3.5-2 shows the tracking of some of the notable storms in Pennsylvania, including those that passed through or near Chester County.

It is important to note that a number of hurricane and tropical storm events have impacted the County without tracking through or near it; these storm events include Tropical Storm Debby (2024), Hurricane Irene (2011), and Tropical Storm Lee (2011). Each of these storm events resulted in a Presidential Disaster Declaration. Tropical Storm Debby resulted in significant flooding in the county, with reports of up to two feet of water in certain areas and water rescues required for residents (Barkon, 2024). Hurricane Irene and Tropical Storm Lee brought significant rainfall to the county, causing rivers to rise, roads to close, and houses to flood. The storms occurred just two weeks apart in August 2011, which added to post disaster complications. The county saw 13.2 inches of rain in the month, nearly 3 times the average for August (NWS, 2015).

These examples indicate that Chester County is vulnerable to damage from flooding and heavy winds when hurricanes and tropical storms come near the region. The following map highlights storms that have tracked through Chester County while also showing the storms that have tracked through the remaining parts of Pennsylvania.

Figure 4.3.5-2 Historic Coastal Storms in Pennsylvania, 2024



The NOAA NCEI database does not track nor'easters as a separate weather event; they are tracked as high wind, heavy snow, and/or coastal flooding events, so a complete listing is not available. However, other sources provide record that some of the winter storms listed in Section 4.3.13.3 were nor'easters. An example is a nor'easter in February 2014 that brought more than 14 inches off snow accumulation to parts of the county. The storm resulted in Pennsylvania Governor Tom Corbett extending a state of emergency that was in place due to ice storms the previous week (NBC10, 2014).

4.3.5.4. Future Occurrence

Although hurricanes and tropical storms can cause flood events consistent with 100- and 500-year levels, their probability of occurrence is measured relative to wind speed. The future occurrence of hurricanes, tropical storms, and nor'easters can be considered *likely*, as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1). It is difficult to assign a probability to the future occurrence of nor'easters in Chester County; however, historical records and the county's location indicate the storms are possible in the county.

Hurricane activity in the North Atlantic has increased since the 1970s, with storms migrating northward and generating more destructive potential (Kossin et al. 2017 & Shortle et al. 2015). However, activity does vary year to year, due to factors such as natural variability in ocean circulation, volcanic eruptions, and Saharan dust. In addition, changing climatic conditions have led to more favorable conditions for large storms.

The relationship between climate change and hurricanes is complex due to the variety of potential factors that impact their development. For example, dust from the Sahara Desert that is lifted high in the atmosphere during a particularly hot and dry summer can inhibit the development of some hurricane formation. Consensus does seem to be that future storms will produce more precipitation. This is because warming sea and air temperatures allow for more moisture in the air, providing more fuel for potential storms. The warming of the Atlantic, which is partially due to human activity like the production of greenhouse gases, has already been associated with an increase in extreme precipitation events in the northeast United States since 1996 (Huang et al., 2018). Global storm intensity is also expected to increase as a larger proportion of storms will reach Category 4 and 5 levels, but regional projections are more uncertain due to the complexity of factors. There is also a tentative connection with a general slowdown of atmospheric circulation due to warming in the Arctic, which may lead to these stronger storms lingering longer in each place. The larger rainfall totals, stronger winds, and potentially lingering storm paths will greatly increase the destructive potential of storms.

The effect of having more intense Category 4 and 5 storms may increase potential damage in the Atlantic 30% by 2100 (see NOAA GFDL's site for more details here https://www.gfdl.noaa.gov/global-warming-and-hurricanes/). In addition to those impacts, storm activity has been occurring before the official start of hurricane season (June 1st) more and more frequently, potentially signaling an extended season each year (Truchelut, et al. 2022).

4.3.5.5. Vulnerability Assessment

A vulnerability assessment for hurricanes and tropical storms focuses on the impacts of flooding and severe wind. A detailed assessment of Chester County's flood-related vulnerability is addressed in Section 4.3.4.

In addition, mobile/manufactured homes are vulnerable to hurricanes, tropical storms, and nor'easters. Section 4.3.9 discusses vulnerability to wind damage and includes Table 4.3.9-6 which lists the number of mobile homes per community. The County is also vulnerable to severe winter weather impacts caused by nor'easters which are evaluated in Section 4.3.11.

4.3.5.6. Equity in Vulnerable Communities

Regarding equity, residents living within mobile homes or other manufactured homes will experience risks associated with severe storms at a disproportionate rate compared to other housing types due to their susceptibility to high winds and floods. West Nottingham Township is at a particularly high risk due to their concentration of mobile homes. Households with no vehicles, lack of internet access, and/or no access to smartphones may have extra hurdles if evacuation is needed in the face of this hazard. Municipalities with higher concentrations of these households include Honey Brook Township, West Fallowfield Township, Oxford Borough, Penn Township, Lower Oxford Township, City of Coatesville, and West Chester Borough. Populations of people experiencing homelessness will require extra help finding locations to shelter in place.

4.3.6. Invasive Species

4.3.6.1. Location and Extent



An invasive species is any living species that is not native to an ecosystem and causes damage. The presence of invasive species can impact the environment, economy, and even human health. Often, an invasive species spreads and reproduces quickly. Any organism that isn't native to an ecosystem can be an invasive species; they can come from a foreign country or even a different region in the United States (National Wildlife Federation, 2018). Pennsylvania hosts several invasive pathogens, insects, plants, invertebrates, fish, and mammals. Human action largely fuels the introduction of invasive species.

Pennsylvania Governor's Invasive Species Council (PGISC), also referenced as the Governor's Invasive Species Council of Pennsylvania (PISC), is the lead organization for invasive species threats in the commonwealth. The PISC recognizes two types of invasive species: Aquatic and Terrestrial (PISC, 2017).

- Aquatic Invasive Species are nonnative species that have part or all of their life cycle in water. They threaten the diversity or abundance of native species, the ecological stability of the infested waters, human health and safety, or

commercial, agriculture, aquaculture, or recreational activities dependent on such waters.

- Terrestrial Invasive Species are nonnative species that complete their lifecycle on land instead of in an aquatic environment. Their introduction does or is likely to cause economic or environmental harm or harm to human health.

The location and extent of these invasive threats depends on the preferred habitat of the species as well as the species' ease of movement and establishment.

West Bradford Township's Land Preservation and Sustainability Committee has identified the most common invasive plant species found in Chester County, which include autumn olive, Japanese barberry, common reed, Japanese stiltgrass, and Japanese knotweed. Invasive plant species can be found throughout the County, with particular species doing very well in waterways and wetlands. See Table 4.3.6-1 for a full list of common invasive plant species in Chester County and their ecological threats.

West Bradford Township has also identified three of the most common invasive insects impacting the County: the spotted lanternfly, which damages trees and agriculture; the stink bug, which is more of a nuisance to residents, but these insects can also damage crops such as corn and fruits; and the emerald ash borer, which causes damage to ash trees (West Bradford Township, 2025). Aquatic invasive species have also been identified in Chester County, including New Zealand mudsnails, Northern snakeheads, red-eared sliders, common carp, and basket clams.

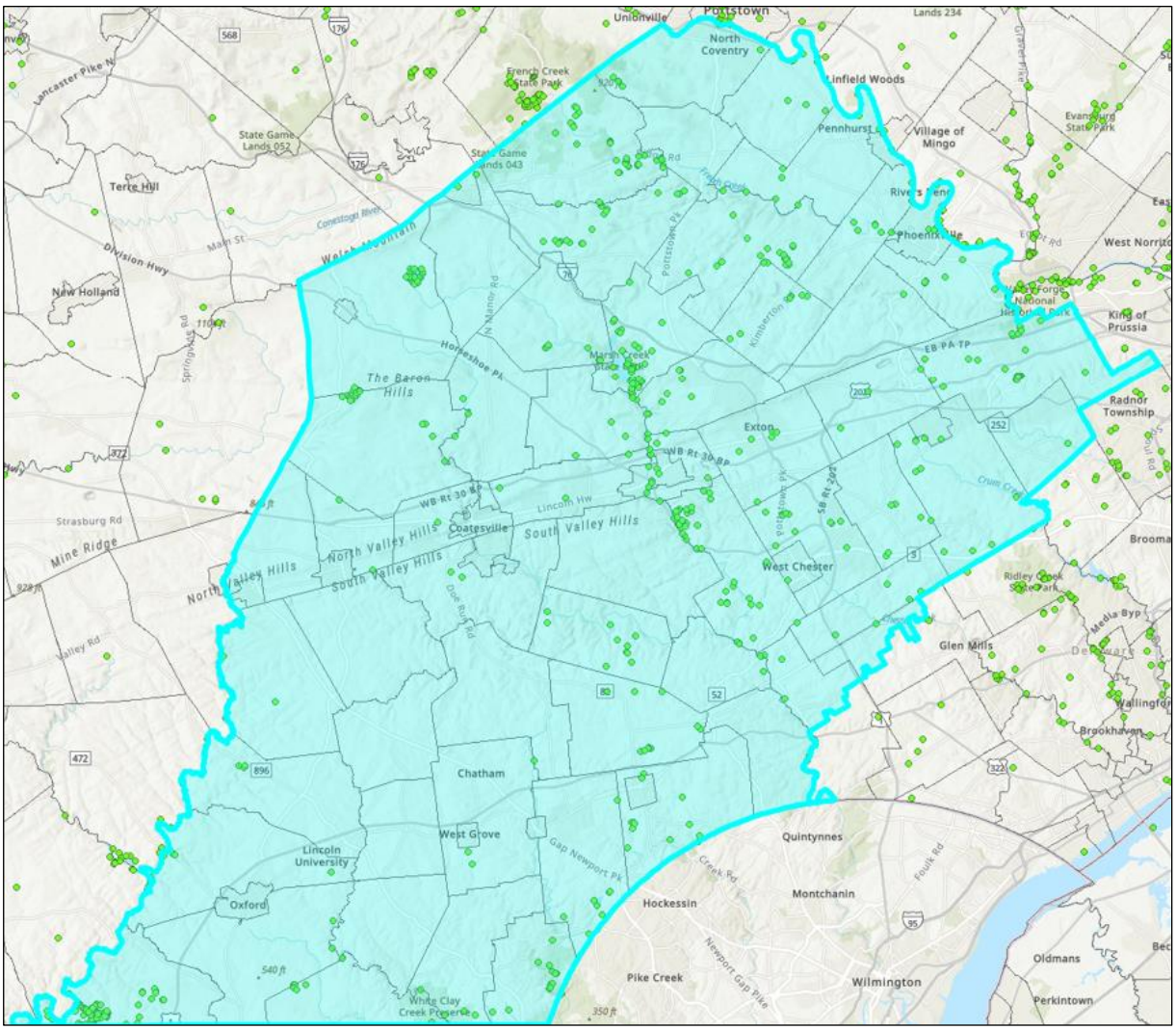
Invasives are introduced into Pennsylvania through a few key pathways (PISC, 2017):

- Contamination of internationally traded products.
- Hull fouling.
- Ship ballast water release.
- Hitchhiking on boats or fishing gear.
- Discarded live fish bait.
- Intentional release.
- Escape from cultivation.
- Movement of soil, compost, wood, vehicles, or other materials and equipment.
- Unregulated sale of organisms.
- Smuggling activities.
- Hobby trading or specimen trading.

iMapInvasives, a project coordinated by the Pennsylvania Natural Heritage Program, shares invasive species data within Pennsylvania. Chester County's most prominent types of invasive species are aquatic and plant species, including the common carp, mile-a-minute vine, and Japanese stiltgrass. Invasive species are distributed around Chester County, but clusters and patterns occur, specifically along waterways and in open spaces. Figure 4.3.6-1 shows the density of invasive species observed in Chester County as collected by iMapInvasives, each

green dot showing one observation. The map shows clusters along Brandywine Creek, including the East Branch, Marsh Creek State Park, municipalities in the northern portion of the county, and West Nottingham Township.

Figure 4.3.6-1 Invasive Species Reports in Chester County (iMapInvasives, 2025)



4.3.6.2. Range of Magnitude

Some invasive species can cause significant changes in the composition of their ecosystems. For example, the spotted lanternfly will inflict weeping wounds on trees, which not only distresses the tree, but the sap will attract other insects, especially ants and wasps. A study by Penn State found that it could cost the state's economy $325 million annually (Duke, 2020). Hydrilla grows aggressively in shallow water areas, forming thick mats that block sunlight and displace native species. They have also been shown to alter the physical and chemical characteristics of water bodies (USGS, 2020). The magnitude of an invasive species threat is generally amplified when the ecosystem or host species is already stressed, such as in times of drought or after a wildfire, as the already weakened state of the native ecosystem causes it to succumb to an infestation more easily (Flory, et. al, 2022). Some species can also increase vulnerability to other hazards. For example, Japanese knotweed can increase flood risk by overtaking waterways and wetlands and clogging streams, and common reed can increase fire risk by altering wetlands and crowding out native plant species.

Table 4.3.6-1 lists invasive plant species commonly found in Chester County and their ecological threat. Most of these plant species are highly competitive growers and may out-populate native plants.

Table 4.3.6-1 Invasive Plant Species Found in Chester County (West Bradford Township, 2025) (PA DCNR, 2025a)

Invasive Species	Ecological Threat
Trees	
Bradford Pear	Naturalized callery pears compete with native early successional trees in old fields and hedgerows. It cross-pollinates with related species and forces out the natives in wild areas.
Norway Maple	A frequent invader of urban and suburban forests. Its extreme shade tolerance allows it to penetrate deep within an intact forest canopy. Norway Maples displace native plants of all types; plant sugar or red maples instead.
Tree-of-Heaven	Produces chemicals in its roots that prevent the establishment of other plant species nearby. Its fast growth limits habitat for other species. Its root system may be extensive and has been known to cause damage to sewer lines and building foundations. Also, the primary host for spotted lanternflies, another invasive species.
Shrubs	
Autumn Olive	These shrubs are highly competitive against native species, shading out shorter plants. Their nitrogen-fixing capabilities may adversely affect the nitrogen cycle of native communities that depend on infertile soils.
Burning Bush	Easily outcompetes native plants with its large, dense silhouette. Lacking pests and tolerant of deep shade, this shrub can force itself into moist forested sites, creating large thickets that displace native herbs and shrubs. This displacement has negative consequences for both aquatic and terrestrial ecosystems. Burning bush is also poisonous to dogs.
Japanese Barberry	Forms dense stands in natural habitats including forests, open woodlands, wetlands, and meadows. Once established, it displaces native plants and reduces wildlife habitat and forage, increasing pressure on natives by white-tailed deer. It has been found to alter pH and biological activity of soil. Barberry is also a human health hazard, due to its sharp spines and it acts as a nursery for deer ticks, which can transmit Lyme disease.
Multiflora Roses	Forms impenetrable thickets that exclude native plant species. Grows very prolifically in riparian areas, where its inedible leaf litter can change the composition of the aquatic macroinvertebrate community. Its occasional habitat of climbing can weight down trees, making them susceptible to breakage.
Vines	
Japanese Honeysuckle	Vines can girdle and kill small saplings and form dense mats in tree canopies, shading native vegetation below.
Oriental Bittersweet	Vines able to girdle and kill trees or break their branches off from the weight of the vines. When it grows into the canopy it can shade out natives.
Mile-a-Minute	This plant can grow up to six inches a day and can quickly smother native vegetation and climb into the tree canopy where it restricts light availability to plants below. It can be a pest plant on tree farms and for horticultural crops where the soil is not regularly tilled. Mile-a-Minute is on the Federal and PA Noxious Weed list.

Table 4.3.6-1 Invasive Plant Species Found in Chester County (West Bradford Township, 2025) (PA DCNR, 2025a)

Invasive Species	Ecological Threat
Grasses	
Common Reed (Phragmites)	Can rapidly take over wetland communities, crowding out native plants, changing hydrology, altering wildlife habitat, and increasing fire potential.
Japanese Stiltgrass	When it invades a site, Japanese stiltgrass can quickly crowd out native plant species. Invasions can also change soil nutrient cycling processes, inhibit tree survival and growth, and reduce light availability. After it dies back in late fall, it forms a thick layer or smothering thatch that is slow to decompose. Because stiltgrass is relatively unpalatable, it may encourage heavier deer browsing on native plant species.
Herbs	
Japanese Knotweed	Knotweeds are capable of quickly forming dense stands where they can crowd out native vegetation. Thickets can clog small waterways and displace streamside vegetation, increasing bank erosion and lowering the quality of riparian habitat for fish and wildlife. Once established, these stands are very difficult to eradicate.
Purple Loosestrife	Invades wetlands, outcompeting native plants, including some federally endangered orchids, forming dense homogenous stands. These monocultures reduce habitat for waterfowl, clog waterways, disrupt nutrient cycling, and collect debris, eventually displacing the entire wetland.
Aquatic Plants	
Hydrilla	Forms dense floating mats that can restrict native vegetation, impact recreation and slow water flow. It is listed on the Federal Noxious Weed list.

Aquatic invasive species can pose threats to waterways and aquatic habitats. Bighead, Silver, and Grass Carp have the potential to radically alter aquatic ecosystems. They are capable of wiping out the base of the local food web, thus depriving native fish and mussel species of sustenance (PA FBC, 2021). The New Zealand mudsnail are competitors with native gastropods and other macroinvertebrates such as caddisfly larvae and mayfly nymphs due to their potential to attain high densities within invaded waters. Infestations may result in reductions in macroinvertebrate abundance and biodiversity (PA FBC, 2025). Northern snakehead have the potential to significantly impact fish communities due to their ecological role as a large, predatory generalist. They can significantly reduce biomass of prey fish species such as sunfishes or minnows (PA FBC, 2023). All three species are projected to have the greatest impacts on fisheries.

With the wide range of types and impacts of invasive species, the impacts to community lifelines will also vary.

Table 4.3.6-2 Most Likely Lifelines Impacted by Invasive Species

LIFELINES	NOTES
	Some invasive plants species can cause harm to humans, such as causing injury through plant spikes or sap. Some plant species can also house deer ticks, which can increase the risk of Lyme disease.
	An increase in invasive species, such as the spotted lanternfly, may impact Chester County's agriculture, especially their wineries, as the species prefers the sugary sap of grape plants.
	Some invasive plant species, such as the common reed, may disrupt water systems by crowding out native plants in wetlands, and they can overwhelm water sources.

4.3.6.3. Past Occurrence

Invasive species have been entering Pennsylvania since the arrival of early European settlers, but not all occurrences have required government action. The first invasive species outbreak requiring state attention occurred in 1862 when legislation was enacted to provide for the destruction of and to prevent the spread of Canada Thistle, Johnson Grass, and Marijuana. Since then, there have been 26 acts and quarantines enacted to prevent the spread of invasive species. As illustrated in Table 4.3.6-3, the volume of acts and quarantines has increased since 2000 (PISC, 2013).

Table 4.3.6-3 Previous Occurrences of Invasive Species Events Requiring State Action or Quarantine.

YEAR	SPECIES	YEAR	SPECIES
1911	Chestnut Blight Disease	2003	Black Carp, Bighead Carp, Silver Carp
1917	Tuberculosis	2005	Eurasian Watermilfoil
1919	European Wart Disease of the Potato	2006	Chronic Wasting Disease
1923	Japanese Beetle	2006	Scrapie
1925	European Corn Borer	2006	Vesicular Stomatitis
1927	Canada Thistle , Wild Garlic, Orange Hawkweed, King-Devil, Sow Thistle, Field Bindweed	2007	Emerald Ash Borer
1933	White Pine Blister	2007	Feral Pig
1933	Gypsy Moth	2008	Viral Hemorrhagic Septicemia Virus
1935	Mosquitoes	2009	Avian Influenza
1953	Black Stem Rust	2009	West Nile encephalitis, Chronic Wasting Disease, Spring Viremia of Carp, Viral Hemorrhagic Septicemia, Lymphocytic Choriomeningitis Virus, Equine Rhinopneumonitis
1983-84	Avian Influenza	2009	Emerald Ash Borer (expansion of

Table 4.3.6-3 Previous Occurrences of Invasive Species Events Requiring State Action or Quarantine.

YEAR	SPECIES	YEAR	SPECIES
			previous quarantine)
1992	Pine Shoot Beetle	2014	Thousand Canker Disease
1996	Reptile and Amphibian Species	2014	Spotted Lanternfly
1999	Plum Pox Virus		

The reports above required statewide action, but invasive species are found in Chester County even without a quarantine. Utilizing reports from government and nongovernmental entities, iMapInvasives reports 29 species with at least five confirmed reports in Chester County:

Table 4.3.6-4 Invasive Species in Chester County (iMapInvasives, 2025)

SCIENTIFIC NAME	COMMON NAME	CONFIRMED PRESENT SPECIES COUNT
Cyprinus carpio	Common Carp	71
Persicaria perfoliata	Mile-a-minute vine	56
Microstegium vimineum	Japanese Stiltgrass	53
Trachemys scripta elegans	Red-eared Slider	46
Ficaria verna	Lesser Celandine	45
Berberis thunbergii	Japanese Barberry	40
Corbicula fluminea	Basket Clam	35
Celastrus orbiculatus	Roundleaf Bittersweet	29
Elaeagnus umbellata	Autumn Olive	19
Rosa multiflora	Multiflora Rose	16
Euonymus alatus	Burning Bush	15
Lonicera japonica	Japanese Honeysuckle	15
Hedera helix	English Ivy	13
Alliaria petiolata	Garlic Mustard	11
Carassius auratus	Goldfish	11
Ailanthus altissima	Tree-of-Heaven	9
Potamopyrgus antipodarum	New Zealand Mudsnail	9
Conium maculatum	Poison-hemlock	8
Lythrum salicaria	Purple Loosestrife	8
Channa argus	Northern Snakehead	7
Phragmites australis ssp. australis	Common Reed	7
Rubus phoenicolasius	Wineberry	7
Miscanthus sinensis	Chinese Silver Grass	6
Paulownia tomentosa	Princess Tree	6
Reynoutria japonica	Japanese Knotweed	6
Arthraxon hispidus	Joint-head Arthraxon	5
Cirsium arvense	Canada Thistle	5
Hydrilla verticillata	Hydrilla	5

Table 4.3.6-4 Invasive Species in Chester County (iMapInvasives, 2025)

SCIENTIFIC NAME	COMMON NAME	CONFIRMED PRESENT SPECIES COUNT
Reynoutria spp. (species unknown)	Knotweed (species unknown)	5

Like in the rest of the Commonwealth, Spotted Lanternflies are of particular concern in Chester County. Hatching around mid-May each year, the reports of lanternfly populations have been steadily growing since 2019. Further, warming climate conditions could cause lanternflies to hatch sooner, raising the potential of stressing young crops in their infant stages (Aucker, 2024). Trees-of-heaven, another invasive species, are prime hosts to spotted lanternflies, offering ideal environments for mating and laying eggs. As lanternflies feed on the sap of the host tree, they excrete honeydew, which attracts wasps and ants. Trees-of-heaven are remarkably hearty, growing up to eighty feet tall even in poor soil conditions. They often take light and nutrients from native trees, enabling them to take over areas while hosting lanternflies (Crick et al., 2023).

4.3.6.4. Future Occurrence

According to the PISC, the probability of future occurrence for invasive species threats is on the rise because of the growing volume of transported goods, increasing technology, efficiency and speed of transportation and expanding international trade agreements. Expanded global trade has created opportunities for many organisms to be transported to and establish themselves in new countries and regions. In 2024, Pennsylvania imported $127 billion in goods from abroad, which were dominated by pharmaceuticals and machinery but still included agricultural, forestry, and fisheries goods that commonly carry unknown pests (OEC, 2025). This was the eighth highest of any state in the country.

Furthermore, climate change can contribute to the introduction of new invasive species by modifying competition in a way that native species are more susceptible to expansion of existing invaders or the addition of new invaders (Finch et. al, 2021). The reverse may also be true in some cases. As maximum and minimum seasonal temperatures change and growing seasons lengthen, pests are given more time to outcompete native species in areas with previously inhospitable climates; these shifts are expected to impact the Northeastern Region, where Chester County is located, the most (NISAW, 2021). Heightened levels of CO_2, which invasive pests contribute to if they have significant negative impacts on tree populations, can also have a dramatic positive effect on invasive plants that are already outcompeting native species (Finch et. al, 2021). For more information on recent changes in extreme temperatures, see Section 4.3.3. These varying changes may shift the dominance of ecosystems in favor of nonnative species over time, but how that will play out is difficult to predict due to how many different factors are involved for each type of species and the context in which they are present. Overall, the probability of invasive species impacting Chester County can be considered *likely* according to the Risk Factor Methodology (see Table 4.4.1-1).

4.3.6.5. Vulnerability Assessment

Losses from invasive species threats stem from three sources: (1) lost revenue from diseased, damaged, or deceased crops, livestock, lumber, or other agricultural commodities; (2) economic losses from the cost of eradication programs; and (3) losses in the form of illness or death of humans. Data is most readily available for the first source, agricultural losses. Invasive species may threaten the 1,558 farms located in Chester County, which sold approximately $736,075,000 in agricultural products in 2022. Most sales to date have come from crop sales, totaling $610,942,250 (83%). Livestock sales made up the remaining 17% (USDA, 2022). However, it is unlikely that all crops would be lost due to a single invasive species event, given that each species has different levels of seriousness. It is difficult to estimate the costs of eradication programs and potential losses to illness or death as these situations depend largely on the species and its location.

Education plays an important role in reducing invasive species and promoting planting with native species. The Chester County Planning Commission provides information online about the benefits of landscaping with native plants and where to find information on choosing the right plants for specific sites. The Planning Commission also provides examples of ordinances that promote use of native plants or ban the planting of specific invasives. Municipalities can update their subdivision and land development ordinances or pass resolutions to help control invasive species (CCPC, 2025). Vulnerability to invasive species can decrease as education and policy tools are expanded through the county.

4.3.6.6. Equity in Vulnerable Communities

According to the US Department of Agriculture National Invasive Species Information Center, invasive species introduce a variety of social and economic equity concerns. Direct impacts, such as effects on property values, agricultural productivity, and public utility operations may be of particular concern to low-income communities and those who work in the agriculture and utility sectors (USDA, 2025). Underserved communities are also particularly vulnerable to the economic impacts of invasive species as well as to pathogens related to invasive species, as many underserved communities lack the resources to map and report sightings (DOI, 2025).

4.3.7. Pandemic and Infectious Disease

4.3.7.1. Location and Extent



Pandemics are defined as a disease affecting or attacking the population of an extensive region, including several countries, and/or continent(s). It is further described as extensively epidemic. Generally, pandemic diseases cause sudden, pervasive illness in all age groups on a global scale. Infectious diseases are also highly virulent but are not spread person-to-person.

Pandemic and infectious disease events cover a wide geographical area and can affect large populations, potentially including the entire population of the County. 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 diseases 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.

Chester County is primarily concerned with the possibility of a pandemic flu outbreak. Influenza, also known as "the flu", is a contagious disease that is caused by the influenza virus and most commonly attacks the respiratory tract in humans. Influenza is considered to have pandemic potential if it is novel, meaning that people have no immunity to it, virulent, meaning that it causes deaths in normally healthy individuals, and easily transmittable from person-to-person (CDC, 2024a).

Different strains of influenza mutate over time and replace older stands of the virus and thus have drastically different effects. The H1N1 virus, colloquially known as swine flu, is of particular concern. This virus was first detected in people in the United States in April 2009. On June 11, 2009, the World Health Organization signaled that a pandemic of 2009 H1N1 flu was underway (CDC, 2009). Avian influenza, also known as bird flu, infects birds. A recent strain, H5N1, has caused particular concern due to its ability to pass from wild birds to poultry then on to people. This virus has killed more than half of the people infected with it, although the avian flu is less likely to infect humans (Mayo Clinic, 2024).

In late 2019 and early 2020, a novel coronavirus began to spread into a worldwide pandemic. Named COVID-19, this type of coronavirus is a new virus that causes respiratory illness and is extremely contagious even prior to exhibiting symptoms and may be transmitted between people even if the infected person is asymptomatic.

Chester County is also vulnerable to vector borne diseases (VBDs), which are human illnesses caused by parasites, viruses, and bacteria that are transmitted by vectors (e.g., mosquitoes, ticks, fleas). Some examples include Lyme Disease, West Nile Virus, and Dengue Fever. Cases of VBDs have increased significantly since 2004, with more than 1 million cases reported between

2001 and 2023 in the US. Annual reported VBD cases more than doubled during this period. Several factors drive the emergence and increased spread of VBDs, putting more people at greater risk (CDC, 2024c):

- Changing Land Use Patterns like reforestation can lead to increased deer populations and suburban growth, exposing more people to more infected tick bites each year.
- Global travel and trade play a role in introducing invasive vectors and pathogens throughout the US (e.g., travelers have inadvertently brought chikungunya and Zika viruses into the US, and almost every year travelers have been associated with local spread of dengue in southern states).
- A changing climate influences the geographic distribution and seasonality of VBDs. This includes:
    - Changing weather patterns and increased frequency of severe and unpredictable weather, such as heat waves and droughts.
    - Longer and warmer summers and shorter and milder winters lengthen vector seasons in the US.
    - Temperature and precipitation affect disease transmission by impacting the replication, interaction, and survival of disease vectors.

4.3.7.2. Range of Magnitude

The magnitude of a pandemic or infectious disease threat in Chester County will vary significantly depending on the aggressiveness of the virus in question and the ease of transmission. Pandemic influenza is easily transmitted from person-to-person, but advances in medical technologies have greatly reduced the number of deaths caused by influenza over time. The magnitude of a pandemic may be exacerbated by the fact that an influenza pandemic will cause outbreaks across the United States, limiting the ability to transfer assistance from one jurisdiction to another. Additionally, effective preventative and therapeutic measures, including vaccines and other medications, will likely be in short supply or will not be available.

In terms of lives lost, the impacts various pandemic influenza outbreaks have had globally over the last century have declined (see Table 4.3.7-2 in the next section). The severity of illness from the 2009 H1N1 influenza flu virus varied, with the gravest cases occurring mainly among those considered at high risk. High-risk populations considered more vulnerable include children, the elderly, pregnant women, and chronic disease patients with reduced immune system capacity. These populations are described in more detail in Section 4.3.7.5. Most people infected with swine flu in 2009 recovered without needing medical treatment (CDC, 2010). Unlike a regular flu season, according to the CDC, the overwhelming majority of the people who died, as many as 77 percent, were 18 to 64 years old with up to 11 percent of the deaths estimated in those 17 years old and younger.

The 1918 Spanish flu pandemic was the worst-case pandemic event in the 20th century for both Pennsylvania and worldwide. County data is unavailable, and mortality figures were probably

under-reported. It is recorded that 8,000 Pennsylvanians died from the flu or its complications in the first month alone (US DHHS, 2009). Infection rates were much worse in denser cities, which should be a high priority for response actions in future flu events.

Chester County has faced varying impacts of the COVID-19 pandemic. It is believed that the virus originated in the Wuhan province of China in November 2019. Shortly afterwards, the virus began to spread to nearby countries like Japan and South Korea. By March 2020, the virus had reached almost every country worldwide, with the most cases in the United States. At first, concern was focused on people who might be infected due to recent travel. However, community infections soon began to crop up in many cities and towns. This led to a statewide shutdown of schools and businesses and the cancellation of large events for Spring and Summer 2020. Only life sustaining services were permitted to remain open, including medical facilities, pharmacies, and grocery stores. People were advised to remain home as much as possible in attempt to slow the transmission of COVID-19. State health officials note that the virus has infected all age ranges at about the same rate, and that no age group can be considered more or less vulnerable to infection (CDC, 2024b).

This virus quickly became a great concern in the early months of the pandemic due to its high rates of transmission and high incidence of mortality in addition to so little being known about it. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. Most people infected with COVID-19 will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness (PA DOH, 2023a). Some people who have been infected with COVID-19 can experience long-term effects from the infection, known as post-COVID conditions (PCC) or long COVID. PCCs can include a wide range of ongoing health problems that can last weeks, months, or years. Some general symptoms of PCC can include ongoing fatigue, symptoms that get worse with physical or mental activity, fever, difficulty breathing, chest pain, heart palpitations, headache, dizziness, diarrhea, and joint or muscle pain. These are more often found in people who had severe COVID-19 illness, but anyone who has been infected with COVID-19 can experience PCCs.

At the end of 2020, the first COVID-19 vaccine for emergency use was authorized by the FDA and by March 2021 more than 100 million COVID-19 vaccine doses had been administered (CDC, 2024b). While the Federal Public Health Emergency for COVID-19 expired on May 11th, 2023, new variants have begun to pop up and case levels remain significant nationwide (US DHHS, 2024). COVID-19 is still impacting populations in Chester County at the time of this plan development.

Those not vaccinated and who become infected may have a higher risk of developing PCCs, compared to people previously vaccinated. In some cases, a person with PCCs may not have tested positive for the virus or known they were infected (CDC, 2022b). Viruses like COVID-19 constantly change through mutation, which sometimes results in a new variant of the virus. Some

changes and mutations may allow the virus to spread more easily or make it resistant to treatments and vaccines. It is essential to track and monitor the incidence of variants during a pandemic to effectively respond to changing trends in transmission and patient care (WHO, 2023). Variants are designated as:

- Variant Under Monitoring (VUM): Variants where data indicates there is a potential or clear impact on approved or authorized medical countermeasures or that have been associated with more severe disease or increased transmission but are no longer detected or are circulating at very low levels in the United States.
- Variant of Interest (VOI): A variant with specific genetic markers that have been associated with changes to receptor binding, reduced neutralization by antibodies generated against previous infection or vaccination, reduced efficacy of treatments, potentially diagnostic impact, or predicated increase in transmissibility or disease severity.
- Variant of Concern (VOC): A variant for which there is evidence of an increase in transmissibility, more severe disease (for example, increased hospitalizations or deaths), significant reduction in neutralizations by antibodies generated during previous infection or vaccination, reduced effectiveness of treatments or vaccines, or diagnostics detection failures.

The COVID-19 pandemic impacted how all County services were delivered, particularly with changes in clinic operations (virtual, masking, social distancing, contact tracing). The Chester County Health Department (CCHD) continues to operate remote services, which can be ramped up in a pandemic event. CCHD reported the following operational impacts from the COVID-19 pandemic. These impacts can be expected if another pandemic occurs.

- Diverted resources to help coordinate and administer relevant vaccinations and PPE.
- Coordinated the procurement and transportation of vaccinations and other medical and PPE supplies.
- Dedicated effort to possible vaccine response, in collaboration with the department's Public Health Emergency Preparedness Team.
- Conducted mobile vaccination clinics.
- Curtailed regular clinics to reallocate staff or allow for social distancing.
- Developed communications to combat mis/disinformation.

The community also faces many challenges with how the COVID-19 pandemic impacted the economy. During the pandemic, supply chain shortages for essential goods like masks and baby formula impacted the County's ability to provide services. Increased inflation following the pandemic is causing ongoing economic challenges.

The range of magnitude for VBDs can range from impacting single individuals to wider populations. Some VBDs can replicate in their hosts (i.e., a reservoir host) and spread to new vector populations if that vector comes in contact with the already infected host. For example,

Dengue fever replicates in humans; if someone travels and contracts Dengue, then comes back to Chester County and is bit by a mosquito here, that mosquito could potentially spread Dengue throughout the local mosquito population in Chester County. The potential for this depends on the specific vector, host, and disease (WHO, 2024).

The potential impacts of pandemic and infectious diseases to community lifelines include:

Table 4.3.7-1 Most Likely Lifelines Impacted by Pandemic and Infectious Diseases

LIFELINES	NOTES
	Government services and administration will be significantly impacted by widespread disease. Response plans will need to be developed.
	Staffing issues may occur due to illness at various points in the food supply chain.
	Hospitals will be impacted through staffing issues, an increase in patients, and supply chain issues as the disease becomes more widespread.

4.3.7.3. Past Occurrence

The United States Department of Health and Human Services estimates that influenza pandemics have occurred for at least 300 years at unpredictable intervals. There have been several pandemic influenza outbreaks over the past 100 years. A list of events and worldwide deaths are shown in Table 4.3.7-2.

Table 4.3.7-2 Significant Influenza Outbreaks over the Past Century (Global Security, 2009; WHO, 2009; WHO, 2025)

DATE	PANDEMIC	WORLDWIDE DEATHS (APPROXIMATE)
1918-1920	Spanish Flu/H1n1	50 Million
1957-1958	Asian Flu/H2n2	1.5-2 Million
1968-1969	Hong Kong Flu/H3n2	1 Million
2009-2010	Swine Flu/H1n1	12,000
2019 - Present	COVID-19	7 million

Deaths occurred in the United States as a result of the Spanish Flu, Asian Flu, and Hong Kong Flu outbreaks. The Spanish Flu claimed 500,000 lives in the United States. There were 350,000 cases and 8,000 deaths in Pennsylvania. 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 percent of the population of Pennsylvania was affected. The first cases of the Hong Kong Flu in the United States were detected in September of 1968 with deaths peaking between December 1968 and January 1969 (Global Security, 2009).

The Chester County Health Department (CCHD) provides an annual influenza surveillance report. Table 4.3.7-3 lists the number of seasonal flu cases in Chester County from the 2018/2019 flu season.

Table 4.3.7-3 Number of Flu Cases in Chester County by Flu Season (CCHD, 2023; PA Open Data, 2025)

Flu Season	# of Cases
2018/2019	2,939
2019/2020	3,769
2020/2021	7*
2021/2022	2,307
2022/2023	4,413
2023/2024	4,680
2024/2025	7,474

**Abnormally low influenza activity most likely due to COVID-19 mitigation measures*

An avian flu outbreak in Pennsylvania occurred in 1983 through 1984, in which 17 million birds were lost. There has not been an outbreak since in the Commonwealth, although there have recently been outbreaks in the Midwest. From 1996 to 1997, a number of table-egg farms in Lancaster and Lebanon Counties tested positive for H7N2 avian influenza. As a result, nine flocks were lost, and the Pennsylvania Department of Agriculture (PADA) imposed a quarantine on a 75-square-mile area restricting movement of poultry or poultry products into or out of the area (Jacob et al., 1998).

As noted, the COVID-19 outbreak began in China in November 2019 and reached the United States in late February 2020. Most counties in Pennsylvania were affected by March 2020. By October 1, 2020, there were more than 162,140 confirmed cases in Pennsylvania, with almost 7,000 cases and 375 deaths reported in Chester County (PA Open Data, 2024). Table 4.3.7-4 displays the cumulative COVID-19 cases for Chester County from 2020 to 2024.

Table 4.3.7-4 Cumulative COVID-19 Cases Chester County 2020-2023 (PA Open Data, 2025).

DATE	Cumulative Cases	Cumulative deaths
2020	20,531	590
2021	67,794	1,000
2022	114,503	1,292
2023*	119,013	1,404
2024**	N/A	1,433
*as of 6/15/2023; **as of 3/24/2024		

4.3.7.4. Future Occurrence

Future occurrences of pandemics and infectious diseases are unclear. 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. While it is unlikely that pandemics and infectious diseases will affect the county, this hazard occurred recently in Spring 2020. It is impossible to predict this type of hazard. The best form of county response is to expect that these events can occur at any time and to constantly evaluate resources and update emergency response plans.

Climate change is increasing the likelihood of future pandemics due to shifts in the behaviors of hosts, vectors, and pathogens, along with changing weather patterns, migration shifts, and changes in livestock and agriculture practices which may allow new transmission pathways to develop. Climate change may also increase the prevalence of waterborne and foodborne illnesses (Kayesa et al, 2024).

Climate change will also force animals into different migration patterns and into new habitats, which will create new interactions and opportunities for pathogens to infect new hosts; this is a concern as most pandemics are driven by diseases that are passed from animals to humans (Baker & Metcalf, 2022). Tick populations may increase as a result of climate changes, especially warmer winters that allow them to be active for longer periods of the year and expand the ranges they can survive in. Since 2019, the Asian long horned tick and the gulf coast tick have been discovered in Pennsylvania possibly due to changing environmental conditions that allow them to survive (Petelin, 2023). Health threats that the CDC projects climate change will increase risk of are:

- Anaplasmosis and Lyme disease
- Dengue
- Fungal diseases
- Hantavirus
- Harmful algae blooms
- Rabies
- Salmonellosis
- Vibriosis
- West Nile virus

It is important to note that even if these changes do not originate in Pennsylvania, the interconnectedness of global commerce and tourism increase the risks of diseases spreading across the world from their origin. Future pandemics and infectious disease outbreaks may emerge from a long list of diseases and invasive pathogens that Pennsylvanians lack natural immunity to, presenting a significant danger.

Looking at the number of historical incidences of pandemic-potential diseases, the probability of future pandemic events can be considered possible according to the Risk Factor Methodology (see Table 4.4-1).

4.3.7.5. Vulnerability Assessment

Certain population groups are at higher risk of pandemic flu infection. These population group includes people 65 years and older, children younger than five years old, pregnant women, and people of any age with certain chronic medical conditions. Such conditions include but are not limited to diabetes, heart disease, asthma and kidney disease (CDC, 2024b). Schools, colleges, convalescent centers, and other institutions serving those younger than five years old and older than 65 years old, are locations conducive to faster transmission of pandemic influenza since populations identified as being at high risk are concentrated at these facilities or because of a large number of people living in close quarters. All communities in Chester County are considered vulnerable to a pandemic event, with the likely greatest impact in terms of population affected and disruption of economic activity occurring at Tredyffrin Township, West Goshen Township, and West Whiteland Township. 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.

Table 4.3.7-5 below shows the populations aged five or younger in each municipality, along with the population percentage. The municipalities with the largest populations are West Whiteland Township, Tredyffrin Township, Phoenixville Borough, and West Goshen Township. Other municipalities with over 10 percent of their population aged five or younger are Elverson Borough, East Vincent Borough, Atglen Borough, West Fallowfield Borough, and Oxford Borough.

Table 4.3.7-5 Population Aged 5 or Younger by Municipality (U.S. Census, 2023)

MUNICIPALITY	POPULATION 5 OR UNDER	PERCENT OF POPULATION
Atglen Borough	146	11.1%
Avondale Borough	73	5.7%
Birmingham Township	165	4.0%
Caln Township	727	5.0%
Charlestown Township	171	2.8%
Coatesville City	937	7.0%
Downingtown Borough	532	6.5%
East Bradford Township	419	4.0%

Table 4.3.7-5 Population Aged 5 or Younger by Municipality (U.S. Census, 2023)

MUNICIPALITY	POPULATION 5 OR UNDER	PERCENT OF POPULATION
East Brandywine Township	467	4.7%
East Caln Township	292	5.3%
East Coventry Township	451	6.3%
East Fallowfield Township	366	4.7%
East Goshen Township	705	3.8%
East Marlborough Township	335	4.4%
East Nantmeal Township	78	4.7%
East Nottingham Township	417	4.6%
East Pikeland Township	446	5.3%
Easttown Township	367	3.3%
East Vincent Township	859	11.4%
East Whiteland Township	630	4.4%
Elk Township	68	3.9%
Elverson Borough	168	12.1%
Franklin Township	153	3.5%
Highland Township	62	5.1%
Honey Brook Borough	178	8.5%
Honey Brook Township	360	4.3%
Kennett Township	367	4.2%
Kennett Square Borough	446	7.3%
London Britain Township	205	6.4%
Londonderry Township	159	6.3%
London Grove Township	720	8.1%
Lower Oxford Township	199	3.6%
Malvern Borough	115	3.4%
Modena Borough	19	5.5%
New Garden Township	470	4.1%
Newlin Township	41	3.4%
New London Township	214	3.7%
North Coventry Township	230	2.7%
Oxford Borough	604	10.5%
Parkesburg Borough	382	9.8%
Penn Township	86	1.5%
Pennsbury Township	178	4.6%
Phoenixville Borough	1,166	6.1%
Pocopson Township	165	3.7%
Sadsbury Township	409	9.6%
Schuylkill Township	515	5.8%
South Coatesville Borough	115	6.2%
South Coventry Township	103	3.7%
Spring City Borough	185	5.2%
Thornbury Township	262	8.2%

Table 4.3.7-5 Population Aged 5 or Younger by Municipality (U.S. Census, 2023)

MUNICIPALITY	POPULATION 5 OR UNDER	PERCENT OF POPULATION
Tredyffrin Township	1,485	4.7%
Upper Oxford Township	236	9.3%
Upper Uwchlan Township	748	5.9%
Uwchlan Township	1,211	6.3%
Valley Township	268	3.4%
Wallace Township	148	4.0%
Warwick Township	41	1.6%
West Bradford Township	685	4.7%
West Brandywine Township	335	4.4%
West Caln Township	564	6.3%
West Chester Borough	453	2.4%
West Fallowfield Township	266	10.9%
West Goshen Township	1,110	4.8%
West Grove Borough	205	7.3%
West Marlborough Township	30	3.4%
West Nantmeal Township	104	4.7%
West Nottingham Township	252	9.0%
West Pikeland Township	174	4.3%
West Sadsbury Township	217	8.4%
Westtown Township	866	7.7%
West Vincent Township	457	6.8%
West Whiteland Township	1,538	7.7%
Willistown Township	732	6.5%

Table 4.3.7-6 below shows the populations aged 65 or older in each municipality, along with the population percentage. The municipalities with the largest populations are East Goshen Township, Tredyffrin Township, and West Goshen Township. Both East Goshen Township and Elverson Borough have at least one-third of their population aged 65 or older.

Table 4.3.7-6 Population Aged 65 or Older by Municipality (U.S. Census, 2023)

MUNICIPALITY	Population 65 or older	PERCENT OF POPULATION
Atglen Borough	94	7.1%
Avondale Borough	128	10.0%
Birmingham Township	853	20.9%
Caln Township	2,615	18.0%
Charlestown Township	870	14.1%
Coatesville City	1,493	11.2%
Downingtown Borough	1,182	14.5%
East Bradford Township	1,835	17.3%
East Brandywine Township	1,309	13.2%

Table 4.3.7-6 Population Aged 65 or Older by Municipality (U.S. Census, 2023)

MUNICIPALITY	Population 65 or older	PERCENT OF POPULATION
East Caln Township	952	17.3%
East Coventry Township	1,255	17.6%
East Fallowfield Township	993	12.8%
East Goshen Township	6,429	35.0%
East Marlborough Township	1,872	24.7%
East Nantmeal Township	525	31.8%
East Nottingham Township	1211	13.4%
East Pikeland Township	1,675	19.9%
Easttown Township	1,992	18.1%
East Vincent Township	1,160	15.4%
East Whiteland Township	1,739	12.0%
Elk Township	271	15.7%
Elverson Borough	460	33.0%
Franklin Township	746	16.8%
Highland Township	220	18.0%
Honey Brook Borough	233	11.2%
Honey Brook Township	2,428	29.2%
Kennett Township	2,316	26.4%
Kennett Square Borough	909	14.9%
London Britain Township	543	17.0%
Londonderry Township	539	21.3%
London Grove Township	1,053	11.9%
Lower Oxford Township	517	9.3%
Malvern Borough	746	21.8%
Modena Borough	39	11.2%
New Garden Township	1,719	15.0%
Newlin Township	330	27.0%
New London Township	612	10.5%
North Coventry Township	1,589	18.9%
Oxford Borough	1,027	17.8%
Parkesburg Borough	481	12.4%
Penn Township	1,739	30.8%
Pennsbury Township	915	23.6%
Phoenixville Borough	2,438	12.8%
Pocopson Township	937	21.0%
Sadsbury Township	549	12.9%
Schuylkill Township	1,183	13.4%
South Coatesville Borough	212	11.5%
South Coventry Township	442	15.8%
Spring City Borough	458	12.9%
Thornbury Township	411	12.9%
Tredyffrin Township	5,707	17.9%

Table 4.3.7-6 Population Aged 65 or Older by Municipality (U.S. Census, 2023)

MUNICIPALITY	Population 65 or older	PERCENT OF POPULATION
Upper Oxford Township	430	16.9%
Upper Uwchlan Township	1,376	10.8%
Uwchlan Township	3,298	17.1%
Valley Township	1,129	14.2%
Wallace Township	730	19.5%
Warwick Township	677	26.1%
West Bradford Township	2,022	13.9%
West Brandywine Township	2,249	29.9%
West Caln Township	1,916	21.4%
West Chester Borough	1,840	9.6%
West Fallowfield Township	362	14.9%
West Goshen Township	4,638	19.9%
West Grove Borough	278	10.0%
West Marlborough Township	242	27.2%
West Nantmeal Township	473	21.5%
West Nottingham Township	433	15.4%
West Pikeland Township	544	13.5%
West Sadsbury Township	453	17.6%
Westtown Township	2,143	19.1%
West Vincent Township	936	13.9%
West Whiteland Township	2,574	12.9%
Willistown Township	2,948	26.1%

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. Social and economic disruptions could be temporary but may be amplified in today's closely interrelated and interdependent systems of trade and commerce. Social disruption may be greatest when rates of absenteeism impair essential services, such as power, transportation, and communications.

Jurisdictional losses in a pandemic or infectious disease outbreak stem from lost wages and productivity, not losses to buildings or land. Losses are difficult to estimate because the exact rates of absenteeism and cost of treating a widespread disease will depend on the virus or bacterium in question, the availability of vaccination or treatment, and the severity of symptoms. For historical context, the Asian and Hong Kong Flu pandemics killed over 1.5 million people worldwide and caused an estimated $32 billion loss due to lost productivity and medical expenses (Saunders-Hastings & Krewski, 2016). With Pennsylvania's economy so integral to the national economy, economic losses from a pandemic or infectious disease threat could be

significant. An avian flu outbreak could cause some economic loss for poultry farmers in Chester County. According to the 2022 Agricultural Census, livestock, poultry, and product sales make up about 17 percent of Chester County's agricultural sales. Poultry and egg sales totaled around $31,374,000 in 2022.

The COVID-19 pandemic had significant impacts on economic activity across the country. Thousands of individuals were laid off across the commonwealth as non-essential businesses were forced to close. In just one week, over three million Americans filed for unemployment; the greatest amount ever (Rushe & Holpuch, 2020). The service and hospitality industries were particularly impacted. Construction projects and other businesses were forced to pause operations while many others decided to permanently close. To combat these impacts, the commonwealth and the federal government released relief packages for individuals and businesses. Chester County was awarded approximately $102 million in American Rescue Plan Act (ARPA) funds. This money was spent on Government Services, Mental Health Services, Public Health and Safety Services, Housing Services/Affordable Housing, Infrastructure, Community Services, Skills Training, Food Programs, Library Services, and Childcare. Funding was provided to school districts, nonprofits, local businesses, fire/EMS companies, and both county and municipal entities.

The COVID-19 pandemic has also spurred conversations around creating safe public spaces and work environments in regard to pandemic and infectious disease. The International Code Council (ICC) published an overview of code compliance that helps facilitate response to pandemic instances. For example, properly designed, installed, and maintained ventilation systems can help in mitigating the spread of pathogens (ICC, 2020). Many building owners have chosen to inspect and upgrade these systems during shelter in place orders. This is essential towards stopping the spread of pathogens in high density residential buildings and ensures workers will return to a safe environment when it is safe to work in offices again.

4.3.7.6. Equity in Vulnerable Communities

Equity considerations during pandemics and infectious disease outbreaks are crucial as there are a number of populations at an increased risk. Low-income populations are more likely to lack access to quality healthcare and have pre-existing health conditions. Furthermore, these populations may be unable to follow quarantine measures as they are essential workers. Municipalities face a variety of risks in these cases:

- Concentrations of low-income residents: West Chester Borough, City of Coatesville, Oxford Borough, and City of Phoenixville.
- At least one-quarter of population without health insurance: West Fallowfield Township and Honey Brook Township.
- Over one-third of population 65 and older: East Goshen Township, Kennett Township, West Brandywine Township, and Willistown Township.
- Households with inadequate broadband connections will have inequitable access to both remote work and remote learning.

Having measures and protections in place for these groups is essential to mitigate and reduce the extensivity of pandemic and infectious disease events.

4.3.8. Radon Exposure



4.3.8.1. Location and Extent

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 1980s that the wide geographic distribution of elevated values in houses and the possibility of extremely high radon values in houses were recognized. In 1984, routine monitoring of employees leaving the Limerick nuclear power plant near Reading, Pennsylvania, showed that the readings on an employee frequently exceeded expected radiation levels, yet only natural, non-fission-product radioactivity was detected on him. Radon levels in his home were detected around 2,500 pCi/L (pico Curies per Liter), much higher than the 4 pCi/L guideline of the Environmental Protection Agency or even the 67 pCi/L limit for uranium miners. As a result of this event, the Reading Prong section of Pennsylvania where the employee lived became the focus of the first large-scale radon scare in the world.

Radon is a gas that cannot be seen or smelled. It is a noble gas that originates from 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, 222Rn and 220Rn, formed in the radioactive decay series of 238U and 232Th, respectively. The isotope thoron (i.e. 220Rn) 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, radon (i.e. 222Rn), which has a half-life of 3.8 days, is a widespread hazard (DOI, 1992).

The distribution of radon is correlated with the distribution of radium (i.e. 226Ra), its immediate radioactive parent, and with uranium, its original ancestor. Due to the short half-life of radon, the distance that radon atoms can travel from their parent before decay is generally limited to distances of feet or tens of feet (DOI, 1992).

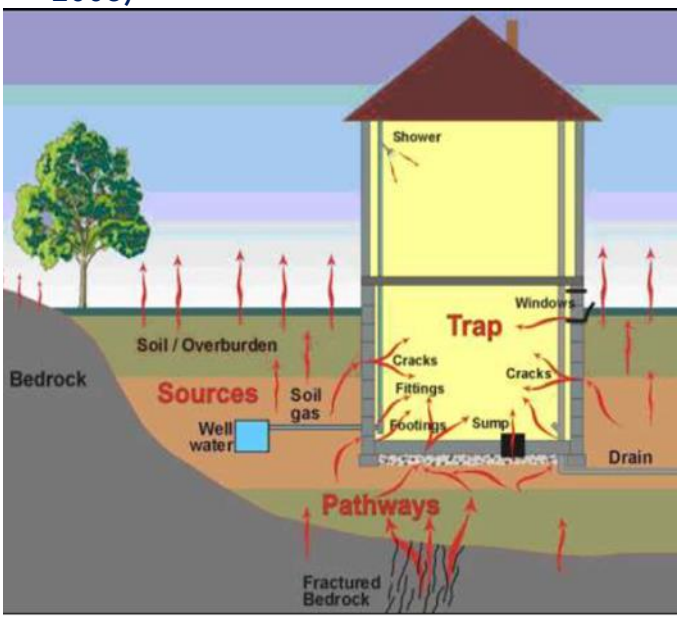
Three sources of radon in houses are now recognized (shown in Figure 4.3.9-1):

- Radon in soil air that flows into the house;
- Radon dissolved in water from private wells and exsolved during water usage; this is rarely a problem in Pennsylvania; and
- Radon emanating from uranium-rich building materials (e.g. concrete blocks or gypsum wallboard); this is not known to be a problem in Pennsylvania.

High radon levels were 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 key factors in radon concentrations. 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 (see figure 4.3.9-1). Soil gas typically contains between a few hundred to a few thousand pCi/L of radon; therefore, even a small rate of soil gas inflow can lead to elevated radon concentrations in a house.

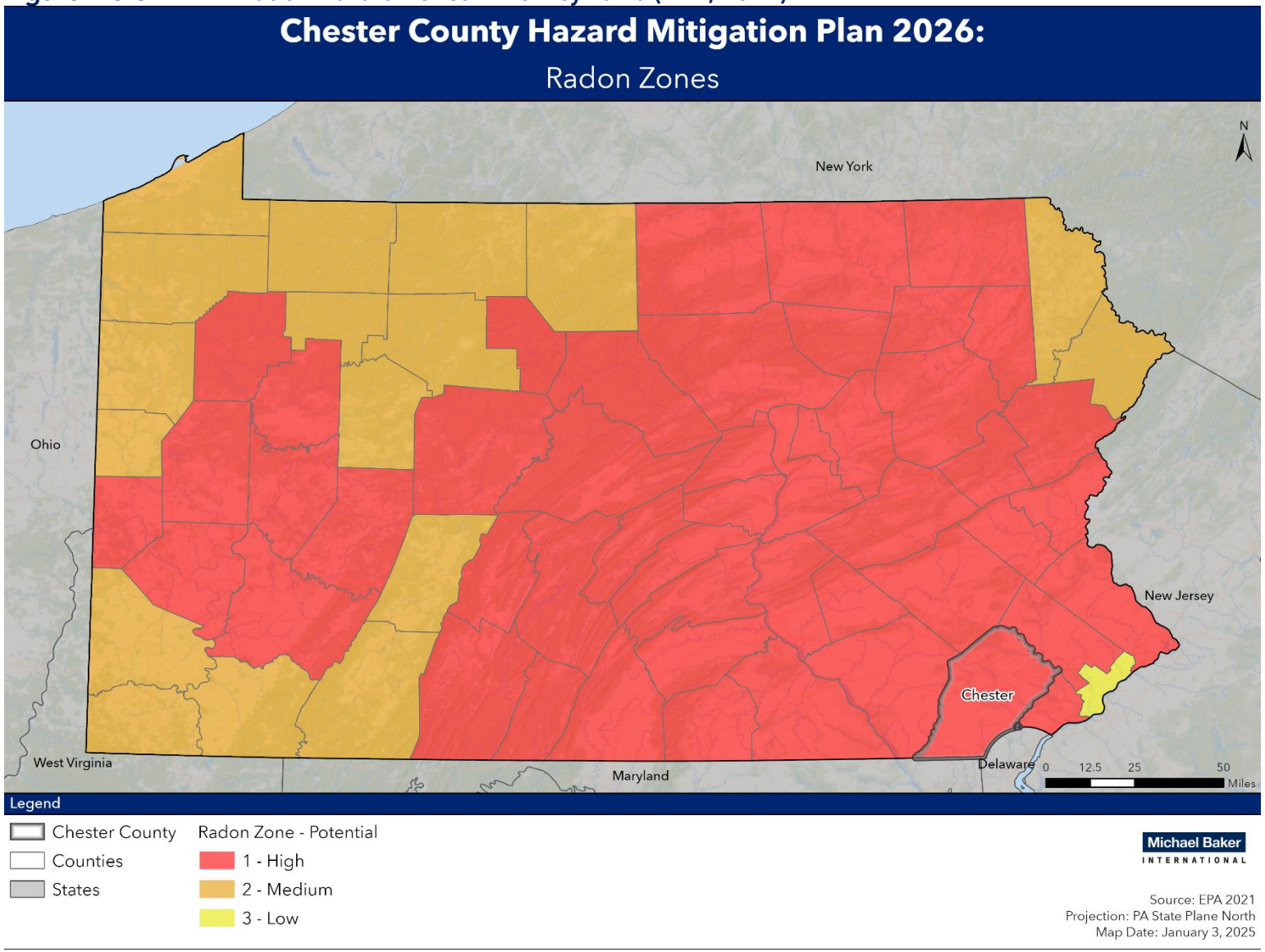
Figure 4.3.8-1 Sketch of Radon Entry Points into a House (Arizona Geological Survey, 2006)



The radon concentration of soil gas depends upon several soil properties, the importance of which is still being evaluated. In general, ten to fifty percent of 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.

Each county in Pennsylvania is classified as having a *low*, *moderate*, or *high* radon hazard potential. Chester County is classified as having a high hazard, meaning there is a predicted indoor radon level greater than 4 pCi/L (see Figure 4.3.9-2).

Figure 4.3.8-2 Radon Hazard Zones in Pennsylvania (EPA, 2021)



Areas where houses have high levels of radon can be divided into three groups in terms of uranium content in rock and soil:

- Areas of very elevated uranium content (>50 ppm) around uranium deposits and prospects. Although very high levels of radon can occur in such areas, the hazard normally is restricted to within a few hundred feet of the deposit. In Pennsylvania, such localities occupy an insignificant area.
- Areas of common rocks having higher than average uranium content (5 to 50 ppm). In Pennsylvania, such rock types include granitic and felsic alkali igneous rocks and black shales. In the Reading Prong, high uranium values in rock or soil and high radon levels in houses are associated with Precambrian granitic gneisses commonly containing 10 to 20 ppm uranium, but locally containing more than 500 ppm uranium. In Pennsylvania, elevated uranium occurs in black shales of the Devonian Marcellus Formation and possibly the Ordovician Martinsburg Formation. High radon values are locally present in areas underlain by these formations.
- Areas of soil or bedrock that have normal uranium content but properties that promote high radon levels in houses. This group is incompletely understood at present. Relatively high soil permeability can lead to high radon, the clearest example being houses built on glacial eskers. Limestone-dolomite soils also appear to be predisposed for high radon levels in houses, perhaps because of the deep clay-rich residuum in which radium is concentrated by weathering on iron oxide or clay surfaces, coupled with moderate porosity and permeability.

Figures 4.3.9-3, 4.3.9-4, 4.3.9-5, and 4.3.9-6 show the radon test data available for Chester County by zip code. As shown in Figure 4.3.9-3, most communities have average basement radon readings of over 4.0 pCi/L and many communities in the western part of the county are above the threshold of action of 8.0 pCi/L. Most communities had maximum basement readings over 50 pCi/L (see Figure 4.3.9-4).

There have been five basement recordings over 1,000 pCi/L recorded in Chester County's testing database. The highest recorded reading was 1669 pCi/L in Coatesville, followed by 1530 pCi/L, 1468 pCi/L, and 1329.9 pCi/L all recorded in Parkesburg. The fifth highest recording was 1,122.8 in Coatesville. All of these recordings occurred between 1997 and 2002.

Figure 4.3.8-3 Chester County Average Basement Radon Test Results, 2024

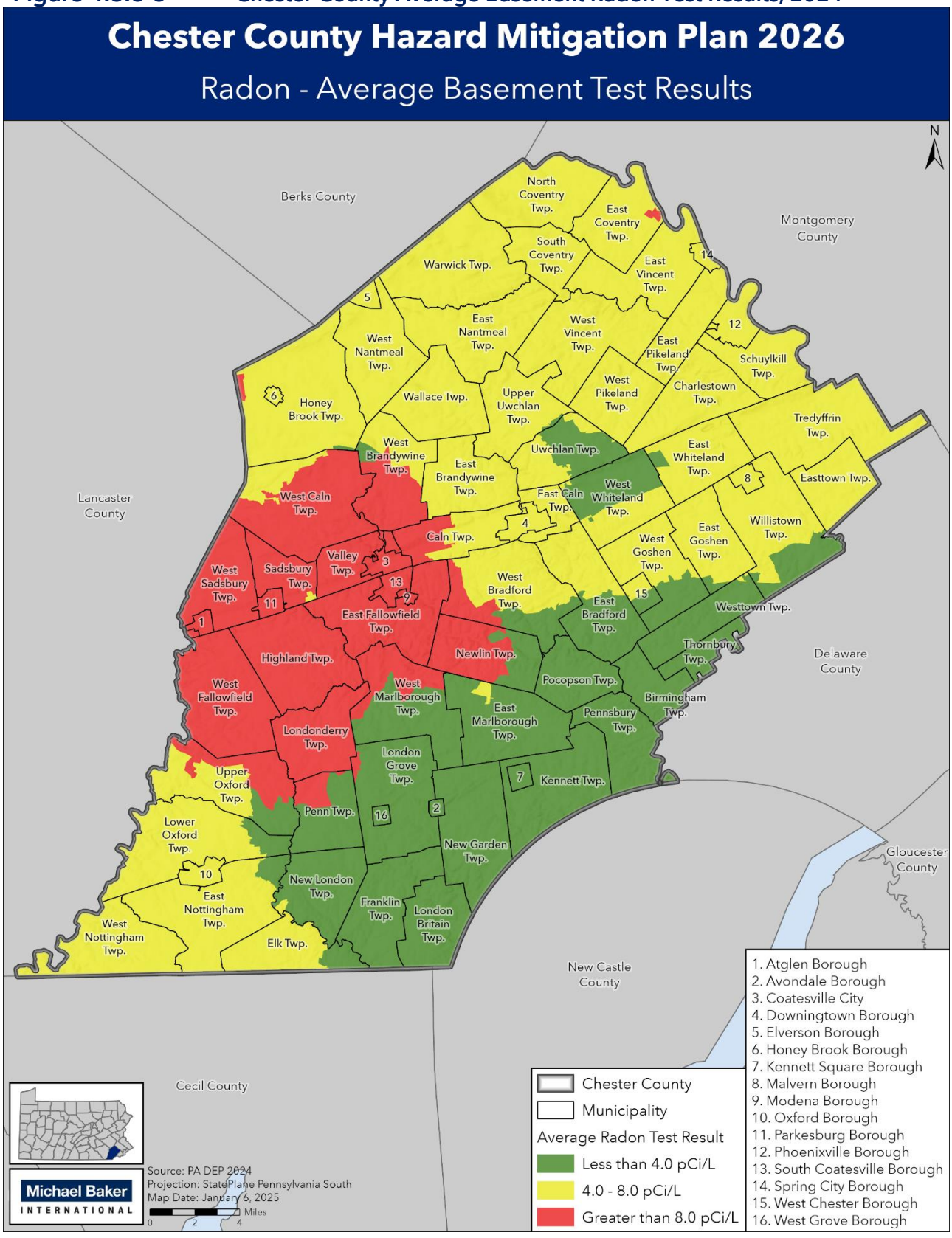


Figure 4.3.8-4 Chester County Maximum Basement Radon Test Results, 2024

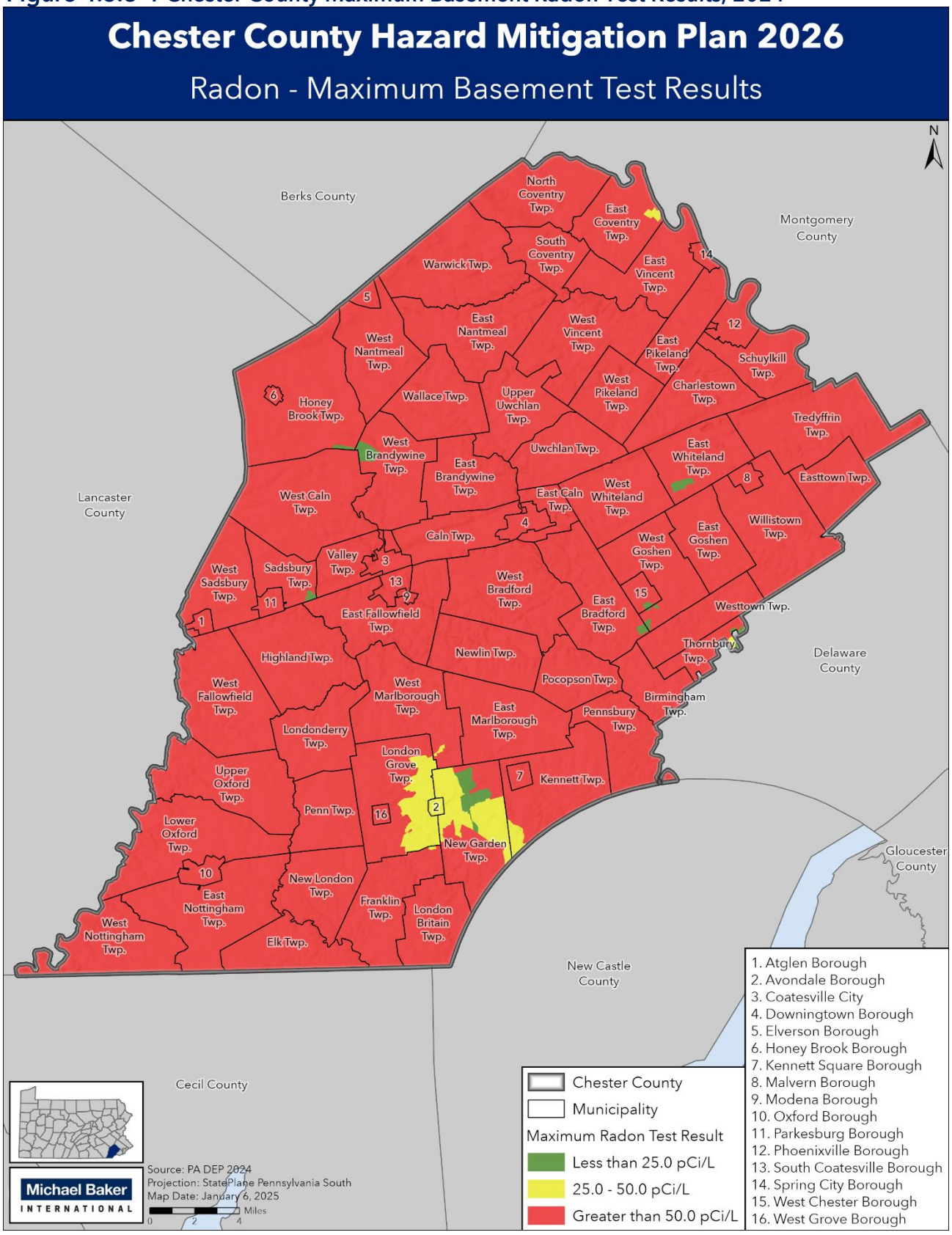


Figure 4.3.8-5 Chester County Average First Floor Radon Test Results, 2024

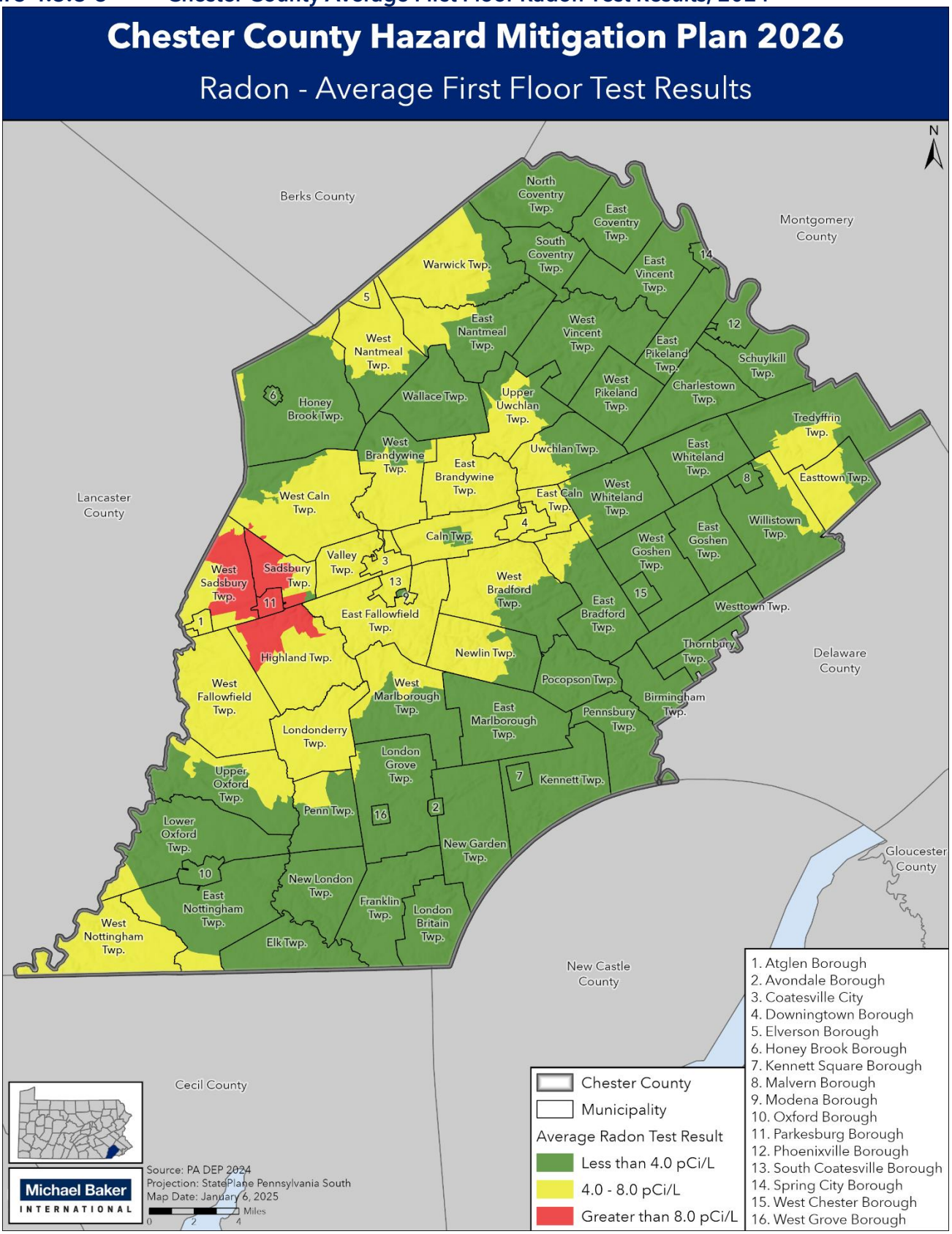
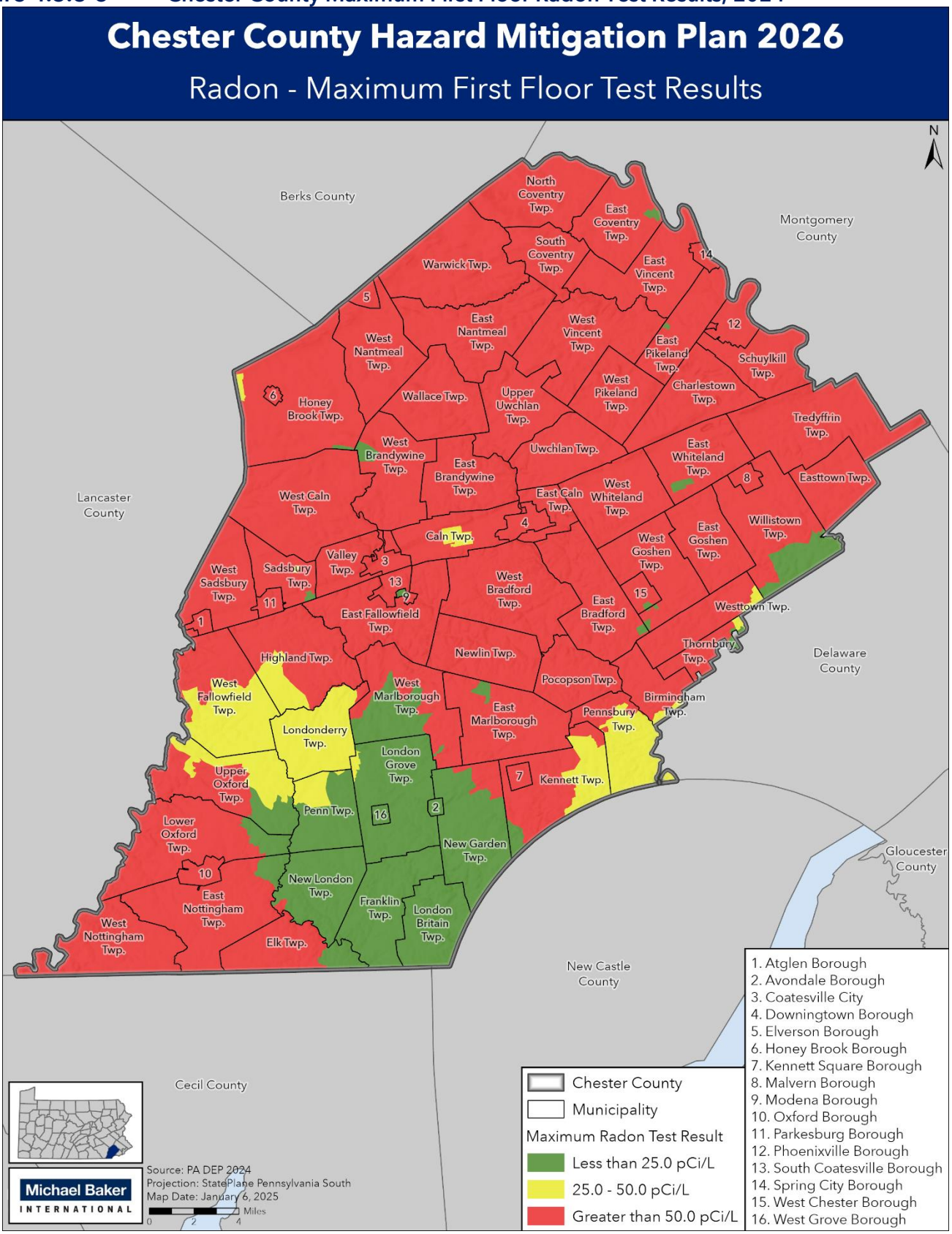


Figure 4.3.8-6 Chester County Maximum First Floor Radon Test Results, 2024



4.3.8.2. Range of Magnitude

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. The main hazard is actually from the radon daughter products (218Po, 214Pb, 214Bi), which may become attached to lung tissue and induce lung cancer by their radioactive decay (EPA, 2016).

According to the EPA, the average radon concentration in the indoor air of homes nationwide is about 1.3 pCi/L. The EPA recommends homes be fixed if the radon level is 4 pCi/L or more. However, because there is no known safe level of exposure to radon, the EPA also recommends that Americans consider fixing their home for radon levels between 2 pCi/L and 4 pCi/L (EPA, 2016). Table 4.3.9-1 shows the relationship between various radon levels, probability of lung cancer, comparable risks from other hazards, and action thresholds. As is shown in Table 4.3.9-1, a smoker exposed to radon has a much higher risk of lung cancer.

Table 4.3.8-1 Radon risk for Smokers and Non-Smokers (EPA, 2016).

RADON LEVEL (cCi/L)	IF 1,000 PEOPLE WERE EXPOSED TO THIS LEVEL OVER A LIFETIME…*	RISK OF CANCER FROM RADON EXPOSURE COMPARES TO…**	ACTION THRESHOLD
SMOKERS			
20	About 260 people could get lung cancer	250 times the risk of drowning	Fix structure
10	About 150 people could get lung cancer	200 times the risk of dying in a home fire	
8	About 120 people could get lung cancer	30 times the risk of dying in a fall	
4	About 62 people could get lung cancer	5 times the risk of dying in a car crash	
2	About 32 people could get lung cancer	6 times the risk of dying from poison	Consider fixing structure between 2 and 4 pci/l
1.3	About 20 people could get lung cancer	(Average indoor radon level)	Reducing radon levels 2pci/l is difficult
0.4	About 3 people could get lung cancer	(Average outdoor radon level)	
NON-SMOKERS			
20	About 36 people could get lung cancer	35 times the risk of drowning	Fix structure
10	About 18 people could get lung cancer	20 times the risk of dying in a home fire	
8	About 15 people could get lung cancer	4 times the risk of dying in a fall	
4	About 7 people could get lung cancer	The risk of dying in a car crash	
2	About 4 people could get lung cancer	The risk of dying from poison	Consider fixing structure between 2 and 4 pci/l
1.3	About 2 people could get lung cancer	(Average indoor radon level)	Reducing radon levels below 2pci/l is difficult
0.4	-	(Average outdoor radon level)	

NOTE: Risk may be lower for former smokers.

* Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003).

The worst-case scenario for radon exposure would be that a large area of tightly sealed homes provided residents high levels of exposure over a prolonged period of time without the resident being aware. This worst-case scenario exposure then could lead to a large number of people with cancer attributed to the radon exposure.

The potential impacts of radon exposure community lifelines are as follows:

Table 4.3.8-2 Most Likely Lifelines Impacted by Radon Exposure

LIFELINES	IMPACTS
	Direct exposure to radon can pose serious health risks and impact the safety of the community.
	Shelters may be at risk if exposed to radon.
	Exposure will increase the chances of lung cancer-causing potential increase in the amount of services and resources needed if communities develop more instances of cancer.

4.3.8.3. Past Occurrence

Current data on abundance and distribution of radon as it affects individual houses in the state of Pennsylvania in general is considered incomplete and potentially biased. Chester County is no exception. The EPA has estimated that the national average indoor radon concentration is 1.3 pCi/L and the level for action is 4.0 pCi/L; however, they have estimated that the average indoor concentration in Pennsylvania basements is about 7.1 pCi/L and 3.6 pCi/L on the first floor (PA DEP, 2019).

The PA DEP Bureau of Radiation Protection provides information for homeowners on how to test for radon in their houses. If a test results in radon concentrations over 4 pCi/L, then the Bureau works to help the homeowners make repairs to their houses to mitigate against high radon levels. The Bureau has testing data going back to 1986 and their results are provided by zip code.

In Chester County, there have been 311,136 tests reported to the Bureau. Of those tests, 273,952 have been basement tests. Figures 4.3.9-3, 4.3.9-4, 4.3.9-5, and 4.3.9-6 in Section 4.3.9.1 show the radon test data available for Chester County by zip code, with municipal boundaries shown. As shown in Figure 4.3.9-3, most communities have average basement radon readings of over 4.0 pCi/L and many communities in the western part of the county are above the threshold of action of 8.0 pCi/L. Most communities had maximum basement readings over 50 pCi/L (see Figure 4.3.9-4).

4.3.8.4. Future Occurrence

Radon exposure retains a significant probability given present soil, geologic, and geomorphic factors in Chester County. Future occurrence of high radon level hazards can be considered *likely* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1). 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.

Climate change and radon exposure, though distinct issues, intersect in ways that can influence public health. As climate change alters precipitation patterns and increases the frequency of extreme weather events, soil moisture levels fluctuate, which can impact radon release from the ground. Drier conditions can enhance radon migration into homes, while wetter soils might impede it. Additionally, rising temperatures often lead to increased use of air conditioning and improved home insulation, resulting in tightly sealed buildings with reduced ventilation. This can trap radon indoors, elevating exposure risks. Extreme weather events, such as heavy rainfall or flooding, can damage building foundations and radon mitigation systems, creating new pathways for radon entry and necessitating repairs. Addressing these intertwined challenges requires integrating radon mitigation into climate adaptation strategies, ensuring that efforts to improve energy efficiency and building resilience also consider radon risk reduction.

4.3.8.5. Vulnerability Assessment

Structures in Chester County, particularly in high vulnerability areas as shown in Figures 4.3.8-6 and 4.3.8-7, could be susceptible to moderate levels of radon

Figure 4.3.8-7 . Radon System Manometer in Basement (Scott Home Inspection, 2017) (IRadon, 2024



Figure 4.3.8-8 Radon Mitigation Systems (Scott Home Inspection, 2017) (IRadon, 2024)



Smokers can be up to ten times more vulnerable to lung cancer from high levels of radon depending on the level of radon they are exposed to. Older houses that have crawl spaces or unfinished basements are more vulnerable as well because of the increased exposure to soils which could be releasing higher levels of radon gas. Additionally, houses that rely on wells for their water may face an additional risk, although this type of exposure is low and rare in Pennsylvania (US EPA, 2016).

Proper testing for radon levels should be completed throughout Chester County, especially in the areas of higher incidence levels and for vulnerable populations that face the contributing risks described above. This testing will determine the level of vulnerability that residents face in their homes, as well as in their businesses and schools.

The EPA determines that an average radon mitigation system costs $1,000. The EPA also states that current state surveys show that one home in five has elevated radon levels. Using this methodology, radon loss estimation is factored by assuming that 20 percent of the buildings within the zip codes with elevated rest results have elevated radon values and each would require a radon mitigation system installed at the EPA estimated average of $1,000. According to the Pennsylvania State Hazard Mitigation Plan, Chester County has 139,296 buildings in areas with high radon test results, while approximately 20 percent, or 27,859 of these buildings will be impacted. The estimated costs for radon mitigation totaled $33,431,040.

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.

4.3.8.6. Equity in Vulnerable Communities

Communities with an aged housing stock are the most likely to be exposed to radon exposure as radon creeps in through poor foundations or ventilation systems. Low-income communities are more likely to have aged housing stock, so proper awareness is essential. Public awareness materials should also be provided in secondary languages in municipalities such as West Chester Borough and New Garden Township who have higher concentrations of households with Limited English Proficiency. Low-income communities may also be at an increased risk as

home repairs, testing kits, and mitigation systems are significant financial investments. This puts West Chester Borough, City of Coatesville, Oxford Borough, and City of Phoenixville at a higher risk due to concentrations of low-income residents. Additionally, those who live in rural areas, where geological conditions may lead to higher radon levels, are at an increased risk.

4.3.9. Tornado, Windstorm

4.3.9.1. Location and Extent



Tornadoes and potentially damaging high winds occur throughout Pennsylvania. Tornados and high winds can be experienced at any location in Chester County. This is underscored by public survey respondents ranking tornado/windstorm as one of the top five hazards threatening the County.

A tornado, a violently rotating funnel-like vortex, is an extraordinary feature of severe thunderstorms. A condensation funnel does not need to reach the ground for a tornado to be present; a debris cloud beneath a thunderstorm is all that is needed to confirm the presence of a tornado, even in the total absence of a funnel. While the extent of tornado damage is usually localized, the extreme winds of this vortex can be among the most destructive on earth when they move through populated, developed areas.

Tornadoes can occur at any time during the day or night but are most frequent during late afternoon into early evening, the warmest hours of the day. May to August is the most likely time for tornadoes to occur in Pennsylvania. 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. Rotational wind speeds of the vortex can range from 100 mph to more than 250 mph. In addition, the speed of forward motion can be zero to 45 or 50 mph. Therefore, some estimates place the maximum velocity (combination of ground speed, wind speed, and upper winds) of tornadoes at about 300 mph.

The forward motion of the tornado path can be a few hundred yards or several hundred miles in length. The width of tornadoes can vary greatly, but generally ranges from less than 100 feet to over a mile in width. Some tornadoes never touch the ground and are short-lived, while others may touch the ground several times.

Straight-line winds often accompany tornados and are caused by the movement of air from areas of higher pressure to areas of lower pressure – the greater the difference in pressure, the stronger the winds. Windstorms are generally defined as sustained wind speeds of 40 mph or greater lasting for one hour or longer, or winds of 58 mph or greater for any duration.

4.3.9.2. Range of Magnitude

The destruction caused by tornadoes ranges from light to catastrophic depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction, such as mobile homes. The impact of tornado hazards is ultimately dependent on the population or amount of property present in the area in which the tornado occurs. Tornado events are often so severe that property loss or human fatality is typically inevitable if evacuation or proper construction standards are not implemented.

Since 2007, the Enhanced Fujita Scale (or the EF-Scale) has been used in the United States to describe the magnitude of tornadoes. Prior to 2007, the Fujita Scale (F-Scale) was commonly used to describe magnitude. The EF scale is based on new information about the relationship between wind speed, given in miles per hour (mph), and corresponding damage. It categorizes tornadoes from EF0 to EF5, with EF0 being the lowest magnitude, yet most commonly occurring type of tornado. The strongest tornado recorded in Chester County was a category F3. Table 4.3.9-1 shows the relationship between the EF- and F- Scales. The types of damage that can be expected with each category of tornado are described in Table 4.3.9-2.

Table 4.3.9-1 Enhanced Fujita Scale (EF-Scale) categories with associated wind speeds

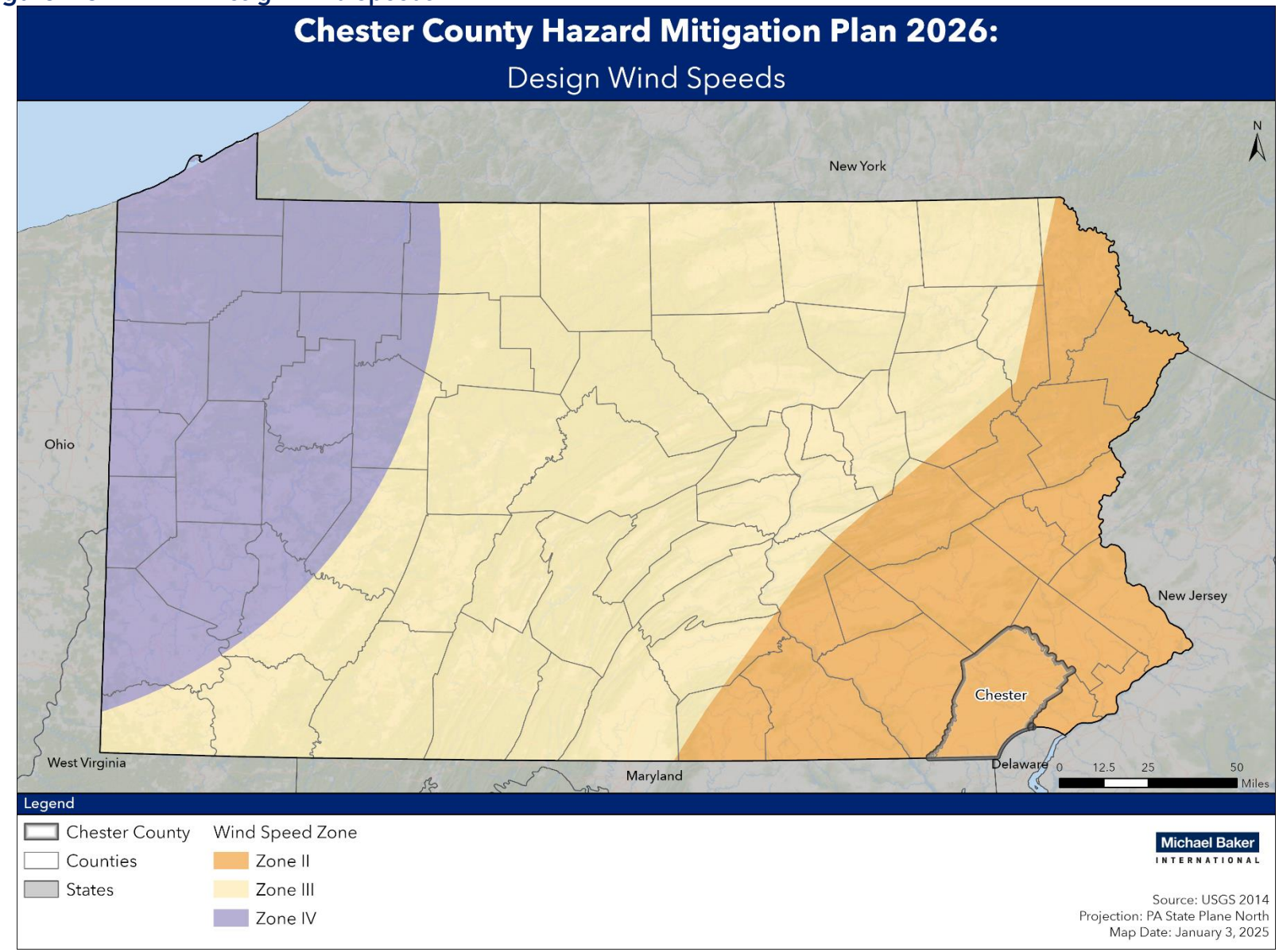
FUJITA SCALE		ENHANCE FUJITA SCALE	
F NUMBER	3-SECOND GUST (MPH)	EF NUMBER	3-SECOND GUST (MPH)
0	45-78	0	65-85
1	79-117	1	86-110
2	118-161	2	111-135
3	162-209	3	136-165
4	210-261	4	166-200
5	262-317	5	Over 200

Table 4.3.9-2 Expected Tornado Damages

F OR EF SCALE	EXAMPLES OF POSSIBLE DAMAGE
0	Light damage. Some damage to chimneys; broken tree branches; shallow-rooted trees pushed over; damage to sign boards.
1	Moderate damage. Roof surface peeled off; mobile homes pushed off foundations or overturned; moving automobiles pushed off roads.
2	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.
3	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; cars lifted off ground and thrown.
4	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown, and large missiles generated.
5	Catastrophic damage. Well-built houses swept away completely, leaving only the slab foundations.

Figure 4.3.9-1 shows wind speed zones developed by the American Society of Civil Engineers based on 40 years of tornado history and over 100 years of hurricane history. It identifies wind speeds that could occur across the United States to be used as the basis for design and evaluation of the structural integrity of shelters and critical facilities. Chester County falls in Zone II, meaning the whole County is susceptible to winds up to 160 miles per hour. The hurricane susceptibility shown in the map is discussed in Section 4.3.5. Shelters and critical facilities should be able to withstand a three second gust of up to 160 mph, regardless of whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm event. In Chester County, all new residential and commercial structures are required to be constructed per the International Building Code (IBC), which requires structures to be designed to a 90-mph wind speed.

Figure 4.3.9-1 Design Wind Speeds



Since tornado and windstorm events are typically localized, environmental impacts are rarely widespread. However, where these events occur, severe damage to buildings and plant species is likely. Tree damage is commonly seen after high wind events. This includes loss of trees and an increased threat of wildfire in areas where dead trees are not removed. Hazardous material facilities should meet design requirements to withstand a three-second gust of up to 160 mph in order to prevent the release of hazardous materials into the environment.

The potential impacts of a tornado or windstorm on community lifelines are as follows:

Table 4.3.9-3 Most Likely Lifelines Impacted by Tornadoes or Windstorms

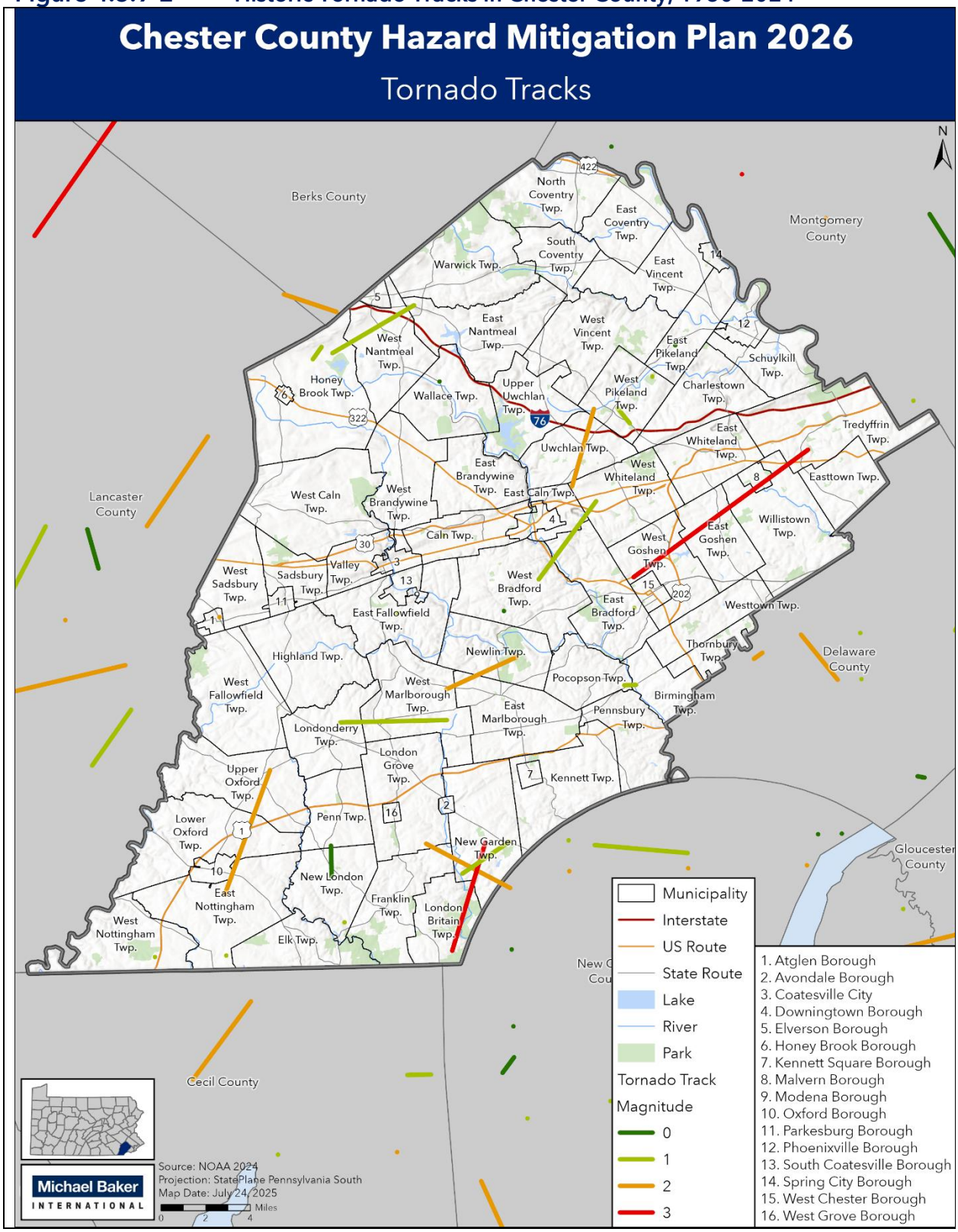
LIFELINES	NOTES
	Government officials, including police and fire, will be needed for community safety due to potential harm from tornadoes, high winds, and associated weather conditions.
	Tornadoes and windstorms cause significant damage to agricultural operations and structures.
	Energy lifelines may be impacted in response and recovery phases due to potential direct damage from tornadoes and windstorms.
	Material storage facilities and operations may be damaged due to significant damage from tornadoes and windstorms.

4.3.9.3. Past Occurrence

Tornadoes and windstorm events in Pennsylvania have impacted the western and southeastern sections of the state most frequently. The most intense tornadoes impacting Chester County occurred in 1955 and 1994, both reaching a level F3. The costliest tornadoes in terms of property damage occurred in 1994 ($5,000,000), 1999 ($3,000,000), and 1979 ($2,500,000).

A list of tornado and windstorm events that have occurred in Chester County between 1950 and 2024 is shown in Table 4.3.9-4 with an associated F-Scale or EF-Scale magnitude where applicable. Note that the NOAA NCEI database did not start collecting information about windstorms until 1996.

Figure 4.3.9-2 Historic Tornado Tracks in Chester County, 1950-2024



High winds moving in a straight line are the movement of air from areas of higher pressure to areas of lower pressure. As the difference in pressure increases, the strength and speed of the winds increase. As noted, windstorms are generally defined as having sustained straight-line wind speeds of 40 mph or greater that last for one hour or longer, or winds of 58 mph (i.e. 50 knots) or greater for any duration. There have been 36 windstorm events in Chester County since 1996, when the NOAA NCEI started tracking additional storm event types.

Table 4.3.9-4 Previous Tornado and Windstorm Events in Chester County (NCEI 2024)

DATE	TYPE OF EVENT	WIND SPEED (MPH)	MAGNITUDE (FUJITA SCALE)	DEATHS	INJURIES	PROPERTY DAMAGE ($)
6/22/1953	Tornado	N/A	F1	0	0	$2,500
3/22/1955	Tornado	N/A	F3	1	0	$250,000
8/19/1955	Tornado	N/A	F2	0	0	$25,000
11/14/1969	Tornado	N/A	F1	0	0	$25,000
11/28/1973	Tornado	N/A	F0	0	0	$25,000
8/4/1974	Tornado	N/A	F1	0	0	$25,000
4/3/1975	Tornado	N/A	F2	0	0	$2,500
9/5/1979	Tornado	N/A	F2	1	4	$2,500,000
7/16/1980	Tornado	N/A	F1	0	0	$2,500
7/17/1988	Tornado	N/A	F1	0	1	$250,000
11/16/1989	Tornado	N/A	F0	0	0	$0
7/9/1990	Tornado	N/A	F1	0	0	$250,000
7/17/1992	Tornado	N/A	F2	0	0	$250,000
8/28/1992	Tornado	N/A	F2	0	3	$250,000
7/27/1994	Tornado	N/A	F3	0	11	$5,000,000
7/27/1994	Tornado	N/A	F1	0	0	$500,000
8/13/1994	Tornado	N/A	F0	0	0	$0
8/13/1994	Tornado	N/A	F1	0	0	$0
9/8/1996	Tornado	N/A	F0	0	0	$0
11/2/1997	Tornado	N/A	F0	0	0	$25,000
4/1/1998	Tornado	N/A	F1	0	1	$25,000
5/31/1998	Tornado	N/A	F1	0	0	$200,000
5/31/1998	Tornado	N/A	F1	0	0	$300,000
11/26/1999	Tornado	N/A	F1	0	12	$3,000,000
8/29/2006	Tornado	N/A	F1	0	0	$75,000
9/27/2010	Tornado	N/A	EF0	0	0	$25,000
12/22/2012	Strong Wind	47	N/A	0	0	$500
12/22/2012	Strong Wind	46	N/A	0	0	$500

Table 4.3.9-4 Previous Tornado and Windstorm Events in Chester County (NCEI 2024)

DATE	TYPE OF EVENT	WIND SPEED (MPH)	MAGNITUDE (FUJITA SCALE)	DEATHS	INJURIES	PROPERTY DAMAGE ($)
12/26/2012	Strong Wind	53	N/A	0	0	$2,000
12/26/2012	Strong Wind	56	N/A	0	0	$3,000
1/31/2013	Strong Wind	54	N/A	0	0	$1,000
1/31/2013	High Wind	57	N/A	0	0	$10,000
3/6/2013	Strong Wind	46	N/A	0	0	$2,000
11/24/2013	Strong Wind	46	N/A	0	0	$100
11/24/2013	Strong Wind	46	N/A	0	0	$100
1/6/2014	Strong Wind	46	N/A	0	0	$100
1/6/2014	Strong Wind	46	N/A	0	0	$100
3/12/2014	Strong Wind	53	N/A	0	0	$2,000
3/12/2014	Strong Wind	49	N/A	0	0	$2,000
11/2/2014	Strong Wind	45	N/A	0	0	$2,500
11/2/2014	Strong Wind	45	N/A	0	0	$2,500
2/2/2015	Strong Wind	46	N/A	0	0	$9,000
2/2/2015	Strong Wind	46	N/A	0	0	$8,000
2/15/2015	Strong Wind	53	N/A	0	0	$5,000
2/15/2015	Strong Wind	52	N/A	0	0	$5,000
6/30/2015	Tornado	N/A	EF1	0	0	$250,000
4/3/2016	High Wind	57	N/A	0	0	$0
4/3/2016	High Wind	57	N/A	0	0	$0
2/13/2017	High Wind	60	N/A	0	0	$0
2/13/2017	High Wind	60	N/A	0	0	$0
3/14/2017	Strong Wind	49	N/A	0	0	$10
3/2/2018	High Wind	60	N/A	0	0	$0
3/2/2018	High Wind	60	N/A	0	0	$0
4/4/2018	High Wind	57	N/A	0	0	$0
2/24/2019	High Wind	57	N/A	0	0	$0
2/25/2019	High Wind	57	N/A	0	0	$0
4/30/2020	High Wind	60	N/A	0	0	$0
4/30/2020	High Wind	57	N/A	0	0	$0
4/30/2021	High Wind	57	N/A	0	0	$0
4/30/2021	High Wind	57	N/A	0	0	$0
9/1/2021	Tornado	N/A	EF2	0	0	$500,000
6/16/2023	Tornado	N/A	EF1	0	0	$0

Table 4.3.9-4 Previous Tornado and Windstorm Events in Chester County (NCEI 2024)

DATE	TYPE OF EVENT	WIND SPEED (MPH)	MAGNITUDE (FUJITA SCALE)	DEATHS	INJURIES	PROPERTY DAMAGE ($)
1/9/2024	High Wind	60	N/A	0	0	$0
2/26/2025	High Wind	62	N/A	0	0	$0
2/26/2025	High Wind	57	N/A	0	0	$0
TOTAL				**2**	**32**	**$13,812,910**

In 2023 and 2024, four adverse/severe weather events were reported to the Chester County Department of Emergency Services that were related to tornado or windstorm events. The storm on July 25, 2024, had nine reported incidents related to it. Event information is included in Table 4.3.9-5 below:

Table 4.3.9-5 Adverse/Severe Weather Events in Chester County (Chester County DES, 2023-24)

DATE	EVENT DETAILS	LOCATION (IF APPLICABLE)
4/15/23	Tree struck by lightning. Fell on car. 1 Fatality.	Highland Road and Limestone Road Highland Township
6/19/23	Straight line wind damage	
8/7/23	Trees into numerous homes.	London Britain Township
7/25/24	Numerous trees into homes. 76,000 residents without power.	
	Tree into house.	106 N Hawthorne Road, West Brandywine, PA
	Roof blown off of barber shop. No injuries.	Area of N Seventh Ave/ Merchant Street, Coatesville.
	Tree into house.	47 Lenape Way, West Brandywine, PA
	Tree into house.	19 Castle Ln, West Brandywine, PA
	Tree into house.	1149 Hilltop Ln, Vally, PA
	Tree into house.	42 Mulligan Ct, East Brandywine, PA
	Tree into house.	91 Irish Ln, Valley, PA
	Tree into house.	300 Kennett Pike, Kennett Township, PA

One of the deadliest tornadoes in Pennsylvania occurred during a tornado outbreak on May 31, 1985, when up to 43 tornadoes touched down in Pennsylvania, Ohio, New York, and southeastern Ontario. One storm, rated at EF5 (F4) intensity, tracked across the state forests of central Pennsylvania during the early evening producing tornadic winds of 200-250 mph. Officials estimated that 85,000 to 90,000 trees were leveled across its track. In total, this event destroyed 13 houses, a large steel fire tower, and many miles of state forest. Major population centers were missed, sparing many lives. The tornado was estimated to remain on the ground for more than one hour and 25 minutes and covered a path of about 70 miles. This event represents the worst-case scenario in Chester County, especially if the tornado track was close to population centers.

4.3.9.4. Future Occurrence

For the period between 1950 and 2024, 29 tornadoes were reported in Chester County by NCEI. While the chance of being hit by a tornado is small, the damage that results when the tornado arrives can be potentially devastating. An F4 tornado, with a 0.01-percent-annual probability of occurring, can carry wind velocities of 200 mph, resulting in a force of more than 100 pounds per square foot of surface area. This is a "wind load" that exceeds the design limits of most buildings.

According to NCEI, there have been 36 wind events in Chester County between 1996 and 2024. Chester County experiences windstorm events more commonly than tornadoes, which cause power failures, loss of communication networks, and residents requiring temporary shelters and provision of supplies. The probability of tornadoes and windstorms in Chester County can be considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1).

4.3.9.5. Vulnerability Assessment

For tornadoes or high winds, aged and dilapidated structures or structures not built to applicable building codes are more susceptible to damage. Mobile homes and campgrounds are especially susceptible to damage due to tornadoes or high wind. Strong winds can rip roofs from any dilapidated structures and overturn mobile homes. Past experiences with tornadoes in Chester County shows that death and injury are possibilities. Vulnerability to the effects of a tornado or high wind is somewhat dependent upon the age of a structure; as building codes become more stringent, buildings are capable of enduring greater wind forces.

In Chester County, high winds occur annually. The most common detrimental effects are interruptions in power supply and communications services due to downed wires and blocked roadways due to downed trees. Most severe power failures or outages are regional events. With the loss of power, electrical-powered equipment and systems will not be operational. Examples include lighting, HVAC and ancillary support equipment, communication systems, ventilation system, refrigerators, sterilizers, and medical equipment. This can cause food spoilage, loss of heat or air conditions, basement flooding (sump pump failure), lack of light, loss of water (well pump failure), lack of phone service, or lack of internet. While it is most often a short-term nuisance rather than a catastrophic hazard, utility interruptions can cause challenges for communication and response, particularly in more rural areas of the county. A worst-case scenario for utility interruption in Chester County would involve a power outage during winter snow or ice storms, which have the potential to cause power outages for prolonged periods of time. See Section 4.3.21 for more information about utility interruption.

All structures and infrastructure might be exposed to the effects of a tornado or other high winds. Depending upon the severity of a tornado or high wind, any existing structures might be damaged to some extent. Any future structures might be exposed to tornados or high winds as this hazard does not occur in specific locations. However, future buildings will be somewhat

protected from the effects of tornado or high wind as they will meet the most current State building code requirements for bracing and roof design.

Manufactured housing (i.e., mobiles homes or trailers) is particularly vulnerable to high winds and tornadoes. The U.S. Census Bureau defines manufactured homes as "movable dwellings, eight feet or wider and 40 feet or longer, designed to be towed on its own chassis, with transportation gear integral to the unit when it leaves the factory, and without need of a permanent foundation (U.S. Census Bureau, 2020)." They can include multi-wide and expandable manufactured homes but exclude travel trailers, motor homes, and modular housing. Due to their lightweight and often unanchored design, manufactured housing is extremely vulnerable to high winds and will generally sustain the most damage.

There is an estimated total of 1,981 mobile home structures in Chester County. Table 4.3.9-6 details the total residential structures and the number of mobile home structures in each municipality. West Caln Township (346 mobile homes), Honey Brook Township (166), East Nottingham Township (143), and West Nottingham Township (118) have the most mobile homes. West Caln Township and West Nottingham Township have the highest percentages of residential structures that are mobile homes, each with 6%. There are 18 municipalities in the County that have no mobile homes. Higher concentrations of mobile home structures increase the vulnerability of the area to tornadoes and windstorms.

Table 4.3.9-6 Mobile homes in Chester County (U.S. Census Bureau, 2023)

MUNICIPALITY	TOTAL RESIDENTIAL STRUCTURES	TOTAL MOBILE HOMES	PERCENT MOBILE HOMES
Atglen Borough	577	3	1%
Avondale Borough	405	6	1%
Birmingham Township	1,624	0	0%
Caln Township	4,701	8	0%
Charlestown Township	2,266	2	0%
Coatesville City	2,732	0	0%
Downingtown Borough	2,291	1	0%
East Bradford Township	3,658	2	0%
East Brandywine Township	3,683	2	0%
East Caln Township	1,269	4	0%
East Coventry Township	3,563	20	1%
East Fallowfield Township	3,944	33	1%
East Goshen Township	5,665	0	0%
East Marlborough Township	3,571	4	0%
East Nantmeal Township	1,508	9	1%
East Nottingham Township	4,885	143	3%

Table 4.3.9-6 Mobile homes in Chester County (U.S. Census Bureau, 2023)

MUNICIPALITY	TOTAL RESIDENTIAL STRUCTURES	TOTAL MOBILE HOMES	PERCENT MOBILE HOMES
East Pikeland Township	3,552	12	0%
Easttown Township	3,727	19	1%
East Vincent Township	4,029	0	0%
East Whiteland Township	4,401	0	0%
Elk Township	1,367	71	5%
Elverson Borough	584	4	1%
Franklin Township	2,456	26	1%
Highland Township	1,307	15	1%
Honey Brook Borough	732	17	2%
Honey Brook Township	4,909	166	3%
Kennett Township	1,751	0	0%
Kennett Square Borough	3,867	4	0%
London Britain Township	1,782	1	0%
Londonderry Township	4,078	51	1%
London Grove Township	1,692	30	2%
Lower Oxford Township	2,579	96	4%
Malvern Borough	1,066	1	0%
Modena Borough	201	8	4%
New Garden Township	5,451	85	2%
Newlin Township	2,921	33	1%
New London Township	1,193	19	2%
North Coventry Township	4,288	33	1%
Oxford Borough	1,704	24	1%
Parkesburg Borough	1,371	2	0%
Penn Township	2,901	47	2%
Pennsbury Township	1,712	0	0%
Phoenixville Borough	4,731	0	0%
Pocopson Township	1,757	0	0%
Sadsbury Township	1,987	22	1%
Schuylkill Township	4,096	2	0%
South Coatesville Borough	506	2	0%
South Coventry Township	1,653	16	1%
Spring City Borough	1,199	2	0%
Thornbury Township	1,060	0	0%
Tredyffrin Township	9,617	0	0%

Table 4.3.9-6 Mobile homes in Chester County (U.S. Census Bureau, 2023)

MUNICIPALITY	TOTAL RESIDENTIAL STRUCTURES	TOTAL MOBILE HOMES	PERCENT MOBILE HOMES
Upper Oxford Township	2,109	53	3%
Upper Uwchlan Township	3,909	0	0%
Uwchlan Township	5,805	14	0%
Valley Township	2,926	81	3%
Wallace Township	2,065	17	1%
Warwick Township	2,192	22	1%
West Bradford Township	5,801	22	0%
West Brandywine Township	4,141	68	2%
West Caln Township	6,070	346	6%
West Chester Borough	3,147	0	0%
West Fallowfield Township	2,226	29	1%
West Goshen Township	8,075	0	0%
West Grove Borough	964	6	1%
West Marlborough Township	983	6	1%
West Nantmeal Township	1,832	52	3%
West Nottingham Township	2,014	118	6%
West Pikeland Township	2,050	0	0%
West Sadsbury Township	1,915	95	5%
West Vincent Township	3,127	0	0%
West Whiteland Township	5,656	7	0%
Westtown Township	3,838	0	0%
Willistown Township	5,275	0	0%
Total	**214,689**	**1,981**	**1%**

Table 4.3.9-7 below shows the expected annual losses to tornadoes by census tract in Chester County.

Table 4.3.9-7 Expected Annual Losses to Tornadoes by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3001.01	Tredyffrin Township	$43,694.81	Relatively Low
3001.03	Tredyffrin Township	$37,036.19	Relatively Low
3001.04	Tredyffrin Township	$77,019.14	Relatively Moderate
3001.06	Tredyffrin Township	$67,926.83	Relatively Moderate

Table 4.3.9-7 Expected Annual Losses to Tornadoes by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3001.07	Tredyffrin Township	$87,596.15	Relatively Moderate
3001.08	Tredyffrin Township	$91,862.51	Relatively Moderate
3001.09	Tredyffrin Township	$55,051.67	Relatively Low
3002.01	Easttown Township	$78,340.32	Relatively Moderate
3002.02	Easttown Township	$87,880.82	Relatively Moderate
3003.01	Willistown Township	$64,965.13	Relatively Moderate
3003.02	Willistown Township	$68,362.87	Relatively Moderate
3003.03	Willistown Township	$50,157.28	Relatively Low
3004	Malvern Borough	$42,493.77	Relatively Low
3005.01	Schuylkill Township	$83,915.00	Relatively Moderate
3005.02	Schuylkill Township	$55,985.67	Relatively Low
3006	Phoenixville	$69,950.44	Relatively Moderate
3007	Phoenixville	$62,735.57	Relatively Moderate
3008	Phoenixville	$46,971.66	Relatively Low
3009	Phoenixville	$33,991.09	Relatively Low
3010.01	East Pikeland Township	$70,588.81	Relatively Moderate
3010.02	East Pikeland Township	$57,068.71	Relatively Low
3011	Spring City Borough	$43,874.56	Relatively Low
3013	East Coventry Township	$99,248.55	Relatively Moderate
3014.01	North Coventry Township	$44,108.96	Relatively Low
3014.02	North Coventry Township	$84,520.61	Relatively Moderate
3015	South Coventry Township	$45,550.18	Relatively Low
3016	Warwick Township	$40,624.60	Relatively Low
3017	East Nantmeal Township	$34,794.75	Relatively Low
3018	West Vincent Township	$122,264.11	Relatively Moderate
3019	West Pikeland Township	$74,945.27	Relatively Moderate
3020	Charlestown Township	$105,896.95	Relatively Moderate
3021.02	East Whiteland Township	$58,815.26	Relatively Low
3021.03	East Whiteland Township	$96,371.92	Relatively Moderate
3021.04	East Whiteland Township	$111,820.05	Relatively Moderate
3022.03	West Whiteland Township	$75,534.20	Relatively Moderate
3022.04	West Whiteland Township	$82,546.07	Relatively Moderate
3022.05	West Whiteland Township	$84,774.37	Relatively Moderate
3022.06	West Whiteland Township	$73,560.81	Relatively Moderate

Table 4.3.9-7 Expected Annual Losses to Tornadoes by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3022.07	West Whiteland Township	$28,598.30	Relatively Low
3023	West Chester Borough	$38,638.24	Relatively Low
3024	West Chester Borough	$47,866.00	Relatively Low
3025	West Chester Borough	$52,186.18	Relatively Low
3026	West Chester Borough	$54,289.07	Relatively Low
3027.02	West Goshen Township	$73,467.35	Relatively Moderate
3027.03	West Goshen Township	$93,203.03	Relatively Moderate
3027.04	West Goshen Township	$71,570.96	Relatively Moderate
3027.05	West Goshen Township	$46,272.38	Relatively Low
3027.06	West Goshen Township	$74,515.21	Relatively Moderate
3028.02	East Goshen Township	$93,192.35	Relatively Moderate
3028.03	East Goshen Township	$25,593.02	Relatively Low
3028.04	East Goshen Township	$50,359.24	Relatively Low
3028.06	East Goshen Township	$29,743.19	Relatively Low
3028.07	East Goshen Township	$49,154.59	Relatively Low
3029.01	Westtown Township	$63,788.51	Relatively Moderate
3029.02	Westtown Township	$82,584.31	Relatively Moderate
3030	Thornbury Township	$49,951.39	Relatively Low
3031	Birmingham Township	$70,448.05	Relatively Moderate
3033.01	Kennett Township	$69,244.28	Relatively Moderate
3033.02	Kennett Township	$100,773.18	Relatively Moderate
3034.01	Kennett Square Borough	$57,631.95	Relatively Low
3034.02	Kennett Square Borough	$31,109.23	Relatively Low
3035.01	East Marlborough Township	$91,152.87	Relatively Moderate
3035.02	East Marlborough Township	$59,701.06	Relatively Low
3038.01	West Bradford Township	$69,878.72	Relatively Moderate
3038.03	West Bradford Township	$50,913.37	Relatively Low
3038.04	West Bradford Township	$91,049.80	Relatively Moderate
3039.01	East Bradford Township	$78,244.46	Relatively Moderate
3039.02	East Bradford Township	$86,853.60	Relatively Moderate
3040	East Caln Township	$83,388.94	Relatively Moderate
3041.01	Downingtown Borough	$70,606.07	Relatively Moderate
3041.02	Downingtown Borough	$46,379.03	Relatively Low
3042.01	Caln Township	$105,689.69	Relatively Moderate

Table 4.3.9-7 Expected Annual Losses to Tornadoes by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3043	East Brandywine Township	$154,973.21	Relatively Moderate
3044.03	Uwchlan Township	$65,023.62	Relatively Moderate
3044.04	Uwchlan Township	$69,595.28	Relatively Moderate
3044.05	Uwchlan Township	$100,277.21	Relatively Moderate
3044.06	Uwchlan Township	$72,447.82	Relatively Moderate
3045.02	Upper Uwchlan Township	$57,851.81	Relatively Low
3045.03	Upper Uwchlan Township	$86,475.87	Relatively Moderate
3045.04	Upper Uwchlan Township	$65,237.31	Relatively Moderate
3046	Wallace Township	$59,690.96	Relatively Low
3049	Honey Brook Township	$123,209.86	Relatively Moderate
3050	Honey Brook Borough	$23,803.77	Relatively Low
3051.01	West Caln Township	$65,178.45	Relatively Moderate
3051.02	West Caln Township	$62,710.97	Relatively Moderate
3053	Valley Township	$117,079.17	Relatively Moderate
3054	Coatesville City	$46,299.68	Relatively Low
3055	Coatesville City	$43,127.44	Relatively Low
3056	Coatesville City	$33,465.57	Relatively Low
3057	Coatesville City	$27,505.97	Relatively Low
3060	East Fallowfield Township, Modena Borough	$110,113.98	Relatively Moderate
3063	West Grove Borough	$34,817.12	Relatively Low
3065.01	New Garden Township	$80,521.09	Relatively Moderate
3065.03	New Garden Township	$50,422.94	Relatively Low
3065.04	New Garden Township	$97,019.51	Relatively Moderate
3066	London Britain Township	$60,576.95	Relatively Low
3067	Franklin Township	$82,024.76	Relatively Moderate
3068	Elk Township	$31,448.11	Relatively Low
3069	New London Township	$105,815.87	Relatively Moderate
3070	Penn Township	$99,614.48	Relatively Moderate
3071	Londonderry Township	$44,352.77	Relatively Low
3072	Highland Township	$27,629.25	Relatively Low
3073	Parkesburg Borough	$62,774.50	Relatively Moderate
3074	Sadsbury Township	$50,245.91	Relatively Low
3077	West Fallowfield Township	$47,526.90	Relatively Low
3078	Upper Oxford Township	$46,288.49	Relatively Low

Table 4.3.9-7 Expected Annual Losses to Tornadoes by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3079	Lower Oxford Township	$91,342.94	Relatively Moderate
3080	Oxford Borough	$80,827.66	Relatively Moderate
3081.01	East Nottingham Township	$70,610.96	Relatively Moderate
3081.02	East Nottingham Township	$72,290.52	Relatively Moderate
3082	West Nottingham Township	$43,101.00	Relatively Low
3110	East Vincent Township	$108,845.11	Relatively Moderate
3111	Pennsbury Township	$72,913.88	Relatively Moderate
3112	Newlin Township, West Marlborough Township	$50,073.48	Relatively Low
3113	Pocopson Township	$75,088.45	Relatively Moderate
3114.01	Caln Township	$104,293.88	Relatively Moderate
3114.03	West Brandywine Township	$48,350.80	Relatively Low
3114.04	West Brandywine Township	$62,782.39	Relatively Moderate
3115	West Nantmeal Township, Elverson Borough	$60,443.43	Relatively Low
3116	South Coatesville Borough	$33,971.15	Relatively Low
3117.01	London Grove Township	$62,494.85	Relatively Moderate
3117.02	London Grove Township, Avondale Borough	$113,502.83	Relatively Moderate
3118	West Sadsbury Township, Atglen Borough	$60,599.16	Relatively Low
9800	West Chester Borough	$73,333.79	Relatively Moderate
TOTAL		**$8,390,896.17**	

Table 4.3.9-8 below shows the expected annual losses to strong winds by census tract in Chester County.

Table 4.3.9-8 Expected Annual Losses to Strong Winds by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3001.01	Tredyffrin Township	$27,110.28	Relatively Moderate
3001.03	Tredyffrin Township	$23,099.06	Relatively Moderate
3001.04	Tredyffrin Township	$47,594.11	Relatively High
3001.06	Tredyffrin Township	$42,848.80	Relatively High
3001.07	Tredyffrin Township	$52,706.18	Relatively High
3001.08	Tredyffrin Township	$57,089.52	Relatively High

Table 4.3.9-8 Expected Annual Losses to Strong Winds by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3001.09	Tredyffrin Township	$34,035.84	Relatively Moderate
3002.01	Easttown Township	$48,349.58	Relatively High
3002.02	Easttown Township	$53,878.71	Relatively High
3003.01	Willistown Township	$40,064.69	Relatively High
3003.02	Willistown Township	$41,552.85	Relatively High
3003.03	Willistown Township	$30,746.60	Relatively Moderate
3004	Malvern Borough	$26,707.43	Relatively Moderate
3005.01	Schuylkill Township	$51,130.99	Relatively High
3005.02	Schuylkill Township	$33,352.58	Relatively Moderate
3006	Phoenixville	$44,414.46	Relatively High
3007	Phoenixville	$39,822.74	Relatively High
3008	Phoenixville	$29,536.18	Relatively Moderate
3009	Phoenixville	$21,174.93	Relatively Moderate
3010.01	East Pikeland Township	$37,765.60	Relatively Moderate
3010.02	East Pikeland Township	$30,694.30	Relatively Moderate
3011	Spring City Borough	$24,055.15	Relatively Moderate
3013	East Coventry Township	$53,960.13	Relatively High
3014.01	North Coventry Township	$23,844.91	Relatively Moderate
3014.02	North Coventry Township	$45,097.33	Relatively High
3015	South Coventry Township	$24,327.55	Relatively Moderate
3016	Warwick Township	$22,150.56	Relatively Moderate
3017	East Nantmeal Township	$18,815.34	Relatively Moderate
3018	West Vincent Township	$64,617.72	Relatively High
3019	West Pikeland Township	$39,324.09	Relatively High
3020	Charlestown Township	$58,991.88	Relatively High
3021.02	East Whiteland Township	$35,715.54	Relatively Moderate
3021.03	East Whiteland Township	$55,462.13	Relatively High
3021.04	East Whiteland Township	$62,431.13	Relatively High
3022.03	West Whiteland Township	$40,939.82	Relatively High
3022.04	West Whiteland Township	$44,943.40	Relatively High
3022.05	West Whiteland Township	$42,672.88	Relatively High
3022.06	West Whiteland Township	$39,475.50	Relatively High
3022.07	West Whiteland Township	$13,507.81	Relatively Moderate
3023	West Chester Borough	$20,970.74	Relatively Moderate

Table 4.3.9-8 Expected Annual Losses to Strong Winds by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3024	West Chester Borough	$26,339.66	Relatively Moderate
3025	West Chester Borough	$28,237.72	Relatively Moderate
3026	West Chester Borough	$29,817.58	Relatively Moderate
3027.02	West Goshen Township	$42,379.88	Relatively High
3027.03	West Goshen Township	$48,626.90	Relatively High
3027.04	West Goshen Township	$38,533.77	Relatively High
3027.05	West Goshen Township	$29,316.93	Relatively Moderate
3027.06	West Goshen Township	$43,797.96	Relatively High
3028.02	East Goshen Township	$55,703.29	Relatively High
3028.03	East Goshen Township	$16,056.98	Relatively Moderate
3028.04	East Goshen Township	$31,572.52	Relatively Moderate
3028.06	East Goshen Township	$19,455.84	Relatively Moderate
3028.07	East Goshen Township	$30,966.95	Relatively Moderate
3029.01	Westtown Township	$39,869.62	Relatively High
3029.02	Westtown Township	$51,079.24	Relatively High
3030	Thornbury Township	$30,605.01	Relatively Moderate
3031	Birmingham Township	$40,618.20	Relatively High
3033.01	Kennett Township	$33,818.62	Relatively Moderate
3033.02	Kennett Township	$49,267.42	Relatively High
3034.01	Kennett Square Borough	$28,961.44	Relatively Moderate
3034.02	Kennett Square Borough	$15,399.61	Relatively Moderate
3035.01	East Marlborough Township	$44,789.37	Relatively High
3035.02	East Marlborough Township	$29,875.93	Relatively Moderate
3038.01	West Bradford Township	$37,487.30	Relatively Moderate
3038.03	West Bradford Township	$27,510.34	Relatively Moderate
3038.04	West Bradford Township	$48,863.52	Relatively High
3039.01	East Bradford Township	$41,709.87	Relatively High
3039.02	East Bradford Township	$46,222.82	Relatively High
3040	East Caln Township	$44,389.58	Relatively High
3041.01	Dowingtown Borough	$37,608.80	Relatively Moderate
3041.02	Dowingtown Borough	$25,101.06	Relatively Moderate
3042.01	Caln Township	$56,825.56	Relatively High
3043	East Brandywine Township	$82,339.65	Relatively High
3044.03	Uwchlan Township	$34,492.48	Relatively Moderate

Table 4.3.9-8 Expected Annual Losses to Strong Winds by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3044.04	Uwchlan Township	$37,744.96	Relatively Moderate
3044.05	Uwchlan Township	$53,460.81	Relatively High
3044.06	Uwchlan Township	$37,648.68	Relatively Moderate
3045.02	Upper Uwchlan Township	$30,305.19	Relatively Moderate
3045.03	Upper Uwchlan Township	$45,598.37	Relatively High
3045.04	Upper Uwchlan Township	$34,779.82	Relatively Moderate
3046	Wallace Township	$31,941.51	Relatively Moderate
3049	Honey Brook Township	$68,566.03	Relatively High
3050	Honey Brook Borough	$13,052.05	Relatively Moderate
3051.01	West Caln Township	$35,365.16	Relatively Moderate
3051.02	West Caln Township	$34,537.42	Relatively Moderate
3053	Valley Township	$62,916.03	Relatively High
3054	Coatesville City	$25,850.71	Relatively Moderate
3055	Coatesville City	$23,905.14	Relatively Moderate
3056	Coatesville City	$18,679.58	Relatively Moderate
3057	Coatesville City	$15,314.34	Relatively Moderate
3060	East Fallowfield Township, Modena Borough	$59,653.70	Relatively High
3063	West Grove Borough	$17,698.18	Relatively Moderate
3065.01	New Garden Township	$39,526.32	Relatively High
3065.03	New Garden Township	$24,738.47	Relatively Moderate
3065.04	New Garden Township	$47,380.90	Relatively High
3066	London Britain Township	$29,928.17	Relatively Moderate
3067	Franklin Township	$40,889.33	Relatively High
3068	Elk Township	$16,139.35	Relatively Moderate
3069	New London Township	$52,605.01	Relatively High
3070	Penn Township	$49,887.20	Relatively High
3071	Londonderry Township	$22,930.93	Relatively Moderate
3072	Highland Township	$16,205.11	Relatively Moderate
3073	Parkesburg Borough	$33,971.85	Relatively Moderate
3074	Sadsbury Township	$27,418.34	Relatively Moderate
3077	West Fallowfield Township	$26,016.14	Relatively Moderate
3078	Upper Oxford Township	$25,039.08	Relatively Moderate
3079	Lower Oxford Township	$47,228.51	Relatively High
3080	Oxford Borough	$40,695.60	Relatively High

Table 4.3.9-8 Expected Annual Losses to Strong Winds by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3081.01	East Nottingham Township	$35,745.16	Relatively Moderate
3081.02	East Nottingham Township	$37,365.02	Relatively Moderate
3082	West Nottingham Township	$22,261.46	Relatively Moderate
3110	East Vincent Township	$59,043.00	Relatively High
3111	Pennsbury Township	$37,254.20	Relatively Moderate
3112	Newlin Township, West Marlborough Township	$26,720.34	Relatively Moderate
3113	Pocopson Township	$39,801.98	Relatively High
3114.01	Caln Township	$56,049.06	Relatively High
3114.03	West Brandywine Township	$26,135.21	Relatively Moderate
3114.04	West Brandywine Township	$33,794.14	Relatively Moderate
3115	West Nantmeal Township, Elverson Borough	$33,136.79	Relatively Moderate
3116	South Coatesville Borough	$18,063.03	Relatively Moderate
3117.01	London Grove Township	$31,689.30	Relatively Moderate
3117.02	London Grove Township, Avondale Borough	$56,234.22	Relatively High
3118	West Sadsbury Township, Atglen Borough	$33,483.70	Relatively Moderate
9800	West Chester Borough	$38,082.74	Relatively High
TOTAL		$4,605,097.86	

Overall, however, tornado and windstorm events are not specific to select parts of the County. Rather, a tornado could strike in any part of the County at any time and could cause as much or as little damage as possible for the given magnitude event. Historically, however, Chester County has been most typically impacted by minimal (EF0-EF2) tornadoes, with few events resulting in significant monetary damage.

4.3.9.6. Equity in Vulnerable Communities

Regarding equity, there are several communities of consideration when it comes to planning for tornadoes and windstorms. Manufactured home communities, primarily mobile homes, are extremely at risk in the face of tornadoes as they are highly susceptible to high-speed winds. Additionally, households without vehicles, smartphones, or people with disabilities are also at higher risk if evacuation becomes necessary as all of these factors present significant barriers to active response times. The City of Coatesville and Spring City Borough have census tracts where more than 20 percent of the population has a disability while Honey Brook Township, West Fallowfield Township, Oxford Borough, Penn Township, Lower Oxford Township, and City of Coatesville have high concentrations of residents without smartphones.

4.3.10. Wildfire

4.3.10.1. Location and Extent



A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. A wildland fire is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines, and similar facilities. An urban-wildland interface fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels. The most high-risk areas of the County are at the forest-urban interface, where the potential for wildfire to spread to structures is greatest.

Wildfires can occur at any time of the year but are most likely to occur in the County during a drought. Wildland fires in Pennsylvania can occur in fields, grass, and brush as well as in the forest itself. Under dry conditions or drought, wildfires have the potential to burn forests as well as croplands. Any small fire in a wooded area, if not quickly detected and suppressed, can get out of control. Most wildland fires are caused by human carelessness, negligence, and ignorance. In 2023, debris burning accounted for the largest number of wildfires, while incendiary causes accounted for the largest number of acres burned in Pennsylvania (DCNR, 2025a). However, some are precipitated by lightning strikes and in rare instances, spontaneous combustion. Note that 99 percent of wildfires in Pennsylvania are caused by people, often by debris burns (DCNR, 2025b).

Forests are the dominant land use in Pennsylvania and represent 28.5% of the land area in Chester County. A portion of the William Penn State Forest is located in Chester County. This forest, as well as State Gameland areas, are of particular concern for wildfire events due to the large area of expanded woodland. However, a wildfire could develop in any portion of the County.

4.3.10.2. 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. A wildfire has the potential to kill people, livestock, fish, and wildlife. They often destroy property, valuable timber, and forage, recreational, and scenic values.

Vegetation loss is an environmental concern with wildfires, but it typically is not a serious impact in that they burn dead trees, leaves, and grasses to allow more open space for new and different types of vegetation to grow and receive sunlight. Another positive effect of a wildfire is that it stimulates the growth of new shoots on trees and shrubs and its heat can open pinecones and other seed pods. The most significant negative impact is the potential for severe erosion, silting of stream beds and reservoirs, and flooding due to ground-cover loss following a fire event.

In addition to the risk wildfires pose to the general public and property owners, the safety of firefighters is also a concern. Although loss of life among firefighters does not occur often in Pennsylvania, it is always a risk. More common firefighting injuries include falls, sprains, abrasions, or heat-related injuries such as dehydration. Response to wildfires also exposes emergency responders to the risk of motor vehicle accidents and can place them in remote acres away from the communities that they are chartered to protect.

The worst-case scenario for a wildfire in Chester County would be an uncontrolled fire that spreads from forested areas into bordering residential areas, causing significant damage to homes and other assets in addition to natural resources. See Table 4.3.10-4 for details on structures and critical facilities in high hazard and forested areas.

The potential impacts of wildfire on community lifelines are as follows:

Table 4.3.10-1 Most Likely Lifelines Impacted by Wildfires

LIFELINES	NOTES
	Fire departments will need to respond and possibly support recovery efforts where community safety is threatened.
	Wildfire directly threatens structures, including shelters, and potentially agricultural operations.
	Potential serious injuries and fatalities may occur, requiring response in the medical system.

4.3.10.3. Past Occurrence

Chester County falls in Pennsylvania Forest District 17, William Penn, a nine-county district in southeast Pennsylvania, as shown in Figure 4.3.10-1.

Figure 4.3.10-1 Fire Districts in Pennsylvania.



Table 4.3.10-2 below lists wildfire statistics for PA Forest District 17. These are visualized in Figure 4.3.10-2. This data accounts for more than just Chester County. However, it points towards the regional risk to wildfire. Figure 4.3.10-3 shows the origin of wildfires in Chester County.

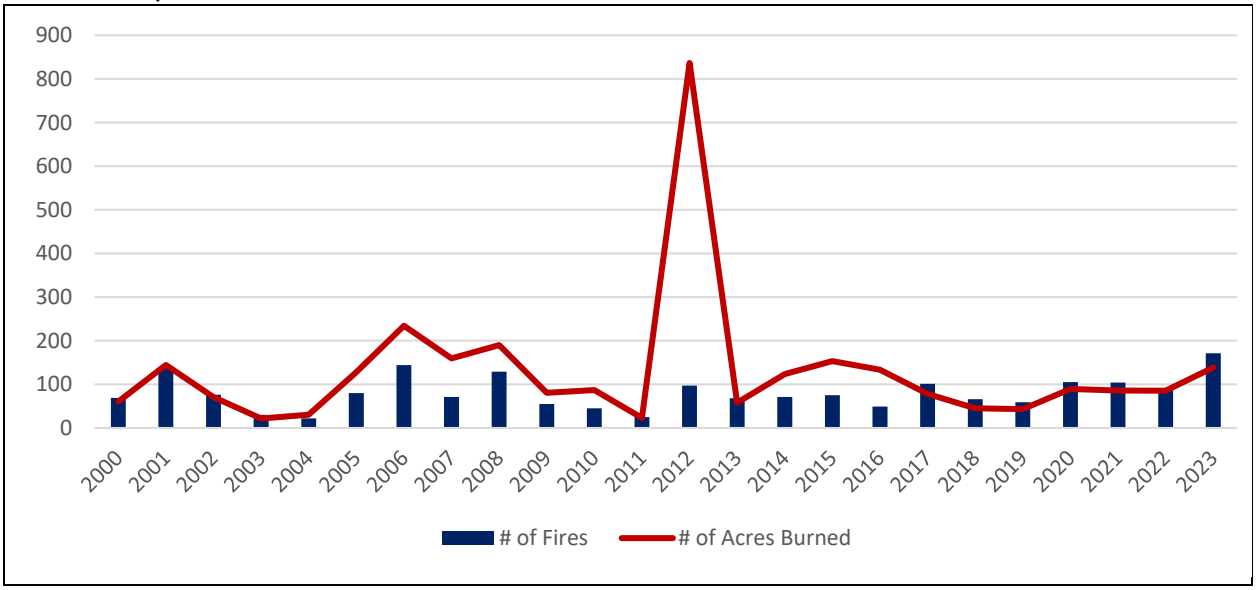
Table 4.3.10-2 Wildfires in PA Forest District 17 (DCNR, 2025a)

Year	Number Of Fires	Acres Burned
2000	69	60.3
2001	139	144.3
2002	76	70.7
2003	30	21.6
2004	22	30.3
2005	80	127.7
2006	144	234.1
2007	71	159.4
2008	129	189.9
2009	55	80.7
2010	45	86.8
2011	25	23.1
2012	97	836.6
2013	68	57.7

Table 4.3.10-2 Wildfires in PA Forest District 17 (DCNR, 2025a)

Year	Number Of Fires	Acres Burned
2014	71	123.5
2015	75	153.1
2016	49	133.3
2017	101	78
2018	66	45.1
2019	59	43.3
2020	105	89.4
2021	104	85.8
2022	90	85.5
2023	171	138.4
TOTAL	**1,941**	**3,098.6**

Figure 4.3.10-2 Number of Fires and Acres Burned in PA Forest District 17 (DCNR, 2025a)



The highest number of wildfire events recorded between 2000 to 2023 was in 2023 with 171 fires, in 2006 with 144 wildfires, and in 2001 with 139 wildfires. However, 2012 saw the most acres burned with 836.6 acres burned that year. No single year comes close to the 2012 acreage, although 234.1 acres were burned in 2006 and 189.9 acres were burned in 2008.

Furthermore, Chester County EMS provided brush fire data from 2023 through April 21, 2025, as seen in Table 4.3.10-3.

Table 4.3.10-3 Brush Fires in Chester County from 2023-2025 (Chester County EMS, 2025)

Year	Number Of Fires
2023	323
2024	400

Table 4.3.10-3 Brush Fires in Chester County from 2023-2025 (Chester County EMS, 2025)

Year	Number Of Fires
2025	234
TOTAL	957

Figure 4.3.10-3 Wildfire Origin in Chester County, 2024

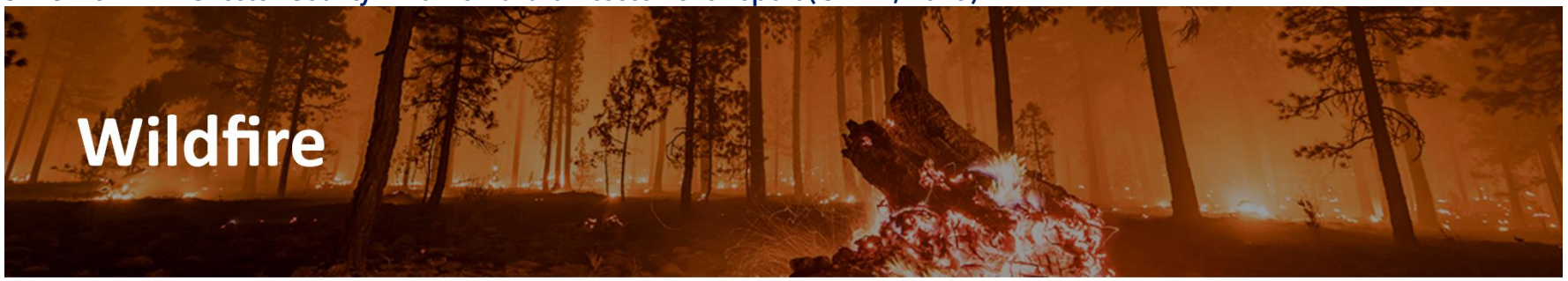


4.3.10.4. Future Occurrence

Previous events indicate that annual large wildfire occurrences in the County are unlikely, but possible. Weather conditions like drought can increase the likelihood of wildfires occurring. Many wildfires are the result of human-caused ignitions. Any fire, without the quick response or attention of fire-fighters, forestry personnel, or visitors to the forest, has the potential to become a wildfire. Therefore, the probability of an urban fire or wildfire occurring in Chester County is considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

The Climate Mapping for Resilience and Adaptation (CMRA) Tool provides a county-level assessment report for wildfire, shown in Figure 4.3.10-4 below. The future climate indicators for wildfire are precipitation and temperature thresholds. According to CRMA, the number of days per year with no precipitation is projected to increase slightly while the number of days with a maximum temperature above 90 degrees Fahrenheit is expected to increase significantly. These projections show that the conditions in the future may make wildfires more likely.

Figure 4.3.10-4 Chester County Wildfire Hazard Assessment Report (CRMA, 2025)



Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Days per year with no precipitation (dry days)	**180 days** 175 - 185	**181 days** 169 - 192	**181 days** 170 - 195	**181 days** 168 - 196	**182 days** 169 - 199	**181 days** 169 - 195	**184 days** 164 - 212
Maximum number of consecutive dry days	**12 days** 11 - 13	**12 days** 10 - 14	**12 days** 10 - 14	**12 days** 10 - 15	**12 days** 11 - 15	**12 days** 11 - 14	**13 days** 11 - 17
Days per year with precipitation (wet days)	**185 days** 180 - 190	**184 days** 173 - 196	**184 days** 170 - 195	**184 days** 169 - 197	**183 days** 166 - 196	**184 days** 170 - 196	**182 days** 154 - 201
Temperature thresholds:							
Annual days with maximum temperature > 90°F	**11 days** 11 - 17	**32 days** 17 - 44	**34 days** 19 - 48	**41 days** 22 - 59	**50 days** 25 - 69	**50 days** 26 - 75	**82 days** 36 - 107
Annual days with maximum temperature > 100°F	**0 days** 0 - 0	**2 days** 0 - 5	**2 days** 0 - 5	**3 days** 1 - 10	**5 days** 1 - 15	**5 days** 1 - 10	**19 days** 2 - 47

N/A = Data Not Available for the selected area

4.3.10.5. Vulnerability Assessment

Figure 4.3.10-5 shows wildfire hazard potential in Chester County (USFS, 2023). All of County is identified as either having "low" or "very low" hazard potential. Figure 4.3.10-6 shows forested areas throughout Chester County in 2023. The County has sporadic forest coverage, which is also particularly vulnerable to wildfire events. Communities that have more developed areas adjacent to wooded land also have potentially greater vulnerability to wildfire hazard.

Figure 4.3.10-5 Wildfire Hazard Potential in Chester County, 2023

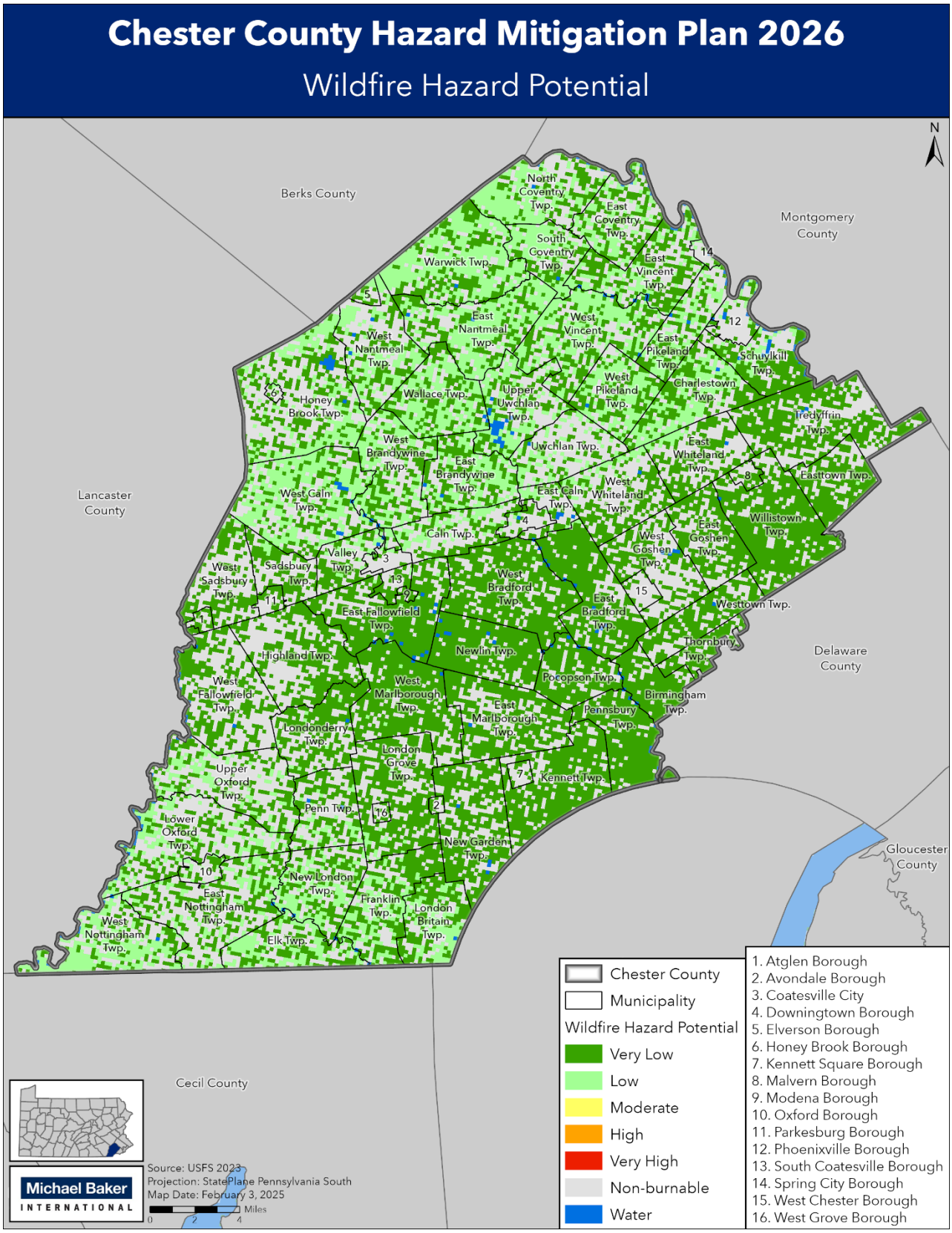


Figure 4.3.10-6 Forested Areas in Chester County, 2023

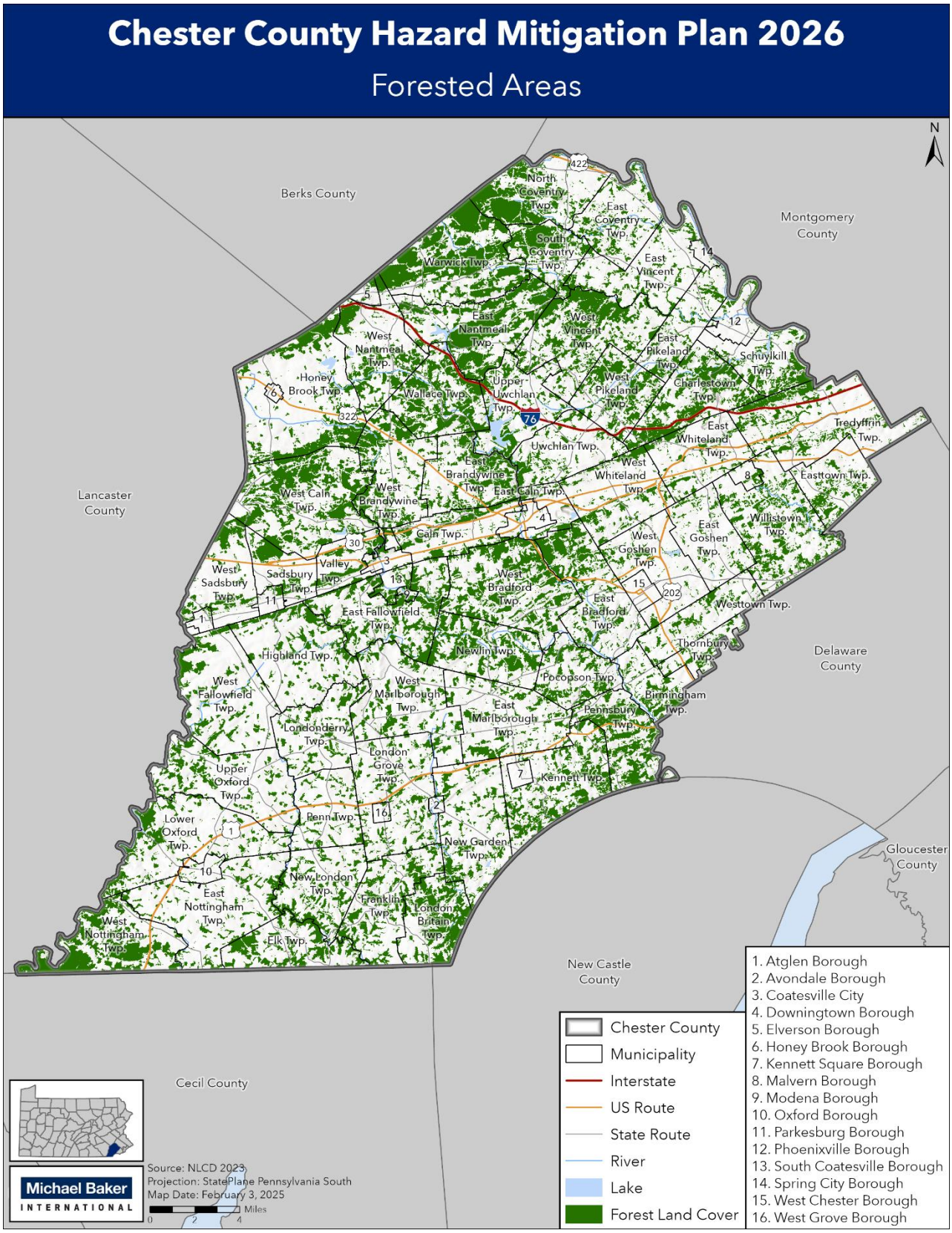


Table 4.3.10-4 lists the total addressable structures and critical facilities (excluding oil and gas wells) in each municipality that are located in forested land use areas. As indicated in the table, West Caln Township has the highest number of vulnerable structures located in wooded areas, with 1,086 structures. It is the only municipality with more than 1,000 structures located in wooded areas. East Nantmeal Township, Charlestown Township, and Warwick Township are the only other municipalities with at least 25% of structures in wooded areas. Tredyffrin Township has the most critical facilities in wooded areas (13). It is the only township with more than ten critical facilities in wooded area. Pennsbury Township, New London Township, and Elk Township are the only municipalities with at least 25% of critical facilities in wooded areas (28%, 28%, and 25% respectively). Mitigation tactics like brush clearing and prescribed burns around these facilities could reduce risk to wildfire events.

Table 4.3.10-4 Structures and Critical Facilities Vulnerable to Wildfire

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN WOODED AREAS	PERCENT STRUCTURES IN WOODED AREAS	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN WOODED AREAS	PERCENT CRITICAL FACILITIES IN WOODED AREAS
Atglen Borough	577	2	0%	8	0	0%
Avondale Borough	405	6	1%	5	0	0%
Birmingham Township	1,624	195	12%	11	2	18%
Caln Township	4,701	196	4%	57	0	0%
Charlestown Township	2,266	590	26%	29	4	14%
Coatesville City	2,732	10	0%	27	0	0%
Downingtown Borough	2,291	5	0%	41	0	0%
East Bradford Township	3,658	397	11%	43	3	7%
East Brandywine Township	3,683	486	13%	49	3	6%
East Caln Township	1,269	114	9%	28	0	0%
East Coventry Township	3,563	306	9%	34	4	12%
East Fallowfield Township	3,944	358	9%	26	3	12%
East Goshen Township	5,665	182	3%	32	1	3%
East Marlborough Township	3,571	287	8%	25	0	0%
East Nantmeal Township	1,508	424	28%	16	2	13%
East Nottingham Township	4,885	242	5%	36	1	3%
East Pikeland Township	3,552	214	6%	23	1	4%
Easttown Township	3,727	264	7%	28	3	11%

Table 4.3.10-4 Structures and Critical Facilities Vulnerable to Wildfire

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN WOODED AREAS	PERCENT STRUCTURES IN WOODED AREAS	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN WOODED AREAS	PERCENT CRITICAL FACILITIES IN WOODED AREAS
East Vincent Township	4,029	123	3%	81	3	4%
East Whiteland Township	4,401	169	4%	35	2	6%
Elk Township	1,367	144	11%	12	3	25%
Elverson Borough	584	30	5%	4	0	0%
Franklin Township	2,456	317	13%	17	2	12%
Highland Township	1,307	159	12%	15	0	0%
Honey Brook Borough	732	0	0%	5	0	0%
Honey Brook Township	4,909	545	11%	31	1	3%
Kennett Township	1,751	3	0%	14	0	0%
Kennett Square Borough	3,867	477	12%	44	6	14%
London Britain Township	1,782	375	21%	13	3	23%
Londonderry Township	4,078	188	5%	38	0	0%
London Grove Township	1,692	101	6%	9	2	22%
Lower Oxford Township	2,579	192	7%	36	1	3%
Malvern Borough	1,066	8	1%	10	0	0%
Modena Borough	201	18	9%	5	0	0%
New Garden Township	5,451	343	6%	44	3	7%
Newlin Township	2,921	237	8%	15	0	0%
New London Township	1,193	236	20%	18	5	28%
North Coventry Township	4,288	527	12%	37	2	5%
Oxford Borough	1,704	11	1%	17	0	0%
Parkesburg Borough	1,371	17	1%	15	1	7%
Penn Township	2,901	91	3%	25	1	4%
Pennsbury Township	1,712	384	22%	25	7	28%
Phoenixville Borough	4,731	6	0%	32	0	0%
Pocopson Township	1,757	305	17%	27	0	0%
Sadsbury Township	1,987	129	6%	18	0	0%
Schuylkill Township	4,096	304	7%	36	2	6%
South Coatesville Borough	506	10	2%	6	0	0%
South Coventry Township	1,653	387	23%	18	1	6%
Spring City Borough	1,199	3	0%	6	0	0%

Table 4.3.10-4 Structures and Critical Facilities Vulnerable to Wildfire

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN WOODED AREAS	PERCENT STRUCTURES IN WOODED AREAS	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN WOODED AREAS	PERCENT CRITICAL FACILITIES IN WOODED AREAS
Thornbury Township	1,060	140	13%	10	1	10%
Tredyffrin Township	9,617	444	5%	139	13	9%
Upper Oxford Township	2,109	189	9%	18	0	0%
Upper Uwchlan Township	3,909	188	5%	27	0	0%
Uwchlan Township	5,805	264	5%	42	0	0%
Valley Township	2,926	77	3%	33	0	0%
Wallace Township	2,065	394	19%	19	2	11%
Warwick Township	2,192	547	25%	13	2	15%
West Bradford Township	5,801	799	14%	33	2	6%
West Brandywine Township	4,141	509	12%	30	1	3%
West Caln Township	6,070	1,086	18%	20	0	0%
West Chester Borough	3,147	5	0%	26	0	0%
West Fallowfield Township	2,226	174	8%	21	2	10%
West Goshen Township	8,075	148	2%	78	3	4%
West Grove Borough	964	7	1%	6	0	0%
West Marlborough Township	983	58	6%	21	0	0%
West Nantmeal Township	1,832	268	15%	21	0	0%
West Nottingham Township	2,014	334	17%	12	0	0%
West Pikeland Township	2,050	354	17%	22	0	0%
West Sadsbury Township	1,915	245	13%	16	0	0%
West Vincent Township	3,127	625	20%	25	2	8%
West Whiteland Township	5,656	292	5%	86	3	3%
Westtown Township	3,838	219	6%	28	1	4%
Willistown Township	5,275	531	10%	55	4	7%
Total	**214,689**	**18,014**	**8%**	**2,027**	**108**	**5%**

Table 4.3.10-5 below shows the populations in each municipality that are located in forested land use areas. West Bradford Township and West Caln Township both have over 5,000 residents living in wooded areas (5,481 and 5,072 people respectively). Uwchlan Township (4,256) is the only other municipality with over 4,000. Honey Brook Borough, Malvern Borough, and West Chester Borough are the only municipalities with no population living in wooded areas. There are five municipalities where at least 50% of the population lives in wooded areas – Wallace Township (67%), Warwick Township (61%), East Nantmeal Township (59%), West Caln Township (57%), and Modena Borough (50%).

Table 4.3.10-5 Population Vulnerable to Wildfire by Municipality

MUNICIPALITY	TOTAL 2020 POPULATION	TOTAL POPULATION IN WOODED AREAS	PERCENT POPULATION IN WOODED AREAS
Atglen Borough	1,313	9	1%
Avondale Borough	1,274	20	2%
Birmingham Township	4,082	1,276	31%
Caln Township	14,432	3,450	24%
Charlestown Township	6,001	2,734	46%
Coatesville City	13,350	1,320	10%
Downingtown Borough	7,892	228	3%
East Bradford Township	10,339	2,441	24%
East Brandywine Township	9,738	3,533	36%
East Caln Township	5,384	2,413	45%
East Coventry Township	7,068	1,217	17%
East Fallowfield Township	7,626	1,444	19%
East Goshen Township	18,410	2,114	11%
East Marlborough Township	7,306	2,269	31%
East Nantmeal Township	1,832	1,090	59%
East Nottingham Township	8,982	1,195	13%
East Pikeland Township	8,260	1,043	13%
Easttown Township	7,433	757	10%
East Vincent Township	13,917	2,621	19%
East Whiteland Township	10,984	1,687	15%
Elk Township	1,698	511	30%
Elverson Borough	1,330	449	34%
Franklin Township	4,433	1,472	33%
Highland Township	1,259	311	25%
Honey Brook Borough	1,892	0	0%
Honey Brook Township	8,274	2,114	26%
Kennett Township	5,936	134	2%

Table 4.3.10-5 Population Vulnerable to Wildfire by Municipality

MUNICIPALITY	TOTAL 2020 POPULATION	TOTAL POPULATION IN WOODED AREAS	PERCENT POPULATION IN WOODED AREAS
Kennett Square Borough	8,289	2,527	30%
London Britain Township	3,179	1,563	49%
Londonderry Township	8,797	2,418	27%
London Grove Township	2,476	630	25%
Lower Oxford Township	5,436	597	11%
Malvern Borough	3,419	0	0%
Modena Borough	541	272	50%
New Garden Township	11,363	2,800	25%
Newlin Township	5,810	1,508	26%
New London Township	1,358	527	39%
North Coventry Township	8,441	2,679	32%
Oxford Borough	5,736	126	2%
Parkesburg Borough	3,862	39	1%
Penn Township	5,644	792	14%
Pennsbury Township	3,876	1,407	36%
Phoenixville Borough	18,602	747	4%
Pocopson Township	4,455	803	18%
Sadsbury Township	4,125	362	9%
Schuylkill Township	8,780	1,290	15%
South Coatesville Borough	1,601	454	28%
South Coventry Township	2,796	1,155	41%
Spring City Borough	3,494	58	2%
Thornbury Township	3,177	811	26%
Tredyffrin Township	31,927	3,925	12%
Upper Oxford Township	2,560	577	23%
Upper Uwchlan Township	12,275	2,414	20%
Uwchlan Township	19,161	4,256	22%
Valley Township	7,985	1,726	22%
Wallace Township	3,711	2,474	67%
Warwick Township	2,590	1,577	61%
West Bradford Township	14,316	5,481	38%
West Brandywine Township	7,331	2,440	33%
West Caln Township	8,910	5,072	57%
West Chester Borough	18,671	0	0%
West Fallowfield Township	2,459	289	12%

Table 4.3.10-5 Population Vulnerable to Wildfire by Municipality

MUNICIPALITY	TOTAL 2020 POPULATION	TOTAL POPULATION IN WOODED AREAS	PERCENT POPULATION IN WOODED AREAS
West Goshen Township	23,040	809	4%
West Grove Borough	2,770	78	3%
West Marlborough Township	819	265	32%
West Nantmeal Township	2,251	460	20%
West Nottingham Township	2,748	828	30%
West Pikeland Township	4,024	1,029	26%
West Sadsbury Township	2,436	886	36%
West Vincent Township	6,668	2,733	41%
West Whiteland Township	19,632	2,845	14%
Westtown Township	11,154	2,167	19%
Willistown Township	11,273	2,825	25%
Total	**534,413**	**106,573**	**20%**

Table 4.3.10-6 below lists the expected annual losses to wildfire by census tract in Chester County.

Table 4.3.10-6 Expected Annual Losses to Wildfire by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3001.01	Tredyffrin Township	$0.03	Very Low
3001.03	Tredyffrin Township	$0.00	No Expected Annual Losses
3001.04	Tredyffrin Township	$87.30	Very Low
3001.06	Tredyffrin Township	$35.47	Very Low
3001.07	Tredyffrin Township	$670.81	Relatively Low
3001.08	Tredyffrin Township	$1,812.87	Relatively Low
3001.09	Tredyffrin Township	$0.00	No Expected Annual Losses
3002.01	Easttown Township	$91.33	Very Low
3002.02	Easttown Township	$345.48	Very Low
3003.01	Willistown Township	$629.80	Relatively Low
3003.02	Willistown Township	$891.36	Relatively Low
3003.03	Willistown Township	$66.33	Very Low
3004	Malvern Borough	$0.00	No Expected Annual Losses
3005.01	Schuylkill Township	$264.08	Very Low
3005.02	Schuylkill Township	$490.48	Relatively Low
3006	Phoenixville	$10.38	Very Low

Table 4.3.10-6 Expected Annual Losses to Wildfire by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3007	Phoenixville	$0.00	No Expected Annual Losses
3008	Phoenixville	$0.00	No Expected Annual Losses
3009	Phoenixville	$209.13	Very Low
3010.01	East Pikeland Township	$384.18	Relatively Low
3010.02	East Pikeland Township	$35.78	Very Low
3011	Spring City Borough	$0.00	No Expected Annual Losses
3013	East Coventry Township	$188.78	Very Low
3014.01	North Coventry Township	$142.98	Very Low
3014.02	North Coventry Township	$410.66	Relatively Low
3015	South Coventry Township	$282.10	Very Low
3016	Warwick Township	$107.04	Very Low
3017	East Nantmeal Township	$307.52	Very Low
3018	West Vincent Township	$633.77	Relatively Low
3019	West Pikeland Township	$284.58	Very Low
3020	Charlestown Township	$834.20	Relatively Low
3021.02	East Whiteland Township	$0.00	Very Low
3021.03	East Whiteland Township	$219.12	Very Low
3021.04	East Whiteland Township	$97.57	Very Low
3022.03	West Whiteland Township	$0.00	No Expected Annual Losses
3022.04	West Whiteland Township	$96.93	Very Low
3022.05	West Whiteland Township	$128.81	Very Low
3022.06	West Whiteland Township	$522.87	Relatively Low
3022.07	West Whiteland Township	$0.00	No Expected Annual Losses
3023	West Chester Borough	$816.58	Relatively Low
3024	West Chester Borough	$100.17	Very Low
3025	West Chester Borough	$0.00	No Expected Annual Losses
3026	West Chester Borough	$0.00	No Expected Annual Losses
3027.02	West Goshen Township	$97.26	Very Low
3027.03	West Goshen Township	$566.17	Relatively Low
3027.04	West Goshen Township	$0.00	No Expected Annual Losses
3027.05	West Goshen Township	$1,160.26	Relatively Low
3027.06	West Goshen Township	$34.27	Very Low
3028.02	East Goshen Township	$3,009.20	Relatively Low
3028.03	East Goshen Township	$550.38	Relatively Low

Table 4.3.10-6 Expected Annual Losses to Wildfire by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3028.04	East Goshen Township	$331.17	Very Low
3028.06	East Goshen Township	$0.00	No Expected Annual Losses
3028.07	East Goshen Township	$0.00	No Expected Annual Losses
3029.01	Westtown Township	$0.00	Very Low
3029.02	Westtown Township	$587.09	Relatively Low
3030	Thornbury Township	$818.43	Relatively Low
3031	Birmingham Township	$161.52	Very Low
3033.01	Kennett Township	$0.03	Very Low
3033.02	Kennett Township	$69.83	Very Low
3034.01	Kennett Square Borough	$126.16	Very Low
3034.02	Kennett Square Borough	$48.65	Very Low
3035.01	East Marlborough Township	$86.35	Very Low
3035.02	East Marlborough Township	$27.46	Very Low
3038.01	West Bradford Township	$178.41	Very Low
3038.03	West Bradford Township	$741.03	Relatively Low
3038.04	West Bradford Township	$49.70	Very Low
3039.01	East Bradford Township	$136.07	Very Low
3039.02	East Bradford Township	$85.01	Very Low
3040	East Caln Township	$275.46	Very Low
3041.01	Downingtown Borough	$12.62	Very Low
3041.02	Downingtown Borough	$14.17	Very Low
3042.01	Caln Township	$318.78	Very Low
3043	East Brandywine Township	$1,370.32	Relatively Low
3044.03	Uwchlan Township	$98.84	Very Low
3044.04	Uwchlan Township	$62.71	Very Low
3044.05	Uwchlan Township	$326.23	Very Low
3044.06	Uwchlan Township	$2.07	Very Low
3045.02	Upper Uwchlan Township	$59.11	Very Low
3045.03	Upper Uwchlan Township	$0.00	No Expected Annual Losses
3045.04	Upper Uwchlan Township	$159.75	Very Low
3046	Wallace Township	$131.08	Very Low
3049	Honey Brook Township	$1,134.69	Relatively Low
3050	Honey Brook Borough	$5.00	Very Low
3051.01	West Caln Township	$181.10	Very Low

Table 4.3.10-6 Expected Annual Losses to Wildfire by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3051.02	West Caln Township	$333.93	Very Low
3053	Valley Township	$361.85	Relatively Low
3054	Coatesville City	$0.00	No Expected Annual Losses
3055	Coatesville City	$0.00	No Expected Annual Losses
3056	Coatesville City	$0.00	No Expected Annual Losses
3057	Coatesville City	$0.00	No Expected Annual Losses
3060	East Fallowfield Township, Modena Borough	$175.34	Very Low
3063	West Grove Borough	$0.00	No Expected Annual Losses
3065.01	New Garden Township	$32.39	Very Low
3065.03	New Garden Township	$19.76	Very Low
3065.04	New Garden Township	$0.00	No Expected Annual Losses
3066	London Britain Township	$34.08	Very Low
3067	Franklin Township	$397.79	Relatively Low
3068	Elk Township	$31.52	Very Low
3069	New London Township	$13.76	Very Low
3070	Penn Township	$96.99	Very Low
3071	Londonderry Township	$204.88	Very Low
3072	Highland Township	$236.46	Very Low
3073	Parkesburg Borough	$296.56	Very Low
3074	Sadsbury Township	$373.61	Relatively Low
3077	West Fallowfield Township	$371.61	Relatively Low
3078	Upper Oxford Township	$441.81	Relatively Low
3079	Lower Oxford Township	$253.45	Very Low
3080	Oxford Borough	$299.09	Very Low
3081.01	East Nottingham Township	$198.77	Very Low
3081.02	East Nottingham Township	$397.57	Relatively Low
3082	West Nottingham Township	$165.81	Very Low
3110	East Vincent Township	$250.47	Very Low
3111	Pennsbury Township	$35.60	Very Low
3112	Newlin Township, West Marlborough Township	$258.16	Very Low
3113	Pocopson Township	$839.05	Relatively Low
3114.01	Caln Township	$527.97	Relatively Low
3114.03	West Brandywine Township	$28.72	Very Low

Table 4.3.10-6 Expected Annual Losses to Wildfire by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITIES	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
3114.04	West Brandywine Township	$446.46	Relatively Low
3115	West Nantmeal Township, Elverson Borough	$269.81	Very Low
3116	South Coatesville Borough	$60.37	Very Low
3117.01	London Grove Township	$358.96	Relatively Low
3117.02	London Grove Township, Avondale Borough	$1,849.79	Relatively Low
3118	West Sadsbury Township, Atglen Borough	$379.08	Relatively Low
9800	West Chester Borough	$0.00	No Expected Annual Losses
TOTAL		**$34,256.33**	

4.3.10.6. Equity in Vulnerable Communities

Communities in rural areas are more susceptible to wildfires than their urban counterparts due to potential proximity to large fire-prone wooded areas. These areas may have limited evacuation routes, increasing the risk for residents in the path of wildfire. Additionally, households with people with disabilities, specifically related to lung or respiratory issues, are going to be at an increased risk of harm, and county hospitals should be prepared. The City of Coatesville and Spring City Borough have census tracts where more than 20 percent of the population has a disability but are at lower risk overall to wildfires.

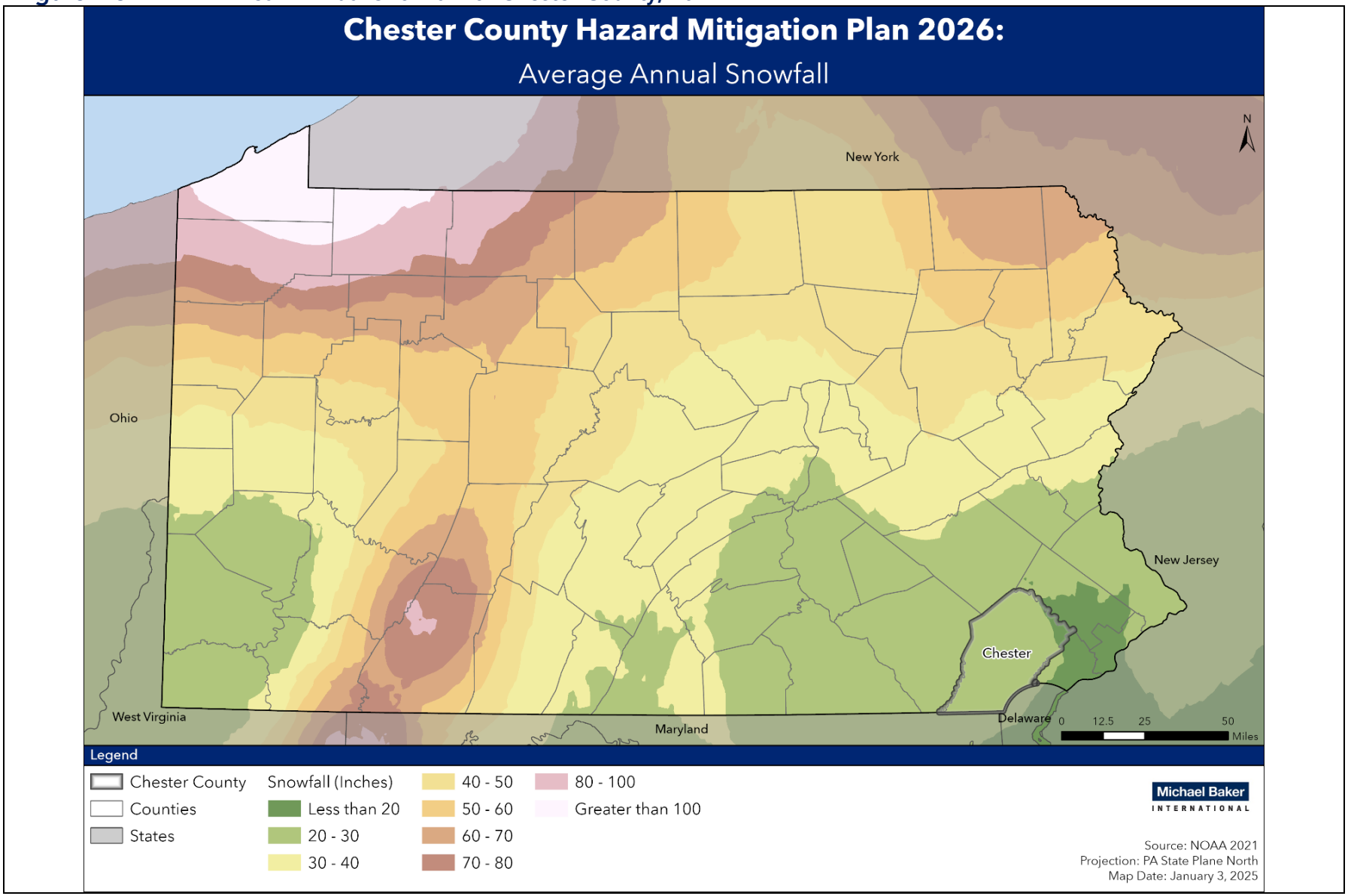
4.3.11. Winter Storm



4.3.11.1. Location and Extent

Heavy snow or ice occurs throughout the Commonwealth of Pennsylvania. Every municipality in Chester County is affected by these storms. Chester County experiences all levels of winter storms from ice storms and freezing rain to heavy snow and blizzards. Hazard Identification survey respondents ranked winter storms in the top five hazards presenting the most risk to the County. Generally, the average annual snowfall is consistent throughout the County, with the area receiving between 20 and 30 inches of snow annually (see Figure 4.3.11-1 below) (NOAA NWS, 2024a). This dataset from NOAA in 2021 is the most current, comprehensive, and publicly available geospatial data at the time of this Plan Update. This map continues to depict current conditions.

Figure 4.3.11-1 Mean Annual Snowfall for Chester County, 2021



4.3.11.2. Range of Magnitude

Winter storms consist of cold temperatures, heavy snow or ice and sometimes strong winds. Because winter storms are a regular occurrence in Chester County, they are considered hazards only when they result in damage to specific structures and/or overwhelm local capabilities to handle disruptions to traffic, communications, and electric power. The cost of removing snow, repairing damages, especially from ice storms, and the loss to businesses can have a negative economic impact for communities. Winter storms can generate other hazards such as infrastructure disruption (blocked roads and power outages), human-caused hazards (traffic accidents and trapped vehicles), and technological problems (communication system outages and overload). Winter storms can adversely affect roadways, utilities, business activities, and can cause loss of life, frostbite, or freezing.

Winter storms can include one or more of the following weather events:

1. Heavy Snowstorm: Accumulations of four inches or more in a six-hour period, or six inches or more in a 12-hour period.
2. Sleet Storm: Sleet is formed when snow falling to the earth partially melts as it passes through a layer of warm air. The precipitation then passes through a cold layer of air and refreezes into solid pellets. Sleet causes surfaces to become slippery, posing hazards to pedestrians and motorists.
3. Ice Storm: An ice storm occurs when rain freezes upon impact with the ground or other objects such as trees and power lines. Heavy accumulations of ice can bring down trees and utility poles, disrupting power and communication for days while crews make the necessary repairs. The icy conditions are also dangerous for pedestrians and vehicular traffic.
4. Blizzard: According to NWS, a blizzard is a severe snowstorm that occurs when winds reach 35 mph or more. The blowing snow reduces visibility to less than one-quarter of a mile for at least three hours. Storms that meet these criteria are not frequent in Chester County; however, storms that produce blizzard-like conditions are a common occurrence.
5. Severe Blizzard: Wind velocity of 45 mph, temperatures of 10° Fahrenheit or lower, a high density of snow with visibility frequently measured in feet prevailing over an extended period time.

Any of the above events can result in the closing of secondary roads, particularly in rural locations, loss of utility services and depletion of oil heating supplies. Environmental impacts 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.

Gradual melting of snow and ice provides excellent groundwater recharge. However, high temperatures following a heavy snowfall can cause rapid surface water runoff and severe flooding. The blizzard of 1996 represents the largest impact Chester County is anticipated to encounter from a winter storm hazard. During this event, heavy snow fell on the County, resulting in two to three feet of snow in places. A storm of this magnitude could be considered a worst-case scenario winter storm for Chester County.

The potential impacts of winter storms on community lifelines are as follows:

Table 4.3.11-1 Most Likely Lifelines Impacted by Winter Storm

LIFELINES	NOTES
	Government administrative services may be impacted through transportation infrastructure issues and community safety may be threatened due to potential harm from storm impacts.
	Winter storms can cause damage to structures and water utility infrastructure, while the food supply chain may be disrupted due to impacts on transportation infrastructure.
	Potential direct damage to infrastructure and then potential increased fuel use for those who lost access to electrical heating may occur.
	Transportation lifeline impacted during response and recovery due to direct damage to infrastructure and dangerous road conditions.

4.3.11.3. Past Occurrence

The Commonwealth of Pennsylvania has a long history of severe winter weather. Average annual snowfall in Chester County can range from 20 and 30 inches (NOAA NWS, 2024a). Three of the twenty-five Presidential Disaster and Emergency Declarations affecting Chester County have been in response to hazard events related to winter storms (see Table 4.2-1). Three of the nine Gubernational Declarations since 2018 have been for winter storms (see Table 4.2-2). The number of winter storm events occurring each year in Chester County and associated damages are listed in Table 4.3.13-2.

Table 4.3.11-2 Previous Winter Storm Events Impacting Chester County from 2013-2024 (NOAA NCEI, 2024)

YEAR	NUMBER OF EVENTS	DAMAGES ($)
2013	4	$0
2014	2	$0
2015	3	$0
2016	2	$0
2017	2	$0
2018	5	$0
2019	3	$0
2020	3	$0
2021	6	$0
2022	0	$0
2023	0	$0
2024	3	$0
2025	0	$0
Total	33	$0

4.3.11.4. Future Occurrence

Approximately 35 winter storms occur across Pennsylvania annually. Winter storms are a regular, annual occurrence in Chester County and should be considered *highly likely* as defined by the Risk Factor methodology probability criteria (see Table 4.4-1).

Climate projections show that while precipitation totals are expected to increase, the number of days below 32 degrees Fahrenheit may decrease. This may lead to a decrease in the number of winter storms. That said, the polar jet stream and arctic warming may play a part in large-scale storms still being a potential hazard. Cohen, Pfeiffer, and Francis (2018) noted that warming Artic temperatures have led to a weakening of the polar jet stream, which has allowed warmer, yet still very cold, artic air to travel southward and provide the other half of the equation for the intense winter storms seen in the Northeast United States. There is a possibility these storms continue to occur and may even occur more frequently, with the warming Atlantic Ocean generating more fuel and the potential for more intense hot air-cold air clashes that strengthen storms (Feuerstein, 2022). However, this study has been criticized due to the small size of the 35-year sample and the potential for compounding factors impacting the data, as various climate modeling techniques have so-far been unable to reproduce the effect and confirm the linkage (Blackport and Screen, 2020). More studies are ongoing.

4.3.11.5. Vulnerability Assessment

In Chester County, accumulations of snow and/or ice during winter months are expected and normal. The most common detrimental effects of snow and/or ice are not collapsed structures but traffic accidents and interruptions in power supply and communications services. Motorists may occasionally become stranded on major highways, especially on I-76 during these storms. Stranded motorists are also likely on US 322 in remote locations.

Emergency medical supplies, food, and fuel are sometimes required during these storms. Particular areas of vulnerability include low-income and elderly populations, mobile homes, and infrastructure such as roadways and utilities that can be damaged by such storms and the low-lying areas that can be impacted by flooding related to rapid snow melt.

Critical facilities would be impacted by a storm event, but these structures are largely constructed of concrete and masonry; therefore, they should only suffer minimal structural damage. Because power interruption can occur, backup power is recommended for critical facilities and infrastructure.

Vulnerability to the effects of winter storms on buildings is somewhat dependent on the age of a building. As building codes become more stringent, buildings can support heavier loads and as buildings age, various factors may deteriorate their structural integrity. Vulnerability also depends upon the type of construction and the degree to which a structure has been maintained. The most vulnerable structures are those that were poorly built or are dilapidated. The weight of heavy snow or ice may lead to minor damage or to structural collapse.

All structures and infrastructure in Chester County are exposed to heavy snow and ice. For this analysis, structures built prior to 1940 are identified as being potentially at risk of being somewhat weakened and more susceptible to damage due to heavy snow or ice. The following table shows the number of housing units in Chester County built prior to 1940 according to the ACS 2023 five-year estimates. West Chester Borough, Phoenixville Borough, and Coatesville City have the most units of any municipality in the county built prior to 1940 (all over 2,000). However, Avondale Borough and West Marlborough Township have the largest proportion of housing units built prior to 1940 (53.0% and 52.9%, respectively). While the U.S. Census Bureau provides estimates for residential structures, the age of non-residential structures is not available.

Table 4.3.11-3 Housing Units Built Prior to 1940 by Municipality (U.S. Census, 2023)

MUNICIPALITY	UNITS	PERCENT OF TOTAL UNITS
Atglen Borough	65	16.0%
Avondale Borough	267	53.0%
Birmingham Township	140	9.0%
Caln Township	480	8.5%
Charlestown Township	139	6.5%
Coatesville City	2,059	38.6%
Downingtown Borough	1,081	29.6%
East Bradford Township	280	7.7%
East Brandywine Township	193	5.6%
East Caln Township	84	3.1%
East Coventry Township	170	6.3%
East Fallowfield Township	191	7.1%
East Goshen Township	160	1.8%
East Marlborough Township	365	12.5%
East Nantmeal Township	198	31.1%
East Nottingham Township	137	4.7%
East Pikeland Township	294	8.5%
Easttown Township	288	11.3%
East Vincent Township	216	3.9%
East Whiteland Township	503	12.4%
Elk Township	77	13.0%
Elverson Borough	147	23.8%
Franklin Township	133	7.8%
Highland Township	82	17.5%
Honey Brook Borough	225	28.8%
Honey Brook Township	232	7.4%
Kennett Township	764	32.5%
Kennett Square Borough	164	4.5%
London Britain Township	88	8.2%
Londonderry Township	239	8.1%
London Grove Township	105	11.2%
Lower Oxford Township	154	12.9%
Malvern Borough	475	27.1%
Modena Borough	66	45.8%
New Garden Township	343	8.3%
Newlin Township	199	9.3%
New London Township	107	22.9%
North Coventry Township	810	22.6%
Oxford Borough	597	26.0%
Parkesburg Borough	382	24.5%
Penn Township	106	4.7%
Pennsbury Township	65	4.6%

Table 4.3.11-3 Housing Units Built Prior to 1940 by Municipality (U.S. Census, 2023)

MUNICIPALITY	UNITS	PERCENT OF TOTAL UNITS
Phoenixville Borough	2,633	28.1%
Pocopson Township	116	10.4%
Sadsbury Township	176	10.5%
Schuylkill Township	352	11.1%
South Coatesville Borough	210	27.5%
South Coventry Township	116	10.5%
Spring City Borough	1,044	49.9%
Thornbury Township	49	4.2%
Tredyffrin Township	1,089	8.4%
Upper Oxford Township	173	19.9%
Upper Uwchlan Township	60	1.4%
Uwchlan Township	297	3.8%
Valley Township	514	17.1%
Wallace Township	217	17.8%
Warwick Township	335	30.6%
West Bradford Township	353	6.9%
West Brandywine Township	208	6.9%
West Caln Township	223	6.5%
West Chester Borough	2,934	39.8%
West Fallowfield Township	141	16.4%
West Goshen Township	638	6.7%
West Grove Borough	276	29.6%
West Marlborough Township	243	52.9%
West Nantmeal Township	173	21.8%
West Nottingham Township	196	17.1%
West Pikeland Township	92	6.6%
West Sadsbury Township	115	13.4%
Westtown Township	197	7.9%
West Vincent Township	281	3.4%
West Whiteland Township	303	6.9%
Willistown Township	308	6.8%

As all structures and infrastructure in Chester County will be exposed to heavy snow and ice, all of Chester County has adopted the 2018 IBC and IRC building codes. New construction will be able to withstand the weight of heavy snow or ice.

4.3.11.6. Equity in Vulnerable Communities

During winter storms there will be a disproportionate impact on low-income and marginalized communities. Low-income families are more likely to live in poorly insulated or older homes that are less able to withstand extreme cold. These homes may lack sufficient heating, insulation, and weatherproofing, making them more

vulnerable to damage from ice, snow, and cold temperatures. Many low-income households also experience energy insecurity and may struggle to afford heating during winter months. Energy shutoffs due to unpaid bills can leave them dangerously exposed to cold weather. This includes West Chester Borough, City of Coatesville, and Oxford Borough as they have areas with the highest percentage of population below the poverty level. Elderly households or households with people with disabilities may also face additional challenges due to mobility issues. Icy conditions, snow buildup, and impassable roads or sidewalks can prevent them from leaving their homes. East Goshen Township, Kennett Township, West Brandywine Township, and Willistown Township are home to census tracts where over one-third of the population is aged 65 or older. The City of Coatesville and Spring City Borough have census tracts where more than 20 percent of the population has a disability.

4.3.12. Cyber Terrorism

4.3.12.1. Location and Extent



Cyber terrorism is a broad term that refers to acts associated with the convergence of terrorism and cyberspace. Generally, cyberterrorism involves unlawful attacks or threats against computers, networks, and the information stored therein to intimidate or coerce a government or its people to achieve political or social objectives (Denning, 2000). These acts can range from taking control of a host website to using networked resources to directly cause destruction and harm. Table 4.3.15-1 includes the types and methods of cyberattacks as defined by the Pennsylvania Security.

Table 4.3.12-1 Methods Of Cyberattacks (PA OHS, 2022)

THREAT	DESCRIPTION
Botnet (also zombies)	A collection of computers subject to control by an outside party, usually without the knowledge of the owners, using secretly installed software robots. The robots are spread by trojan horses and viruses. The botnets can be used to launch denial-of-service attacks and transmit spam.
Card skimming	The act of using a skimmer to illegally collect data from the magnetic stripe of a credit, debit or atm card. This information, copied onto another blank card's magnetic stripe, is then used by an identity thief to make purchases or withdraw cash in the name of the actual account holder. Skimming can take place at an atm and can occur at restaurants, taxis, or other places where a user surrenders his or her card to an employee.
Denial-of-service attack	Flooding the networks or servers of individuals or organizations with false data requests so they are unable to respond to requests from legitimate users.
Malicious code (also Malware)	Any code that can be used to attack a computer by spreading viruses, crashing networks, gathering intelligence, corrupting data, distributing misinformation and interfering with normal operations.
Pharming	A cyberattack that redirects website traffic to a fake website by installing malicious code on a victim's computer or by exploiting vulnerabilities in DNS servers. Unlike phishing, pharming does not rely on tricking users into clicking links; instead, it manipulates DNS settings or the computer's hosts file so that users are automatically redirected to fraudulent websites even when they enter the correct web address. This allows attackers to steal personal information such as passwords, credit card numbers, and bank account details.
Phishing	Using fake e-mails to trick individuals into revealing personal information, such as social security numbers, debit and credit card account numbers and passwords, for nefarious uses.
Spam	Unsolicited bulk e-mails that may contain malicious software. Spam is now said to account for around 81 percent of all e-mail traffic.
Spear phishing	A type of phishing attack that focuses on a single user or department within an organization, addressed from someone within the company in a

Table 4.3.12-1 Methods Of Cyberattacks (PA OHS, 2022)

THREAT	DESCRIPTION
	position of trust and requesting information such as login ids and passwords. Spear phishing scams will often appear to be from a company's own human resources or technical support divisions and may ask employees to update their username and passwords. Once hackers get this data, they can gain entry into secured networks. Another type of spear phishing attack will ask users to click on a link, which deploys spyware that can thieve data.
Spoofing	Making a message or transaction appear to come from a source other than the originator.
Spyware	Software that collects information without a user`s knowledge and transfers it to a third party.
Trojan horse	A destructive program that masquerades as a benign application. Unlike viruses, trojan horses do not replicate themselves, but they can be just as destructive. One of the most insidious types of trojan horse is a program that claims to rid your computer of viruses but instead introduces viruses onto your computer.
Virus	A program designed to degrade service, cause inexplicable symptoms or damage networks.
Worm	Program or algorithm that replicates itself over a computer network and usually performs malicious actions, such as using up the computer's resources and possibly shutting the system down. A worm, unlike a virus, has the capability to travel without human action and does not need to be attached to another file or program.

Cyberattacks may not always constitute acts of cyberterrorism because some acts may have relatively small impacts and only produce annoyances. A cyberattack is generally considered an act of cyberterrorism when the following motivations are present:

- Effects-based: When computer attacks result in effects that are disruptive enough to generate fear comparable to a traditional act of terrorism.
- Intent-based: When unlawful or politically motivated computer attacks are committed to intimidate or coerce a government or people to further a political objective, or to cause grave harm or severe economic damage (Rollins and Wilson, 2007).

Cyberattacks can be further divided into the following categories based on the complexity of the attack:

- Simple-Unstructured: Simple-unstructured attacks are the most common. These are amateurish attacks with relatively minimal consequences.
- Advanced-Structured: Advanced-structured attacks are more sophisticated and consequential and have a greater emphasis on targeting victims prior to an attack, resulting in a more debilitating effect.

- Complex-Coordinated: Complex-coordinated attacks are the most advanced and most troublesome type of attacks where success could mean a network shutdown (Denning, 2000).

Cyber terrorism can cause severe disruptions to transportation, public safety, and utility services, all of which are critical infrastructure that are highly dependent on information technology. Cyber terrorism can take many forms, including attacks through physical means, electronic means, and use of malicious code. Cyber terrorists can also have a wide range of personal, political, or cultural agendas. All county departments, as well as individuals, businesses, and other institutions in Chester County, are potential targets for cyberterrorism. Potential threats include identity theft, loss of sensitive information, disruption of services, and other malicious activity.

Cyber terrorists can be difficult to identify because the internet provides a meeting place for individuals from various parts of the world. Individuals or groups planning a cyber-attack are not organized in a traditional manner, as they are able to effectively communicate over long distances without delay. Cyberattacks are also unpredictable and typically occur without warning.

4.3.12.2. Range of Magnitude

In recent years, cyber terrorism has become a significant threat and can impact people, businesses, institutions, local governments, and county and state agencies to varying degrees. Impacts from a large-scale cyberterrorism event could disrupt the county's economy and potentially threaten its economic stability. The magnitude of a cyber terrorism attack will vary greatly based on the extent of systems affected and duration of the impact. Additionally, the magnitude will vary based upon which specific system is affected by an attack, the ability to preempt an attack, and an attack's effect on continuity of operations. The largest threat to institutions from cyber terrorism comes from any processes that are networked and controlled via computer. The county and individual municipalities should address and take measures to reduce any vulnerabilities that could allow access to sensitive data or processes. In addition, attacks on institutions or organizations outside of the county or even the state can impact residents, businesses, and government services.

The potential impacts of cyberterrorism on community lifelines are as follows:

Table 4.3.12-2 Most Likely Lifelines Impacted by Cyberterrorism

Lifelines	Notes

	Community safety may be threatened. Any government service can be targeted by cyberterrorism activities.
	Energy infrastructure may be a target for cyberterrorism activities.
	Hazardous materials facilities and operations may be targets for cyber terrorists.

4.3.12.3. Past Occurrence

A malware attack occurred in February 2019 on the Chester County government. As a result, various online services for the county were unavailable, including dispatch services leading to an increase in use of the radio system. No county information was accessed or compromised and essential county services (i.e., 9-1-1 operations, emergency communications, etc.) were not affected. Outside cybersecurity consultants were hired to work with the Chester County's Department of Computing and Information Services to resolve the issues (Heinze, 2019).

In late 2024, Chester County Probation/parole and Pretrial Services was targeted by a cyber-attack that impacted 8,281 individuals. This office is responsible for overseeing probation and parole services, ensuring that individuals comply with the terms of their release, and supporting the judicial process in Chester County. The breach was characterized by an inadvertent disclosure of personal information. The office notified those impacted, and identify theft protection services were offered, including a 12-month subscription to Experian's credit monitoring, identify theft detection and restoration, and identify theft insurance (SLF, 2025).

Chester County has also been impacted by statewide and/international cyber-attacks. A large-scale attack was the Equifax data breach in 2017, which was estimated to potentially impact over 5.5 million residents of Pennsylvania and over 145.5 million nationally. The information accessed included names, Social Security numbers, birthdates, addresses, and driver's license numbers (PA Office of the Attorney General, 2017). Additionally, in 2013 all 3 billion Yahoo user accounts that existed at that time were compromised: user names, email addresses, phone numbers, birth dates, hashed passwords and both encrypted and unencrypted security questions and answers were breached(Yahoo 2016). In terms of a data breach cyber-attack, this could be considered

a worst-case scenario event. Large-scale data breach events are becoming more common.

Attacks on state-level systems have also occurred recently; these impacted residents across Pennsylvania, including Chester County. In February 2024, the Administrative Office of Pennsylvania Courts was the victim of a denial-of-service attack on their website. The attack did not compromise any data or stop the courts from operating, but state Supreme Court Chief Justice Debra Todd noted it was still "significant and serious" (Levy, 2024). In January 2025, Conduent State & Local Solutions, Inc. experienced disruption due to a cyberattack. The company is contracted by the Pennsylvania Department of Human Services to handle collection and disbursement of child support, and the attack caused a delay in payments. The estimated impact was a delay of $27 million in payments for 121,000 families. No data was compromised, and the payments were eventually sent once operations resumed (Scicchitano, 2025). In August 2025, the PA Office of Attorney General was victim to a ransomware attack. The attack impeded several agency functions, including access to archived emails, files, and systems that are essential for pursuing cases. The interruption was caused by an outsider encrypting files in an effort to force the office to make a payment to restore operations, but this ransom was not paid. Initially, the attack took down communications systems, but most of the offices 1,200 staff members regained access to email shortly after the attack (Greig, 2025).

In addition to large-scale acts of cyber terrorism, smaller cyberattacks occur daily. Billions of emails are sent each day, and spam and phishing emails account for a significant share of all email traffic. Additionally, brute force attacks, which are trial and error attempts to obtain user passwords and pins, are frequently used by criminals attempting to crack encrypted data or gain access to private accounts. Firewalls can be effective at keeping security threats such as these out, but once a cybercriminal gains access to a system, they can attack from within. For example, gaining access to a County employee's email account would allow a hacker to send additional phishing emails from within a network, which may not be as monitored as closely as attacks from outside the system. This is known as spear phishing.

4.3.12.4. Future Occurrence

Cyber terrorism is an emerging hazard that has the potential to impact the county's computer infrastructure and the systems and services that are provided to the public. Concerns about cyberterrorism throughout the United States is growing as its impacts could have potentially crippling effects. Security experts describe the threat of cyberterrorism as imminent. The future occurrence of cyberterrorism can be considered

possible as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1).

4.3.12.5. Vulnerability Assessment

Generally, cyber terrorism has no direct effect on the environment; however, the environment may be affected if a hazardous materials release occurred because of critical infrastructure failure as a result of cyber terrorism. Similarly, an act of cyber terrorism on a nuclear facility could have devastating environmental consequences if the plant suffered an intentional catastrophic failure. See Section 4.3.19 for more information on Hazardous Materials Release.

All county and municipal facilities are vulnerable to cyber terrorism. While the physical structures of these buildings are generally not at risk, information systems and data stored within them are vulnerable. Government computer networks contain sensitive information that is integral to the security of the County and municipalities and could be the target of a cyberattack. County and municipal governments may possess and maintain forms of personal and financial information, including tax filings, birth and death records, Social Security numbers, medical information, and more. Additionally, many critical facilities that are essential to Chester County operations are reliant upon computer networks to monitor and control critical functions. For example, an attack on internet access or the power grid could have detrimental impacts on County services and functions. Additionally, a large-scale computer breach could lead to economic costs in lost productivity to the impacted agency/organization and potentially related businesses and industries. Lost revenues and productivity would depend on the type of magnitude of the cyber terrorism event.

All communities in Chester County are vulnerable on some level, directly or indirectly, to a cyber terrorism attack. However, in general, areas with higher concentrations of government or industry facilities may have a higher risk. Additionally, areas with higher concentrations of people, businesses, and critical infrastructure may be at higher risk.

4.3.12.6. Equity in Vulnerable Communities

Households with those 65 or older may be more susceptible to cyber-attacks as older adults have lower levels of digital literacy compared to younger generations. This makes them more susceptible to scams, phishing, and other forms of cybercrime. East Goshen Township, Kennett Township, West Brandywine Township, and Willistown Township are home to census tracts where over one-third of the population is aged 65 or older. People in low-income or marginalized communities often have less access to education and resources on cybersecurity. These communities may not be able to afford the most up to date technology or cybersecurity tools, such as firewalls, antivirus, or secure home networks leaving them more exposed to cyber threats. West Chester Borough, the City

of Coatesville, and Oxford Borough have areas with the highest percentages of population below the poverty level and may require additional outreach and education efforts.

Human-Made Hazards

4.3.13. Dam Failure

Due to data sensitivity, the Dam Failure profile can be found in Appendix G.



4.3.14. Environmental Hazards – Gas and Liquid Pipelines

4.3.14.1. Location and Extent



Pipelines are a vital component of the nation's infrastructure that transport two of the materials most essential to daily life – water and energy products. This profile addresses the risks posed by the gas and liquid pipeline systems that move energy products in Pennsylvania and across Chester County. Pipeline systems are defined by federal regulations as all parts of a pipeline facility through which a hazardous liquid or gas moves, including piping, valves, pumps or compressors, metering and delivery stations, and storage and breakout tanks. Although pipelines are typically located underground, they may also be located aboveground when dictated by operational considerations (such as connections to pump and compressor stations) or environmental conditions (such as geological characteristics) (FEMA, 2015).

Natural gas pipelines are the most common type of pipeline in the United States and serve to transport natural gas from the point of production to the point of use. Three major types of pipelines move natural gas: gathering lines, transmission lines, and distribution lines. Gathering lines are pipelines that move natural gas from the production well to a processing facility. Gas transmission lines are the large pipelines (6 to 48 inches in diameter) that move natural gas from the processing facility to local distribution networks. Gas transmission lines are designed to transport natural gas long distances at high pressures (often 200 – 1,500 psi). There are approximately 300,000 miles of gas transmission pipelines in the United States. Gas distribution lines are the smaller gas mains and service lines (1/2 to 2 inches in diameter) that move natural gas from the transmission network directly to homes and businesses. Gas distribution pipelines are designed to transport natural gas shorter distances at relatively low pressures. There are approximately 2.35 million miles of gas distribution lines in the United States (PHMSA, 2023).

Liquid petroleum pipelines are the second most common type of pipeline in the United States, and serve to transport crude oil, refined product, and highly volatile liquids (HVLs) to local distribution networks. For crude oil and its refined products, there are

three major types of pipelines that move the product from producing areas to local distribution networks: gathering lines, transmission lines, and refined product lines. Gathering lines are the smaller pipelines (2 to 8 inches in diameter) that gather crude oil from production wells. Crude oil transmission lines are the larger, cross-country pipelines that transport crude oil and refined products from production sites or refineries to markets. Refined product pipelines transport fuels from refineries to end-use markets and distribution terminals. Last-mile delivery to consumers is often made by tanker trucks from these terminals.

Based on past occurrences, pipeline incidents within Chester County have been accidental and have not been considered terrorist or criminal acts. While past occurrences have not been deemed intentional, an intentional release of any of these products in large quantity would pose a threat to the local population, economy, and environment resulting in lost revenue, injuries, and deaths. Chester County is home to nearly 600 linear miles of pipelines. Many of the pipelines have been in place for decades; more recently, the construction of new lines and upgrades to existing lines have increased. The county's large agricultural areas increase vulnerability to pipeline accidents.

In 2013, the Chester County Planning Commission created the Pipeline Information Center (PIC) to inform community members of all pipeline issues, pipeline safety, the new pipeline review process, and the latest information on pipeline project activity within the county (Chester County Planning Commission, n.d.). Active pipeline projects in the county include the Mariner East 2 project that carries natural gas, ethane, and propane; 2017 Expansion Project; Northeast Supply Enhancement Project; Greater Philadelphia Expansion Project; and Adelphia Gateway, all of which transport natural gas.

Figure 4.1.14-1 shows pipelines in Chester County. Almost all municipalities in Chester County are intersected by pipelines. Municipalities not intersected by pipelines are Avondale Borough, East Nottingham Township, Honey Brook Borough, Kennett Square Borough, London Grove Township, Malvern Borough, Modena Borough, Oxford Borough, South Coatesville Borough, West Chester Borough, West Fallowfield Township, West Grove Borough, and West Nottingham Township.

Figure 4.1.14-2 shows pipeline locations along with areas of carbonate rocks near the land surface. This is important to visualize as these areas are more susceptible to subsidence or sinkholes, which can lead to pipeline damage and potential releases.

Figure 4.3.14-1 Pipelines in Chester County

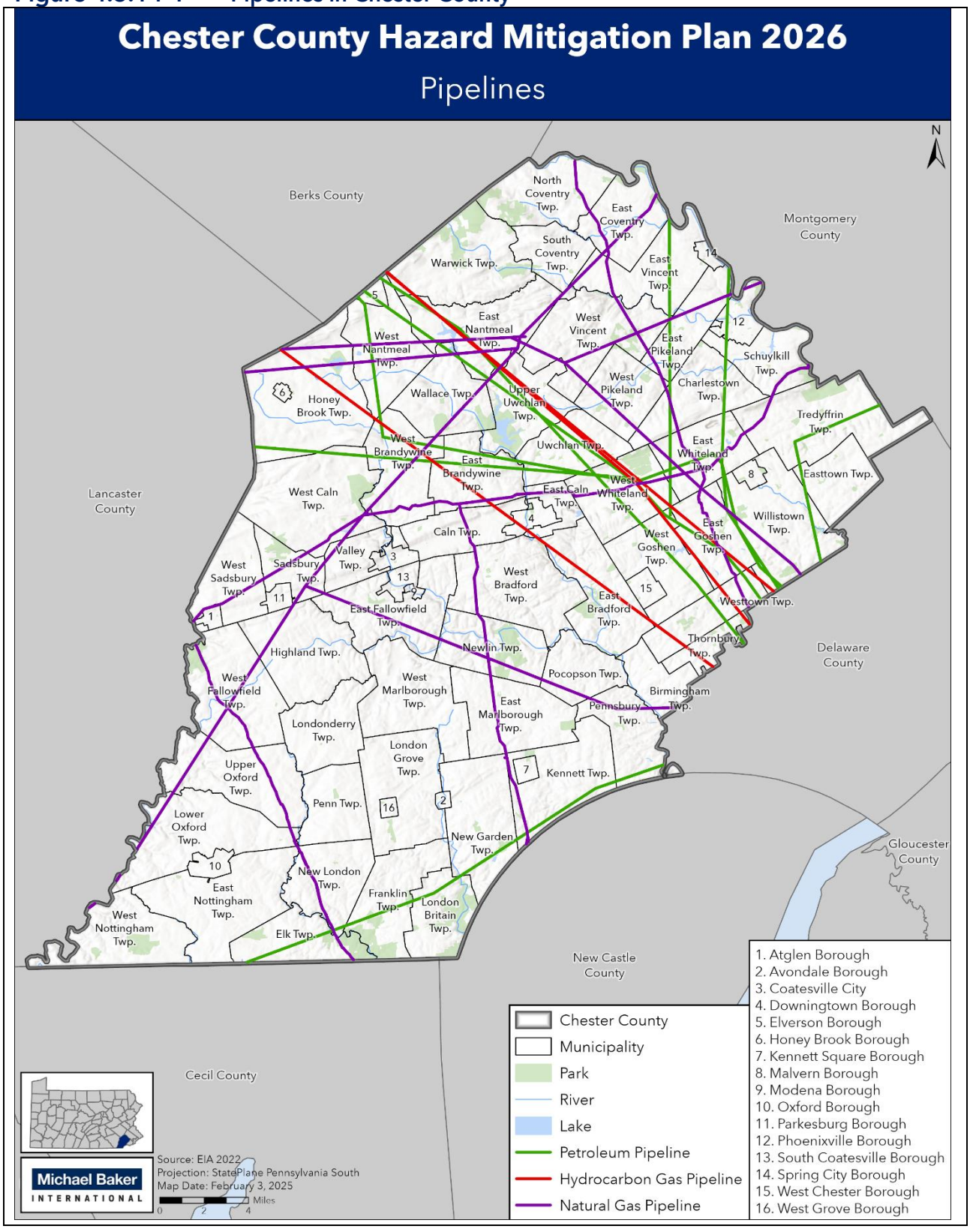
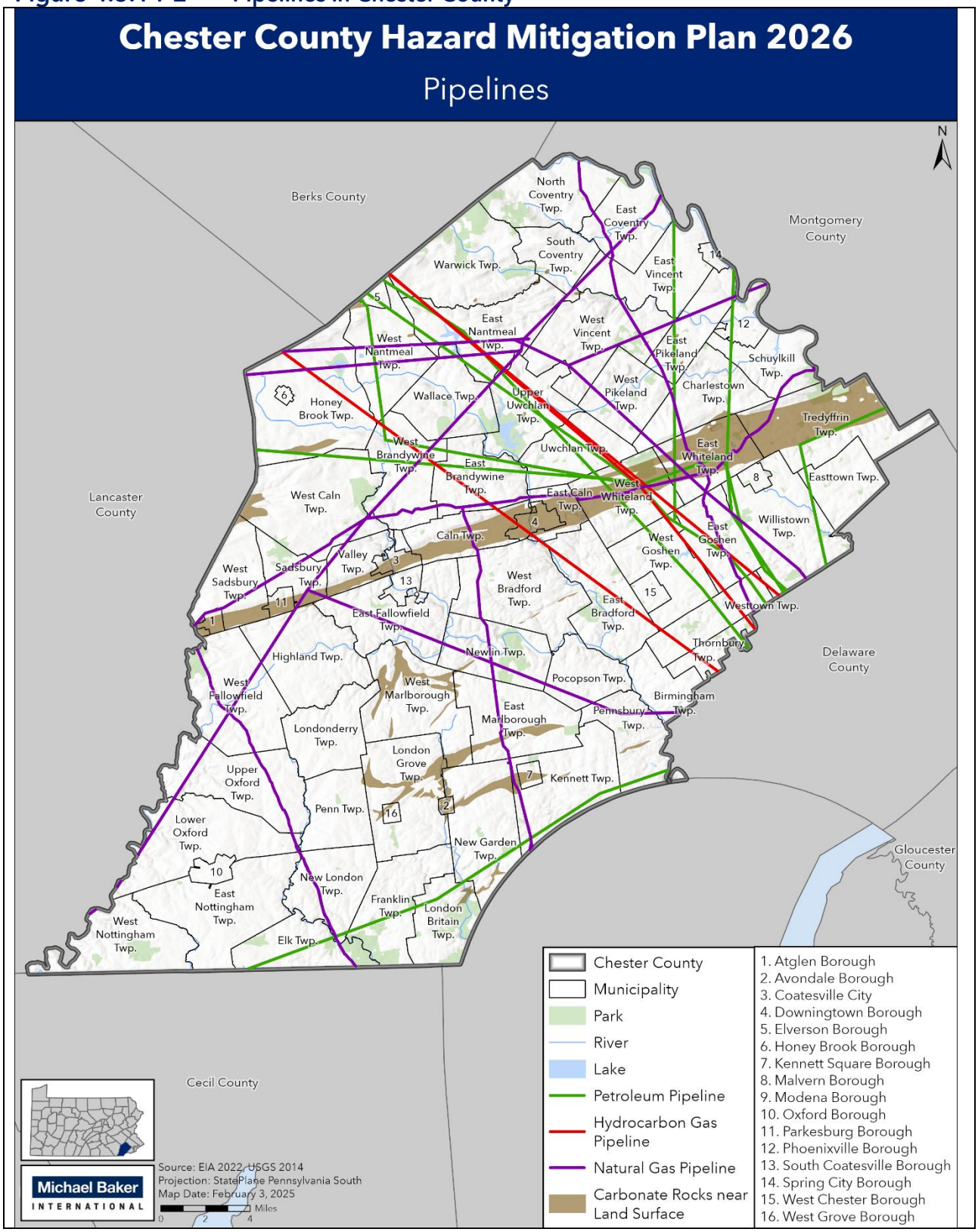


Figure 4.3.14-2 Pipelines in Chester County



4.3.14.2. Range of Magnitude

The Pipeline and Hazardous Materials Safety Administration (PHMSA) classifies pipeline incidents into the following categories: Gas Distribution, Gas Gathering, Gas Transmission, and Liquefied Natural Gas (LNG). Pipeline incidents within Chester County can range from minor leaks to a large explosion that could lead to loss of life and damage to property, the environment, and the economy. Severity of an incident varies depending on the type of material released, and distance and related response time for emergency response teams. Areas closest to the release sites are generally at the greatest risk; however, depending on the material, a release can travel great distances or persist over a long period of time resulting in far-reaching effects on people and the environment.

Understanding pipeline threats and hazards begins with understanding the physical and chemical properties of the products in the pipeline. Natural gas is a clean-burning fuel that consists mostly of methane (94 percent) and ethane (2 percent). Some relevant characteristics of natural gas are summarized below:

- Although natural gas is nontoxic, it can cause asphyxiation if released in an enclosed area.
- Natural gas is combustible and natural gas fires produce large amounts of radiant heat.
- If an ignition source exists, natural gas releases can result in a sudden fire or explosion near the point of release. Once the release ends, however, the hazard declines very quickly as the gas disperses.
- If natural gas migrates into a building and accumulates inside, the hazard can persist for longer.

Liquid petroleum pipelines can carry many different crude oil and refined petroleum products with widely varying physical and chemical properties. Many of these products can spread over land and water, flowing into valleys, ravines, and waterways. Relevant characteristics of some liquid petroleum products are summarized below:

- Most crude oils are heavier and less toxic than refined petroleum products, and do not penetrate porous surfaces such as soil and sand. Because these products do not evaporate and tend to adhere to surfaces, however, they remain in the environment longer than refined products. Oil spills may take weeks, months, or even years to clean up.
- Most refined petroleum products are highly fluid, spread quickly over land or water surfaces, and penetrate porous surfaces. These products are usually flammable, and their volatile components can burn the eyes and skin and irritate the nose, eyes, and mouth. Because these products have a high evaporation rate

and generally do not adhere to surfaces, they are easier to clean up. Refined petroleum products also produce vapors that are heavier than air. These vapors will collect in low areas.

- Highly volatile liquids are lighter than air and will form a vapor cloud when released to the atmosphere.
- Anhydrous ammonia is a highly volatile liquid that is particularly toxic and corrosive. It is typically transported under pressure as liquefied gas and rapidly expands when released.

In some cases, natural hazard events can cause pipeline failures and/or complicate emergency response activities. When a pipeline failure occurs during a natural disaster, access to the pipeline may be restricted, waterlines for fire suppression may be compromised, and response personnel and resources may be limited. In addition, the potential threat of a pipeline failure can be amplified by natural hazard events that are accompanied by winds, thunderstorms, or floods. These conditions can spread contamination more quickly and exacerbate the threat to local water supplies, air quality, soil, and agriculture. Other natural hazard events that can lead to pipeline failure include earthquakes, land subsidence, avalanches, lightning, fires, and severe winter storms (FEMA, 1997).

Several exacerbating or mitigating circumstances can affect the severity of a pipeline failure. Exacerbating circumstances can include weather conditions, the micro-meteorological effects of buildings and terrain, and lack of code compliance or maintenance. 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 pipelines and surrounding buildings. Mitigating circumstances include precautionary measures taken in advance to reduce the impact of a release on the surrounding environment. After a release, primary and secondary containment or shielding by sheltering-in-place can help protect people and property.

The worst-case scenario would be a large, uncontrolled release of toxic gas or liquid from a pipeline or pump station within a densely populated area. Physical property damage to private wells and public water systems is likely from this type of event, the potential for injury and death to people up to 0.25 mile from the scene is significant. This type of event would likely overwhelm the medical care capacity within the county, and possibly the region. Businesses nearby could close, and households could potentially be displaced.

Many factors determine the magnitude of the hazard posed by pipeline failures, including the chemicals released, the failure mode of the pipeline, the operating conditions of the pipeline at the time of the incident, and the characteristics of the surrounding area. Impacts to life and property can result from inhalation or ingestion of toxins, exposure to a fire or explosion, or exposure to contaminated soils or drinking water (FEMA, 2015). These impacts may include:

- Serious injuries or fatalities;
- Damage to buildings and infrastructure;
- Disruptions and closures to critical infrastructure and services, including transportation routes and emergency medical services;
- Residential, commercial, and industrial energy supply losses;
- Disruption of local businesses and regional economies; and
- Displacement of residential communities or businesses.

The potential impacts of gas and liquid pipelines on community lifelines are as follows:

Table 4.3.14-1 Most Likely Lifelines Impacted by Pipeline Incidents

LIFELINES	NOTES
	Fire departments may be called into response and recovery efforts if leaks or other issues result in explosions and fires.
	Environmental contamination from pipelines can impact agricultural operations and water supplies. Supply chains may also be impacted if there are disruptions to transportation infrastructure.
	Environmental impacts from pipelines could adversely impact communities, leading to more strain on the local healthcare system.
	Pipelines play an important role in energy production and distribution. Issues with pipelines may lead to additional challenges with energy production and availability.

4.3.14.3. Past Occurrence

Pipeline incidents have occurred in Chester County. For most incidents, municipal police departments and county emergency dispatchers are contacted for emergency response. The county's Hazardous Materials Response Team is contacted for technical advice about addressing the hazardous material. Between 2005 and 2024, a total of 268 pipeline incidents occurred in Pennsylvania, resulting in 20 fatalities, 39 injuries, and $227,451,860 in damages in the state of Pennsylvania (PHMSA, 2025).

One significant incident took place in West Whiteland and Uwchlan Townships in July 2017, where several households complained about access to their private well water being interrupted or being cloudy. Sunoco Pipeline LP suspended installation of its contentious Mariner East 2 underground pipeline near Exton. Some families had to stay in hotels for the rest of the week, and several families were provided with bottled water. Local officials suspected that non-toxic bentonite clay used as a lubricant during the horizontal-drilling process may have migrated into private wells (Maykuth, 2017).

In June 2018, Sunoco pipeline spilled 33,500 gallons of gas into Darby Creek. Sunoco installed a new 12-inch line that would temporarily carry gas liquids, which was the same line that leaked gasoline in a creek near Philadelphia International Airport. The company said the stretch of pipeline that was converted runs about 25 miles between Wallace and Middletown Townships (Hurdle, 2018).

Another significant incident occurred in West Goshen Township on August 5, 2019, when there was an explosion at a pump station. Pipeline experts state vapor buildup likely led to the explosion at a Sunoco Pipeline pump station. Independent pipeline experts say the explosion appeared to have been caused by relighting a pilot in a flare for burning off excess gases at a time when vapor had accumulated. In a report developed for the township, responders concluded that Sunoco exceeded federal safety requirements in the plans for the pumping station. Local residents reported that the explosion shook their house (Hurdle, 2019).

During the construction of the Mariner East 2 pipeline in 2020, a plume of around 8,000 gallons of drilling fluid and mud ran into Marsh Creek Lake, north of Downingtown. Sunoco's parent company, Energy Transfer LP, were criminally charged in 2021 due to this incident along with a documented history of drilling-fluid leaks, the use of unapproved additives, and failure to report incidents. These events occurred during the construction of the pipeline, not during its operation (Kummer, 2024).

While it did not directly lead to a pipeline incident, a sinkhole opened near the Mariner East pipeline in West Whiteland Township in July 2023. Similar events occurred during the pipelines construction in March 2018. The Pennsylvania Utility Commission ordered

a temporary shutdown of the pipeline in 2018 due to the potential catastrophic effects of a leak. The sinkhole discovered in July 2023 was backfilled and repaired. Residents in the county continue to be concerned about the pipeline, sinkholes, and potential leaks and damage (Phillips, 2023).

Pennsylvania has a long history of oil and gas well drilling and transportation and, though relatively infrequent, many accidents and incidents have occurred related to the extraction and transportation of these natural resources. No comprehensive list of oil and gas related incidents exists at the county level. The hazards associated with each incident vary widely and encompass damages including serious injury, explosion, fire, and water contamination.

Other prior year incident information for Pennsylvania can be found on the Pennsylvania Emergency Management Association website. The Pennsylvania Hazardous Material Emergency Planning and Response Act 1990-165 2021 Annual Report, the latest available, states there was one "Natural Gas Release" incident and 3 "Pipeline Breaks" in Chester County in 2021 (PEMA, 2021).

Chester County Planning Commission compiles news articles related to pipeline activities in the county and region at https://www.chescoplanning.org/pic/news.cfm. Articles include updates to repair work, planned construction, fines or violations, and opportunities for public involvement.

4.3.14.4. Future Occurrence

While many pipeline break incidents have occurred in Pennsylvania in the past, they are generally considered difficult to predict, especially within the boundaries of a county. An occurrence is largely dependent upon the accidental or intentional actions of a person or group. It is difficult to predict when and where environmental hazards related to gas pipelines will arise as they are often related to equipment failure and human error. Adequate monitoring through the DEP will reduce the likelihood of potential impacts to the community and to the environment. Overall, the probability of future environmental hazards events is *likely* as defined by the Risk Factor Methodology (See Section 4.4.1-1).

4.3.14.5. Vulnerability Assessment

The public survey for this HMP revealed widespread concern about a lack of knowledge about how to respond during a pipeline incident. Multiple respondents expressed uncertainty about the appropriate actions to take, with some fearing they might make the wrong decision, such as sheltering in place when evacuation is necessary. This feedback underscores the urgent need for targeted public education on pipeline safety.

Clear, scenario-specific guidance can empower residents to respond appropriately and confidently, ultimately reducing the potential for injury or loss during such emergencies.

Table 4.3.14-4 lists the total structures vulnerable to a liquid or gas pipeline incident, defined by those located within 0.5 miles of a pipeline. East Goshen Township (5,078 structures), West Goshen Township (3,909), West Whiteland Township (3,792), and Uwchlan Township (3,668) have the highest numbers of structures at risk. Elverson Borough and East Goshen Township have the largest shares of structures at risk, 93% and 90% respectively. There are 14 municipalities with at least 50% of their structures at risk, and 12 municipalities with no structures at risk.

Table 4.3.14-2 Structures Vulnerable to Pipelines

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES IN PIPELINE HAZARD AREA	PERCENT STRUCTURES IN PIPELINE HAZARD AREA
Atglen Borough	577	197	34%
Avondale Borough	405	0	0%
Birmingham Township	1,624	131	8%
Caln Township	4,701	1,494	32%
Charlestown Township	2,266	797	35%
Coatesville City	2,732	0	0%
Downingtown Borough	2,291	986	43%
East Bradford Township	3,658	1,223	33%
East Brandywine Township	3,683	2,891	78%
East Caln Township	1,269	852	67%
East Coventry Township	3,563	1,398	39%
East Fallowfield Township	3,944	1,142	29%
East Goshen Township	5,665	5,078	90%
East Marlborough Township	3,571	522	15%
East Nantmeal Township	1,508	962	64%
East Nottingham Township	4,885	0	0%
East Pikeland Township	3,552	1,755	49%
Easttown Township	3,727	1,283	34%
East Vincent Township	4,029	3,197	79%
East Whiteland Township	4,401	360	8%
Elk Township	1,367	576	42%
Elverson Borough	584	544	93%
Franklin Township	2,456	448	18%
Highland Township	1,307	194	15%
Honey Brook Borough	732	0	0%

Table 4.3.14-2 Structures Vulnerable to Pipelines

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES IN PIPELINE HAZARD AREA	PERCENT STRUCTURES IN PIPELINE HAZARD AREA
Honey Brook Township	4,909	1,982	40%
Kennett Township	1,751	247	14%
Kennett Square Borough	3,867	1,008	26%
London Britain Township	1,782	367	21%
Londonderry Township	4,078	0	0%
London Grove Township	1,692	0	0%
Lower Oxford Township	2,579	252	10%
Malvern Borough	1,066	4	0%
Modena Borough	201	0	0%
New Garden Township	5,451	1,186	22%
Newlin Township	2,921	599	21%
New London Township	1,193	500	42%
North Coventry Township	4,288	1,051	25%
Oxford Borough	1,704	0	0%
Parkesburg Borough	1,371	94	7%
Penn Township	2,901	1	0%
Pennsbury Township	1,712	629	37%
Phoenixville Borough	4,731	1,425	30%
Pocopson Township	1,757	384	22%
Sadsbury Township	1,987	1,485	75%
Schuylkill Township	4,096	946	23%
South Coatesville Borough	506	0	0%
South Coventry Township	1,653	165	10%
Spring City Borough	1,199	0	0%
Thornbury Township	1,060	541	51%
Tredyffrin Township	9,617	2,504	26%
Upper Oxford Township	2,109	765	36%
Upper Uwchlan Township	3,909	2,039	52%
Uwchlan Township	5,805	3,668	63%
Valley Township	2,926	340	12%
Wallace Township	2,065	566	27%
Warwick Township	2,192	79	4%
West Bradford Township	5,801	687	12%
West Brandywine Township	4,141	3,079	74%
West Caln Township	6,070	1,469	24%

Table 4.3.14-2 Structures Vulnerable to Pipelines

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES IN PIPELINE HAZARD AREA	PERCENT STRUCTURES IN PIPELINE HAZARD AREA
West Chester Borough	3,147	58	2%
West Fallowfield Township	2,226	641	29%
West Goshen Township	8,075	3,909	48%
West Grove Borough	964	0	0%
West Marlborough Township	983	0	0%
West Nantmeal Township	1,832	1,408	77%
West Nottingham Township	2,014	21	1%
West Pikeland Township	2,050	641	31%
West Sadsbury Township	1,915	365	19%
West Vincent Township	3,127	1,532	49%
West Whiteland Township	5,656	3,792	67%
Westtown Township	3,838	2,320	60%
Willistown Township	5,275	1,947	37%
Total	214,689	70,726	33%

Table 4.3.14-5 lists the structures in each municipality vulnerable to pipelines generalized by land use. The most vulnerable structure to the hazard is residential with 58,008 structures located near a pipeline. East Goshen has the most residential structures at risk with 4,317. West Whiteland Township has the most apartments at risk with 246. East Vincent Township has the most commercial structures at risk with 653. Honey Brook Township has the most farm-related structures at risk with 353.

Table 4.3.14-3 Structures Vulnerable to Pipeline Incidents by Land Use

MUNICIAPLITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Atglen Borough	1	17	5	4	3	166	0	1	**197**
Avondale Borough	0	0	0	0	0	0	0	0	**0**
Birmingham Township	0	1	0	8	0	121	1	0	**131**
Caln Township	8	89	50	13	5	1,325	4	0	**1,494**
Charlestown Township	0	24	26	119	22	602	1	3	**797**
Coatesville City	0	0	0	0	0	0	0	0	**0**
Downingtown Borough	33	81	84	0	1	786	1	0	**986**
East Bradford Township	0	22	49	53	0	1,088	0	11	**1,223**
East Brandywine Township	6	98	48	106	16	2,613	1	3	**2,891**
East Caln Township	18	133	32	0	7	659	1	2	**852**
East Coventry Township	4	171	14	73	8	1,125	3	0	**1,398**
East Fallowfield Township	5	40	35	94	0	967	0	1	**1,142**
East Goshen Township	105	532	55	51	12	4,317	4	2	**5,078**
East Marlborough Township	2	27	8	89	0	396	0	0	**522**
East Nantmeal Township	1	42	27	189	0	701	2	0	**962**
East Nottingham Township	0	0	0	0	0	0	0	0	**0**
East Pikeland Township	10	113	23	72	45	1,484	6	2	**1,755**
Easttown Township	0	40	40	164	0	1,032	4	3	**1,283**
East Vincent Township	75	653	99	2	83	2,276	7	2	**3,197**
East Whiteland Township	0	13	11	3	0	333	0	0	**360**
Elk Township	1	4	0	144	0	422	5	0	**576**
Elverson Borough	2	30	24	8	13	467	0	0	**544**
Franklin Township	10	14	6	35	0	380	0	3	**448**
Highland Township	0	3	6	62	0	123	0	0	**194**

Table 4.3.14-3 Structures Vulnerable to Pipeline Incidents by Land Use

MUNICIAPLITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Honey Brook Borough	0	0	0	0	0	0	0	0	**0**
Honey Brook Township	6	346	54	353	17	1,198	8	0	**1,982**
Kennett Township	2	21	0	0	0	224	0	0	**247**
Kennett Square Borough	0	83	39	56	3	802	23	2	**1,008**
London Britain Township	0	0	2	29	0	336	0	0	**367**
Londonderry Township	0	0	0	0	0	0	0	0	**0**
London Grove Township	0	0	0	0	0	0	0	0	**0**
Lower Oxford Township	0	0	31	65	0	155	0	1	**252**
Malvern Borough	0	0	0	0	0	4	0	0	**4**
Modena Borough	0	0	0	0	0	0	0	0	**0**
New Garden Township	11	140	8	19	1	1,004	1	2	**1,186**
Newlin Township	0	0	5	73	0	521	0	0	**599**
New London Township	0	18	1	170	0	311	0	0	**500**
North Coventry Township	40	75	46	38	0	849	2	1	**1,051**
Oxford Borough	0	0	0	0	0	0	0	0	**0**
Parkesburg Borough	0	4	1	4	0	85	0	0	**94**
Penn Township	0	0	0	0	0	1	0	0	**1**
Pennsbury Township	31	14	3	54	0	526	1	0	**629**
Phoenixville Borough	67	71	30	4	10	1,232	4	7	**1,425**
Pocopson Township	0	0	0	37	0	347	0	0	**384**
Sadsbury Township	11	182	39	47	12	1,187	3	4	**1,485**
Schuylkill Township	3	151	41	12	2	736	0	1	**946**
South Coatesville Borough	0	0	0	0	0	0	0	0	**0**
South Coventry Township	0	0	6	16	0	143	0	0	**165**

Table 4.3.14-3 Structures Vulnerable to Pipeline Incidents by Land Use

MUNICIAPLITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Spring City Borough	0	0	0	0	0	0	0	0	**0**
Thornbury Township	3	11	34	17	0	469	7	0	**541**
Tredyffrin Township	20	180	60	15	4	2,198	1	26	**2,504**
Upper Oxford Township	0	23	5	209	0	526	2	0	**765**
Upper Uwchlan Township	2	135	40	30	2	1,825	2	3	**2,039**
Uwchlan Township	128	216	88	8	6	3,213	4	5	**3,668**
Valley Township	2	34	28	0	0	276	0	0	**340**
Wallace Township	0	2	50	34	0	475	5	0	**566**
Warwick Township	4	9	0	8	0	58	0	0	**79**
West Bradford Township	0	2	4	18	0	663	0	0	**687**
West Brandywine Township	2	279	56	149	8	2,579	0	6	**3,079**
West Caln Township	0	189	46	99	29	1,105	1	0	**1,469**
West Chester Borough	0	0	1	0	0	57	0	0	**58**
West Fallowfield Township	0	57	11	251	53	268	1	0	**641**
West Goshen Township	78	234	80	0	23	3,485	3	6	**3,909**
West Grove Borough	0	0	0	0	0	0	0	0	**0**
West Marlborough Township	0	0	0	0	0	0	0	0	**0**
West Nantmeal Township	4	77	41	290	0	992	4	0	**1,408**
West Nottingham Township	0	4	0	10	0	7	0	0	**21**
West Pikeland Township	0	27	8	47	0	559	0	0	**641**
West Sadsbury Township	0	14	17	75	0	257	2	0	**365**
West Vincent Township	19	40	43	156	0	1,272	2	0	**1,532**
West Whiteland Township	246	401	117	0	32	2,984	4	8	**3,792**
Westtown Township	56	57	83	48	0	2,075	0	1	**2,320**

Table 4.3.14-3 Structures Vulnerable to Pipeline Incidents by Land Use

MUNICIAPLITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Willistown Township	7	40	34	240	2	1,621	3	0	**1,947**
Total	**1,023**	**5,283**	**1,794**	**3,970**	**419**	**58,008**	**123**	**106**	**70,726**

Table 4.3.14-6 lists the total critical facilities vulnerable to a liquid or gas pipeline incident, defined by those located within 0.5 miles of a pipeline. Municipalities that have the most critical facilities at risk are East Vincent Township and West Whiteland Township, both with 69 critical facilities at risk. They are the only municipalities with over 50 critical facilities at risk. The municipalities with the highest percentage of total critical facilities within 0.5 miles of a liquid or gas pipeline are Elverson Borough (100% of total critical facilities) and East Goshen Township (97%). There are 17 municipalities where at least 50% of their critical facilities are at risk, and 17 municipalities with no critical facilities at risk.

Table 4.3.14-4 Critical Facilities Vulnerable to Pipeline Incidents

MUNICIPALITY	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN PIPELINE HAZARD AREA	PERCENT CRITICAL FACILITIES IN PIPELINE HAZARD AREA
Atglen Borough	8	4	50%
Avondale Borough	5	0	0%
Birmingham Township	11	0	0%
Caln Township	57	21	37%
Charlestown Township	29	13	45%
Coatesville City	27	0	0%
Downingtown Borough	41	22	54%
East Bradford Township	43	10	23%
East Brandywine Township	49	42	86%
East Caln Township	28	12	43%
East Coventry Township	34	11	32%
East Fallowfield Township	26	2	8%
East Goshen Township	32	31	97%
East Marlborough Township	25	5	20%
East Nantmeal Township	16	10	63%
East Nottingham Township	36	0	0%
East Pikeland Township	23	13	57%
Easttown Township	28	6	21%
East Vincent Township	81	69	85%
East Whiteland Township	35	1	3%
Elk Township	12	3	25%
Elverson Borough	4	4	100%
Franklin Township	17	3	18%
Highland Township	15	2	13%
Honey Brook Borough	5	0	0%
Honey Brook Township	31	11	35%
Kennett Township	14	0	0%
Kennett Square Borough	44	17	39%
London Britain Township	13	4	31%

Table 4.3.14-4 Critical Facilities Vulnerable to Pipeline Incidents

MUNICIPALITY	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN PIPELINE HAZARD AREA	PERCENT CRITICAL FACILITIES IN PIPELINE HAZARD AREA
Londonderry Township	38	0	0%
London Grove Township	9	0	0%
Lower Oxford Township	36	5	14%
Malvern Borough	10	0	0%
Modena Borough	5	0	0%
New Garden Township	44	10	23%
Newlin Township	15	3	20%
New London Township	18	6	33%
North Coventry Township	37	17	46%
Oxford Borough	17	0	0%
Parkesburg Borough	15	2	13%
Penn Township	25	1	4%
Pennsbury Township	25	10	40%
Phoenixville Borough	32	6	19%
Pocopson Township	27	3	11%
Sadsbury Township	18	12	67%
Schuylkill Township	36	6	17%
South Coatesville Borough	6	0	0%
South Coventry Township	18	1	6%
Spring City Borough	6	0	0%
Thornbury Township	10	5	50%
Tredyffrin Township	139	39	28%
Upper Oxford Township	18	3	17%
Upper Uwchlan Township	27	19	70%
Uwchlan Township	42	33	79%
Valley Township	33	3	9%
Wallace Township	19	5	26%
Warwick Township	13	2	15%
West Bradford Township	33	4	12%
West Brandywine Township	30	15	50%
West Caln Township	20	7	35%
West Chester Borough	26	0	0%
West Fallowfield Township	21	3	14%
West Goshen Township	78	36	46%
West Grove Borough	6	0	0%
West Marlborough Township	21	0	0%
West Nantmeal Township	21	15	71%
West Nottingham Township	12	0	0%
West Pikeland Township	22	4	18%
West Sadsbury Township	16	5	31%

Table 4.3.14-4 Critical Facilities Vulnerable to Pipeline Incidents

MUNICIPALITY	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN PIPELINE HAZARD AREA	PERCENT CRITICAL FACILITIES IN PIPELINE HAZARD AREA
West Vincent Township	25	14	56%
West Whiteland Township	86	69	80%
Westtown Township	28	17	61%
Willistown Township	55	19	35%
Total	2,027	715	35%

Table 4.3.14-7 shows the populations vulnerable to a liquid or gas pipeline incident, defined by those located within 0.5 miles of a pipeline. Municipalities that have the most population at risk are East Goshen Township (16,219 people), West Whiteland Township (13,421), Uwchlan Township (12,589), West Goshen Township (12,106), and East Vincent Township (11,585). They are the only municipalities with over 7,500 people at risk. The municipalities with the highest percentage of population within 0.5 miles of a liquid or gas pipeline are Elverson Borough (96% of total population), East Goshen Township (88%), East Vincent Township (83%), and West Brandywine Township (80%). There are 13 municipalities where at least 50% of their population are at risk, and 13 municipalities with no population at risk.

Table 4.3.14-5 Population Vulnerable to Pipeline Incidents

MUNICIPALITY	TOTAL ESTIMATED 2020 POPULATION	TOTAL POPULATION IN PIPELINE HAZARD AREA	PERCENT POPULATION IN PIPELINE HAZARD AREA
Atglen Borough	1,313	437	33%
Avondale Borough	1,274	0	0%
Birmingham Township	4,082	386	9%
Caln Township	14,432	3,805	26%
Charlestown Township	6,001	2,040	34%
Coatesville City	13,350	0	0%
Downingtown Borough	7,892	3,291	42%
East Bradford Township	10,339	4,104	40%
East Brandywine Township	9,738	7,469	77%
East Caln Township	5,384	4,009	74%
East Coventry Township	7,068	2,010	28%
East Fallowfield Township	7,626	1,692	22%
East Goshen Township	18,410	16,219	88%
East Marlborough Township	7,306	718	10%
East Nantmeal Township	1,832	1,338	73%
East Nottingham Township	8,982	8	0%
East Pikeland Township	8,260	3,291	40%
Easttown Township	7,433	2,331	31%
East Vincent Township	13,917	11,585	83%
East Whiteland Township	10,984	1,257	11%
Elk Township	1,698	756	45%
Elverson Borough	1,330	1,273	96%
Franklin Township	4,433	993	22%
Highland Township	1,259	347	28%
Honey Brook Borough	1,892	0	0%
Honey Brook Township	8,274	2,754	33%
Kennett Township	5,936	911	15%
Kennett Square Borough	8,289	2,130	26%
London Britain Township	3,179	568	18%
Londonderry Township	8,797	0	0%
London Grove Township	2,476	0	0%
Lower Oxford Township	5,436	379	7%
Malvern Borough	3,419	0	0%
Modena Borough	541	0	0%
New Garden Township	11,363	2,062	18%
Newlin Township	5,810	1,034	18%
New London Township	1,358	595	44%

Table 4.3.14-5 Population Vulnerable to Pipeline Incidents

MUNICIPALITY	TOTAL ESTIMATED 2020 POPULATION	TOTAL POPULATION IN PIPELINE HAZARD AREA	PERCENT POPULATION IN PIPELINE HAZARD AREA
North Coventry Township	8,441	2,486	29%
Oxford Borough	5,736	0	0%
Parkesburg Borough	3,862	265	7%
Penn Township	5,644	0	0%
Pennsbury Township	3,876	1,178	30%
Phoenixville Borough	18,602	5,879	32%
Pocopson Township	4,455	740	17%
Sadsbury Township	4,125	2,632	64%
Schuylkill Township	8,780	1,752	20%
South Coatesville Borough	1,601	0	0%
South Coventry Township	2,796	124	4%
Spring City Borough	3,494	0	0%
Thornbury Township	3,177	1,047	33%
Tredyffrin Township	31,927	7,202	23%
Upper Oxford Township	2,560	949	37%
Upper Uwchlan Township	12,275	6,230	51%
Uwchlan Township	19,161	12,589	66%
Valley Township	7,985	1,399	18%
Wallace Township	3,711	706	19%
Warwick Township	2,590	144	6%
West Bradford Township	14,316	2,792	20%
West Brandywine Township	7,331	5,857	80%
West Caln Township	8,910	2,021	23%
West Chester Borough	18,671	65	0%
West Fallowfield Township	2,459	501	20%
West Goshen Township	23,040	12,106	53%
West Grove Borough	2,770	0	0%
West Marlborough Township	819	0	0%
West Nantmeal Township	2,251	1,504	67%
West Nottingham Township	2,748	31	1%
West Pikeland Township	4,024	1,123	28%
West Sadsbury Township	2,436	406	17%
West Vincent Township	6,668	2,987	45%
West Whiteland Township	19,632	13,421	68%
Westtown Township	11,154	6,997	63%
Willistown Township	11,273	4,950	44%

Table 4.3.14-5 Population Vulnerable to Pipeline Incidents

MUNICIPALITY	TOTAL ESTIMATED 2020 POPULATION	TOTAL POPULATION IN PIPELINE HAZARD AREA	PERCENT POPULATION IN PIPELINE HAZARD AREA
Total	**534,413**	**179,875**	**34%**

4.3.14.6. Equity in Vulnerable Communities

Equity considerations in gas and liquid pipelines emphasize ensuring that mitigation and preparedness actions address the unique needs of vulnerable populations. Communities near pipelines are at higher risk of leaks, spills, or explosions, yet they may lack the resources or infrastructure needed for effective emergency response. Pipelines are often in or near low-income and minority communities, indigenous lands, and rural areas. Pipelines also are oftentimes located in existing industrial areas, compounding potential impacts. Health impacts associated with pipelines include respiratory illnesses, cancers, and neurological impacts. Those with pre-existing health conditions or older homes may be more at risk due to associated contaminated air or water. In addition, West Fallowfield Township and Honey Brook Township have the highest concentration of people without health insurance. Preparedness efforts must include accessible emergency response plans, clear communication in multiple languages, and training programs tailored to local communities. Additionally, prioritizing regular maintenance, with a focus on areas where vulnerable populations live, is essential to mitigate harmful effects.

4.3.15. Environmental Hazards – Hazardous Materials Release

4.3.15.1. Location and Extent



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, and any materials that are explosive, corrosive, flammable, or radioactive. 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 soil.

Fixed-site facilities that use, manufacture, or store hazardous materials in Chester County pose significant 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, and the Commonwealth's reporting requirements under the Hazardous Materials Emergency Planning and Response Act (1990-165), as amended. These statutes 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, shall report to the county where the facility is located and the Commonwealth. These facilities are subject to the requirement of assisting the Local Emergency Planning Committee (LEPC) in the development of an Off-site Emergency Response Plan (EPA, 2020). The right-to-know reporting requirements keep communities abreast of the presence and release of chemicals at individual facilities. The EPA also tracks key information about chemicals handled by industrial facilities through its Toxics 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 and PEMA. In 2023, there were 1,047 tracked facilities on EPA's TRI in Pennsylvania, 31 of which are located in Chester County as shown in Figure 4.3.15-1 and listed in Table 4.3.15-1.

Figure 4.3.15-1 Location of Toxic Release Inventory (TRI) Facilities in Chester County, 2025

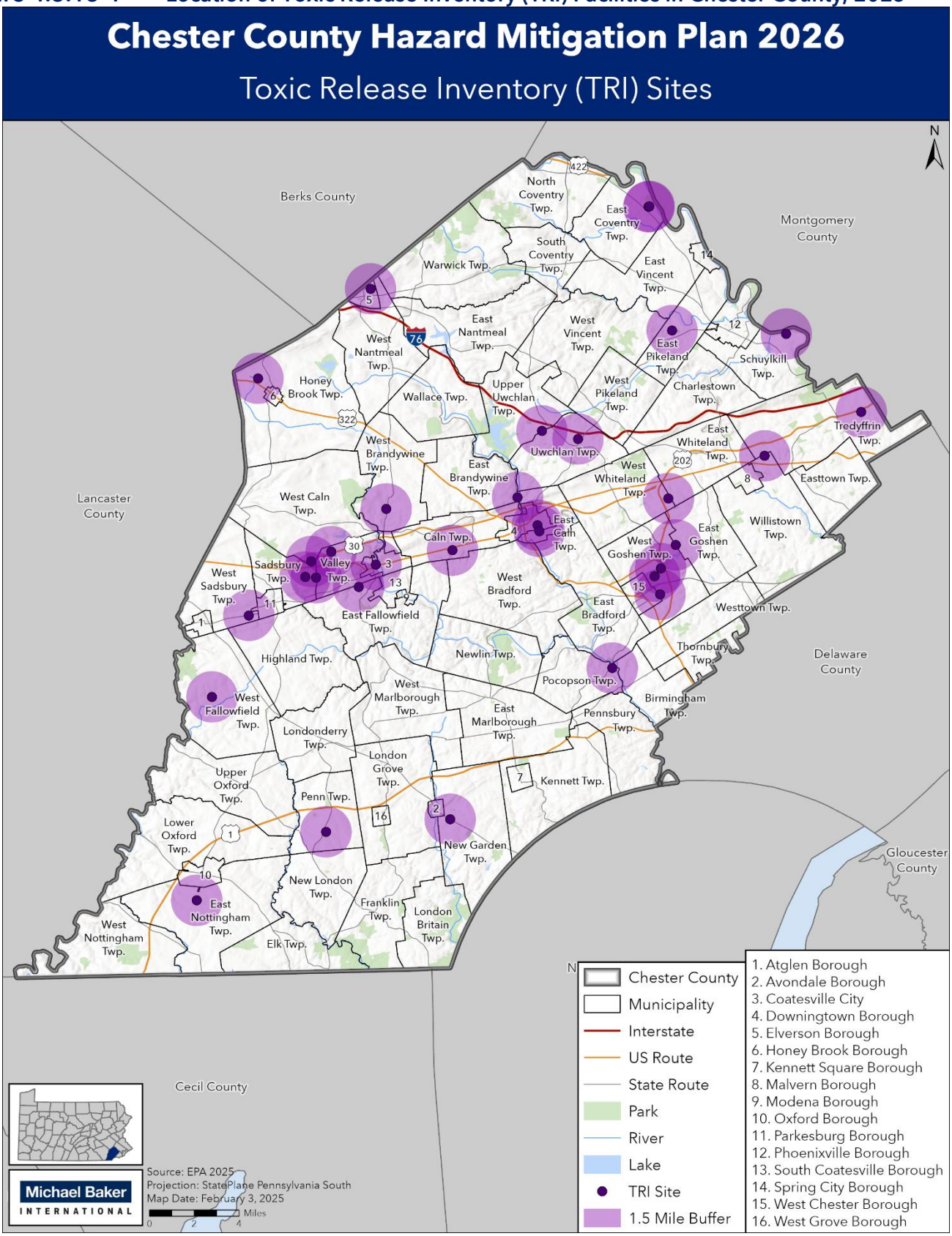


Table 4.3.15-1 lists the TRI facilities in Chester County by municipality. Of the 73 municipalities in Chester County, 16 contain a TRI facility. Coatesville and West Chester have the most TRI sites in the County with six TRI sites each.

Table 4.3.15-1 TRI Facilities in Chester County (EPA, 2025)

Municipality	TRI Facility	Address
Atglen	Action Manufacturing Co	500 Bailey Crossroads Rd
Avondale	HMA Concrete LLC Dba Heritage Concrete Avondale Facility	8840 Gap Newport Pike
Coatesville	Cigas Machine Shop Inc.	200 Waverly Blvd
	Cleveland-Cliffs Plate LLC Coatesville Facility	139 Modena Rd
	Nathan Trotter & Co. Inc.	241 Stewart Huston Dr
	Stein LLC	14 Ims Dr
	The Rock Kamps LLC	500 Independence Way
	Wire & Cable Specialties Inc	440 Highlands Blvd
Downingtown	AGC Chemicals Americas Inc	255 S Bailey Rd
	Brandywine Machine Co Inc	300 Creek Rd
	Chemstation Philadelphia	415 Boot Road Suite B
	Fenzi Agt Usa LLC	498 Acorn Ln
Elverson	Whitford Corp	47 Park Ave
Exton	Dft Inc.	140 Sheree Blvd
	Dsm Biomedical	735 Pennsylvania Dr
Honey Brook	R-V Industries Inc.	584 Poplar Rd
Kimberton	Henry Co	336 Cold Stream Rd
Oxford	Hoover Treated Wood Products Inc.	385 Waterway Rd
Paoli	Force Industries Division	28 Industrial Blvd
Parker Ford	Ep Henry	16 Anderson Road
	Taylor Industries Inc.	35 Anderson Road
Parkesburg	Victory Brewing Co LLC	3127 Lower Valley Rd
Phoenixville	McAvoy Vitrified Brick Co.	75 McAvoy Ln
Wayne	Johnson Matthey Inc	434 436 456 Devon Park Dr
West Chester	Arkema West Chester Plant	610 S Bolmar St
	Johnson Matthey	1401 King Rd
	Lenape Forged Products Corp	1334 Lenape Rd
	Metallurgical Products Co	810 Lincoln Ave
	Tin Technology & Refining	905 Fernhill Rd
	Zeks Compressed Air Solutions	1302 Goshen Pkwy
West Grove	Delaware Valley Custom Marble Inc	4 Briar Dr

The Cleveland-Cliffs Plate LLC facility in Coatesville manufactures steel plates, such as carbon, high-strength low alloy (HSLA), commercial alloy, military alloy and flame-cut steel plate for several industries: aircraft and aerospace, construction, distribution, energy, heavy equipment, and military (Cleveland-Cliffs Inc, 2025). In 2023, this

company was responsible for roughly 50 percent of Chester County releases with a total on-site toxic release of 115,773.836 pounds (EPA, 2025).

In addition to fixed-site hazardous materials releases, there are increasingly large numbers of chemicals, oils, radioactive materials, and other hazardous substances spilled as a result of highway, rail, and waterway accidents, storage tank leakage, pipeline break, and/or other accidents. On occasion, these events become a major disaster and force people to evacuate and/or lose their homes and businesses. According to the U.S. DOT's Office of Operations and the U.S. Census Bureau, it is estimated that 11 percent of all freight transported by trucks is hazardous material.

A number of major highways can be used in Chester County for the transport of hazardous materials including I-76 (Pennsylvania Turnpike), US-1, US-30, US-202, US322, US-422, PA-3, PA-10, PA-272, PA-282, PA-372, and PA-401. Chester County is home to 3,706.46 miles of roadways, including 26.03 miles of turnpike, 1,016.99 miles of state and federal highways, and 2,649.72 miles of secondary and tertiary roads (PennDOT, 2024). Additionally, many of these roads cross rivers and streams and travel through downtown and residential areas, increasing the potential to pollute surface water and groundwater and cause harm to life and property.

Several railroad accidents have occurred in Pennsylvania involving hazardous materials. Potential also exists for hazardous material release incidents to occur along pipelines. Large spills can result from collisions or derailments of train cars. Pipelines that transport hazardous liquids and flammable substances can corrode, be damaged during excavation, incorrectly operated, or damaged by other natural or human-made forces leading to a hazardous materials release incident. Additional hazardous materials are contained at the military installations within Pennsylvania. Nuclear facilities are another type of fixed facility that poses risk of hazard material release. For more information about nuclear incidents, reference Section 4.3.16.

4.3.15.2. Range of Magnitude

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 waste. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas.

With hazardous material release, whether accidental or intentional, there are several potentially exacerbating or mitigating circumstances that will affect its severity or

impact. Exacerbating conditions, characteristics that can enhance or magnify the effects of a hazardous material release include:

- Weather conditions: Affects how 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.

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.

The severity of the incident is dependent not only on the circumstances described above, but also on 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.

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.

The worst-case scenario hazardous material release event would be a large, uncontrolled release of toxic gas within a major urban area. In Chester County, this could take the form of an accident involving a major rupture of a tanker hauling toxic or flammable gas in or near West Chester or another densely populated area. While little physical property damage is likely from this type of event, the potential for injury and

death to people up to 0.25 mile from the scene is significant. This event would likely overwhelm the medical care capacity within the county, and possibly the region. The population vulnerable to such a release includes the 18,671 people in West Chester alone. In addition, an event such as this would likely close county offices, causing major disruption to government operations. The most likely scenario would be a transportation accident resulting in a rupture of a truck's fuel tank, spilling a small quantity of diesel fuel onto the roadway.

The potential impacts of hazardous materials release on community lifelines are as follows:

Table 4.3.15-2 Most Likely Lifelines Impacted by Hazardous Materials Release

LIFELINES	NOTES
	Fire departments may be called into response and recovery if leaks or other issues result in explosions and fires.
	Impacts from hazardous materials releases include environmental contamination, which can impact agricultural operations and water supplies.
	Releases can have adverse impacts on communities, leading to more strain on the local healthcare system.
	Transportation lifeline can cause release itself or resulting explosions and fires.

4.3.15.3. Past Occurrence

The county has experienced hazardous materials release accidents at facilities and along roadways. For most incidents, the County Hazmat Team's representative is contacted by the on-scene fire department for technical advice about addressing the hazardous material.

A significant incident occurred in West Nottingham Township on July 10, 2017, where several people were hospitalized after a hazmat leak. At least eight people had to be treated after a hazmat situation occurred at a home on Red Oak Drive in the Nottingham Manor section of the township. Seven responders were sent through decontamination protocol and transported to Lancaster General Hospital in addition to one resident. Chester County Hazmat crews thoroughly checked the home; no hazards were found,

and neither the type of leaked hazardous material or the extent of the contamination was able to be clearly determined (Heinze, 2017).

Another notable hazardous materials release occurred on August 9, 2023. Approximately 300 to 500 gallons of Nitric Acid and Phosphoric Acid mixture spilled inside ChemStation along Boot Road in Downingtown. A small vapor cloud formed around the facility following the accident. No injuries were reported and a nearby daycare evacuated the children inside to a safe location. A shelter-in-place order was recommended for the surrounding one-mile radius (NBC Philadelphia, 2023).

Since the passage of SARA, Title III facilities which produce, use, or store hazardous chemicals must notify the public through the county 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 facility. SARA Title III and Pennsylvania Act 165 also require a written follow-up report to PEMA and the County. 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 (SEOC) to provide effective emergency response coordination. Table 4.3.15-3 shows the number of hazardous material incidents in Chester County from 2018 through April 2023, as reported to PEMA's incident management system. This data is reported in the Pennsylvania State Hazard Mitigation Plan (PEMA, 2023).

Table 4.3.15-3 Hazardous Materials Incidents Reported to PEMA (2018 – April 2023)

YEAR	NUMBER OF HAZARDOUS MATERIAL INCIDENTS
2018	24
2019	25
2020	96
2021	45
2022	53
2023	7

In 2023 and 2024, 45 hazardous materials incidents were reported to the Chester County Department of Emergency Services, listed in Table 4.3.15-4. Most of the incidents were related to chemical or oil spills and propane leaks.

Table 4.3.15-4 Hazardous Materials Releases in Chester County (Chester County EMA, 2025)

DATE	INCIDENT	LOCATION (IF AVAILABLE)
1/3/2023	Odor from pipeline	
1/6/2023	Tanker overturned - Diesel Leak	
2/2/2023	Oil Spill - NRC#1359162	
2/22/2023	Chemical Spill - Dimethyl Sulfoxide	221 Gale Ln, Kennett Square, PA
3/10/2023	Precious Metals processing. Pressurized Hazardous gas vessels	1401 King Rd, West Chester, PA 19380
3/22/2023	Pipeline - Gas Odor	35 Meadow Creek Lane, Upper Uwchlan, PA, 19343
3/30/2023	Fuel Oil Spill	22 S Bacton Hill Rd, Malvern, PA
4/28/2023	Fire in insulation.	345 Scarlett Rd, New Garden, PA
5/3/2023	Unknown oil leak. NRC# 1366273	12 Sioux Lane, Honey Brook, PA 19344
5/11/2023	Heating oil spill	PA 82 and PA 322 Intersection, 5-1 Tomahawk Lane, 19344
5/12/2023	Refrigerant gas leak - NRC#1367080	176 Pennsylvania Ave, Malvern, PA, 19355
5/16/2023	Diesel fuel spill	601 Westtown Road, West Chester, PA 19382
5/25/2023	Chemical Spill	965 E Lancaster Avenue, East Caln, PA 19335
6/2/2023	Illegal chemical dumping - NRC#1368964	Fleetwood Street and N 5th Ave, Coatesville, PA 19320
6/22/2023	Unknown sheen - NRC#1370928	
7/6/2023	Unknown sheen - NRC# 1371973	300 Oakwood Lane, Devon, PA 19333
7/9/2023	Heating oil spill	1251 Ash Bridge Road, West Chester, PA 19380
7/10/2023	Toxic gas	487 Schuylkill Road, Phoenixville, PA
7/11/2023	Propane leak	720 West Strasburg Road (PA-162), West Chester, PA 19382
7/26/2023	HAZMAT team dispatch requested for an unknown material hazard.	300 East Evans Street, West Chester Borough, PA 19380
8/2/2023	Propane leak	603 Peacock Lane, Kennett Square, PA 19348
8/2/2023	Propane leak	388 N Creek Road, Landenberg, PA
8/3/2023	Fuel in storm drain	906 Colonial Court, Coatesville, PA 19320
8/7/2023	Propane leak	1126 Hollow Rd., Chester Springs, PA

DATE	INCIDENT	LOCATION (IF AVAILABLE)
9/11/2023	300-500 gallons of Nitric and Phosphoric acid	415 Boot Road, Downingtown, PA 19335
9/21/2023	HAZMAT team dispatched to an acid fire at the Metallurgical Products building caused by burning phosphorus.	810 Lincoln Avenue, West Chester, PA 19380
12/9/2023	Small exterior nitrogen leak.	17 Lee Blvd, Malvern, PA 19355
12/18/2023	Transformer oil spill. NRC#1386984	627 Contention Ln, Berwyn, PA 19312
12/26/2023	Heating oil discharge. NRC#1387664	62 Violet Drive, Honey Brook Borough, PA 19344
12/27/2023	Containers spilled of hazardous materials.	3001 Saint Peters Road, Warwick, PA
1/3/2024	Chemical spill	1401 King Road, West Chester, PA 19380
1/8/2024	A milk spill is reported running into a stream in the area of Hickory Hill and Hilltop Roads in East Nottingham Township, Chester County.	
1/10/2024	500 gallon propane tank under ground on fire and part of the back of the house on fire and actively spreading.	258 N Creek Rd, Landenberg, PA
2/17/2024	Building fire with numerous hazmat.	1031 Pottstown Pike, Chester Springs, PA 19425
3/13/2024	Chemical spill	Limestone Road and Borough Line Road, Parkesburg, PA
5/4/2024	Several complaints about an irritant and request for the HAZMAT team.	100 Federal Walk, Kennett Square, PA 19348
5/13/2024	A Tractor Trailer carrying anhydrous ammonia experienced a break fire.	1495 Valley Forge Rd, Valley Forge Service Plaza
7/12/2024	Report of 70 gallons of fuel leaking from a disabled trash truck. Leak is in close proximity to a creek.	650 Pikeland Ave, East Pikeland, PA 19475
7/16/2024	Flammable liquid spill	1015 Lafayette Dr, Valley, PA
7/31/2024	Transformer oil into creek.	3 South Brandywine Ave, Coatesville, PA 19335
8/16/2024	HAZMAT team (Station 15) requested per Chief 4 for an underground propane tank leaking, unknown size propane tank.	129 Davis Rd, Malvern, PA 19355
8/28/2024	A worker working on a doorway cut into a wall at the Octorara Elementary School located at 104 Highland Rd. During this process the worker noticed what they believe to be a large amount of asbestos that fell out of the wall.	104 Highland Road, Atglen, PA 19310
10/3/2024	NRC#1412753 - Sewer Line Struck	22 ANDREWS RD, MALVERN, PA 19355
11/21/2024	FD and Hazmat have been dispatched for the propane truck on fire up against the building which is a SARA site.	241 Woodbine Rd, Downingtown, PA 19335

DATE	INCIDENT	LOCATION (IF AVAILABLE)
12/8/2024	Propane leak	679 Little Elk Creek Rd, Oxford, PA

4.3.15.4. Future Occurrence

While many hazardous material release incidents have occurred in Chester County 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 4.3.18 Terrorism.

Smaller incidents, such as fuel spills, will affect the county many times each year, most likely along corridors such as I-76 or during refilling of home heating oil tanks, and may not be reported. Although the county does not anticipate severe releases on any regular basis, the possibility of a significant release should not be discounted. The probability of future hazardous materials release events can be considered *possible* according to the Risk Factor Methodology (see Table 4.4-1).

4.3.15.5. Vulnerability Assessment

Jurisdictions that are home to one or more hazardous materials facilities should be considered vulnerable to hazardous materials releases from fixed facilities. Structures, critical facilities, and populations located near hazardous material areas are also at risk. Table 4.3.15-5 shows the total number of structures in hazardous materials hazard areas defined as a 1.5-mile radius from any TRI facility. West Goshen Township (4,054 structures), Tredyffrin Township (2,858), Uwchlan Township (2,651), Valley Township (2,562), West Chester Borough (2,471), Caln Township (2,323), and Coatesville (2,240) have the highest numbers of structures at risk. Municipalities with at least 80% of structure in hazard areas include Elverson Borough (100%), Avondale Borough (99%), Valley Township (88%), and Coatesville (82%).

Table 4.3.15-5 Structures Vulnerable to Hazardous Materials Release

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES IN HAZARDOUS MATERIAL HAZARD AREAS	PERCENT STRUCTURES IN HAZARDOUS MATERIAL HAZARD AREAS
Atglen Borough	577	0	0%
Avondale Borough	405	402	99%
Birmingham Township	1,624	318	20%
Caln Township	4,701	2,323	49%
Charlestown Township	2,266	0	0%
Coatesville City	2,732	2,240	82%
Downingtown Borough	2,291	1,574	69%
East Bradford Township	3,658	489	13%

Table 4.3.15-5 Structures Vulnerable to Hazardous Materials Release

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES IN HAZARDOUS MATERIAL HAZARD AREAS	PERCENT STRUCTURES IN HAZARDOUS MATERIAL HAZARD AREAS
East Brandywine Township	3,683	349	9%
East Caln Township	1,269	752	59%
East Coventry Township	3,563	1,037	29%
East Fallowfield Township	3,944	1,201	30%
East Goshen Township	5,665	1,279	23%
East Marlborough Township	3,571	0	0%
East Nantmeal Township	1,508	0	0%
East Nottingham Township	4,885	1,394	29%
East Pikeland Township	3,552	1,683	47%
Easttown Township	3,727	70	2%
East Vincent Township	4,029	474	12%
East Whiteland Township	4,401	0	0%
Elk Township	1,367	0	0%
Elverson Borough	584	584	100%
Franklin Township	2,456	0	0%
Highland Township	1,307	95	7%
Honey Brook Borough	732	489	67%
Honey Brook Township	4,909	554	11%
Kennett Township	1,751	0	0%
Kennett Square Borough	3,867	0	0%
London Britain Township	1,782	0	0%
Londonderry Township	4,078	234	6%
London Grove Township	1,692	0	0%
Lower Oxford Township	2,579	0	0%
Malvern Borough	1,066	456	43%
Modena Borough	201	0	0%
New Garden Township	5,451	1,097	20%
Newlin Township	2,921	39	1%
New London Township	1,193	0	0%
North Coventry Township	4,288	0	0%
Oxford Borough	1,704	788	46%
Parkesburg Borough	1,371	1,026	75%
Penn Township	2,901	1,128	39%
Pennsbury Township	1,712	0	0%
Phoenixville Borough	4,731	0	0%
Pocopson Township	1,757	592	34%
Sadsbury Township	1,987	1,365	69%
Schuylkill Township	4,096	977	24%
South Coatesville Borough	506	259	51%
South Coventry Township	1,653	0	0%

Table 4.3.15-5 Structures Vulnerable to Hazardous Materials Release

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES IN HAZARDOUS MATERIAL HAZARD AREAS	PERCENT STRUCTURES IN HAZARDOUS MATERIAL HAZARD AREAS
Spring City Borough	1,199	0	0%
Thornbury Township	1,060	0	0%
Tredyffrin Township	9,617	2,858	30%
Upper Oxford Township	2,109	0	0%
Upper Uwchlan Township	3,909	806	21%
Uwchlan Township	5,805	2,651	46%
Valley Township	2,926	2,562	88%
Wallace Township	2,065	0	0%
Warwick Township	2,192	36	2%
West Bradford Township	5,801	477	8%
West Brandywine Township	4,141	1,542	37%
West Caln Township	6,070	507	8%
West Chester Borough	3,147	2,471	79%
West Fallowfield Township	2,226	337	15%
West Goshen Township	8,075	4,054	50%
West Grove Borough	964	0	0%
West Marlborough Township	983	0	0%
West Nantmeal Township	1,832	86	5%
West Nottingham Township	2,014	0	0%
West Pikeland Township	2,050	91	4%
West Sadsbury Township	1,915	448	23%
West Vincent Township	3,127	151	5%
West Whiteland Township	5,656	840	15%
Westtown Township	3,838	0	0%
Willistown Township	5,275	1,433	27%
Total	**214,689**	**46,618**	**27%**

Table 4.3.15-6 lists the type of structures vulnerable to hazardous materials sites in Chester County by municipality. Residential structures are the most vulnerable, accounting for 82% of all vulnerable structures (38,235 total). The next highest is commercial structures with 4,441, or 9.5%. West Goshen has the most residential structures at risk with 3,291. New Garden Township and West Goshen Township have the most commercial structures at risk (487 and 461 respectively).

Table 4.3.15-6 Structures Vulnerable to Hazardous Materials Release

MUNICIPALITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Atglen Borough	0	0	0	0	0	0	0	0	0
Avondale Borough	11	42	15	0	10	322	1	1	402
Birmingham Township	0	17	1	0	0	300	0	0	318
Caln Township	60	175	78	7	8	1,990	5	0	2,323
Charlestown Township	0	0	0	0	0	0	0	0	0
Coatesville City	114	165	89	0	18	1,851	1	2	2,240
Downingtown Borough	71	185	110	2	16	1,188	0	2	1,574
East Bradford Township	0	9	3	12	0	465	0	0	489
East Brandywine Township	0	6	5	17	14	307	0	0	349
East Caln Township	5	88	39	0	14	605	1	0	752
East Coventry Township	4	226	25	49	8	721	3	1	1,037
East Fallowfield Township	7	120	22	18	0	1,033	0	1	1,201
East Goshen Township	1	83	14	38	12	1,130	0	1	1,279
East Marlborough Township	0	0	0	0	0	0	0	0	0
East Nantmeal Township	0	0	0	0	0	0	0	0	0
East Nottingham Township	0	232	38	89	17	1,018	0	0	1,394
East Pikeland Township	8	78	30	29	27	1,506	3	2	1,683

Table 4.3.15-6 Structures Vulnerable to Hazardous Materials Release

MUNICIPALITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Easttown Township	0	2	16	20	0	31	0	1	70
East Vincent Township	34	107	36	21	6	270	0	0	474
East Whiteland Township	0	0	0	0	0	0	0	0	0
Elk Township	0	0	0	0	0	0	0	0	0
Elverson Borough	4	33	25	8	16	498	0	0	584
Franklin Township	0	0	0	0	0	0	0	0	0
Highland Township	0	0	0	42	0	53	0	0	95
Honey Brook Borough	10	32	21	6	0	419	0	1	489
Honey Brook Township	6	77	13	103	14	331	10	0	554
Kennett Township	0	0	0	0	0	0	0	0	0
Kennett Square Borough	0	0	0	0	0	0	0	0	0
London Britain Township	0	0	0	0	0	0	0	0	0
Londonderry Township	0	14	1	3	0	216	0	0	234
London Grove Township	0	0	0	0	0	0	0	0	0
Lower Oxford Township	0	0	0	0	0	0	0	0	0
Malvern Borough	12	59	14	0	0	370	1	0	456
Modena Borough	0	0	0	0	0	0	0	0	0
New Garden Township	11	487	30	17	15	535	2	0	1,097

Table 4.3.15-6 Structures Vulnerable to Hazardous Materials Release

MUNICIPALITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Newlin Township	0	16	2	2	0	19	0	0	39
New London Township	0	0	0	0	0	0	0	0	0
North Coventry Township	0	0	0	0	0	0	0	0	0
Oxford Borough	37	70	31	4	0	643	0	3	788
Parkesburg Borough	12	36	35	0	0	940	3	0	1,026
Penn Township	7	193	52	50	6	820	0	0	1,128
Pennsbury Township	0	0	0	0	0	0	0	0	0
Phoenixville Borough	0	0	0	0	0	0	0	0	0
Pocopson Township	0	17	7	15	6	545	0	2	592
Sadsbury Township	16	175	37	10	12	1,110	3	2	1,365
Schuylkill Township	3	52	24	2	14	853	0	29	977
South Coatesville Borough	11	18	15	0	15	199	0	1	259
South Coventry Township	0	0	0	0	0	0	0	0	0
Spring City Borough	0	0	0	0	0	0	0	0	0
Thornbury Township	0	0	0	0	0	0	0	0	0
Tredyffrin Township	34	197	45	11	8	2,560	1	2	2,858
Upper Oxford Township	0	0	0	0	0	0	0	0	0
Upper Uwchlan Township	2	111	23	3	0	664	0	3	806

Table 4.3.15-6 Structures Vulnerable to Hazardous Materials Release

MUNICIPALITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Uwchlan Township	110	212	57	24	14	2,232	2	0	2,651
Valley Township	17	155	106	10	46	2,219	8	1	2,562
Wallace Township	0	0	0	0	0	0	0	0	0
Warwick Township	0	6	0	3	0	27	0	0	36
West Bradford Township	0	0	0	10	0	467	0	0	477
West Brandywine Township	0	34	6	83	5	1,414	0	0	1,542
West Caln Township	1	24	19	30	0	432	1	0	507
West Chester Borough	152	258	140	0	30	1,881	10	0	2,471
West Fallowfield Township	0	6	6	148	53	122	2	0	337
West Goshen Township	57	461	161	0	70	3,291	9	5	4,054
West Grove Borough	0	0	0	0	0	0	0	0	0
West Marlborough Township	0	0	0	0	0	0	0	0	0
West Nantmeal Township	1	10	2	38	0	34	1	0	86
West Nottingham Township	0	0	0	0	0	0	0	0	0
West Pikeland Township	0	0	0	0	0	91	0	0	91
West Sadsbury Township	2	15	8	47	9	366	1	0	448
West Vincent Township	0	7	2	17	0	125	0	0	151
West Whiteland Township	24	39	40	0	9	728	0	0	840

Table 4.3.15-6 Structures Vulnerable to Hazardous Materials Release

MUNICIPALITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Westtown Township	0	0	0	0	0	0	0	0	0
Willistown Township	8	92	29	0	7	1,294	3	0	1,433
TOTAL	**852**	**4,441**	**1,472**	**988**	**499**	**38,235**	**71**	**60**	**46,618**

Table 4.3.15-7 shows the total number of critical facilities in hazardous materials areas by municipality. Note that the critical facility analysis for hazardous material hazard areas does not include TRI facilities classified as a critical facility as these sites are those that define the hazard area in this analysis. West Goshen Township and Tredyffrin Township have the highest number of critical facilities at risk, 63 and 61, respectively. Avondale Borough, Elverson Borough, and Honey Brook Borough all have 100% of critical facilities in hazard areas. There are 15 municipalities with at least 50% of critical facilities in hazard areas.

Table 4.3.15-7 Critical Facilities Vulnerable to Hazardous Materials Release

MUNICIPALITY	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN HAZARDOUS MATERIAL HAZARD AREA	PERCENT CRITICAL FACILITIES IN HAZARDOUS MATERIAL HAZARD AREA
Atglen Borough	8	0	0%
Avondale Borough	5	5	100%
Birmingham Township	11	4	36%
Caln Township	57	25	44%
Charlestown Township	29	0	0%
Coatesville City	27	23	85%
Downingtown Borough	41	38	93%
East Bradford Township	43	2	5%
East Brandywine Township	49	4	8%
East Caln Township	28	15	54%
East Coventry Township	34	14	41%
East Fallowfield Township	26	5	19%
East Goshen Township	32	10	31%
East Marlborough Township	25	0	0%
East Nantmeal Township	16	0	0%
East Nottingham Township	36	9	25%
East Pikeland Township	23	10	43%
Easttown Township	28	2	7%
East Vincent Township	81	14	17%
East Whiteland Township	35	0	0%
Elk Township	12	0	0%
Elverson Borough	4	4	100%
Franklin Township	17	0	0%
Highland Township	15	0	0%
Honey Brook Borough	5	5	100%
Honey Brook Township	31	6	19%
Kennett Township	14	0	0%
Kennett Square Borough	44	0	0%

Table 4.3.15-7 Critical Facilities Vulnerable to Hazardous Materials Release

MUNICIPALITY	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN HAZARDOUS MATERIAL HAZARD AREA	PERCENT CRITICAL FACILITIES IN HAZARDOUS MATERIAL HAZARD AREA
London Britain Township	13	0	0%
Londonderry Township	38	0	0%
London Grove Township	9	0	0%
Lower Oxford Township	36	0	0%
Malvern Borough	10	4	40%
Modena Borough	5	0	0%
New Garden Township	44	9	20%
Newlin Township	15	1	7%
New London Township	18	0	0%
North Coventry Township	37	0	0%
Oxford Borough	17	9	53%
Parkesburg Borough	15	9	60%
Penn Township	25	15	60%
Pennsbury Township	25	0	0%
Phoenixville Borough	32	0	0%
Pocopson Township	27	8	30%
Sadsbury Township	18	10	56%
Schuylkill Township	36	5	14%
South Coatesville Borough	6	3	50%
South Coventry Township	18	0	0%
Spring City Borough	6	0	0%
Thornbury Township	10	0	0%
Tredyffrin Township	139	61	44%
Upper Oxford Township	18	0	0%
Upper Uwchlan Township	27	10	37%
Uwchlan Township	42	27	64%
Valley Township	33	30	91%
Wallace Township	19	0	0%
Warwick Township	13	1	8%
West Bradford Township	33	3	9%
West Brandywine Township	30	5	17%
West Caln Township	20	4	20%
West Chester Borough	26	24	92%
West Fallowfield Township	21	4	19%
West Goshen Township	78	63	81%
West Grove Borough	6	0	0%
West Marlborough Township	21	0	0%

Table 4.3.15-7 Critical Facilities Vulnerable to Hazardous Materials Release

MUNICIPALITY	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN HAZARDOUS MATERIAL HAZARD AREA	PERCENT CRITICAL FACILITIES IN HAZARDOUS MATERIAL HAZARD AREA
West Nantmeal Township	21	4	19%
West Nottingham Township	12	0	0%
West Pikeland Township	22	0	0%
West Sadsbury Township	16	4	25%
West Vincent Township	25	0	0%
West Whiteland Township	86	14	16%
Westtown Township	28	0	0%
Willistown Township	55	11	20%
TOTAL	**2,027**	**533**	**26%**

Table 4.3.15-8 shows the vulnerability of the County's population to hazardous material hazard areas. Over 25% of the County's population lives in hazardous material hazard areas, with most of these residents concentrated in West Chester Borough (15,932 people), Coatesville (11,785), West Goshen Township (11,444), Uwchlan Township (10,705), and Tredyffrin Township (9,171). Twenty-six municipalities have no population within 1.5 miles of a TRI facility. Elverson Borough and Avondale Borough are the only municipalities with 100% of their population in risk areas.

Table 4.3.15-8 Population Vulnerable to Hazardous Materials Release

MUNICIPALITY	TOTAL ESTIMATED 2020 POPULATION	TOTAL POPULATION IN HAZARDOUS MATERIAL HAZARD AREA	PERCENT POPULATION IN HAZARDOUS MATERIAL HAZARD AREA
Atglen Borough	1,313	0	0%
Avondale Borough	1,274	1,274	100%
Birmingham Township	4,082	537	13%
Caln Township	14,432	6,740	47%
Charlestown Township	6,001	0	0%
Coatesville City	13,350	11,785	88%
Downingtown Borough	7,892	5,777	73%
East Bradford Township	10,339	1,544	15%
East Brandywine Township	9,738	657	7%
East Caln Township	5,384	3,688	68%
East Coventry Township	7,068	1,515	21%
East Fallowfield Township	7,626	2,656	35%
East Goshen Township	18,410	3,266	18%
East Marlborough Township	7,306	0	0%
East Nantmeal Township	1,832	0	0%
East Nottingham Township	8,982	2,643	29%
East Pikeland Township	8,260	4,116	50%
Easttown Township	7,433	23	0%
East Vincent Township	13,917	2,900	21%
East Whiteland Township	10,984	0	0%
Elk Township	1,698	0	0%
Elverson Borough	1,330	1,330	100%
Franklin Township	4,433	0	0%
Highland Township	1,259	131	10%
Honey Brook Borough	1,892	1,277	67%
Honey Brook Township	8,274	670	8%
Kennett Township	5,936	0	0%
Kennett Square Borough	8,289	0	0%
London Britain Township	3,179	0	0%
Londonderry Township	8,797	519	6%
London Grove Township	2,476	0	0%
Lower Oxford Township	5,436	0	0%
Malvern Borough	3,419	1,374	40%
Modena Borough	541	0	0%
New Garden Township	11,363	1,721	15%
Newlin Township	5,810	111	2%
New London Township	1,358	0	0%

Table 4.3.15-8 Population Vulnerable to Hazardous Materials Release

MUNICIPALITY	TOTAL ESTIMATED 2020 POPULATION	TOTAL POPULATION IN HAZARDOUS MATERIAL HAZARD AREA	PERCENT POPULATION IN HAZARDOUS MATERIAL HAZARD AREA
North Coventry Township	8,441	0	0%
Oxford Borough	5,736	2,769	48%
Parkesburg Borough	3,862	2,846	74%
Penn Township	5,644	2,688	48%
Pennsbury Township	3,876	0	0%
Phoenixville Borough	18,602	0	0%
Pocopson Township	4,455	1,460	33%
Sadsbury Township	4,125	3,360	81%
Schuylkill Township	8,780	2,050	23%
South Coatesville Borough	1,601	912	57%
South Coventry Township	2,796	0	0%
Spring City Borough	3,494	0	0%
Thornbury Township	3,177	0	0%
Tredyffrin Township	31,927	9,171	29%
Upper Oxford Township	2,560	0	0%
Upper Uwchlan Township	12,275	3,390	28%
Uwchlan Township	19,161	10,705	56%
Valley Township	7,985	6,878	86%
Wallace Township	3,711	0	0%
Warwick Township	2,590	6	0%
West Bradford Township	14,316	1,104	8%
West Brandywine Township	7,331	2,618	36%
West Caln Township	8,910	804	9%
West Chester Borough	18,671	15,932	85%
West Fallowfield Township	2,459	276	11%
West Goshen Township	23,040	11,444	50%
West Grove Borough	2,770	0	0%
West Marlborough Township	819	0	0%
West Nantmeal Township	2,251	61	3%
West Nottingham Township	2,748	0	0%
West Pikeland Township	4,024	100	2%
West Sadsbury Township	2,436	440	18%
West Vincent Township	6,668	57	1%
West Whiteland Township	19,632	2,213	11%
Westtown Township	11,154	0	0%

Table 4.3.15-8 Population Vulnerable to Hazardous Materials Release

MUNICIPALITY	TOTAL ESTIMATED 2020 POPULATION	TOTAL POPULATION IN HAZARDOUS MATERIAL HAZARD AREA	PERCENT POPULATION IN HAZARDOUS MATERIAL HAZARD AREA
Willistown Township	11,273	2,858	25%
Total	**534,413**	**140,396**	**26%**

4.3.15.6. Equity in Vulnerable Communities

Marginalized communities, particularly low-income and minority populations, are often located near industrial facilities, waste sites, and transport routes for hazardous materials. These areas are more likely to experience spills, leaks, or accidents involving toxic substances making them more susceptible. Children, the elderly, and people with preexisting health conditions are particularly vulnerable to the effects of hazardous materials. Municipalities with high concentrations of these groups should plan accordingly. This includes East Goshen Township, Kennett Township, West Brandywine Township, and Willistown Township, where over one-third of the population is aged 65 or older in certain census tracts.

4.3.16. Nuclear Incidents



4.3.16.1. Location and Extent

Nuclear incidents generally refer to events involving the release of significant levels of radioactivity or exposure of workers or the general public to radiation. The primary concern following such an incident or accident is the extent of radiation, inhalation, and ingestion of radioactive isotopes which can cause acute health effects (e.g. death, burns, severe impairment), chronic health effects (e.g. cancer), and psychological effects (US EPA, 2025c).

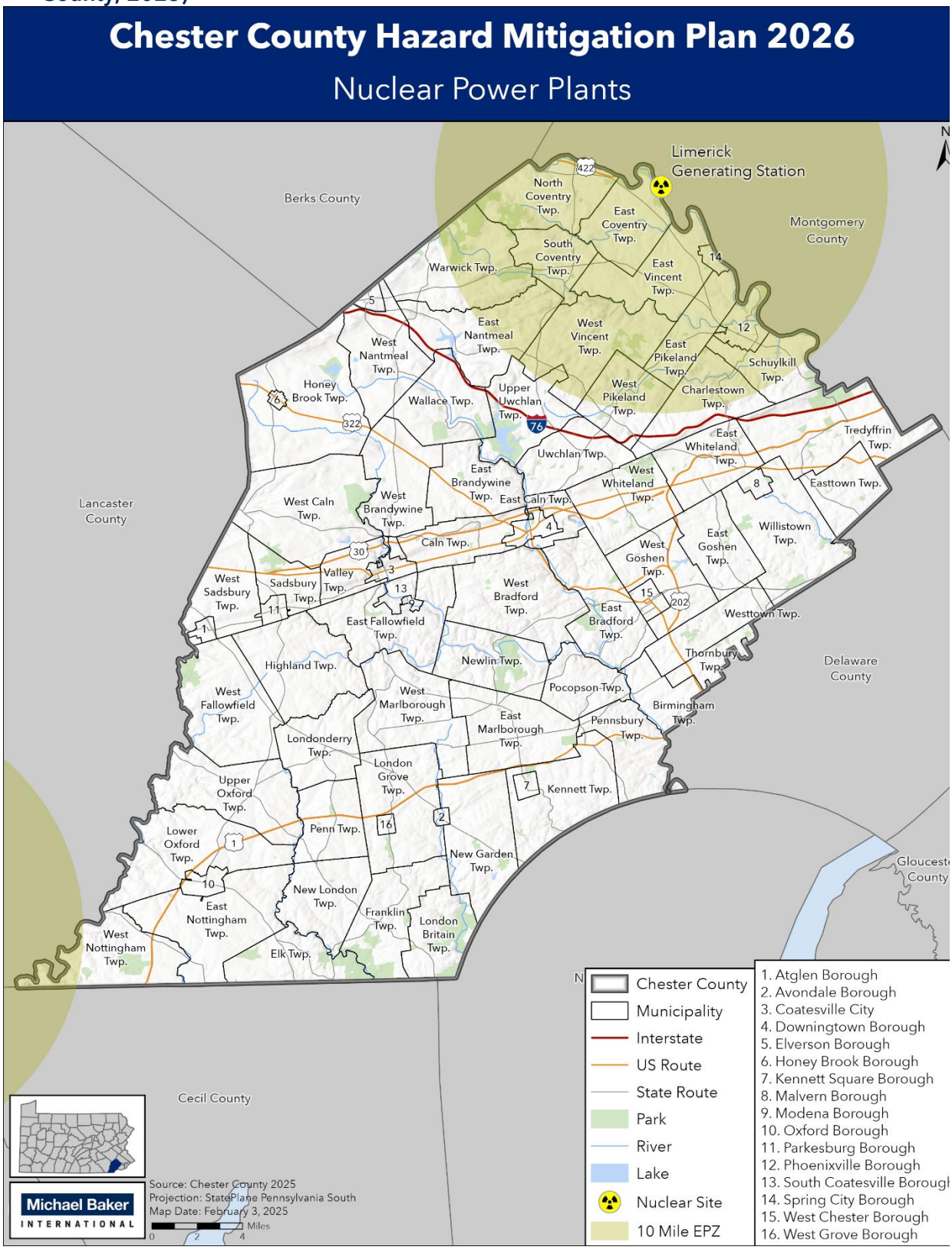
The Nuclear Regulatory Commission encourages the use of Probabilistic Risk Assessments (PRA) to quantitatively estimate the potential risk to public health and safety considering the design, operations and maintenance practices at nuclear power plants. PRAs typically focus on accidents that can severely damage the core and that may challenge containment (USNRC, 2020). 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 (USNRC, 2024a).

The state of Pennsylvania contains five nuclear power generation stations. None of these lie within Chester County's borders. However, the county is located within the ten-mile plume Exposure Pathway EPZ for two nuclear facilities: the Limerick Generating Station and Peach Bottom Atomic Power Station, shown in Figure 4.3.16-1.

- Limerick Generating Station is located just outside of County borders in Pottstown. Limerick consists of two boiling water reactors with capacity to produce electricity for 1.7 million homes (Constellation, 2024).
- Peach Bottom Atomic Power Station is located thirteen miles from Nottingham, across the Susquehanna River. Peach Bottom consists of two boiling water reactors operated by Constellation Energy Generation, LLC.

According to PEMA, there are approximately 59 people at risk in the Plume Exposure EPZ for Limerick and 77,300 people for Peach Bottom. The entire county is at risk in the Ingestion Exposure EPZ for both Limerick and Peach Bottom.

Figure 4.3.16-1 Areas of Chester County within Plume Exposure EPZs (Chester County, 2025)



4.3.16.2. Range of Magnitude

The magnitude of a nuclear incident differs for those within the Plume Exposure Pathway EPZ and those within the Ingestion Exposure Pathway EPZ. The Plume Exposure Pathway refers to whole-body external exposure to gamma radiation from a radioactive plume and from deposited materials and inhalation exposure from the passing radioactive plume. 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 (USNRC, 2024a).

The following municipalities are located in the Plume Exposure Pathway EPZ for Limerick:

- Charlestown Township
- East Coventry Township
- East Nantmeal Township
- East Pikeland Township
- East Vincent Township
- North Coventry Township
- Phoenixville Borough
- Schuylkill Township
- South Coventry Township
- Spring City Borough
- Upper Uwchlan Township
- Warwick Township
- West Pikeland Township
- West Vincent Township

West Nottingham Township is the only municipality in Chester County within the Plume Exposure EPZ for Peach Bottom. The entire County lies in the Ingestion Exposure Pathway EPZ of both Limerick and Peach Bottom. Chester County can expect some radioactive contamination in the case of a nuclear incident at either Limerick Generating Station or Peach Bottom Atomic Power Station.

Nuclear accidents themselves are classified into three categories (USNRC, 2021a):

- 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 incidents.

Nuclear facilities must notify the appropriate authorities in the event of an accident. The USNRC uses four classification levels for nuclear incidents (USNRC, 2021b):

- Unusual Event: Under this category, events are in process or have occurred which indicate potential degradation in the level of safety of the plant. No release of radioactive material requiring offsite response or monitoring is expected unless further degradation occurs.
- Alert: If an alert is declared, events are in process or have occurred which involve an actual or potential substantial degradation in the level of safety of the plant. Any releases of radioactive material from the plant are expected to be limited to a small fraction of the EPA Protective Action Guides (PAGs).
- Site Area Emergency: A site area emergency involves events in process or which have occurred that result in actual or likely major failures of plant functions needed for protection of the public. Any releases of radioactive material are not expected to exceed the EPA PAGs except near the site boundary.
- General Emergency: A general emergency involves actual or imminent substantial core damage or melting of reactor fuel with the potential for loss of containment integrity. Radioactive releases during a general emergency can reasonably be expected to exceed the EPA PAGs for more than the immediate site area.

The accident at the Three Mile Island Generating Station on March 28, 1979 remains the nation's only nuclear incident at the General Emergency level and remains 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 at TMI (USNRC, 2024b).

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 radiologically active materials from accidents can result in the contamination of soil and water (CDC, 2024d). 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 nuclear facility. 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 (EPA, 2025d).

The nuclear industry has 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 (USNRC, 2022). 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 Exposure 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.

PEMA's Nuclear Evacuation plan is meant to effectively target response to a nuclear incident. For evacuation, the Commonwealth uses a keyhole approach where only sub areas that are directly impacted by a nuclear incident have to evacuate or shelter. This method allows for focused resources and attempts to minimize unnecessary strain on emergency services.

The worst-case scenario for Chester County would be if a general emergency occurred at either Limerick Generating Station or Peach Bottom Atomic Power Station that leaked

enough radiation to create longer-term damage in the form of contaminated water, soil, and food supplies in the County.

The potential impacts of nuclear incidents on community lifelines are as follows:

Table 4.3.16-1 Most Likely Lifelines Impacted by Nuclear Incidents

LIFELINE	NOTES
	Community safety due to potential harm from radioactivity.
	Potential long-term effects of radioactive contamination for water resources and agricultural operations.
	The immediate impacts on public health and the potential long-term health impacts including cancers and psychological impacts will increase the amount of resources needed at local healthcare facilities.

4.3.16.3. Past Occurrence

There have been no failures at the Limerick Generating Station or Peach Bottom Atomic Power Station that have resulted in injuries or fatalities. No large-scale nuclear events have occurred in Chester County.

That said, there have been many notable events at the Peach Bottom Atomic Power Station, including several unusual events, an alert, and numerous violations and plant shutdowns to address issues identified by the USNRC or inspectors. A summary of issues between 1983 and 1992 can be found at https://www.tmia.com/old-website/reactors/peachbottom/pb-a.html. A more comprehensive source for events outside this timeframe could not be found.

Nuclear incidents rarely occur, but the incident at Three Mile Island (TMI) is the worst fixed-nuclear facility accident in U.S. history. The resulting contamination and state of the reactor core led to the development of a 14-year cleanup and scientific effort. The *President's Commission on the Accident at Three Mile Island* 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." (US DHS, 1979).

Despite the severity of the damage, no injuries due to radiation exposure occurred. However, numerous studies were conducted to determine the measurable health effects related to radiation and/or stress. More than a dozen epidemiological and stress related studies conducted to date have found no discernible direct health effects to the population in the vicinity of the plant, but there was evidence of psychological stress in those closest to the site that persisted over time (USNRC, 2024b; Cleary and Houts, 1984).

The issue of radiation effects resulting from the accident at Three Mile Island will continue to be debated. Administrative standards have been incorporated into plans used by public health officials and emergency planners for the purpose of making protective actions decisions pertaining to sheltering and evacuation.

The accident at Three Mile Island had a profound effect on the residents, emergency management community, government officials and nuclear industry, not only in Pennsylvania, but nationwide. There were minimal requirements for off-site emergency planning for nuclear power stations prior to this accident. Afterwards, comprehensive, coordinated, and exercised plans were developed for the state, counties, school districts, special facilities (hospitals, nursing homes and detention facilities) and municipalities to assure the safety of the population (PA DEP, 2014). Costs associated with an event at one of the Commonwealth's nuclear facilities, be it real or perceived, are significant. The mitigation efforts put in place immediately following the 1979 event continue until today. The Commonwealth Nuclear/Radiological plan which is a successor of the original "Annex E" is a result of the Commonwealth's efforts to address the many components of mitigation planning. The comprehensive planning involved with the five nuclear facilities is an ongoing effort. Plans are reviewed and amended on an annual basis. Recent amendments to various planning documents and station procedures include the efforts to enhance station security measures and the means to bolster communications and response in the event of terrorist activities.

The most recent nuclear incident to occur worldwide was that which involved the Fukushima Daiichi nuclear reactor in Okuma, Fukushima, Japan. This incident occurred on March 11, 2011. An earthquake in the area resulted in a series of equipment failures, nuclear meltdowns, and release of radioactive materials. These failures and releases were largely attributed to flooding from the water that penetrated the structures following the tsunami that was generated by the earthquake. The flooding caused the failure of multiple generators meant to keep the systems operating safely after the

automatic shutdown. No deaths have been directly attributed to the incidents at the reactor at this time. However, there were 2,313 disaster-related deaths among evacuees from Fukushima prefecture. The main causes of these deaths were due to physical or mental illnesses that arose from living in shelters, the trauma of being to move into shelters, and delayed medical care due to the destruction caused by the earthquake and tsunami. Note that there were no deaths caused by radiation. Disaster-related deaths are in addition to the 19,500 that were killed by the earthquake or tsunami. The World Health Organization completed a report that indicated there were only small proportional increases in the occurrence of certain cancers following the radiation exposure from the plant (WNA, 2020).

Following this incident, the United States Nuclear Regulatory Commission developed a set of recommendations based on the lessons learned from the Fukushima incident. These recommendations are meant to enhance reactor safety for US-based nuclear reactors against a variety of factors. Recommendations included the categories of regulatory framework, ensuring protection (of the facilities and equipment), enhancing mitigation, strengthening emergency preparedness and improving the efficiency of USNRC programs. One of the specific recommendations involved the re-evaluation and upgrade of seismic and flooding protection of structures, systems and components for each reactor. As more information comes out, and more lessons learned are developed, it should only serve to reinforce the protections in place against any type of incident involving nuclear power stations.

4.3.16.4. Future Occurrence

Pennsylvania is home to the only nuclear power plant *General Emergency* in the nation. Since the Three Mile Island incident, nuclear power has become significantly safer and is one of the most heavily regulated industries in the nation. Despite the knowledge gained since then, there is still the potential for a similar accident to occur again at one of the five nuclear generating facilities in the Commonwealth.

Across the United States, several *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. Therefore, the future occurrence of nuclear incidents that affect Chester County can be considered *unlikely* as defined by the Risk Factor methodology probability criteria (see Table 4.4-1).

4.3.16.5. Vulnerability Assessment

Every municipality in Chester County is within the Ingestion Exposure Pathway EPZ of both the Limerick Generating Station and Peach Bottom Atomic Power Station. Fourteen municipalities are located within the 10-mile Plume Exposure Pathway EPZ of the Limerick Generating Station, listed in the table below. West Nottingham Township is the only municipality in the Plume Exposure Pathway EPZ for the Peach Bottom Atomic Power Station.

Vulnerability was calculated by identifying all census tracts with centers located within 10 miles of a nuclear power station, as defined in the 10-mile Plume Exposure EPZ. In the Peach Bottom 10-mile Plume Exposure EPZ, there are approximately 33,502 structures, 77,300 people, and 289 critical facilities. In the Limerick 10-mile Plume Exposure EPZ, there are approximately 91 structures, 59 people, and two critical facilities.

Table 4.3.16-2 Municipalities within the Limerick Generating Station Plume Exposure EPZ

MUNICIPALITIES	
Charlestown Township	Schuylkill Township
East Coventry Township	South Coventry Township
East Nantmeal Township	Spring City Borough
East Pikeland Township	Upper Uwchlan Township
East Vincent Township	Warwick Township
North Coventry Township	West Pikeland Township
Phoenixville Borough	West Vincent Township

As stated above, the County's primary vulnerability to nuclear incidents comes in the form of food, soil, and water contamination. Based on the 2022 Census of Agriculture, 1,558 farms were operating in Chester County, with a total of 143,442 acres of farmland. Chester County's farms had a total market value of products sold of over $736,075,000 (USDA, 2022).

Water contamination is also a concern in nuclear incidents. There are several public water suppliers that operate in Chester County or provide water to municipalities. Suppliers include the Aqua Pennsylvania, Atglen Borough Water Department, Chester Water Authority, Downingtown Municipal Water Authority, Honey Brook Borough Water Authority, Kennett Square Borough Water Department, North Coventry Water Authority, Oxford Borough Water Department, Pennsylvania American Water Company, and Phoenixville Borough Water Department. These water supplies, coupled with the County's 23,410 domestic drinking water wells, are all vulnerable to the effects of a nuclear incident.

The loss experienced by each jurisdiction in the case of a nuclear incident will depend on the magnitude of the event. The example of the Three Mile Island incident gives an indication of local and regional economic loss, however. The President's Commission on the Three Mile Island Incident calculated the economic impact of the accident, looking at direct and indirect losses and other potential growth impacts. Direct impacts to the manufacturing sector were estimated at $6.3 million. These losses occurred within a few days after the accident and quickly subsided thereafter with no evidence of permanent layoffs resulting. Food processors also incurred expenses with some farms purchasing equipment to detect radiation levels and converting dairy production to powdered milk.

The utility itself incurred significant costs in the areas of emergency management and plant refurbishment and replacement power. Emergency management costs ran in the hundreds of millions of dollars and replacement power for both units at a cost of $24 million a month. The unaffected TMI Unit 1 was shut down for 6.5 years. During this time, more than $100 million in plant upgrades and refurbishment took place. Replacement power costs today are estimated at nearly twice the 1979 dollars. Cost of the accident cleanup and placing the facility in monitored storage cost approximately $1 billion.

The impact on tourism was estimated at approximately $6.5 million, and wages lost in this sector estimated from $2.8 million to $3.8 million. Losses in the agricultural sector appeared to be minimal due to off-growing season. The Pennsylvania Department of Agriculture indicated that losses were significantly less than $1 million.

4.3.16.6. Equity in Vulnerable Communities

Regarding equity and nuclear incidents, marginalized communities often face disproportionate risks due to their proximity to nuclear facilities, limited access to emergency services, and reduced capacity for evacuation and recovery. Additionally, financial constraints may limit some individuals' ability to evacuate and subsequently recover from nuclear incidents. West Chester Borough and City of Coatesville have the highest concentration of households without a vehicle and also areas with concentrated poverty. The City of Coatesville also has the highest concentration of individuals with disabilities, while West Chester Borough and New Garden Township should consider their populations that may struggle with English. These communities may experience higher exposure to radiation, face barriers to timely medical care, and struggle with long-term recovery issues. Equity considerations involve education on awareness and evacuation, as well as distribution of financial assistance in the aftermath of an incident.

4.3.17. Substance Use Disorder

4.3.17.1. Location and Extent



Substance use disorder occurs when an individual becomes physically dependent on opioids, a class of drugs that reduce pain. Opioid is used as a broad term and includes opiates, which are drugs naturally extracted from certain types of poppy plants and narcotics. Opioids can also be synthetically made to emulate opium. Synthetic opioids include fentanyl as well as prescription pain killers oxycodone (OxyContin), hydrocodone (Vicodin), codeine, morphine, and others.

According to the Drug Enforcement Administration (DEA) opioids come in various forms: tablets, capsules, skin patches, powder, chunks in various colors from white to shades of brown and black, liquid form for oral use and injection, syrups, suppositories, and lollipops. The Centers for Disease Control and Prevention (CDC) defines the following as the three most common types of opioids:

- Prescription Opioids: Opioid medication prescribed by doctors for pain treatment. Prescription opioids can be synthetic, like oxycodone (OxyContin) or hydrocodone (Vicodin), or natural, like morphine.
- Fentanyl: A powerful synthetic opioid that is 50 to 100 times more powerful than morphine and is used for treating severe pain. Illegally made and distributed fentanyl is becoming more prevalent.
- Heroin: An illegal natural opioid processed from morphine and is also becoming more commonly used in the United States.

Opioids are highly addictive. They block the body's ability to feel pain and can create a sense of euphoria. Additionally, individuals often build a tolerance to opioids, which can lead to misuse and overdose. Addiction to these drugs impacts the entire Commonwealth, and it is listed as the number one public health and safety crisis (Office of the Attorney General, n.d.). Pennsylvania is typically among the hardest hit states from total drug overdose deaths each year, ranking 4th in 2020 behind California, Florida, and New York (CDC, 2022). The CDC estimates that nearly 42 out of every 100,000 Pennsylvania residents died from drug overdoses in 2021, which ranked 10th in the nation. This data was broken down by different drug classes and it was found that the death rate for opioids was 36 per 100,000 while the rate for stimulants, such as cocaine or methamphetamine, was 21 per 100,000. These ranked 11th and 12th in the nation, respectively, and were each higher than the national average (CDC, 2022). In

Pennsylvania, overdoses caused by opioids have become the leading cause of accidental death, surpassing automobile accidents (CDC, 2017).

Xylazine, a powerful animal sedative, has become a growing problem for Pennsylvania in recent years. There were 90 reported overdose deaths due to the drug in 2017, but that number jumped to 575 in 2021. This represents an increase of over 600 percent in just five years. Philadelphia reported that 90 percent of opioid samples tested contained xylazine (Governor Josh Shapiro, 2023).

People under the age of 35 have been particularly vulnerable to opioid abuse. According to a joint intelligence report prepared by the DEA Philadelphia Division and the University of Pittsburgh, between 2015 and 2016 in Pennsylvania, fentanyl use increased 380 percent among 15- to 24-year-olds while heroin use increased 970 percent in the 25- to 34-year age range. The report also documented a higher percentage of drug-related deaths attributed to opioid use in Pennsylvania's rural communities at 42 percent, compared to 34 percent in urban communities (DEA Philadelphia Division, 2017).

4.3.17.2. Range of Magnitude

Substance use disorder can lead to overdose, which can be fatal. The most dangerous side effect of an opioid overdose is depressed breathing. The lack of oxygen to the brain causes permanent brain damage, leading to organ failure, and eventually, death. Signs and symptoms include respiratory depression, drowsiness, disorientation, pinpoint pupils, and clammy skin.

Substance use disorder can also be passed from mother to child in the womb. This condition, known as neonatal abstinence syndrome (NAS), increased five-fold from 2000 to 2012, according to the National Institute of Drug Abuse (NIDA), resulting in an estimated 22,000 babies in the United States born with this condition (NIDA, 2019). Between 2010 and 2017, the number of babies diagnosed with NAS increased by 82% (Hirai et al, 2021). Data from 2020 suggests that 59 children are diagnosed with NAS in the United States every day (CDC, 2024).

First responders – paramedics, police officers, and fire fighters, are also affected by Pennsylvania's substance use disorder crisis. In addition to the crisis consuming time and resources, first responders also face exposure risk, particularly to synthetic fentanyl. According to the DEA, it takes two to three milligrams of fentanyl to induce respiratory depression, arrest, and possibly death. Since fentanyl is indistinguishable from several other narcotics and powdered substances, first responders must take extra precaution when dealing with calls related to drug abuse (Rushton, 2019).

The potential impacts of substance abuse on community lifelines are as follows:

Table 4.3.17-1 Most Likely Lifelines Impacted by Substance Abuse

LIFELINES	NOTES
	Government services are needed to aid individuals with substance use disorder and police officers and other first responders may be at risk of exposure to certain substances.
	Substance use has negative impacts on public health and may require medical treatment and mental health services. This can impact health and medical lifelines.

4.3.17.3. Past Occurrence

The CDC found that opioids are the main cause of drug-related overdoses and deaths, being responsible for nearly 75% percent of drug-related deaths nationally in 2017. Of the more than 4,600 drug-related deaths in Pennsylvania in 2016, nearly 84 percent were attributed to two or more drugs. Therefore, drug-related overdose and death statistics account for all drug types, however, as noted above, many drug-related deaths involve opioids.

Compared to statewide death rates, Chester County consistently ranked below the commonwealth's age-adjusted, opioid-related death rates between 2014 and 2020 (PA DOH, 2024b). Overdose Free PA collects county information across the state to track trends in opioid related issues. The following table lists opioid-related deaths from 2015-2023.

Table 4.3.17-2 Number of Reported Accidental Overdose Deaths in Pennsylvania from 2015-2023 (OverdoseFreePA, 2023)

YEAR	NUMBER OF DEATHS PENNSYLVANIA	NUMBER OF DEATHS CHESTER COUNTY
2015	3,119	74
2016	4,540	98
2017	5,425	144
2018	4,451	112
2019	4,479	97
2020	5,176	107
2021	5,356	101
2022	5,158	111
2023	4,717	17*

*Figure from most recently available county-wide data spanning January 1, 2023 through March 10, 2023

Though the substance use disorder crisis is complex and unprecedented, it is widely acknowledged that the opioid crisis began in the late 1990s when pharmaceutical

companies introduced opioid-based pain medication, such as OxyContin, Percocet, and Vicodin. As these drugs become more frequently prescribed, misuse and overdose increased and it became clear that prescription opioids were highly addictive (NIDA, 2020).

4.3.17.4. Future Occurrence

Pennsylvania has seen a rise in opioid-related deaths over the last several years as seen in table 4.1.23-1. Despite this, Pennsylvania saw a decrease in overdose-related deaths between 2022 and 2023 (Open Data PA, 2024).

However, future occurrences of substance use disorder, opioid misuse, overdose, and fatalities are unclear as the state moves forward with overdose prevention initiatives. In January 2018, Governor Tom Wolf declared Pennsylvania's substance use disorder epidemic a disaster emergency. This declaration dedicated resources with the goal of enhancing coordination and data collection between state and local responders, improving tools for families and first responders, and expanding treatment access. The declaration also aimed to improve access to naloxone, a lifesaving drug that reverses the effects of a drug-overdose. In addition, a new Opioid Coordination Group was housed within PEMA (PA DOH, 2018).

Overall, the probability of future opioid overdose and death is *highly likely* as defined by the Risk Factor Methodology (see Section 4.4.1).

4.3.17.5. Vulnerability Assessment

County facilities are not at risk to the opioid crisis, but there are some occupation-specific risks that may make some employees more vulnerable. Employees working in direct patient care are vulnerable to fentanyl exposure. Since fentanyl can be ingested orally, inhaled through the nose or mouth, or absorbed through the skin or eyes, any substance suspected to contain fentanyl should be handled with extreme caution. Exposure to a small amount of fentanyl can lead to respiratory depression or death. Fentanyl-related substances have been found in powders, pills, capsules, liquids, and on blotter paper. The DEA recommends that all first responders carry a Personal Protective Equipment (PPE) kit that includes: nitrile gloves, N-95 dust masks, sturdy eye protection, paper coveralls and shoe protection, and naloxone injectors. The DEA also suggests using extreme caution when using police dogs, as they are at serious risks to health complications from inhaling fentanyl and fentanyl-related substances (DEA, 2016).

Additionally, absenteeism from jobs associated with substance use disorder in high-risk areas could lead to economic loss through lost productivity and increased medical costs.

In general, jurisdictions that are more densely populated are more vulnerable to substance use disorder-related threats as access to the drugs increases. Jurisdictional losses in the substance use disorder crisis stem from lost wages, productivity, and resources rather than losses to buildings or land. Locally, many Pennsylvania counties have seen an increase in time and resources devoted to the opioid epidemic as overdose and response increases. In Chester County, the Overdose Prevention Task Force has operated since 2015 in partnership with the county's Department of Drug & Alcohol Service, District Attorney's Office, Health Department, and others to increase awareness on issues relating to substance use disorder. The task force coordinates Naloxone distribution and continuing medical education events for healthcare providers throughout the county.

Impacts including total costs to jurisdictions are only beginning to be understood, researched, and tracked. There is no comprehensive database currently tracking monetary losses at the local level. However, the American Enterprise Institute (AEI), using national data from the CDC and White House Council of Economic Advisors, calculated a total cost per capita ($1,799), of the opioid epidemic for Pennsylvania. Using this per capita estimate in combination with county population estimates, losses can be estimated for Chester County. It is important to note that this methodology assumes equal per capita opioid misuse and fatalities across all counties, however, based on reported drug overdoses and drug related deaths, it is known that some counties, including those in the southwestern region, are more vulnerable and more likely to experience higher per capita costs while counties in central and north central Pennsylvania tent to be less vulnerable and likely have lesser costs per capita. Another important caveat regarding this methodology is that a portion of the costs will have been state losses rather than County or jurisdictional, but the ratio of state to local cost burden is unknown at this time. It is estimated that Chester County has had a total cost of $989,061,416.

4.3.17.6. Equity in Vulnerable Communities

Communities of concern when it comes to equity and substance use include marginalized communities. The Pennsylvania Department of Health reports that drug overdose rates are higher among Black, Indigenous, and People of Color (BIPOC) than rates among white and non-Hispanic individuals (PA DOH, 2024). Oftentimes these communities frequently encounter obstacles to accessing substance use treatment and prevention services.

4.3.18. Terrorism



4.3.18.1. Location and Extent

The term "terrorism" refers to intentional, criminal, 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 intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives" (28 CFR §0.85).

The Federal Bureau of Investigation (FBI) characterizes terrorism as either domestic or international, depending on the origin, base, and objectives of the terrorist organization. However, the origin of the terrorist or person causing the hazard is far less relevant to mitigation planning than the hazard itself and its consequences.

Terrorism refers to the use of weapons of mass destruction (WMD), including: biological, chemical, radiological, and nuclear weapons; arson, incendiary, explosive, and armed attacks; industrial sabotage and agriterrorism; intentional hazardous materials releases; and cyberterrorism.

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, water and food supplies, utilities, and corporate centers. Furthermore, terrorists are capable of spreading fear by sending explosives or chemical and biological agents through the mail (FEMA, 2009). Additionally, terrorists use threats to create fear, to try to convince citizens of the powerlessness of their government, and/or to get publicity for their causes. Nonetheless, terrorism can take many forms and terrorists have a wide range of personal, political, or cultural agendas.

The probability of terrorism cannot be quantified with as great a level of accuracy as that of many natural hazards. Furthermore, these incidents generally occur at a specific location, such as a government building, rather than encompassing an area such as a floodplain.

An important consideration in evaluating terrorism hazards is the existence of facilities, landmarks, or other buildings of international, national, or regional importance. While Chester County has many notable landmarks from a local historical perspective, no sites

within the county are considered significant landmarks in terms of national or international importance. The county does have critical infrastructure that, if attacked, could have significant effects on the local or regional level. Critical infrastructure can include financial centers, government buildings, media outlets, transportation authorities, power/utilities companies, and telecommunications networks. Several major transportation routes and gas transmission pipelines traverse Chester County, making intentional hazard material release a potential threat to citizens and the environment. This hazard is addressed in Section 4.3.15. In addition, several bridges and railways (discussed in Section 4.3.19, Transportation Incidents) connect Chester County to the Philadelphia metropolitan area that could be considered potential targets. A complete list of critical facilities is included in Appendix E.

No location within Chester County is immune from being a potential terrorist target. Acts of terrorism can occur anywhere, at any time of day. A few types of terrorist activities are particularly relevant to Chester County: cyber terrorism (see Section 4.3.12), conventional/improvised bomb threat, and armed attacks. A cyber-attack can take the form of data breaches, crippling computer viruses, or even damage to physical technology infrastructure. A bomb threat can be verbal or written to ignite an explosive device to cause property damage, death or injuries to victims, and/or to incite fear. An armed attack is using a weapon to cause property damage, death, injuries, and/or incite fear.

4.3.18.2. Range of Magnitude

Terrorist attacks can take many forms. The FBI identifies the following as some of the common tactics of terrorism (FBI, 2023):

- Agroterrorism
- Arson/incendiary attack
- Armed attack
- Assassination
- Biological agent
- Chemical agent
- Cyberterrorism
- Conventional bomb
- Hijackings
- Intentional hazardous materials release
- Kidnapping
- Nuclear bomb
- Radiological agent

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 if 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.

An evolving type of terrorist threat is Complex Coordinated Terrorist Attacks (CCTAs). CCTAs are acts of terrorism that involve synchronized and independent team(s) at multiple locations, sequentially or in close succession, initiated with little or no warning, and employing one or more weapon systems which could include firearms, explosives, fire as a weapon, and other nontraditional attack methodologies that are intended to result in large numbers of casualties (FEMA, 2018). The dynamic nature of CCTAs makes the timing and location of threats difficult to predict, representing a shift from traditional symbolic and highly planned attacks. CCTAs could occur anywhere, at any time, with the potential for mass casualties and infrastructure damage.

Depending on the type of terrorist attack, there may be significant loss of life for humans and animals as well as economic losses. Additionally, the impact of the attack itself may be exacerbated by the fact that human services agencies like community support programs, health and medical services, public assistance programs, and social services can experience physical damage to facilities, supplies, and equipment and disruption of emergency communications. There may also be ancillary effects of terrorism such as urban fires or, in the case of a radiological device, radioactive fallout that can multiply the impact of a terrorist event.

The worst-case scenario for a terrorism event in Chester County would involve an active shooter incident or the use of explosive devices with radiological material at a public event in a well-populated area. This type of event would cause casualties and fatalities across all demographics, and depending on the time of recovery, would cause severe economic losses. In addition to the physical injuries, there will be high emotional and behavioral impacts on the population that was near the attack, as well as residents of Chester County who were not near the attack. Further, any event that results in mass casualties or fatalities could overwhelm the capabilities of Chester County government services, emergency services, and healthcare facilities and hospitals.

The potential impacts of terrorism on community lifelines are as follows:

Table 4.3.18-1 Most Likely Lifelines Impacted by Terrorism

LIFELINES	NOTES
	Community safety is often threatened, and police, fire, and other government services are either targeted or needed to respond to terroristic threats or actions.
	Water resources and the food supply chain may be targeted by biological terrorism.
	Energy infrastructure may be a potential target for terrorism.
	Hazardous materials facilities may be a potential target for terrorism.

4.3.18.3. Past Occurrence

There has been a high consciousness of terrorist activity in the press with few catastrophic events. The most significant terrorist attack on United States soil occurred on September 11, 2001; Flight 93, the fourth hijacked aircraft in the attack, crashed in Somerset County, Pennsylvania.

Chester County has never suffered an international terrorist attack. However, Chester County has experienced domestic terrorism incidents. Table 4.3.18-2 lists the number of domestic terrorism incidents by type reported by Chester County DES between 2015 and 2018, and Table 4.3.18-3 lists incidents in 2023. Data is not available for 2020 through 2022 due to a cyberattack on the County. Chester County is largely rural in nature and for most of its history, residents have not experienced any major civil disorders. The majority of incidents that have occurred were in more urban areas.

Table 4.3.18-2 Terrorist Activity Recorded in Chester County (2015-2018)

EVENT TYPE	2015	2016	2017	2018
Bomb Threat	10	4	6	10
Explosive Found	1		1	1
Possible Explosive Found			1	1
Suspicious Package	1	2		1
Officer Injury	1			
Threat Received			1	
Barricaded Subject	1		1	
Hostage Situation			1	
Poisoning	1			

Table 4.3.18-2 Terrorist Activity Recorded in Chester County (2015-2018)

EVENT TYPE	2015	2016	2017	2018
Terrorist Activity		2	1	
School Incident / Lock Down		1		1
Prison Disturbance			1	
Large Fight				2
ERT Team Activation				1
TOTAL	**15**	**9**	**13**	**17**

Table 4.3.18-3 Terrorist Activity Recorded in Chester County in 2023 (Chester County DES, 2025)

DATE	DETAILS	LOCATION
1/6/2023	Grenade Found	N/A
1/30/2023	Grenade Found	N/A
9/2/2023	Explosive found	233 Kimbel Dr Phoenixville, PA 19460
9/23/2023	Explosive found	106 Columbia Dr Coatesville, PA 19320

4.3.18.4. Future Occurrence

An important consideration in estimating the likelihood of a terrorist incident is the existence of facilities, landmarks, or other buildings of national or regional importance. As stated, there are no sites within Chester County which are considered significant landmarks in terms of national or international importance.

Based on historical events, Chester County can expect to experience suspected terrorist incidents or threats each year. Although previous events have not resulted in what are considered significant terrorist attacks, the severity of a future incident cannot be predicted with a sufficient level of certainty. 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, terrorism is a possibility. Overall, the likelihood of a terrorist attack is considered *unlikely* as defined by the Risk Factor Methodology (See Section 4.4-1).

The National Terrorism Advisory System (NTAS) communicates information about terrorist threats by providing timely, detailed information to the public, government agencies, first responders, public sector organizations, airports, and other transportation hubs. Information can be distributed through two mediums: Bulletins or Alerts. NTAS Bulletins are used to disseminate critical information regarding terrorism that may not relate to a specific threat (US DHS, 2022).

When a threat arises, the Secretary of Homeland Security announces an NTAS Alert and shares the news with the public. The alert may include specific information about the nature of the threat, including the geographic region, mode of transportation, or critical infrastructure potentially affected as well as steps that individuals and communities can

take to protect themselves and help prevent, mitigate, or respond to the threat. The alert indicates whether the threat is elevated or imminent. Elevated threats are those that include no specific information about the timing or location. Imminent threats are threats believed to be impending or occurring very soon. DHS will issue an NTAS advisory through their website, news media, and its social media channels such as Facebook and Twitter (US DHS, 2022).

4.3.18.5. Vulnerability Assessment

The probability of Chester County becoming a terrorist target should remain relatively low; however, because of its proximity to other more vulnerable areas, its vulnerability and potential for secondary impacts is increased. Chester County may experience some serious issues caused by an influx of people from the larger metropolitan areas to the east in situations of terrorism and/or nuclear threats to these areas. This influx of population in these critical situations would stress the facilities of Chester County, its municipalities, and first responders. First responders' safety may be at risk during on-scene operations, and there would be a higher than normal call volume/demand. First responders may have to perform additional duties such as traffic control and responding to traffic incidents.

Since the probability of terrorism occurring cannot be quantified in the same way as that of many natural hazards, it is not possible to assess vulnerability in terms of likelihood of occurrence. Instead, vulnerability is assessed in terms of specific assets. By identifying potentially at-risk terrorist targets in Chester County, planning efforts can be put in place to reduce the risk of attack. All communities in Chester County are vulnerable on some level, directly or indirectly, to a terrorist attack. However, communities where the previously mentioned potential targets are located should be considered more vulnerable. FEMA's Integrating Manmade Hazards into Mitigation Planning (2003) encourages site-specific assessments that should be based on the relative importance of a particular site to the surrounding community or population, threats that are known to exist, and vulnerabilities including:

Inherent Vulnerability

- Visibility: How aware is the public of the existence of the facility?
- Utility: How valuable might the place be in meeting the objectives of a potential terrorist?
- Accessibility: How accessible is the place to the public?
- Asset Mobility: Is the asset's location fixed or mobile?
- Presence of Hazardous Materials: Are flammable, explosive, biological, chemical and/or radiological materials present on site? If so, are they well secured?

- Potential for Collateral Damage: What are the potential consequences for the surrounding area if the asset is attacked or damaged?
- Occupancy: What is the potential for mass casualties based on the maximum number of individuals on site at a given time?

Tactical Vulnerability

Site Perimeter

- Site Planning and Landscape Design: Is the facility designed with security in mind, both site-specific and with regard to adjacent land uses?
- Parking Security: Are vehicle access and parking managed in a way that separates vehicles and structures?

Building Envelope

- Structural Engineering: Is the building's envelope designed to be blast-resistant? Does it provide collective protection against chemical, biological, and radiological contaminants?

Facility Interior

- Architectural and Interior Space Planning: Does security screening cover all public and private areas?
- Mechanical Engineering: Are utilities and Heating, Ventilating and Air Conditioning (HVAC) systems protected and/or backed up with redundant systems?
- Electrical Engineering: Are emergency power and telecommunications available? Are alarm systems operational? Is lighting sufficient?
- Fire Protection Engineering: Are the building's water supply and fire suppression systems adequate, code-compliant, and protected? Are on-site personnel trained appropriately? Are local first responders aware of the nature of the operations at the facility?
- Electronic and Organized Security: Are systems and personnel in place to monitor and protect the facility?

To reduce their vulnerability to terrorism hazards, Chester County belongs to the Southeastern Pennsylvania (SEPA) Regional Task Force (RTF), a group of five counties that collaborate to prevent, protect against, prepare for, respond to, recover from, and mitigate terrorism and other hazards on a regional level. Like the other regional task forces in Pennsylvania, SEPA-RTF is funded by the Pennsylvania Emergency

Management Agency (PEMA) using DHS's Homeland Security Grant Program's State Homeland Security Program (SHSP). The counties of SEPA-RTF, including Chester County, use this funding to conduct emergency planning, training, and exercise activities, and to purchase equipment to reduce the region's vulnerability to terrorism.

4.3.18.6. Equity in Vulnerable Communities

Regarding equity considerations for terrorism preparedness, several vulnerable communities require special attention. Emergency response plans should include and consider the needs of diverse populations, including non-English speakers, individuals with disabilities, and those with limited access to technological resources like smartphones or internet connections. The City of Coatesville and Spring City Borough have census tracts where more than 20 percent of the population has a disability while Honey Brook Township, West Fallowfield Township, Oxford Borough, Penn Township, Lower Oxford Township, and City of Coatesville have high concentrations of residents without smartphones.

4.3.19. Transportation Incidents



4.3.19.1. Location and Extent

For this risk assessment, a transportation incident is defined as an incident involving highway, air, or rail travel. These incidents are collectively the costliest of all hazards in the Commonwealth in terms of lost lives, injuries, and economic losses, but they are also exceedingly common. Pennsylvania has the fifth largest state highway system in the United States. Within Chester County, there are over 3,700 total linear miles of roadway, including 1,016 of PennDOT miles and 2,649 of local municipal linear miles (PennDOT, 2023). Accidents involving hazardous materials are considered under Section 4.3.15 of this report. The analysis in this profile includes the location of all public airports, passenger and freight rail lines, and highways where major accidents are likely to occur.

Key routes throughout the county include I-76 (PA Turnpike), US-1, US-202, and US-322. These are the routes with the highest overall traffic volume and higher speed roadways. This combination of volume and speed can make them the location of more traffic accidents. There is potential for major incidents on any of these roads. Furthermore, several respondents to the Hazard Identification Survey highlighted Route 30 as a significant transportation concern in Chester County. Respondents called out the stretch from Exton to Parkesburg as being in particularly poor condition, with potholes and deteriorating pavement posing safety risks and increasing the likelihood of accidents. Others pointed to the need for increased capacity or alternative routes to alleviate congestion. Some respondents expressed frustration with traffic signal timing along key intersections like Lincoln Highway, Pennsylvania Avenue, and Boot Road. These comments reflect community desire for infrastructure improvements and more reliable transportation options, including SEPTA service beyond Thorndale to serve western parts of the county. Figure 4.3.19-1 illustrates the major transportation systems in the County while Figure 4.3.19-2 shows the traffic volume on key roadways.

Chester County also has multiple rail lines that carry passengers and freight. The two passenger lines are a SEPTA and an Amtrak line. The SEPTA line is a Regional Rail line that passes through the County starting at Thorndale and takes passengers into Philadelphia. The Amtrak line is part of the Keystone Corridor, which is part of Amtrak's Northeast Corridor System. This line runs from Harrisburg to Philadelphia, and connects passengers to Lancaster, Philadelphia, and New York. The Amtrak line runs through Chester County at Parkesburg, Coatesville, Downingtown, Exton and Paoli (CCBC, 2025). The freight line is run by the East Penn Railroad, and runs through Chester County at Chadds Ford, Kennett Square, Avondale, West Grove, and Oxford (East Penn Railroad, 2022). At any point along these rail lines, a transportation incident could occur.

Chester County has three public airports and several private airfields and heliports. The three public airports include Chester County G.O. Carlson Airport, New Garden Airport, and Brandywine Regional Airport. Numerous major air traffic routes for the northern United States also pass over Chester County, but most aviation accidents in the US happen during takeoff and landing. Air transportation incidents are rare; nationwide, in 2023, there were only 40 air carrier accidents, with 26 serious injuries and no fatalities.

Figure 4.3.19-1 Chester County Transportation Systems, 2025

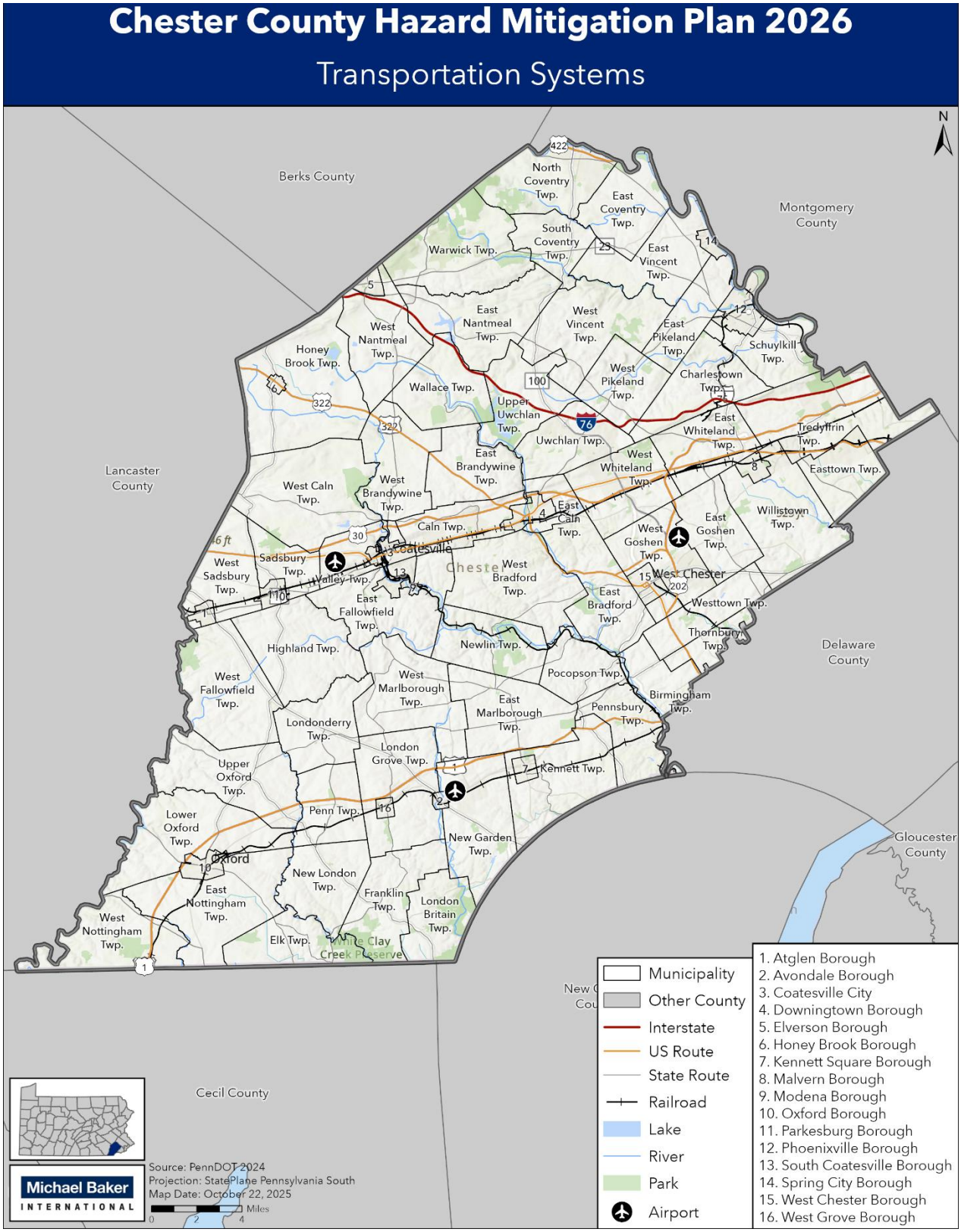
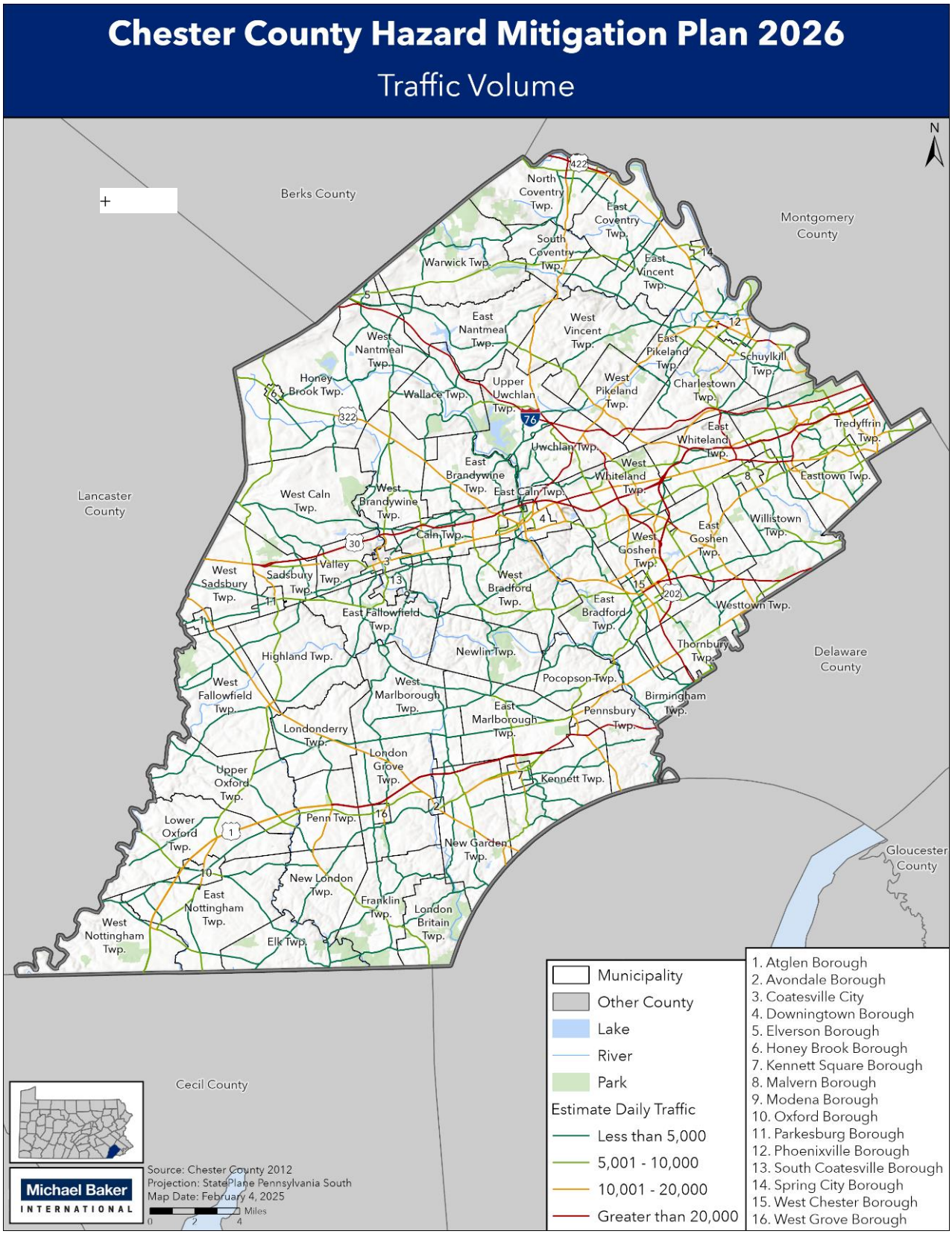


Figure 4.3.19-2 Chester County Traffic Volume on Key Roadways, 2024



4.3.19.2. Range of Magnitude

At a minimum, transportation incidents can result in damage to roadway infrastructure (like guard rails), the vehicle(s) involved and minor injuries to passengers and drivers. At worst, significant transportation incidents can result in death or serious injury and property damage, coupled with business interruptions and hours of congestion. They can also result in environmental damage if the vehicle(s) involved are transporting hazardous materials, whether by truck or rail. The expected impacts of transportation incidents are amplified by the fact that there is often little warning beforehand.

The worst-case scenario for a transportation incident impacting Chester County would be a road accident which results in a hazardous material spill in a densely populated area. Such an event would constitute an immediate health hazard to the population and require an evacuation. It could disrupt businesses, snarl commutes, and potentially cause long-term environmental damage.

The potential impacts of transportation incidents on community lifelines are as follows:

Table 4.3.19-1 Most Likely Lifelines Impacted by Transportation Incidents

LIFELINE	NOTES
Safety and Security	Direct harm to community safety, including drivers, bicyclists, and pedestrians. Depending on the location and magnitude of the incident, this can also disrupt law enforcement operations and fire and emergency services' ability to navigate to where they are needed.
Health and Medical	Medical personnel might be needed due to the significant risk of injury and death that transportation incidents represent. Large-scale traffic accidents causing downstream congestion can hinder patient movement and prevent people from getting to medical care, often on short notice.
Hazardous Materials	Potential negative consequences of incidents occurring while transporting these materials.
Communications	Potential for disruption to telecommunication service if the transportation incident involves damage to communication infrastructure. This is often a short-term impact.
Energy (Power & Fuel)	Potential for disrupted power around a transportation incident if it involves damage to power lines or other utility infrastructure. This is often a short-term impact.

4.3.19.3. Past Occurrence

Vehicle crashes continue to be a risk throughout the County. PennDOT statistics for reportable vehicle crashes in Chester County are shown in Table 4.3.19-2. In 2024,

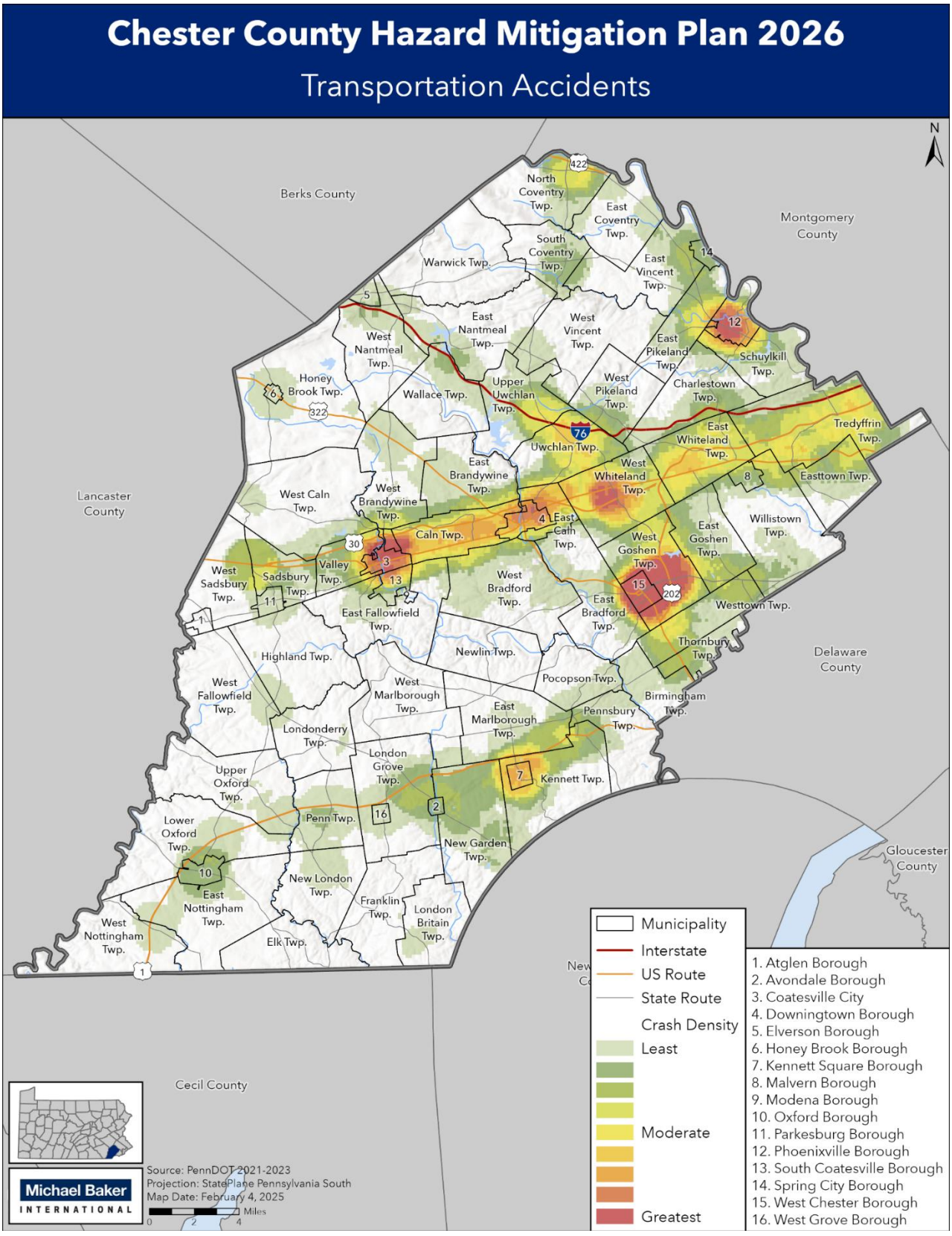
Chester County was one of ten counties responsible for 54% of all traffic crashes in Pennsylvania (PennDOT, 2025).

Table 4.3.19-2 Reportable Traffic Crash Data, 2010-2024 (PennDOT, 2025).

YEAR	REPORTABLE CRASHES	# FATAL CRASHES	# INJURY CRASHES	# PDO CRASHES
2010	4,256	29	1,787	2,440
2011	4,541	35	1,824	2,682
2012	4,310	29	1,824	2,457
2013	4,517	33	1,748	2,736
2014	4,676	33	1,899	2,744
2015	4,938	33	1,903	3,002
2016	4,889	24	1,834	3,031
2017	4,777	33	1,810	2,934
2018	4,924	42	1,854	3,028
2019	4,717	27	1,731	2,959
2020	3,488	30	1,322	2,136
2021	4,057	34	1,565	2,458
2022	4,373	27	1,585	2,761
2023	4,141	30	1,574	2,537
2024	4,362	24	1.669	2,669
PDO = Property Damage Only				

Figure 4.3.19-3 shows the density of transportation crashes throughout Chester County. Red and yellow areas show roadways where the most crashes occurred between 2021 and 2023. In Chester County, most accidents occur along Routes I-76, US-30, and US-202. Crashes are also densely concentrated around the more populated communities in the northern portion of the County. Municipalities in the north central area along I-76 and US-30, such as Coatesville City, South Coatesville Borough, Caln Township, Downingtown Borough, East Caln Township, and West Whiteland Township have areas with dense incidents of transportation crashes.

Figure 4.3.19-3 Chester County Transportation Crash Density, 2021-2023



There is no comprehensive database tracking rail incidents, but there have been some recent events in Chester County. In January 2022, an individual was killed after being struck by an Amtrak train in Sadsbury Township (Samuel, 2022). In August 2022, an East Penn Railroad train derailed in Chester County, resulting in several rail cars in resident's backyard (Hughes, 2022). In July 2025, a SEPTA Regional Rail car caught fire at Paoli station along the Paoli/Thorndale line. Only crew members were on board, with one individual being transported to a local hospital due to smoke inhalation. Two rail cars were rendered inoperable (Ignudo, 2025).

Table 4.3.19-3 below shows the two air transportation incidents, both small aircraft crashes, included in Chester County EMA records since the last plan update.

Table 4.3.19-3 Transportation Incidents Recorded in Chester County (Chester County EMA, 2025).

DATE	TYPE	INCIDENT	LOCATION
3/22/2023	Transportation Emergency	Small aircraft crash – property damage only	N/A
2/5/2024	Transportation Emergency	Small aircraft crash. 1 fatality.	573 Old Wilmington Road, West Caln, PA

4.3.19.4. Future Occurrence

While transportation incidents cannot be accurately predicted, areas with incident-prone characteristics, such as poor visibility and unprotected left turns, and areas with known crashes and speeding issues can be identified and documented. Future aviation incidents are expected to continue to be rare. However, the number of transportation related incidents is expected to increase with growing populations and increased traffic volumes. The population of Chester County increased by 8.2% between 2010 and 2023. Further, the County has an average commute time of 27.4 minutes with 66.9% of residents driving alone to work (U.S. Census Bureau, 2023, ACS). These factors can indicate more individuals on the road, and for longer, increasing the risk of roadway vehicular incidents. Along with this, the transportation and warehousing industry account for 2.8% of overall employment in the county (U.S. Census Bureau, 2023, ACS). Any growth of the transportation and warehousing economic sector will put greater demand on the county's roadways and will likely result in the continued occurrence of transportation incidents. If this growth is dependent on and results in an increase in rail transportation, rail incidents could increase in turn.

Changes to Pennsylvania's climate will also have an impact on future occurrences of transportation incidents because these changes can impact the condition of the infrastructure both long-term and in severe weather events. Changes in precipitation,

extreme weather events, and heat pose risks to transportation infrastructure, affecting performance, safety, and reliability. Flooding can weaken roadways and tunnels and potentially lead to landslides that affect highways, railways, and bridges. Rising temperatures can damage roadways, rail infrastructure, and make it more difficult for airplanes to take off (EPA, 2025a).

The future occurrence of transportation incidents can be considered *likely*, according to the Risk Factor Methodology (see Table 4.4-1).

4.3.19.5. Vulnerability Assessment

A transportation-related incident can occur on any stretch of road in Chester County. However, severe accidents are more likely on the County's highways, which experience heavier traffic volumes including heavy freight vehicles. The combination of high traffic volume, severe winter weather in the County and large numbers of hazardous materials haulers can increase the severity of traffic accidents occurring. Accidents may also occur on any rail line or air flight path, though the greatest danger for an aviation accident is just after takeoff and just before landing. This is why vulnerability is defined as distance from an airport, not flight paths.

Because of the widespread transportation network in Chester County, many structures are exposed to the threat of transportation incidents. Tables 4.3.19-4, 4.3.19-5, and 4.3.19-6 show the structures, critical facilities, and populations vulnerable to transportation incidents on roads, railroads, and near airports in Chester County.

Overall, 52% of all structures in Chester County are located within 0.5 miles of a major highway and 19% are within 0.5 miles of an active rail line. The communities most at risk are those with a high volume of structures within 0.5 miles of both a major highway and an active railroad. There are five municipalities with 90% or more of their structures near a major highway and greater than 80% of structures near an active rail line: Atglen Borough, Avondale Borough, Coatesville City, Parkesburg Borough, and West Grove Borough. However, it is important to note that it is rare that a transportation incident would result in the full loss of all structures in the most vulnerable zones. The magnitude of vulnerability may depend on the proximity to a roadway or rail line, whether there are barriers in place like berms or man-made barriers, and the speed and weather conditions during the incident.

As for critical facilities, Kennett Township and West Grove Borough are the most vulnerable with 100% of their critical facilities location within 0.5 miles of a major highway and an active rail line. Similarly, Coatesville City and West Grove Borough both have a large percentage of people living within 0.5 miles of a major highway and active rail line. In Coatesville City, 94 percent of people are located within 0.5 miles of a major

highway and 92 percent are located within 0.5 miles of an active rail line. In West Grove Borough, 99 percent of people are located within 0.5 miles of a major highway and 81 percent are located within 0.5 miles of an active rail line.

Avondale Borough, New Garden Township, and Valley Township are the only municipalities with structures and some population within 0.5 miles of an airport. New Garden and Valley Townships are the only ones with critical facilities within 0.5 miles of an airport.

Chester County is collaborating with the Delaware Valley Regional Planning Commission on a Regional Safety Action Plan under its Safe Streets and Roads for All Program. This program envisions a future with zero roadway fatalities. Participating communities will take strides to lower the human impact of roadway incidents. The county's Complete Streets Policy, adopted in 2021, also encourages street design that facilitates safe, convenient and comfortable travel for all users (CCPC, 2021). This kind of policy, coupled with other smart growth policies, can support risk reduction and therefore vulnerability to transportation incidents.

Table 4.3.19-4 Structures Vulnerable to Transportation Incidents, 2025

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT STRUCTURES WITHIN 0.5 MILES OF MAJOR HIGHWAY	STRUCTURES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT STRUCTURES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	STRUCTURES WITHIN 0.5 MILES OF AIRPORT	PERCENT STRUCTURES WITHIN 0.5 MILES OF AIRPORT
Atglen Borough	577	547	95%	480	83%	0	0%
Avondale Borough	405	378	93%	363	90%	46	11%
Birmingham Township	1,624	575	35%	143	9%	0	0%
Caln Township	4,701	4,264	91%	1,924	41%	0	0%
Charlestown Township	2,266	1,013	45%	450	20%	0	0%
Coatesville City	2,732	2,632	96%	2,353	86%	0	0%
Downingtown Borough	2,291	2,226	97%	1,662	73%	0	0%
East Bradford Township	3,658	2,180	60%	236	6%	0	0%
East Brandywine Township	3,683	1,672	45%	0	0%	0	0%
East Caln Township	1,269	966	76%	220	17%	0	0%
East Coventry Township	3,563	1,067	30%	62	2%	0	0%
East Fallowfield Township	3,944	1,117	28%	275	7%	0	0%
East Goshen Township	5,665	3,115	55%	0	0%	0	0%
East Marlborough Township	3,571	2,574	72%	0	0%	0	0%
East Nantmeal Township	1,508	730	48%	0	0%	0	0%
East Nottingham	4,885	1,177	24%	1,081	22%	0	0%

Table 4.3.19-4 Structures Vulnerable to Transportation Incidents, 2025

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT STRUCTURES WITHIN 0.5 MILES OF MAJOR HIGHWAY	STRUCTURES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT STRUCTURES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	STRUCTURES WITHIN 0.5 MILES OF AIRPORT	PERCENT STRUCTURES WITHIN 0.5 MILES OF AIRPORT
Township							
East Pikeland Township	3,552	1,915	54%	120	3%	0	0%
Easttown Township	3,727	1,846	50%	30	1%	0	0%
East Vincent Township	4,029	3,002	75%	1,883	47%	0	0%
East Whiteland Township	4,401	2,621	60%	1,478	34%	0	0%
Elk Township	1,367	938	69%	0	0%	0	0%
Elverson Borough	584	582	100%	0	0%	0	0%
Franklin Township	2,456	1,207	49%	0	0%	0	0%
Highland Township	1,307	372	28%	0	0%	0	0%
Honey Brook Borough	732	732	100%	0	0%	0	0%
Honey Brook Township	4,909	2,227	45%	0	0%	0	0%
Kennett Township	1,751	1,497	85%	1,327	76%	0	0%
Kennett Square Borough	3,867	1,783	46%	943	24%	0	0%
London Britain Township	1,782	368	21%	0	0%	0	0%
Londonderry Township	4,078	1,894	46%	811	20%	0	0%
London Grove Township	1,692	1,093	65%	0	0%	0	0%

Table 4.3.19-4 Structures Vulnerable to Transportation Incidents, 2025

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT STRUCTURES WITHIN 0.5 MILES OF MAJOR HIGHWAY	STRUCTURES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT STRUCTURES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	STRUCTURES WITHIN 0.5 MILES OF AIRPORT	PERCENT STRUCTURES WITHIN 0.5 MILES OF AIRPORT
Lower Oxford Township	2,579	872	34%	478	19%	0	0%
Malvern Borough	1,066	217	20%	955	90%	0	0%
Modena Borough	201	0	0%	200	100%	0	0%
New Garden Township	5,451	1,364	25%	846	16%	188	3%
Newlin Township	2,921	817	28%	0	0%	0	0%
New London Township	1,193	522	44%	502	42%	0	0%
North Coventry Township	4,288	1,977	46%	232	5%	0	0%
Oxford Borough	1,704	1,499	88%	1,245	73%	0	0%
Parkesburg Borough	1,371	1,333	97%	1,115	81%	0	0%
Penn Township	2,901	1,922	66%	1,167	40%	0	0%
Pennsbury Township	1,712	1,085	63%	579	34%	0	0%
Phoenixville Borough	4,731	4,414	93%	2,531	53%	0	0%
Pocopson Township	1,757	1,016	58%	446	25%	0	0%
Sadsbury Township	1,987	1,568	79%	691	35%	0	0%
Schuylkill Township	4,096	2,115	52%	1,377	34%	0	0%
South Coatesville Borough	506	30	6%	383	76%	0	0%

Table 4.3.19-4 Structures Vulnerable to Transportation Incidents, 2025

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT STRUCTURES WITHIN 0.5 MILES OF MAJOR HIGHWAY	STRUCTURES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT STRUCTURES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	STRUCTURES WITHIN 0.5 MILES OF AIRPORT	PERCENT STRUCTURES WITHIN 0.5 MILES OF AIRPORT
South Coventry Township	1,653	992	60%	0	0%	0	0%
Spring City Borough	1,199	147	12%	291	24%	0	0%
Thornbury Township	1,060	627	59%	152	14%	0	0%
Tredyffrin Township	9,617	5,464	57%	4,529	47%	0	0%
Upper Oxford Township	2,109	1,338	63%	9	0%	0	0%
Upper Uwchlan Township	3,909	1,665	43%	0	0%	0	0%
Uwchlan Township	5,805	2,371	41%	0	0%	0	0%
Valley Township	2,926	2,778	95%	1,303	45%	64	2%
Wallace Township	2,065	952	46%	0	0%	0	0%
Warwick Township	2,192	967	44%	0	0%	0	0%
West Bradford Township	5,801	711	12%	64	1%	0	0%
West Brandywine Township	4,141	1,918	46%	0	0%	0	0%
West Caln Township	6,070	2,274	37%	0	0%	0	0%
West Chester Borough	3,147	2,954	94%	1,212	39%	0	0%
West Fallowfield	2,226	914	41%	0	0%	0	0%

Table 4.3.19-4 Structures Vulnerable to Transportation Incidents, 2025

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT STRUCTURES WITHIN 0.5 MILES OF MAJOR HIGHWAY	STRUCTURES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT STRUCTURES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	STRUCTURES WITHIN 0.5 MILES OF AIRPORT	PERCENT STRUCTURES WITHIN 0.5 MILES OF AIRPORT
Township							
West Goshen Township	8,075	4,908	61%	396	5%	0	0%
West Grove Borough	964	920	95%	844	88%	0	0%
West Marlborough Township	983	657	67%	0	0%	0	0%
West Nantmeal Township	1,832	810	44%	0	0%	0	0%
West Nottingham Township	2,014	792	39%	409	20%	0	0%
West Pikeland Township	2,050	1,142	56%	0	0%	0	0%
West Sadsbury Township	1,915	863	45%	458	24%	0	0%
Westtown Township	3,127	894	29%	0	0%	0	0%
West Vincent Township	5,656	2,763	49%	960	17%	0	0%
West Whiteland Township	3,838	2,094	55%	505	13%	0	0%
Willistown Township	5,275	1,608	30%	1,035	20%	0	0%
Total	214,689	112,584	52%	40,755	19%	298	0%

Table 4.3.19-5 Critical Facilities Vulnerable to Transportation Accidents, 2025.

MUNICIPALITY	TOTAL CRITICAL FACILITIES	FACILITIES WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT FACILITIES WITHIN 0.5 MILES OF MAJOR HIGHWAY	FACILITIES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT FACILITIES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	FACILITIES WITHIN 0.5 MILES OF AIRPORT	PERCENT FACILITIES WITHIN 0.5 MILES OF AIRPORT
Atglen Borough	8	8	100%	6	75%	0	0%
Avondale Borough	5	5	100%	5	100%	0	0%
Birmingham Township	11	6	55%	3	27%	0	0%
Caln Township	57	53	93%	26	46%	0	0%
Charlestown Township	29	16	55%	14	48%	0	0%
Coatesville City	27	27	100%	25	93%	0	0%
Downingtown Borough	41	35	85%	30	73%	0	0%
East Bradford Township	43	34	79%	4	9%	0	0%
East Brandywine Township	49	29	59%	0	0%	0	0%
East Caln Township	28	17	61%	11	39%	0	0%
East Coventry Township	34	16	47%	1	3%	0	0%
East Fallowfield Township	26	9	35%	5	19%	0	0%
East Goshen Township	32	16	50%	0	0%	0	0%
East Marlborough Township	25	24	96%	0	0%	0	0%
East Nantmeal Township	16	10	63%	0	0%	0	0%
East Nottingham	36	10	28%	6	17%	0	0%

Table 4.3.19-5 Critical Facilities Vulnerable to Transportation Accidents, 2025.

MUNICIPALITY	TOTAL CRITICAL FACILITIES	FACILITIES WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT FACILITIES WITHIN 0.5 MILES OF MAJOR HIGHWAY	FACILITIES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT FACILITIES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	FACILITIES WITHIN 0.5 MILES OF AIRPORT	PERCENT FACILITIES WITHIN 0.5 MILES OF AIRPORT
Township							
East Pikeland Township	23	13	57%	1	4%	0	0%
Easttown Township	28	12	43%	0	0%	0	0%
East Vincent Township	81	70	86%	25	31%	0	0%
East Whiteland Township	35	14	40%	12	34%	0	0%
Elk Township	12	4	33%	0	0%	0	0%
Elverson Borough	4	4	100%	0	0%	0	0%
Franklin Township	17	8	47%	0	0%	0	0%
Highland Township	15	4	27%	0	0%	0	0%
Honey Brook Borough	5	5	100%	0	0%	0	0%
Honey Brook Township	31	9	29%	0	0%	0	0%
Kennett Township	14	14	100%	14	100%	0	0%
Kennett Square Borough	44	25	57%	14	32%	0	0%
London Britain Township	13	1	8%	0	0%	0	0%
Londonderry Township	38	22	58%	8	21%	0	0%
London Grove Township	9	5	56%	0	0%	0	0%
Lower Oxford	36	15	42%	3	8%	0	0%

Table 4.3.19-5 Critical Facilities Vulnerable to Transportation Accidents, 2025.

MUNICIPALITY	TOTAL CRITICAL FACILITIES	FACILITIES WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT FACILITIES WITHIN 0.5 MILES OF MAJOR HIGHWAY	FACILITIES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT FACILITIES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	FACILITIES WITHIN 0.5 MILES OF AIRPORT	PERCENT FACILITIES WITHIN 0.5 MILES OF AIRPORT
Township							
Malvern Borough	10	2	20%	7	70%	0	0%
Modena Borough	5	0	0%	5	100%	0	0%
New Garden Township	44	20	45%	11	25%	2	5%
Newlin Township	15	6	40%	0	0%	0	0%
New London Township	18	9	50%	10	56%	0	0%
North Coventry Township	37	30	81%	8	22%	0	0%
Oxford Borough	17	14	82%	12	71%	0	0%
Parkesburg Borough	15	15	100%	14	93%	0	0%
Penn Township	25	18	72%	6	24%	0	0%
Pennsbury Township	25	14	56%	11	44%	0	0%
Phoenixville Borough	32	32	100%	19	59%	0	0%
Pocopson Township	27	21	78%	7	26%	0	0%
Sadsbury Township	18	14	78%	3	17%	0	0%
Schuylkill Township	36	13	36%	8	22%	0	0%
South Coatesville Borough	6	0	0%	6	100%	0	0%
South Coventry Township	18	11	61%	0	0%	0	0%

Table 4.3.19-5 Critical Facilities Vulnerable to Transportation Accidents, 2025.

MUNICIPALITY	TOTAL CRITICAL FACILITIES	FACILITIES WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT FACILITIES WITHIN 0.5 MILES OF MAJOR HIGHWAY	FACILITIES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT FACILITIES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	FACILITIES WITHIN 0.5 MILES OF AIRPORT	PERCENT FACILITIES WITHIN 0.5 MILES OF AIRPORT
Spring City Borough	6	0	0%	3	50%	0	0%
Thornbury Township	10	8	80%	7	70%	0	0%
Tredyffrin Township	139	112	81%	60	43%	0	0%
Upper Oxford Township	18	11	61%	0	0%	0	0%
Upper Uwchlan Township	27	24	89%	0	0%	0	0%
Uwchlan Township	42	31	74%	0	0%	0	0%
Valley Township	33	33	100%	18	55%	1	3%
Wallace Township	19	14	74%	0	0%	0	0%
Warwick Township	13	8	62%	0	0%	0	0%
West Bradford Township	33	11	33%	3	9%	0	0%
West Brandywine Township	30	18	60%	0	0%	0	0%
West Caln Township	20	12	60%	0	0%	0	0%
West Chester Borough	26	24	92%	14	54%	0	0%
West Fallowfield Township	21	9	43%	0	0%	0	0%
West Goshen Township	78	59	76%	12	15%	0	0%
West Grove	6	6	100%	6	100%	0	0%

Table 4.3.19-5 Critical Facilities Vulnerable to Transportation Accidents, 2025.

MUNICIPALITY	TOTAL CRITICAL FACILITIES	FACILITIES WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT FACILITIES WITHIN 0.5 MILES OF MAJOR HIGHWAY	FACILITIES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT FACILITIES WITHIN 0.5 MILES OF ACTIVE RAIL LINE	FACILITIES WITHIN 0.5 MILES OF AIRPORT	PERCENT FACILITIES WITHIN 0.5 MILES OF AIRPORT
Borough							
West Marlborough Township	21	19	90%	0	0%	0	0%
West Nantmeal Township	21	14	67%	0	0%	0	0%
West Nottingham Township	12	7	58%	3	25%	0	0%
West Pikeland Township	22	16	73%	0	0%	0	0%
West Sadsbury Township	16	12	75%	7	44%	0	0%
Westtown Township	25	11	44%	0	0%	0	0%
West Vincent Township	86	76	88%	42	49%	0	0%
West Whiteland Township	28	16	57%	9	32%	0	0%
Willistown Township	55	17	31%	10	18%	0	0%
Total	**2,027**	**1,327**	**65%**	**534**	**26%**	**3**	**0%**

Table 4.3.19-6 Population Vulnerable to Transportation Accidents, 2025.

MUNICIPALITY	ESTIMATED 2020 POPULATION	POPULATION WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT POPULATION WITHIN 0.5 MILES OF MAJOR HIGHWAY	POPULATION WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT POPULATION WITHIN 0.5 MILES OF ACTIVE RAIL LINE	POPULATION WITHIN 0.5 MILES OF AIRPORT	PERCENT POPULATION WITHIN 0.5 MILES OF AIRPORT
Atglen Borough	1,313	1,088	83%	912	69%	0	0%
Avondale Borough	1,274	1,252	98%	1,121	88%	49	4%
Birmingham Township	4,082	1,682	41%	102	2%	0	0%
Caln Township	14,432	12,587	87%	6,505	45%	0	0%
Charlestown Township	6,001	2,938	49%	1,157	19%	0	0%
Coatesville City	13,350	12,552	94%	12,278	92%	0	0%
Downingtown Borough	7,892	7,817	99%	5,525	70%	0	0%
East Bradford Township	10,339	7,846	76%	96	1%	0	0%
East Brandywine Township	9,738	3,678	38%	0	0%	0	0%
East Caln Township	5,384	4,329	80%	644	12%	0	0%
East Coventry Township	7,068	2,107	30%	65	1%	0	0%
East Fallowfield Township	7,626	1,172	15%	597	8%	0	0%
East Goshen Township	18,410	10,641	58%	0	0%	0	0%
East Marlborough Township	7,306	5,707	78%	0	0%	0	0%
East Nantmeal Township	1,832	781	43%	0	0%	0	0%
East Nottingham Township	8,982	1,768	20%	1,443	16%	0	0%
East Pikeland Township	8,260	5,109	62%	50	1%	0	0%
Easttown Township	7,433	4,220	57%	12	0%	0	0%
East Vincent Township	13,917	9,454	68%	4,680	34%	0	0%
East Whiteland Township	10,984	6,290	57%	3,411	31%	0	0%
Elk Township	1,698	1,132	67%	0	0%	0	0%
Elverson Borough	1,330	1,330	100%	0	0%	0	0%

Table 4.3.19-6 Population Vulnerable to Transportation Accidents, 2025.

MUNICIPALITY	ESTIMATED 2020 POPULATION	POPULATION WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT POPULATION WITHIN 0.5 MILES OF MAJOR HIGHWAY	POPULATION WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT POPULATION WITHIN 0.5 MILES OF ACTIVE RAIL LINE	POPULATION WITHIN 0.5 MILES OF AIRPORT	PERCENT POPULATION WITHIN 0.5 MILES OF AIRPORT
Franklin Township	4,433	2,002	45%	0	0%	0	0%
Highland Township	1,259	302	24%	0	0%	0	0%
Honey Brook Borough	1,892	1,892	100%	0	0%	0	0%
Honey Brook Township	8,274	3,233	39%	0	0%	0	0%
Kennett Township	5,936	5,137	87%	4,839	82%	0	0%
Kennett Square Borough	8,289	3,568	43%	2,134	26%	0	0%
London Britain Township	3,179	446	14%	0	0%	0	0%
Londonderry Township	8,797	3,557	40%	1,654	19%	0	0%
London Grove Township	2,476	1,232	50%	0	0%	0	0%
Lower Oxford Township	5,436	1,246	23%	1,103	20%	0	0%
Malvern Borough	3,419	901	26%	3,112	91%	0	0%
Modena Borough	541	0	0%	541	100%	0	0%
New Garden Township	11,363	2,197	19%	1,422	13%	298	3%
Newlin Township	5,810	1,551	27%	0	0%	0	0%
New London Township	1,358	726	53%	587	43%	0	0%
North Coventry Township	8,441	3,993	47%	472	6%	0	0%
Oxford Borough	5,736	5,331	93%	4,306	75%	0	0%
Parkesburg Borough	3,862	3,694	96%	3,121	81%	0	0%
Penn Township	5,644	3,346	59%	2,330	41%	0	0%
Pennsbury Township	3,876	2,965	76%	1,042	27%	0	0%
Phoenixville Borough	18,602	16,894	91%	11,634	63%	0	0%
Pocopson Township	4,455	2,773	62%	771	17%	0	0%
Sadsbury Township	4,125	2,855	69%	1,245	30%	0	0%

Table 4.3.19-6 Population Vulnerable to Transportation Accidents, 2025.

MUNICIPALITY	ESTIMATED 2020 POPULATION	POPULATION WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT POPULATION WITHIN 0.5 MILES OF MAJOR HIGHWAY	POPULATION WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT POPULATION WITHIN 0.5 MILES OF ACTIVE RAIL LINE	POPULATION WITHIN 0.5 MILES OF AIRPORT	PERCENT POPULATION WITHIN 0.5 MILES OF AIRPORT
Schuylkill Township	8,780	4,003	46%	3,524	40%	0	0%
South Coatesville Borough	1,601	38	2%	1,177	74%	0	0%
South Coventry Township	2,796	1,989	71%	0	0%	0	0%
Spring City Borough	3,494	366	10%	855	24%	0	0%
Thornbury Township	3,177	1,975	62%	227	7%	0	0%
Tredyffrin Township	31,927	20,771	65%	14,443	45%	0	0%
Upper Oxford Township	2,560	1,485	58%	0	0%	0	0%
Upper Uwchlan Township	12,275	5,502	45%	0	0%	0	0%
Uwchlan Township	19,161	9,292	48%	0	0%	0	0%
Valley Township	7,985	7,800	98%	3,686	46%	41	1%
Wallace Township	3,711	1,930	52%	0	0%	0	0%
Warwick Township	2,590	1,122	43%	0	0%	0	0%
West Bradford Township	14,316	1,924	13%	18	0%	0	0%
West Brandywine Township	7,331	3,720	51%	0	0%	0	0%
West Caln Township	8,910	3,510	39%	0	0%	0	0%
West Chester Borough	18,671	18,234	98%	7,335	39%	0	0%
West Fallowfield Township	2,459	1,026	42%	0	0%	0	0%
West Goshen Township	23,040	13,981	61%	665	3%	0	0%
West Grove Borough	2,770	2,735	99%	2,236	81%	0	0%
West Marlborough Township	819	365	45%	0	0%	0	0%
West Nantmeal Township	2,251	967	43%	0	0%	0	0%
West Nottingham	2,748	1,039	38%	492	18%	0	0%

Table 4.3.19-6 Population Vulnerable to Transportation Accidents, 2025.

MUNICIPALITY	ESTIMATED 2020 POPULATION	POPULATION WITHIN 0.5 MILES OF MAJOR HIGHWAY	PERCENT POPULATION WITHIN 0.5 MILES OF MAJOR HIGHWAY	POPULATION WITHIN 0.5 MILES OF ACTIVE RAIL LINE	PERCENT POPULATION WITHIN 0.5 MILES OF ACTIVE RAIL LINE	POPULATION WITHIN 0.5 MILES OF AIRPORT	PERCENT POPULATION WITHIN 0.5 MILES OF AIRPORT
Township							
West Pikeland Township	4,024	1,765	44%	0	0%	0	0%
West Sadsbury Township	2,436	940	39%	609	25%	0	0%
Westtown Township	6,668	2,321	35%	0	0%	0	0%
West Vincent Township	19,632	12,797	65%	4,428	23%	0	0%
West Whiteland Township	11,154	6,310	57%	1,767	16%	0	0%
Willistown Township	11,273	4,653	41%	2,246	20%	0	0%
Total	**534,413**	**307,881**	**58%**	**122,619**	**23%**	**388**	**0%**

4.3.19.6. Equity in Vulnerable Communities

The National Safety Council, a national organization focused on promoting safety, including transportation safety, cites many research-backed issues related to equity in transportation nationwide:

- Older adults and drivers under the age of 25 have a higher fatality rate in vehicular crashes than other age groups.
- Nationally, 43% of all highway fatalities happen on rural roads.
- Pedestrian fatalities stemming from vehicular incidents are higher for low-income communities, with lower income neighborhoods seeing more than twice as many pedestrian fatalities than highest income neighborhoods.
- Lower income neighborhoods are more likely to have more dangerous roadways with characteristics that increase fatalities in crashes, like higher speeds. If hit by a vehicle traveling just 40 miles per hour, only one in ten pedestrians will survive (National Safety Council, 2023).

While these are national statistics, they provide some indication of how equity issues may manifest in Chester County when it comes to transportation incidents. Zero-car households and individuals dependent on walking or biking are more vulnerable in traffic accidents. West Chester Borough and the City of Coatesville have the highest concentration of households without a vehicle and also have areas with concentrated poverty. Chester County's more rural areas may also have disproportionate effects due to their secluded locations which could affect the access to timely and effective emergency response services.

4.3.20. Urban Fire and Explosion

4.3.20.1. Location and Extent



Urban fire and explosion involves a structure or property fire within an urban or developed area. For hazard mitigation purposes, major urban fires involving large buildings and/or multiple properties are of primary concern. Explosions are extremely rapid releases of energy that usually generate high temperatures and often lead to fires. This hazard occurs in the denser, more urbanized areas and occurs most often in residential structures (US Fire Administration, 2019). Urban fires can more easily spread from building to building in these denser areas.

Urban fires and explosions can be triggered or exacerbated by other disaster events such as floods, storms, drought, transportation incidents, hazardous materials releases, and criminal activity such as arson, and terrorism. Urban fires have the potential to cause extensive damage to residential, commercial, or public property. 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.

4.3.20.2. Range of Magnitude

The effects of a major urban fire include minor to significant property damage, loss of life, and residential or business displacement. Impacts vary based on the size of the incident and the population and structure where it occurs. Although most fires are small structural fires, the cumulative effect of these small incidents can be great in terms of property damage and lives lost. Many small incidents have the potential for a fire disaster if early warning and fire department services are not available. The secondary effects of urban fire 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, social services, etc.) 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 load of victims who are suffering from the effects of the urban fire, including loss of their home or place of business.

A significant urban fire occurred in 2023 in downtown Oxford Borough on South Third Street, between Market and Hodgson Street. Fire damaged a total of four businesses and 13 residential buildings (Baietto, Monroe, & Brandt, 2023). This four-alarm blaze resulted in 25 families, over 90 people in total, to be displaced and a disaster declaration for Oxford Borough. The fire burned for several hours and required the assistance of firefighters from state, county, and regional agencies such as Lancaster County, and the states of Delaware and Maryland. Although one firefighter sustained a burn to his ear, no one else was hurt from the fire event. Displaced residents were given temporary housing by the Chester County Emergency Services and the Red Cross, while monetary and household items were donated to help the fire victims. The fire cause was "undetermined" (Oxford Borough, n.d.).



Figure 1.3.12-1 2023 Fire in downtown Oxford (6abc, 2023)



Figure 1.3.12-2 Damage from 2023 urban fire in downtown Oxford (6abc, 2023)

There are additional economic consequences related to this hazard. Urban fires and explosions may result in lost wages due to temporary or permanent business closures, destruction and damage involving business and personal assets, loss of tax base, recovery costs, and lost investments in destroyed property.

The potential impacts of urban fire and explosion on community lifelines are as follows:

Table 4.3.20-1 Most Likely Lifelines Impacted by Urban Explosion and Fire

LIFELINES	NOTES
Safety and Security	Government personnel will need to respond where community safety is threatened.
Food, Hydration, Shelter	Shelter is at risk as fires and explosions have a direct impact on houses and other forms of shelter.
Health and Medical	Medical personnel may be needed for response and recovery.

4.3.20.3. Past Occurrence

Chester County experiences a number of urban fires every year, most of which are small and affect one to a few structures. As reported in the 2021 HMP, a total of 3,377 structural fires were reported in Chester County between January 2017 and June 2020. There were 976 structural fires reported in 2017; 1,013 fires in 2018; and 986 fires in 2019. From January to June 2020, a total of 402 fires had been reported. Details on losses, injuries, and fatalities caused by these events were not found. Chester County EMS provided more recent urban fire data, as seen in Table 4.3.24-2. Structural fires most frequently affect residential communities within Chester County. Photographs of a major fire event are provided in Figures 4.3.24-1 and 4.3.24-2.

Table 4.3.20-2 Structure Fires Recorded in Chester County Incident Log (Chester County, 2023-24)

Date	Type	Additional Details	Location
1/5/2023	Fire	Gas leak causing evacuation.	Not provided.
2/25/2023	Fire	Apartment Fire. Evacuation of 8 units/21 people.	421 Crest Lane, East Coventry Township, PA
4/25/2023	Fire	Apartment Fire. 7 families displaced.	616 West Schuylkill Road, Pottstown, PA, 19465
4/28/2023	Hazardous Materials	Fire in insulation.	345 Scarlett Rd, New Garden Twp.
6/5/2023	Fire	Pipeline - small earth feature.	500 Lancaster Pike, Exton, PA, 19341
9/13/2023	Fire	4th alarm apartment fire. Disaster declaration.	23 S 3rd Street, Oxford, PA, 19363
9/21/2023	Hazardous Materials	HAZMAT team dispatched to an acid fire at the Metallurgical Products building caused by burning phosphorus.	810 Lincoln Avenue, West Chester, PA 19380
12/14/2023	Fire	Apartment fire with evacuation. Shelter setup.	131 S Union Street , Kennett Square , PA , 19346
2/17/2024	Hazardous Materials	Building fire with numerous hazmat.	1031 Pottstown Pike, Chester Springs, PA, 19425
5/19/2024	Fire	House explosion due to propane issue.	1546 Limestone Road, Upper Oxford, PA, 19330
10/22/2024	Fire	Fire in hospital. Total divert.	255 Lancaster Avenue, Paoli, PA

4.3.20.4. Future Occurrence

The future occurrence of urban fire and explosion events can be considered *possible*, according to the Risk Factor Methodology (see Table 4.4-1), with minor events happening more frequently than major fires or explosions in the future. The greatest urban fire and explosion threats in Chester County are industrial fires and hazardous materials fires. While residential fires are more common, industrial fires have a

potentially higher risk because of the possibility of there being flammable chemicals and a sustained fuel source at industrial sites. Areas with greater population density are also at a greater risk for fires.

4.3.20.5. Vulnerability Assessment

Areas where large buildings are located or where development is closely spaced are more vulnerable to urban fire and explosion events. In Chester County, the jurisdictions with the highest population densities (greater than 5,000 persons per square mile) include Tredyffrin and West Goshen Townships. In order to adequately assess vulnerability to urban fires and explosions, detailed information on the design specifications, specifically fire codes, used for the construction of individual buildings is required.

As of December 31, 2006, all communities in Pennsylvania are required to comply with the Uniform Construction Codes. This includes requirements to comply with both the International Fire Code and the International Wildland Urban Interface Code. The adoption and enforcement of these codes will likely decrease the overall vulnerability of structures in Chester County. However, these regulations will only affect new construction, as well as additions and renovations to existing structures. Older buildings that do not meet the criteria established in these modern fire codes will continue to remain vulnerable to urban fire and explosion events.

Communities that do not have fire departments are more vulnerable in urban fire and explosion events as it can take longer for services from another community to reach the site.

4.3.20.6. Equity in Vulnerable Communities

Municipalities with an older housing stock may be at a higher risk for urban fires and explosions. Low-income communities oftentimes live in neighborhoods where inadequate building maintenance is common or are situated near industrial areas due to historic zoning regulations. This includes West Chester Borough, the City of Coatesville, Oxford Borough, and the City of Phoenixville as they have areas with the highest percentage of population below the poverty level. Residential areas in rural areas may also be at a heightened risk due to their seclusion affecting response times. Individuals with disabilities or limited mobility may face additional challenges during a fire or explosion. Ensuring that emergency services are equipped to assist people with diverse needs is essential in responding to these events.

4.3.21. Utility Interruption

4.3.21.1. Location and Extent



Utility interruptions include any impairment of the functioning of telecommunication, gas, electric, water, or waste networks. Interruptions or outages occur because of geomagnetic 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.

These kinds of interruptions rarely spontaneously occur on their own; this hazard is often secondary to other natural hazard events, particularly transportation incidents, lightning strikes, extreme heat or cold events, and coastal and winter storms. For example, severe thunderstorms or winter storms could bring down power lines and cause widespread disruptions in electricity service. Strong heat waves may result in rolling blackouts where power may not be available for an extended period. Local outages may be caused by traffic accidents or wind damage.

Utility interruptions and power failures can take place throughout the County. Respondents to the public survey for this HMP update ranked utility interruptions in the top five hazard risks that Chester County faces. Utility interruption was the most selected option, with 62.3% of respondents including in their top five most concerning hazards. Community members are particularly concerned about this hazard and the consequences and other hazards it could cause if such an interruption occurred.

According to the 2023 5-year American Community Survey, in Chester County, 35.7% of housing units use utility gas, followed by 30.5% of homes using electric heat as their heat source (U.S. Census Bureau, 2023). As a result, an interruption in either of those utilities could affect a significant number of residents. In addition, an increasing reliance on internet access and telecommunications could also impact a large number of residents at any given time.

4.3.21.2. Range of Magnitude

Most severe power failures or outages are regional events. With the loss of power, electric-powered equipment and systems will not be operational. Examples may include lighting, HVAC and ancillary support equipment, communications (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. These issues are often more of a nuisance than a hazard but can cause damage or harm depending on the population affected and the severity of the outage.

Interruptions can also be more severe for special needs populations that are dependent on electronic medical equipment. A study of power interruptions on community health found that power outages are associated with increased rates of carbon monoxide poisoning, temperature-related illness, gastrointestinal illness, and mortality to all-cause, cardiovascular, respiratory, and renal disease hospitalizations, especially for individuals relying on electricity-dependent medical equipment. Communities are especially vulnerable if medical facilities, food safety, long-term care facilities, or life-sustaining medications are compromised from utility interruptions (Casey et al, 2020).

The severity of a utility interruption can be compounded with extreme weather events, especially winter weather events. 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. Telecommunications interruptions will also hinder first responders' efforts. Additionally, internet outages can impact the economy, as many companies and government entities process payments and invoices electronically rather than with physical checks.

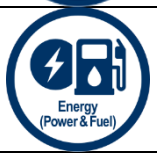
In a possible worst-case scenario in Chester County, a winter storm event could cause widespread power outages, leaving citizens without heat in the midst of subzero temperatures for several days. The power outage would also put elderly populations or others at risk of health problems due to the lack of heat and the inability to call for assistance or leave their homes. Power lines may also be difficult to repair because of the magnitude of the storm.

The potential impacts of utility interruption on the community lifelines are as follows:

Table 4.3.21-1 Most Likely Lifelines Impacted by Utility Interruption

LIFELINES	NOTES
	Government facilities may be impacted directly and the capability to administer services diminished. Impacts to certain facilities will require additional public outreach from the County and authorities (e.g., interruption in water supply).
	Water and electrical utilities in homes and potentially different aspects of the food supply chain will be impacted.

Table 4.3.21-1 Most Likely Lifelines Impacted by Utility Interruption

LIFELINES	NOTES
	Healthcare facilities may be impacted directly and therefore the capacity to deal with patients is diminished. Outages may impact the storage and handling of vaccines.
	Fuel usage may increase as a result of electricity no longer being available for an extended period of time.

4.3.21.3. Past Occurrence

Every year, Chester County is susceptible to minor utility interruptions either through technological failure or as the result of inclement weather.

Table 4.3.21-2 list events reported to Chester County DES in 2023 and 2024. The majority are boil water advisories due to impacts on water utilities. Events that simply included downed trees and power lines are not listed in the table.

Table 4.3.21-2 Utility Interruption Events Reported to Chester County EMA 2023-2024 (Chester County EMA, 2025)

DATE	DETAILS
2/5/2023	Boil Water Advisory
2/8/2023	Boil Water Advisory
2/21/2023	Boil Water Advisory
3/2/2023	Boil Water Advisory
4/3/2023	Boil Water Advisory
4/19/2023	Boil Water Advisory
4/20/2023	Boil Water Advisory
5/1/2023	Boil Water Advisory
5/1/2023	Boil Water Advisory
6/1/2023	Boil Water Advisory
6/1/2023	Boil Water Advisory
6/6/2023	Boil Water Advisory
6/14/2023	Boil Water Advisory
6/15/2023	Boil Water Advisory
6/21/2023	Boil Water Advisory
6/26/2023	Boil Water Advisory
7/17/2023	Boil Water Advisory
7/25/2023	Boil Water Advisory
6/25/2024	Water outage at Paoli Hospital.
7/18/2024	IT outage affecting hospitals.

Table 4.3.21-3 provides power outages in Chester County from 2020 to 2023. The dataset, hosted by the Open Energy Data Initiative (OEDI) was compiled by integrating

three data sources: Environment for the Analysis of Geo-Located Energy Information (EAGLE-I), the Electric Emergency Incident Disturbance Report (DOE-417), and Annual Estimates of the Resident Population for Counties 2024 (CO-EST2024-POP). The table below only includes outages that last at least 12 hours.

Table 4.3.21-3 Power Outages in Chester County 2020 – 2023 (She, Adetola, and Yun, 2024)

DATE	DURATION (HOURS)	MINIMUM CUSTOMERS AFFECTED	MAXIMUM CUSTOMERS AFFECTED	MEAN CUSTOMERS AFFECTED
2/7/2020	27.5	272	5,509	1,233
4/9/2020	23.75	234	5,325	1,105
6/3/2020	129.25	204	72,581	20,578
7/6/2020	26.75	266	4,835	1,375
7/24/2020	12.25	200	6,399	797
8/4/2020	130.5	207	110,546	24,797
8/10/2020	20.75	222	4,191	686
8/18/2020	15	647	909	679
8/22/2020	15	347	476	392
11/30/2020	12	202	3,916	1,635
12/25/2020	46.5	256	21,299	5,448
3/26/2021	27	227	4,729	1,174
4/30/2021	29.25	292	6,271	971
5/29/2021	12.75	344	1,285	524
6/8/2021	24.5	210	6,826	1,644
6/21/2021	16.5	202	4,319	772
8/19/2021	16.5	210	3,499	1,101
10/29/2021	29	202	4,259	1,489
2/18/2022	18.75	213	17,868	3,901
2/25/2022	15	200	4,302	1,386
3/8/2022	20.25	310	2,916	934
3/12/2022	15.5	300	9,191	2,193
5/7/2022	30.5	206	3,673	1,181
12/23/2022	56	200	12,455	2,041
3/4/2023	14.5	206	2,226	423
4/1/2023	22.5	353	12,847	2,898
4/29/2023	14.25	206	447	281
6/25/2023	13	206	3,076	1,326
6/26/2023	25.5	207	6,034	1,397
7/8/2023	22.5	214	1,967	678
7/29/2023	25.5	223	6,123	873
8/7/2023	12.25	4,128	50,218	30,634
8/8/2023	59.75	222	22,455	4,746
9/23/2023	35	211	3,754	844
12/18/2023	25.75	207	4,149	1,014

Outside of event tracking databases, recent reporting identifies several other occurrences in the county. In January 2024, high winds and heavy rain led to power outages across the county. Chester County DES reported 130 calls for downed power lines or wires. PECO reported 215,000 customers without power in the service region. At least 21,200 customers in Chester County lost power (Rettew, 2024). In June 2025, a thunderstorm bringing high winds and rain led to power outages across the county. PECO reported that 50,000 customers in the county were without power. Willistown Township's two sewer plants also went offline due to storm impacts. PECO worked to restore power as high temperatures, close to 100 degrees, were expected for the upcoming weekend (Rellahan, 2025).

4.3.21.4. Future Occurrence

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. Research by the National Oceanic and Atmospheric Administration (NOAA) suggests that climate change may cause more extreme storms in Pennsylvania (Frankson et. al., 2017).

The Climate Mapping for Resilience and Adaptation (CRMA) Tool predicts that average annual precipitation will increase while the number of days per year with precipitation may decrease. The number days per year that exceed the 99th percentile precipitation is projected to increase as well. It also predicts more days with extreme heat. These factors can increase the occurrence of hazards such as drought, flooding, hurricanes and tropical storms, tornados and windstorms, and wildfires. Impacts from any of these hazards can lead to utility interruption on a range of scales. Overall, the future probability of utility interruptions can be considered *likely* according to the Risk Factor Methodology (See Table 4.4-1).

Aging infrastructure may have a higher risk to utility interruptions. In many utility systems, significant portions of the equipment and facilities date from the growth periods of the 1950s and 1960s that followed World War II. As this equipment ages, it deteriorates from the constant wear and tear of service. Eventually, the equipment reaches a point at which it will either fail on its own or as a result of outside forces (storms, loads it was designed to handle but no longer can, etc.). These failures cause service interruptions and can require expensive emergency repairs. In addition, as repairs have taken place along transmission routes, there is often a mix of new and old equipment along the line; repair, not replacement, is generally the choice to resolve an issue.

The wholesale replacement of a system is not a feasible solution for utility companies. This would require the interruption of services while the replacement occurs, as well as accessing the existing system (which may lie under roads, private property, or other inconvenient places). Utility companies face the challenge of managing the issue of the aging infrastructure. They are tasked with reducing the effects of aging equipment while also controlling the deterioration of the existing system as much as possible. This balance will be tenuous as transmission equipment continues to age and break down. These breakdowns will likely lead to more frequent utility disruptions as time goes by.

4.3.21.5. Vulnerability Assessment

All jurisdictions are vulnerable on some level to utility interruptions. Because this hazard often occurs in conjunction with other hazards, jurisdictions that have been identified as more vulnerable to winter storms, windstorms, tornadoes, flooding, and other natural hazard events may be more vulnerable to a utility interruption.

Emergency medical facilities, including retirement homes and senior centers, are particularly vulnerable to power outages. While back-up power generators are often used at these facilities, loss of electricity may result in hot or cold temperatures for which elderly populations are particularly vulnerable. Appendix D provides a list of where those facilities are located in Chester County. Conservation and improved technology have resulted in more efficient use of energy sources. The increasing use of alternative fuel supplies, such as kerosene heaters, wood burning stoves, coal burners, etc., has also decreased our vulnerability to future shortages. However, severe weather extremes, accidents, labor strikes, terrorism, or nationwide shortages could cause significant energy shortage problems.

4.3.21.6. Equity in Vulnerable Communities

Utility interruptions can disproportionately affect vulnerable populations, including the elderly, individuals with disabilities, and those with chronic health issues who rely on electricity for medical equipment. Adequate preparedness for these groups prioritizes these groups by ensuring that backup power systems, such as generators, are in place. Areas of East Goshen Township, Kennett Township, West Brandywine Township, and Willistown Township have a higher risk due to concentrations of their population being aged 65 or older while City of Coatesville and Spring City Borough have census tracts where more than 20 percent of the population has a disability. Additionally, low-income communities often face challenges related to aging or poorly maintained infrastructure, which can increase the likelihood and duration of utility interruptions. Adequate mitigation efforts should focus on improving infrastructure resilience.

4.4. HAZARD VULNERABILITY SUMMARY

4.4.1. Methodology

Ranking hazards helps communities prioritize mitigation based on their vulnerabilities. A Risk Factor (RF) is a tool used to assess the degree of risk for identified hazards in a particular planning area. The RF aids local officials in ranking and prioritizing hazards that pose the most significant threats to the planning area using a mix of qualitative and quantitative data deemed important by the planning team and other stakeholders. The RF system relies mainly on historical data, local knowledge, consensus from the planning team, and information collected through development of the hazard profiles in Section 4.3. The RF approach produces numerical values to rank hazards against one another; the higher the RF value, the greater the hazard risk.

RF values are determined by assigning varying degrees of risk to five categories for each of the hazards profiled in the HMP Update: *probability, impact, spatial extent, warning time, and duration*. Each degree of risk was assigned a value from one to four. The weighting factor is shown in Table 4.4-1. 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:

Risk Factor Value = [(Probability x .30) + (Impact x .30) + (Spatial Extent x .20) + (Warning Time x .10) + (Duration x .10)]

Table 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.

Table 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: WHAT IS THE LIKELIHOOD OF A HAZARD EVENT OCCURRING IN A GIVEN YEAR?	UNLIKELY	LESS THAN 1% ANNUAL PROBABILITY.	1	30%
	POSSIBLE	BETWEEN 1% AND 49.9% ANNUAL PROBABILITY.	2	
	LIKELY	BETWEEN 50% AND 90% ANNUAL PROBABILITY.	3	
	HIGHLY LIKELY	GREATER THAN 90% ANNUAL PROBABILITY.	4	

Table 4.4-1 Summary of Risk Factor Approach Used to Rank Hazard Risk

RISK ASSESSMENT CATEGORY	DEGREE OF RISK				WEIGHT VALUE
	LEVEL	CRITERIA		INDEX	
IMPACT: IN TERMS OF INJURIES, DAMAGE, OR DEATH, WOULD YOU ANTICIPATE IMPACTS TO BE MINOR, LIMITED, CRITICAL, OR CATASTROPHIC WHEN A SIGNIFICANT HAZARD EVENT OCCURS?	MINOR	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE AND 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 AND 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 AND 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: HOW LARGE OF AN AREA COULD BE IMPACTED BY A HAZARD EVENT? ARE IMPACTS LOCALIZED OR REGIONAL?	NEGLIGIBLE	LESS THAN 1% OF AREA AFFECTED.		1	20%
	SMALL	BETWEEN 1% AND 10.9% OF AREA AFFECTED.		2	
	MODERATE	BETWEEN 11% AND 25% OF AREA AFFECTED.		3	
	LARGE	GREATER THAN 25% OF AREA AFFECTED.		4	
WARNING TIME: IS THERE USUALLY SOME	> 24 HOURS	SELF-DEFINED	NOTE: LEVELS OF WARING TIME AND	1	10%
	12 TO 24 HOURS	SELF-DEFINED		2	

Table 4.4-1 Summary of Risk Factor Approach Used to Rank Hazard Risk

RISK ASSESSMENT CATEGORY	DEGREE OF RISK				WEIGHT VALUE
	LEVEL	CRITERIA		INDEX	
LEAD TIME ASSOCIATED WITH THE HAZARD EVENT? HAVE WARNING MEASURES BEEN IMPLEMENTED?	6 TO 12 HOURS	SELF-DEFINED	CRITERIA THAT DEFINE THEM MAY BE ADJUSTED BASED ON HAZARD ADDRESSED.	3	
	< 6 HOURS	SELF-DEFINED		4	
DURATION: HOW LONG DOES THE HAZARD EVENT USUALLY LAST?	< 6 HOURS	SELF-DEFINED	NOTE: LEVELS OF DURATION TIME AND CRITERIA THAT DEFINE THEM MAY BE ADJUSTED BASED ON HAZARD ADDRESSED.	1	10%
	< 24 HOURS	SELF-DEFINED		2	
	< 1 WEEK	SELF-DEFINED		3	
	> 1 WEEK	SELF-DEFINED		4	
CLIMATE CHANGE: HOW WILL CLIMATE CHANGE IMPACT THE OTHER 5 RATINGS FOR THE HAZARD?	NEGATIVE IMPACT	EXPECTED TO INCREASE RISKS.		⬆	N/A
	POTENTIAL NEGATIVE	POTENTIAL TO INCREASE RISKS.		⟷	
	LITTLE TO NO IMPACT	NO IMPACT OR SMALL RISK INCREASE THROUGH INDIRECT MEANS.		⟷	
	POSITIVE IMPACT	RISK EXPECTED TO DECREASE.		⬇	

4.4.2. Ranking Results

Using the methodology described in Section 4.4.1, Table 4.4-2 lists the Countywide RF calculated for each of the 21 potential hazards identified in the 2026 HMP Update. Hazards identified as *high* risk have risk factors greater than 2.5. Risk Factors ranging from 2.0 to 2.4 were deemed *moderate* risk hazards. Hazards with Risk Factors 1.9 and less are considered *low* risk. Based on these results, Centre County has 14 high risk hazards, six moderate risk hazards, and one low risk hazards.

The RF and rankings have remained generally consistent with those identified in the 2021 Plan Update, with a few notable updates. Extreme temperatures, urban fire and explosion, transportation incidents, and nuclear incidents are now considered high risk hazards. The probability and impact ratings increased for extreme temperatures, urban fire and explosion, and transportation incidents, driving their ranking changes. Nuclear incidents were previously listed as a low-risk hazard; however, the potential impacts, spatial extent, and duration ratings were increased as there are several municipalities within 10-mile Plume Exposure Pathway EPZs and every municipality in Chester County is within an Ingestion Exposure Pathway EPZ. Utility interruption and flood, flash flood, and ice jams are still the highest-risk hazards, which is reflective of feedback received from speaking with municipalities, stakeholders, and the public. Dam failure was updated from low-risk to moderate risk due to an increased impact rating, driven by this plan's more in-depth look at High-Hazard Potential Dams and the impact they can have.

A risk assessment result for the entire County does not mean that each municipality is at the same amount of risk to each hazard. Table 4.4-3 shows the different municipalities in Chester County and whether their risk is greater than (>), less than (<), or equal to (=) the risk factor assigned to the County as a whole. This table was developed based on the Risk Assessment findings and municipal input from the "Evaluation of Identified Hazards and Risk" and "Jurisdictional Hazard Risk Ranking" forms distributed to each municipality. In addition, results from each hazard's Vulnerability Assessment sections were considered.

Table 4.4-2 Ranking of Hazard Types Based on Risk Factor Methodology

RISK	HAZARD NATURAL (N) OR MAN-MADE (M)	RISK ASSESSMENT CATEGORY						RF
		PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	CLIMATE CHANGE	
HIGH	Utility Interruption (M)	4	3	4	4	2	↑	3.5
	Flood, Flash Flood, Ice Jam (N)	4	4	2	3	3	↑	3.4
	Pandemic and Infectious Disease (N)	2	4	4	1	4	↔	3.1
	Drought (N)	3	2	4	1	4	↑	2.8
	Transportation Incidents (M)	4	3	1	4	1	↔	2.8
	Urban Fire and Explosion (M)	4	3	1	4	1	↔	2.8
	Substance Use Disorder (M)	4	3	1	4	1	↔	2.8
	Extreme Temperature (N)	3	2	4	2	2	↑	2.7
	Tornado, Windstorm (N)	3	3	2	4	1	↔	2.7
	Winter Storm (N)	3	2	4	1	2	↔	2.6
	Nuclear Incidents (M)	1	3	3	4	4	↔	2.6
	Environmental Hazards (EH) - Hazardous Materials Release (M)	3	3	1	4	2	↔	2.6
	Wildfire (N)	2	3	2	4	2	↑	2.5
	Invasive Species (N)	4	1	3	1	3	↑	2.5
MODERATE	Hurricane, Tropical Storm, Nor'easter (N)	2	2	4	1	3	↔	2.4
	Terrorism (M)	1	3	2	4	2	↔	2.2
	Dam Failure (M)	1	3	2	4	2	↑	2.2
	Earthquake (N)	1	3	2	4	1	↔	2.1

Table 4.4-2 Ranking of Hazard Types Based on Risk Factor Methodology

RISK	HAZARD NATURAL (N) OR MAN-MADE (M)	RISK ASSESSMENT CATEGORY						RF
		PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	CLIMATE CHANGE	
	Environmental Hazards (EH) – Gas and Liquid Pipelines	2	2	1	4	3	⟺	2.1
	Radon Exposure (N)	2	3	1	1	2	⟺	2
LOW	Cyber-Terrorism (M)	2	1	1	4	1	⟺	1.6

Table 4.4-3 Jurisdictional Risk Evaluation

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Environmental Hazards (EH) - Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Environmental Hazards (EH) – Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
Atglen Borough	=	=	=	=	>	=	=	=	=	=	=	<	<	=	=	=	>	=	=	>	=
Avondale Borough	=	=	=	=	>	=	=	=	=	=	=	>	<	=	=	=	>	=	<	=	=
Birmingham Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Caln Township	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=	>	=	=	>	=
Charlestown Township	=	=	=	=	=	=	=	=	=	=	>	<	=	=	=	=	=	=	=	=	=
Coatesville City	=	=	>	=	>	=	>	=	=	=	=	>	=	=	=	>	=	=	<	>	=
Downingtown Borough	=	=	=	=	>	=	>	=	=	=	=	>	<	=	=	>	>	=	=	=	=
East Bradford Township	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=
East Brandywine Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	>	=	=
East Caln Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=

Table 4.4-3 Jurisdictional Risk Evaluation

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Environmental Hazards (EH) - Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Environmental Hazards (EH) – Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
East Coventry Township	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=
East Fallowfield Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
East Goshen Township	=	=	>	=	=	=	=	>	=	=	=	=	=	=	=	=	>	=	>	=	=
East Marlborough Township	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	>	=	=	=	=
East Nantmeal Township	=	=	>	=	=	=	=	>	=	=	>	<	=	>	=	=	>	=	=	=	=
East Nottingham Township	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	<	=	=
East Pikeland Township	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=
Easttown Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=

Table 4.4-3 Jurisdictional Risk Evaluation

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Environmental Hazards (EH) - Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Environmental Hazards (EH) – Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
East Vincent Township	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	>	=	=
East Whiteland Township	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	=	=	=	=	=
Elk Township	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	<	=	=	=	=
Elverson Borough	=	<	>	=	=	=	=	>	=	=	=	>	=	=	=	=	<	=	>	=	=
Franklin Township	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	<	=	=	=	=
Highland Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=
Honey Brook Borough	=	<	>	=	=	=	=	>	=	=	=	=	<	=	=	=	<	=	<	=	=
Honey Brook Township	=	=	>	=	=	=	=	>	>	=	=	=	=	>	=	=	>	=	=	=	=
Kennett Township	=	=	>	=	>	=	=	>	=	=	=	<	<	=	=	=	=	=	=	=	=
Kennett Square Borough	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	<	=	=	=	=

Table 4.4-3 Jurisdictional Risk Evaluation

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Environmental Hazards (EH) - Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Environmental Hazards (EH) – Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
London Britain Township	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	=	=	=	=	=
Londonderry Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	<	=	<	>	=
London Grove Township	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	=	=	<	=	=
Lower Oxford Township	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	=	=	=	=	=
Malvern Borough	=	=	=	=	>	=	=	=	=	=	=	=	<	=	=	=	=	=	=	=	=
Modena Borough	=	=	=	=	>	=	=	=	=	=	=	<	=	=	=	=	<	=	=	>	=
New Garden Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=
Newlin Township	=	=	>	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=	>	=
New London Township	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	<	=	=	=	=

Table 4.4-3 Jurisdictional Risk Evaluation

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Environmental Hazards (EH) - Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Environmental Hazards (EH) – Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
North Coventry Township	=	=	=	=	=	=	=	=	=	=	>	<	=	=	=	=	=	=	=	=	=
Oxford Borough	=	<	>	=	=	=	=	=	=	=	=	=	<	=	=	=	<	=	<	=	=
Parkesburg Borough	=	=	=	=	>	=	=	=	=	=	=	>	<	=	=	=	=	=	=	>	=
Penn Township	=	=	>	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	<	=	=
Pennsbury Township	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	=	=	=	=	=
Phoenixville Borough	=	=	>	=	>	=	>	=	=	=	>	<	=	=	=	>	<	=	=	=	=
Pocopson Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Sadsbury Township	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	<	=	>	>	=
Schuylkill Township	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	>	=	=	=	=
South Coatesville Borough	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	<	>	=
South Coventry Township	=	=	=	=	=	=	=	=	=	=	>	<	=	=	=	=	=	=	=	=	=

Table 4.4-3 Jurisdictional Risk Evaluation

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Environmental Hazards (EH) - Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Environmental Hazards (EH) – Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
Spring City Borough	=	=	=	=	=	=	=	=	=	=	>	<	<	=	=	=	<	=	<	=	=
Thornbury Township	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	<	=	=	=	=
Tredyffrin Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=
Upper Oxford Township	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	=	=	=	=	=
Upper Uwchlan Township	=	=	=	=	=	=	=	=	=	=	>	=	=	>	=	=	>	=	=	=	=
Uwchlan Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	>	=	=
Valley Township	=	=	=	=	>	=	=	=	=	=	=	>	=	=	=	=	=	=	=	>	=
Wallace Township	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	>	=	=	=	=
Warwick Township	=	=	>	=	=	=	=	>	=	=	>	=	=	>	=	=	=	=	=	=	=
West Bradford Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=

Table 4.4-3 Jurisdictional Risk Evaluation

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Environmental Hazards (EH) - Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Environmental Hazards (EH) – Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
West Brandywine Township	=	=	>	=	=	=	=	>	=	=	=	=	=	=	=	=	<	=	>	>	=
West Caln Township	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	>	=	=	>	=
West Chester Borough	=	=	>	=	>	=	>	=	=	=	=	>	<	=	=	>	<	=	=	=	=
West Fallowfield Township	=	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=
West Goshen Township	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	>	=	=	=	=
West Grove Borough	=	<	=	=	>	=	=	=	=	=	=	<	<	=	=	=	<	=	<	=	=
West Marlborough Township	=	=	>	=	=	=	=	>	=	=	=	<	=	=	=	=	=	=	<	=	=
West Nantmeal Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=

Table 4.4-3 Jurisdictional Risk Evaluation

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Environmental Hazards (EH) - Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Environmental Hazards (EH) – Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
West Nottingham Township	=	=	=	=	=	=	=	=	>	=	>	<	=	>	=	=	>	=	=	=	=
West Pikeland Township	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=
West Sadsbury Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	<	=	=	>	=
West Vincent Township	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=
West Whiteland Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=
Westtown Township	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	=	=	=	=	=
Willistown Township	=	=	>	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=

4.4.3. Potential Loss Estimates

Potential loss estimates for hazard events help a community understand the monetary value of what might be at stake during a hazard event. Estimates are considered *potential* in that they generally represent losses that could occur in a countywide hazard scenario. In events that are localized, losses may be lower, while regional events could yield higher losses.

Potential loss estimates have four basic components, including:

- Replacement Value: Current cost of returning an asset to its pre-damaged condition, using present-day cost of labor and materials.
- Content Loss: Value of building's contents, typically measured as a percentage of the building replacement value.
- Functional Loss: The value of a building's use or function that would be lost if it were damaged or closed.
- Displacement Cost: The dollar amount required for relocation of the function (business or service) to another structure following a hazard event.

Loss estimates provided in this section fall into three broad categories: historical losses, current-condition losses, and predictive losses. Historical loss estimates come from two primary sources: the NCEI storm events database and the NFIP. Current condition losses come from geospatial analysis of the value of buildings identified as vulnerable in the vulnerability assessment sections of hazard profiles for floods, landslides, subsidence, wildfires, dam failure, environmental hazards, and transportation incidents. Finally, predictive losses were generated using Hazus-MH, version 6.1. Historical losses are limited to property damage, injuries, and fatalities, but they can provide some indication of the type and magnitude of losses possible. The current-condition losses consider replacement value and exposure value. Hazus modeling considers all four components and provides the most comprehensive description of potential losses.

4.4.3.1. Historic Losses

Historical losses were available for drought, flooding, hurricanes/tropical storms/nor'easters (coastal storms), tornadoes/windstorms, winter storms, and wildfires from NCEI and the NFIP. NCEI reports include property and crop damage estimates with their incident reports. However, as noted in the hazard profiles, many of the events have no damage reported. This does not mean that there was no damage; rather, it indicates that no damage was reported to NCEI. As a result, consider these low-end estimates of losses. The flood and flash flood events reported in NCEI list more than $53.3 million in property damage and $1 million in crop damage since 2000. There is $50,000 in damage reported to NCEI due to winter weather in the same period,

although for most events, damages were not provided. Windstorm and tornado events resulted in over $905,000 in property damages and $25,000 in crop losses according to the NCEI. There were no damages, deaths, or casualties reported for extreme temperature, coastal storms, or wildfire events in the NCEI database.

The final set of historic losses relates solely to prior flood losses and comes from the NFIP's records of claims paid. Table 4.4-4 shows the total amount of claims paid in each municipality according to FEMA and PEMA's records. There has been a total of $21.5 million in paid claims. Any municipality not included in the table has no reported losses or claims to the NFIP.

Table 4.4-4 Historic NFIP Claims by Municipality

MUNICIPALITY	LOSSES	BUILDING PAYMENTS	CONTENTS PAYMENTS	TOTAL PAYMENTS
AVONDALE, BOROUGH OF (421473)	34	$3,155,886.31	$118,899.84	$3,274,786.15
BIRMINGHAM, TOWNSHIP OF (421474)	4	$588,244.85	$28,200.00	$616,444.85
CALN, TOWNSHIP OF (422247)	11	$131,453.08	$21,676.28	$153,129.36
CHARLESTOWN, TOWNSHIP OF (421475)	3	$15,553.19	$2,094.54	$17,647.73
COATESVILLE, CITY OF (420274)	11	$87,896.06	$13,329.71	$101,225.77
DOWNINGTOWN, BOROUGH OF (420275)	194	$2,730,734.70	$207,507.61	$2,938,242.31
EAST BRADFORD TOWNSHIP OF (420276)	99	$1,205,123.87	$476,358.83	$1,681,482.70
EAST CALN, TOWNSHIP OF (421477)	8	$358,101.11	$412,353.37	$770,454.48
EAST COVENTRY, TOWNSHIP OF (421478)	13	$396,377.75	$151,141.75	$547,519.50
EAST GOSHEN, TOWNSHIP OF (420277)	2	$75,801.84	$0.00	$75,801.84
EAST PIKELAND, TOWNSHIP OF (421483)	6	$26,674.63	$291.43	$26,966.06
EAST VINCENT, TOWNSHIP OF (420278)	11	$266,919.14	$19,363.42	$286,282.56
EAST WHITELAND, TOWNSHIP OF (420279)	10	$101,708.10	$0.00	$101,708.10
KENNETT SQUARE, BOROUGH OF (420280)	5	$192,143.88	$7,281.96	$199,425.84
KENNETT, TOWNSHIP OF (422586)	15	$242,966.37	$31,000.00	$273,966.37
MODENA, BOROUGH OF (420282)	5	$41,809.04	$230,524.97	$272,334.01
NEWLIN, TOWNSHIP OF (421486)	2	$8,018.51	$1,545.00	$9,563.51
NORTH COVENTRY, TOWNSHIP OF (420283)	39	$371,200.87	$32,176.51	$403,377.38
PENNSBURY, TOWNSHIP OF (420285)	4	$158,576.28	$16,611.97	$175,188.25
PHOENIXVILLE, BOROUGH OF (420287)	5	$342,185.00	$200,000.00	$542,185.00
POCOPSON, TOWNSHIP OF (420286)	87	$1,876,208.36	$412,144.62	$2,288,352.98
SCHUYLKILL, TOWNSHIP OF (421489)	6	$256,468.04	$6,368.05	$262,836.09
THORNBURY, TOWNSHIP OF (420290)	2	$10,440.81	$0.00	$10,440.81
TREDYFFRIN, TOWNSHIP OF (420291)	44	$1,438,874.06	$303,565.23	$1,742,439.29
UPPER UWCHLAN, TWP OF (421491)	7	$112,589.49	$40,725.89	$153,315.38
UWCHLAN, TOWNSHIP OF (421492)	2	$41,123.05	$10,600.00	$51,723.05
VALLEY, TOWNSHIP OF (421206)	9	$93,135.97	$247,407.73	$340,543.70
WEST BRADFORD, TOWNSHIP OF (421495)	3	$36,194.69	$0.00	$36,194.69
WEST CHESTER, BOROUGH OF (420292)	62	$546,039.44	$2,811,144.92	$3,357,184.36

Table 4.4-4 Historic NFIP Claims by Municipality

MUNICIPALITY	LOSSES	BUILDING PAYMENTS	CONTENTS PAYMENTS	TOTAL PAYMENTS
WEST GOSHEN, TOWNSHIP OF (420293)	8	$81,929.53	$5,882.75	$87,812.28
WEST WHITELAND, TOWNSHIP OF (420295)	34	$586,041.86	$82,167.65	$668,209.51
WESTTOWN, TOWNSHIP OF (420294)	2	$1,235.97	$9,395.95	$10,631.92
WILLISTOWN, TOWNSHIP OF (422282)	2	$11,960.93	$0.00	$11,960.93
TOTAL	**749**	**$15,589,616.78**	**$5,899,759.98**	**$21,489,376.76**

4.4.3.2. Current Condition Losses

The current condition losses were derived using the total assessed value, including land and building values, of properties. Table 4.4-5 details the total assessed values by municipality and type of land. Please note, the data received from Chester County's GIS portal attributed values for buildings and land by parcels. If there was more than one structure on one parcel, then the values would be increased by the number of structures on the parcel; this may inflate the total assessed value, though this was not a common occurrence. The table shown is the full potential dollar amount of loss, though exposure and magnitude of loss will depend on the hazard and structure-specific characteristics.

Table 4.4-5 Chester County Tax Assessed Building Values

MUNICIPALITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Atglen Borough	$695,690	$1,501,695	$2,058,760	$0	$285,380	$49,777,858	$0	$0	$54,319,383
Avondale Borough	$2,040,240	$3,963,320	$3,032,860	$0	$715,500	$36,503,095	$0	$89,640	$46,344,655
Birmingham Township	$0	$28,985,220	$1,364,760	$2,015,150	$0	$269,554,240	$0	$46,570	$301,965,940
Caln Township	$18,743,540	$30,489,777	$41,480,515	$416,940	$3,932,730	$574,849,825	$0	$150,750	$670,064,077
Charlestown Township	$0	$2,431,710	$6,335,860	$3,778,650	$2,844,000	$334,838,730	$0	$389,120	$350,618,070
Coatesville City	$12,965,943	$15,546,400	$11,013,980	$0	$3,535,350	$319,925,850	$0	$0	$362,987,523
Downingtown Borough	$40,451,080	$22,484,370	$27,000,790	$0	$341,180	$283,386,250	$0	$35,890	$373,699,560
East Bradford Township	$245,040	$1,283,740	$6,841,070	$1,887,920	$0	$567,001,739	$0	$561,880	$577,821,389
East Brandywine Township	$0	$3,772,600	$759,700	$1,871,110	$0	$483,393,224	$0	$0	$489,796,634
East Caln Township	$11,139,000	$29,948,490	$7,582,570	$0	$2,703,090	$229,823,620	$0	$92,780	$281,289,550
East Coventry Township	$0	$10,182,870	$8,457,970	$1,364,220	$1,961,250	$280,534,220	$0	$150,080	$302,650,610
East Fallowfield Township	$140,230	$3,351,140	$4,005,340	$2,653,330	$0	$370,074,688	$0	$128,180	$380,352,908

Table 4.4-5 Chester County Tax Assessed Building Values

MUNICIPALITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
East Goshen Township	$96,492,580	$59,621,991	$16,874,640	$1,500,780	$15,447,440	$899,512,250	$0	$89,080	$1,089,538,761
East Marlborough Township	$0	$50,053,880	$9,531,960	$5,574,780	$2,886,390	$427,463,110	$0	$18,960	$495,529,080
East Nantmeal Township	$301,360	$3,390,740	$9,789,960	$13,301,825	$0	$119,427,600	$0	$134,080	$146,345,565
East Nottingham Township	$0	$9,107,460	$34,783,450	$7,205,880	$1,001,660	$351,703,820	$0	$13,510	$403,815,780
East Pikeland Township	$7,844,630	$19,227,705	$3,106,460	$319,070	$2,137,500	$399,485,997	$0	$178,430	$432,299,792
East Vincent Township	$3,043,000	$8,044,660	$48,401,330	$2,116,410	$3,536,070	$296,741,900	$0	$627,100	$362,510,470
East Whiteland Township	$31,968,200	$107,022,620	$2,961,350	$0	$1,436,230	$508,054,658	$0	$653,120	$652,096,178
Easttown Township	$7,334,180	$4,878,540	$7,635,660	$5,830,010	$0	$788,051,129	$0	$83,110	$813,812,629
Elk Township	$0	$131,840	$918,050	$4,873,450	$0	$77,774,140	$0	$0	$83,697,480
Elverson Borough	$0	$2,735,210	$779,570	$0	$0	$82,272,650	$0	$0	$85,787,430
Franklin Township	$0	$936,810	$476,670	$1,867,590	$0	$202,056,970	$0	$60,280	$205,398,320

Table 4.4-5 Chester County Tax Assessed Building Values

MUNICIPALITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
Highland Township	$0	$228,920	$12,502,770	$8,550,160	$0	$68,216,730	$0	$289,000	$89,787,580
Honey Brook Borough	$795,690	$2,210,500	$2,215,610	$564,000	$0	$61,112,940	$0	$0	$66,898,740
Honey Brook Township	$3,767,690	$14,745,640	$26,828,050	$13,324,730	$3,806,530	$269,897,770	$0	$37,090	$332,407,500
Kennett Square Borough	$0	$374,389	$3,861,260	$0	$0	$184,085,090	$0	$0	$188,320,739
Kennett Township	$32,369,060	$21,400,730	$10,684,120	$3,701,390	$7,101,580	$561,100,555	$0	$143,180	$636,500,615
London Britain Township	$109,220	$664,840	$7,579,360	$2,797,030	$0	$176,901,085	$0	$0	$188,051,535
London Grove Township	$0	$16,681,730	$37,281,815	$5,393,960	$0	$335,474,241	$0	$33,900	$394,865,646
Londonderry Township	$0	$3,290,745	$360,860	$4,015,790	$874,650	$121,172,070	$0	$27,180	$129,741,295
Lower Oxford Township	$0	$3,765,680	$1,278,610	$3,787,500	$1,850,000	$167,130,240	$0	$39,950	$177,851,980
Malvern Borough	$12,154,030	$10,207,210	$11,491,270	$0	$4,085,660	$108,127,110	$0	$2,220	$146,067,500
Modena Borough	$0	$0	$0	$0	$0	$25,610,450	$0	$0	$25,610,450

Table 4.4-5 Chester County Tax Assessed Building Values

MUNICIPALITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
New Garden Township	$4,136,280	$44,616,339	$29,894,656	$3,148,630	$4,413,230	$526,786,898	$0	$164,240	$613,160,273
New London Township	$0	$956,250	$19,744,920	$2,981,750	$0	$286,678,100	$0	$14,880	$310,375,900
Newlin Township	$0	$158,050	$524,970	$7,872,670	$0	$77,322,970	$0	$0	$85,878,660
North Coventry Township	$124,770	$2,488,430	$2,271,290	$1,844,280	$72,510	$367,033,350	$0	$81,200	$373,915,830
Oxford Borough	$6,854,300	$32,716,271	$50,773,030	$70,700	$400,580	$147,866,778	$0	$68,720	$238,750,379
Parkesburg Borough	$1,133,430	$11,603,834	$4,010,890	$0	$0	$128,061,080	$0	$0	$144,809,234
Penn Township	$521,790	$14,168,760	$17,404,450	$1,185,020	$0	$245,638,022	$0	$55,220	$278,973,262
Pennsbury Township	$0	$4,547,570	$4,968,630	$5,959,530	$0	$230,274,660	$0	$29,010	$245,779,400
Phoenixville Borough	$38,901,640	$50,106,710	$23,708,140	$65,970	$346,650	$648,167,255	$0	$30,710	$761,327,075
Pocopson Township	$0	$2,664,230	$26,720,840	$1,828,410	$1,130,350	$228,793,280	$0	$72,150	$261,209,260
Sadsbury Township	$1,700,750	$19,028,210	$8,110,230	$678,650	$833,380	$199,731,750	$0	$82,460	$230,165,430
Schuylkill Township	$444,919	$24,061,640	$69,906,790	$598,410	$2,529,780	$473,677,494	$0	$301,070	$571,520,103

Table 4.4-5 Chester County Tax Assessed Building Values

MUNICIPALITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
South Coatesville Borough	$2,610,000	$931,060	$1,359,830	$0	$0	$68,819,280	$0	$256,800	$73,976,970
South Coventry Township	$0	$8,625,240	$2,683,700	$2,277,900	$0	$133,801,880	$0	$56,470	$147,445,190
Spring City Borough	$7,877,500	$5,293,870	$3,426,820	$0	$1,158,970	$134,159,730	$0	$0	$151,916,890
Thornbury Township	$18,981,000	$10,118,920	$28,906,100	$3,921,100	$0	$256,473,289	$0	$2,610	$318,403,019
Tredyffrin Township	$8,457,020	$157,657,320	$114,785,260	$1,613,150	$11,986,450	$1,464,143,373	$0	$690,870	$1,759,333,443
Upper Oxford Township	$0	$709,050	$343,640	$2,400,870	$0	$119,002,320	$0	$0	$122,455,880
Upper Uwchlan Township	$0	$11,915,460	$19,358,830	$407,580	$135,000	$697,499,635	$0	$155,690	$729,472,195
Uwchlan Township	$6,642,000	$108,919,350	$75,818,070	$753,260	$18,257,570	$889,473,560	$0	$539,900	$1,100,403,710
Valley Township	$1,049,170	$30,466,040	$11,957,381	$451,480	$0	$338,354,911	$0	$8,390	$382,287,372
Wallace Township	$390,000	$945,660	$10,406,110	$4,292,700	$0	$224,707,191	$0	$188,020	$240,929,681
Warwick Township	$452,750	$3,515,200	$6,834,150	$9,004,580	$0	$149,954,975	$0	$0	$169,761,655

Table 4.4-5 Chester County Tax Assessed Building Values

MUNICIPALITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
West Bradford Township	$150,550	$5,775,080	$11,844,980	$5,220,640	$0	$716,933,589	$0	$579,230	$740,504,069
West Brandywine Township	$151,300	$8,455,660	$21,754,110	$3,269,820	$0	$355,758,651	$0	$291,900	$389,681,441
West Caln Township	$200,000	$11,166,798	$9,887,990	$5,504,590	$825,730	$369,507,160	$0	$1,496,870	$398,589,138
West Chester Borough	$9,092,070	$3,532,530	$162,216,750	$0	$0	$464,576,900	$0	$0	$639,418,250
West Fallowfield Township	$0	$2,848,170	$4,188,730	$4,690,880	$0	$106,973,300	$0	$431,550	$119,132,630
West Goshen Township	$42,397,760	$200,799,613	$72,920,430	$0	$27,683,720	$1,040,718,687	$0	$63,620	$1,384,583,830
West Grove Borough	$335,780	$477,510	$48,780	$0	$0	$94,774,660	$0	$0	$95,636,730
West Marlborough Township	$0	$1,373,830	$262,530	$6,625,440	$185,950	$42,557,810	$0	$0	$51,005,560
West Nantmeal Township	$237,170	$2,255,990	$1,371,450	$5,875,760	$0	$108,632,245	$0	$0	$118,372,615
West Nottingham Township	$0	$553,410	$162,330	$647,510	$0	$102,239,480	$0	$6,330	$103,609,060

Table 4.4-5 Chester County Tax Assessed Building Values

MUNICIPALITY	APARTMENT	COMMERCIAL	EXEMPT	FARM	INDUSTRIAL	RESIDENTIAL	UNKNOWN	UTILITY	TOTAL
West Pikeland Township	$0	$2,159,730	$1,283,410	$2,915,130	$0	$264,679,430	$0	$93,070	$271,130,770
West Sadsbury Township	$135,000	$21,958,660	$4,668,350	$5,841,645	$4,790,430	$99,363,198	$0	$109,890	$136,867,173
West Vincent Township	$0	$9,765,940	$6,247,760	$7,129,220	$0	$328,310,300	$0	$0	$351,453,220
West Whiteland Township	$62,267,070	$114,462,595	$49,232,070	$0	$4,425,340	$817,898,540	$0	$508,780	$1,048,794,395
Westtown Township	$0	$13,579,610	$111,466,640	$592,800	$0	$443,325,450	$0	$0	$568,964,500
Willistown Township	$420,000	$7,091,710	$30,821,380	$33,932,165	$670,450	$724,239,560	$0	$0	$797,175,265
Total	$498,264,422	$1,445,133,472	$1,391,573,417	$232,313,915	$140,328,280	$24,147,946,585	$0	$10,454,730	$27,866,014,821

4.4.3.3. Predictive Losses

This 2026 Plan Update employed an enhanced Hazus analysis for floods. As opposed to basic analysis using only default data, enhanced analysis incorporates both up-to-date and specific data for inclusion in the hazard models. The enhanced data incorporated into this HMP include:

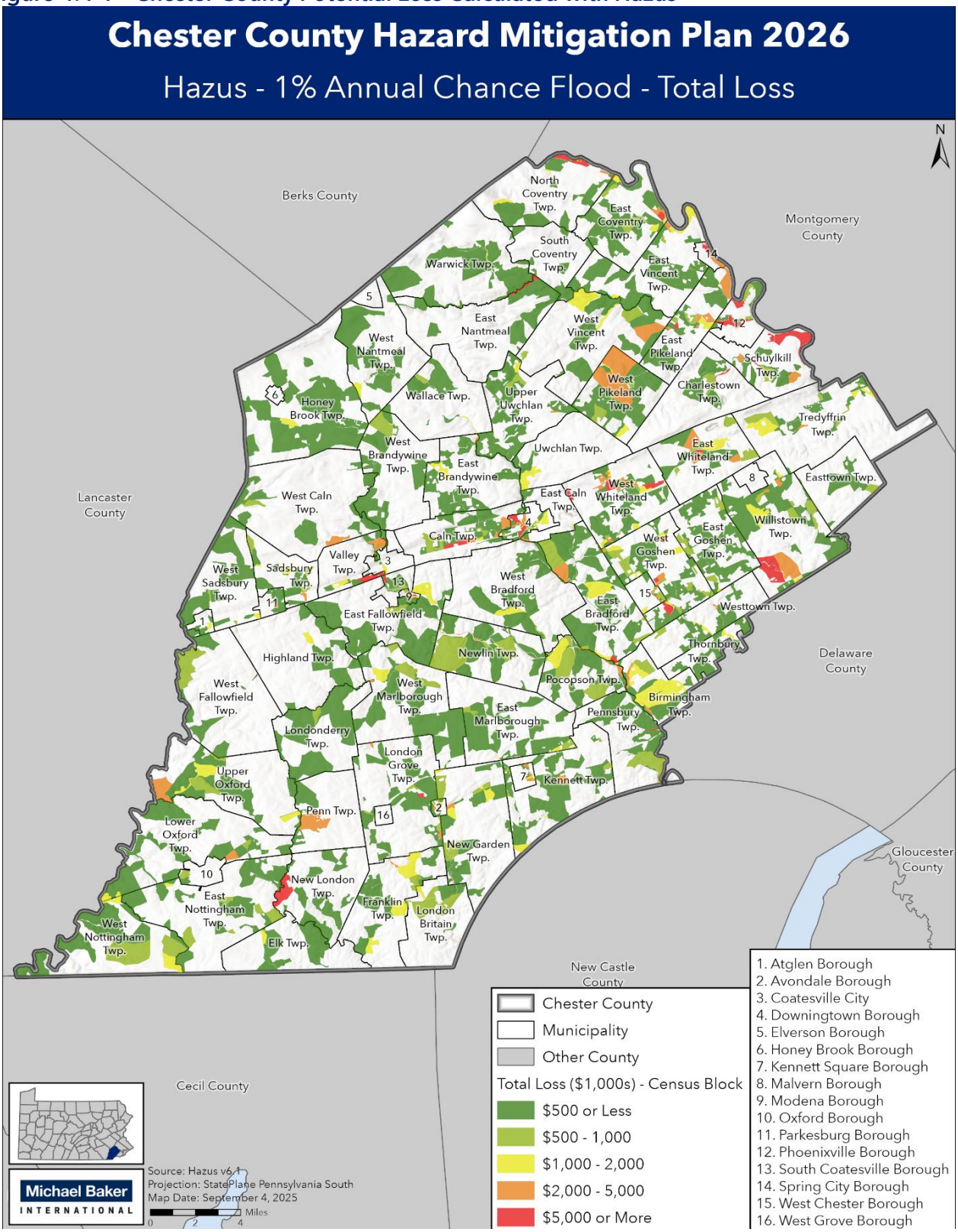
- Demographic data from the 2020 Census.
- Updated critical facilities data from the County.
- Dasymetric Census blocks to better attribute areas of population geographically within the block.
- A user-delineated 100-year depth grid derived for Chester County from the effective FIRM data.

For more details on the Hazus methodology used and additional results reports, see Appendix F – Hazus Methodology and Results Report.

Using these datasets in Hazus-MH Version 6.1, total economic losses from a 1-percent-annual-chance flood in Chester County are estimated at $1.6 billion. Direct building losses are about 18% of the total loss, with content losses at about 32% and inventory losses at 5%. The total building losses are evenly distributed amongst residential, commercial, industrial, and other building types. As for business interruptions, relocation costs are about 5%, income loss at 11%, rental income loss at 2%, and wage losses at 27%, with commercial property types having the highest loss percentage here. Of the critical facilities, no facilities are expected to have substantial damage, and only one school is expected to have moderate damage.

Figure 4.4-1 shows the distribution of building-related losses by census block across Chester County. The areas with the highest potential losses are mostly scattered around the county, although many of the municipalities that are traversed by US Route 30 have census blocks with high predicted losses, along with those that border the Schuylkill River.

Figure 4.4-1 Chester County Potential Loss Calculated with Hazus



4.4.4. Future Development and Vulnerability

Risk and vulnerability to natural and human-made hazard events are not static. Risk will increase or decrease as counties and municipalities see changes in population as well as changes in land use and development.

Population change is perhaps the most significant indicator of future changes in vulnerability. As discussed in Section 2.2, the total population in Chester County is estimated to have increased by approximately seven percent between 2014 and 2023 (see Table 2.2-1). Areas of higher density, in the larger municipalities and growing municipalities, face increased vulnerability and increased exposed structures with most hazard events. Larger populations result in increased vulnerability to hazards such as wildfires, floods, and winter storms as more people will be impacted.

Countywide populations are expected to continue increasing in the future. Table 4.4-6 provides population forecasts for each municipality in Chester County and for the county as a whole between 2025 and 2050, developed by the Delaware Valley Regional Planning Commission. The population of the entire county is estimated to be 634,011 by the year 2050, which represents a net population increase of 84,227 people (15.3 percent) in a 25-year period. As shown in the table, all but one municipality (West Marlborough Township) in Chester County are projected to see an increase in population. DVRPC projects West Whiteland Township and Phoenixville Borough will add the most residents, with both adding over 5,000 people. Modena Borough is expected to more than double its population from 348 people to 697. Other municipalities with large projected percentage increases include Sadsbury Township (42.2 percent) and Penn Township (41.6 percent).

It should be noted that changes in population or demographics may be used to identify higher-risk populations. Maintaining up-to-date data on demographics will allow Chester County to better assess magnitudes of hazards and develop more specific mitigation plans and strategies.

Table 4.4-6 Population Forecasts 2023-2050 by Municipality (DVRPC, 2025)

MUNICIPALITY	2023 POPULATION	2030 FORECAST	2040 FORECAST	2050 FORECAST	2023 – 2050 CHANGE	% 2023 – 2050 CHANGE
Atglen Borough	1,319	1,566	1,566	1,566	247	18.7%
Avondale Borough	1,286	1,309	1,367	1,421	135	10.5%
Birmingham Township	4,086	4,151	4,240	4,296	210	5.1%
Caln Township	14,555	15,934	16,967	17,536	2,981	20.5%
Charlestown Township	6,169	6,310	6,972	7,468	1,299	21.1%
Coatesville City	13,323	13,871	14,565	14,938	1,615	12.1%
Downingtown Borough	8,163	10,587	10,751	10,825	2,662	32.6%
East Bradford Township	10,599	10,836	11,323	11,623	1,024	9.7%
East Brandywine Township	9,935	11,120	11,805	12,185	2,250	22.6%
East Caln Township	5,493	6,474	6,478	6,484	991	18.0%
East Coventry Township	7,136	7,744	8,596	9,073	1,937	27.1%
East Fallowfield Township	7,737	8,211	8,945	9,417	1,680	21.7%
East Goshen Township	18,392	18,753	19,276	19,550	1,158	6.3%
East Marlborough Township	7,567	8,326	9,167	9,741	2,174	28.7%
East Nantmeal Township	1,650	1,881	1,982	2,063	413	25.0%
East Nottingham Township	9,022	9,717	10,697	11,338	2,316	25.7%
East Pikeland Township	8,413	9,055	9,888	10,344	1,931	23.0%
Easttown Township	11,015	11,883	12,061	12,181	1,166	10.6%
East Vincent Township	7,521	8,659	9,291	9,626	2,105	28.0%
East Whiteland Township	14,459	16,764	16,896	16,994	2,535	17.5%
Elk Township	1,731	1,776	1,910	1,992	261	15.1%
Elverson Borough	1,392	1,451	1,642	1,760	368	26.4%
Franklin Township	4,430	4,673	5,122	5,340	910	20.5%
Highland Township	1,225	1,285	1,367	1,415	190	15.5%
Honey Brook Borough	2,089	1,994	2,111	2,168	79	3.8%

Table 4.4-6 Population Forecasts 2023-2050 by Municipality (DVRPC, 2025)

MUNICIPALITY	2023 POPULATION	2030 FORECAST	2040 FORECAST	2050 FORECAST	2023 – 2050 CHANGE	% 2023 – 2050 CHANGE
Honey Brook Township	8,319	9,099	9,993	10,556	2,237	26.9%
Kennett Township	8,763	9,422	10,093	10,453	1,690	19.3%
Kennett Square Borough	6,096	7,761	7,767	7,771	1,675	27.5%
London Britain Township	3,200	3,213	3,304	3,349	149	4.7%
Londonderry Township	2,525	2,577	2,776	2,904	379	15.0%
London Grove Township	8,884	9,497	10,559	11,257	2,373	26.7%
Lower Oxford Township	5,570	5,731	6,310	6,631	1,061	19.0%
Malvern Borough	3,427	3,556	3,864	4,017	590	17.2%
Modena Borough	348	583	659	697	349	100.3%
New Garden Township	11,423	11,911	12,754	13,294	1,871	16.4%
Newlin Township	1,223	1,389	1,471	1,542	319	26.1%
New London Township	5,823	6,303	7,049	7,620	1,797	30.9%
North Coventry Township	8,419	9,031	9,874	10,360	1,941	23.1%
Oxford Borough	5,763	6,021	6,197	6,323	560	9.7%
Parkesburg Borough	3,894	4,383	4,491	4,564	670	17.2%
Penn Township	5,654	6,371	7,370	8,005	2,351	41.6%
Pennsbury Township	3,875	4,011	4,170	4,234	359	9.3%
Phoenixville Borough	19,062	22,463	23,662	24,235	5,173	27.1%
Pocopson Township	4,452	4,577	4,695	4,803	351	7.9%
Sadsbury Township	4,248	4,816	5,634	6,042	1,794	42.2%
Schuylkill Township	8,811	9,018	9,329	9,531	720	8.2%
South Coatesville Borough	1,843	1,708	1,872	1,993	150	8.1%
South Coventry Township	2,796	2,931	3,172	3,298	502	18.0%
Spring City Borough	3,551	3,903	3,996	4,059	508	14.3%
Thornbury Township	3,181	3,618	3,688	3,719	538	16.9%
Tredyffrin Township	31,822	33,123	33,624	33,901	2,079	6.5%

Table 4.4-6 Population Forecasts 2023-2050 by Municipality (DVRPC, 2025)

MUNICIPALITY	2023 POPULATION	2030 FORECAST	2040 FORECAST	2050 FORECAST	2023 – 2050 CHANGE	% 2023 – 2050 CHANGE
Upper Oxford Township	2,547	2,580	2,642	2,656	109	4.3%
Upper Uwchlan Township	12,731	13,844	14,314	14,557	1,826	14.3%
Uwchlan Township	19,231	20,329	21,379	22,047	2,816	14.6%
Valley Township	7,965	8,912	9,420	9,722	1,757	22.1%
Wallace Township	3,736	4,255	4,347	4,386	650	17.4%
Warwick Township	2,596	2,889	2,926	2,952	356	13.7%
West Bradford Township	14,520	14,729	15,519	16,010	1,490	10.3%
West Brandywine Township	7,534	8,563	9,434	9,953	2,419	32.1%
West Caln Township	8,938	9,232	9,866	10,293	1,355	15.2%
West Chester Borough	19,235	19,392	19,680	19,868	633	3.3%
West Fallowfield Township	2,430	2,499	2,591	2,632	202	8.3%
West Goshen Township	23,281	25,185	25,770	26,097	2,816	12.1%
West Grove Borough	2,791	2,867	3,026	3,158	367	13.1%
West Marlborough Township	891	819	830	830	-61	-6.8%
West Nantmeal Township	2,203	2,297	2,391	2,453	250	11.3%
West Nottingham Township	2,803	2,825	2,931	3,000	197	7.0%
West Pikeland Township	4,026	4,327	4,647	4,892	866	21.5%
West Sadsbury Township	2,570	2,678	3,137	3,425	855	33.3%
Westtown Township	11,201	12,228	12,642	12,870	1,669	14.9%
West Vincent Township	6,751	7,537	8,129	8,372	1,621	24.0%
West Whiteland Township	19,951	24,373	25,043	25,494	5,543	27.8%
Willistown Township	11,286	11,556	11,727	11,842	556	4.9%
Chester County	549,784	585,262	615,749	634,011	84,227	15.3%

Land use and development trends will also impact hazard vulnerability, as development in areas of hazard risk or in ways that do not consider hazard risk may increase vulnerabilities by placing more structures, infrastructure, and populations at risk. The Chester County Planning Commission keeps data on housing development within the county and municipalities. Table 4.4-7 below shows the number of new units added each year between 2010 and 2024 in the county. It categorizes new units into single-family detached, single-family attached, and multi-family, which provide some additional information on the density of this development. There were a significant amount of units added since 2020, as 2021 and 2022 saw the highest numbers of units added for all types. Of the 24,811 units added since 2010, 11,288 (45.5 percent) were built between 2020 and 2024. Over 50 percent of the multi-family units built in the county since 2010 were built in this four-year period, with a significant spike in 2021 as 1,963 units were added. On average, the county added 1,654 units per year. These were spread fairly evenly between unit types, though more single-family detached units were built than others.

Unfortunately, data on units built by municipality over this time period was unable to be found. That said, CCPC does report that Downingtown Borough, West Goshen Township, and Sadsbury Township built the most units in 2024, largely driven by single-family attached and multi-family units. West Goshen Township, Honey Brook Township, and Penn Township built the most single-family detached units in 2024. East Caln Township, West Whiteland Township, and East Coventry Township built the most single-family attached units. As stated above, areas of higher density face increased vulnerability and increased exposed structures with most hazard events. Municipalities will continue to add housing units in the future, and to address attendant increases in vulnerability that may occur they should consider how their current land use and development policies relate to hazard mitigation. Ensuring development occurs outside of high-hazard areas and promoting the use of hazard-resilient design are ways municipalities can reduce vulnerabilities.

Table 4.4-7 New Housing Units Built in Chester County 2010 – 2024 (CCPC, 2025b)

YEAR	SINGLE FAMILY DETACHED	SINGLE FAMILY ATTACHED	MULTI-FAMILY	TOTAL UNITS
2010	671	478	157	1,306
2011	494	359	141	994
2012	589	361	355	1,305
2013	710	287	235	1,232
2014	641	321	415	1,377
2015	490	311	643	1,444
2016	430	288	708	1,426

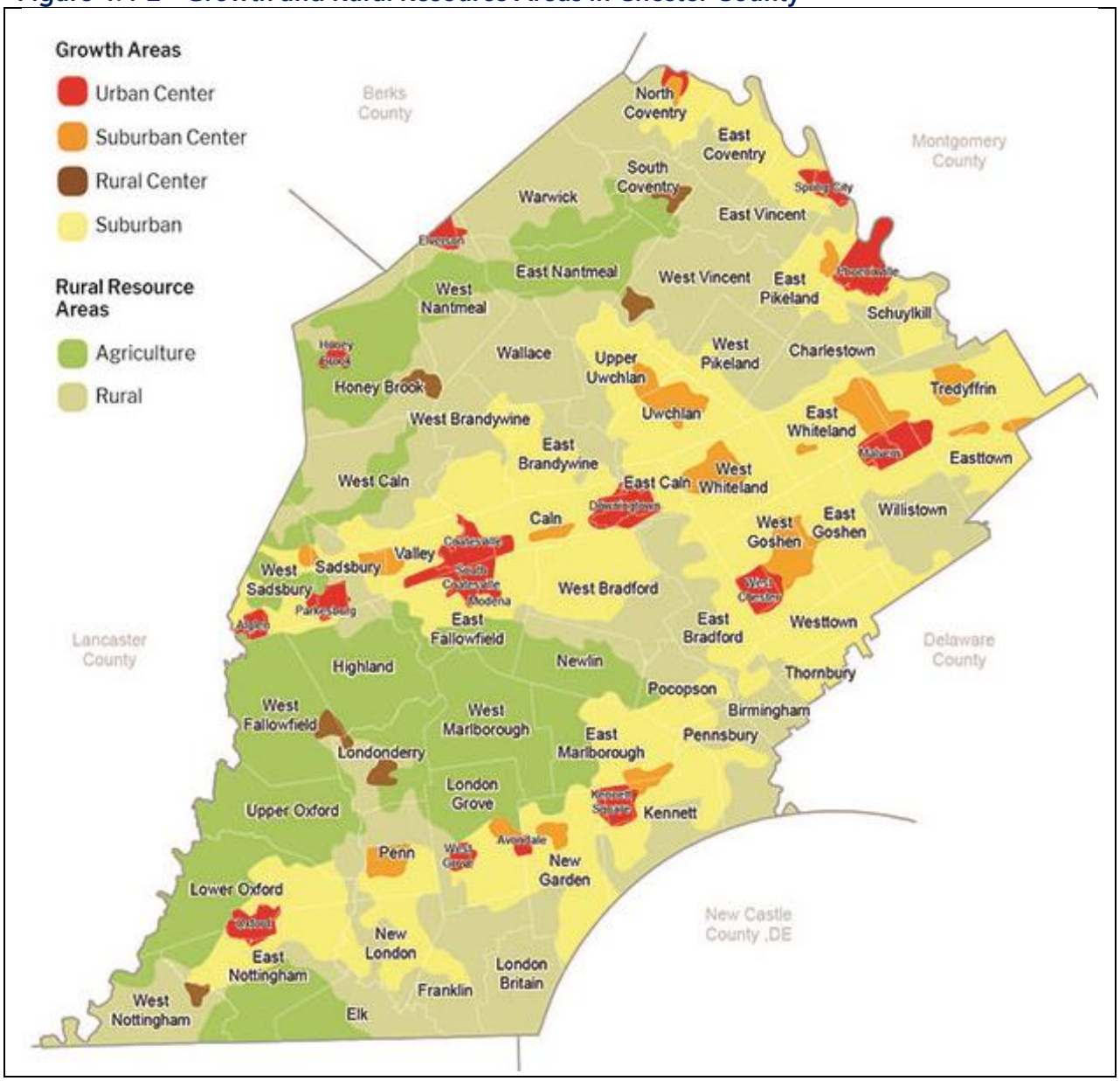
Table 4.4-7 New Housing Units Built in Chester County 2010 – 2024 (CCPC, 2025b)

YEAR	SINGLE FAMILY DETACHED	SINGLE FAMILY ATTACHED	MULTI-FAMILY	TOTAL UNITS
2017	508	511	656	1,675
2018	612	627	116	1,355
2019	600	588	221	1,409
2020	531	586	615	1,732
2021	916	864	1,963	3,743
2022	925	838	774	2,537
2023	601	625	411	1,637
2024	569	653	417	1,639
TOTAL	9,287	7,697	7,827	24,811
AVG. / YEAR	619	513	522	1,654

CCPC has also developed several maps as part of their comprehensive and land use planning initiatives that showcase future land use and development goals, priorities, and strategies. Integrating hazard mitigation into land use and development planning at both the county and municipal level can lead to mitigation and resilience as consistent values in the community and allow development to be managed in ways that do not increase vulnerability. Figure 4.4-2 displays the growth areas and rural resources areas in the county, as identified by the *Landscapes3* Comprehensive Plan. This map and corresponding categories provide insight into where development is planned to occur and how that development may look. The different categories are described as follows:

- Growth Areas
  - Urban Center: Historic downtowns and established neighborhoods that serve as civic, economic, and population centers.
  - Suburban Center: Regional economic, population, and transportation centers with varying land uses.
  - Suburban: Predominately residential communities with locally-oriented commercial uses and community facilities.
  - Rural Center: Often an extension of a village of a historic crossroads.
- Rural Resource Areas
  - Rural: Open and woodland lands with scattered villages, farms, and residential uses.
  - Agricultural: Large concentrations of active and diverse farm operations, along with related support services.

Figure 4.4-2 Growth and Rural Resource Areas in Chester County



In addition to identifying these areas, *Landscapes3* also contained several maps that showcase areas for preservation work in the county. These maps showcase the county's considerations towards guiding development towards places that are better suited for it. By identifying areas that are better served by conservation and protection, the county is impacting future hazard vulnerability by choosing to steer development away from areas that present environment challenges and also the ecological benefits these areas provide, potentially lowering hazard risk for adjacent areas. Figure 4.4-3 showcases areas that are currently protected via agricultural easements and land trusts while also identifying areas for additional preservation opportunities.

Figure 4.4-3 Farmland Preservation Areas in Chester County

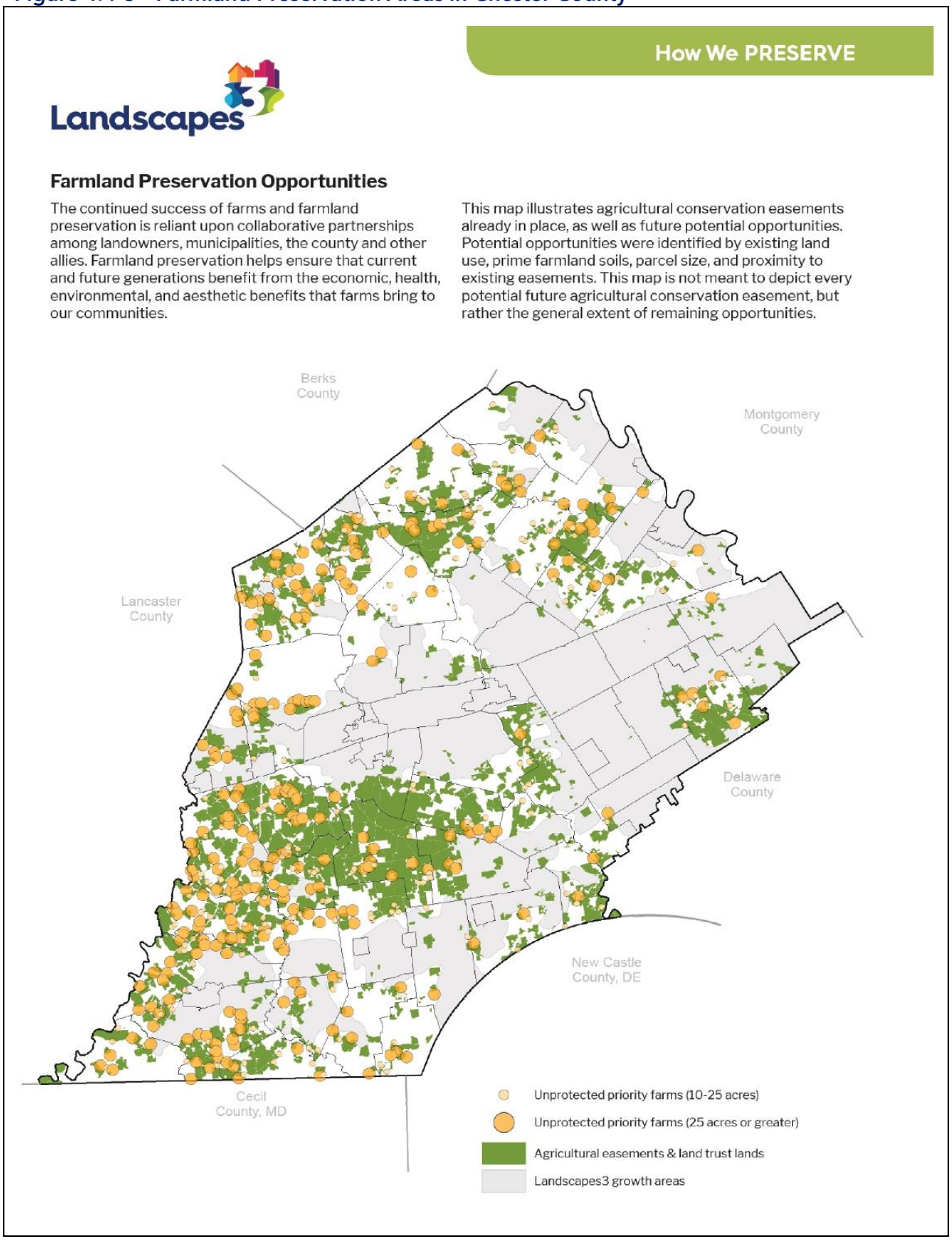


Figure 4.4-4 shows environmentally sensitive areas that should be priorities for protection efforts.

Figure 4.4-4 Natural Resource Priority Protection Areas in Chester County

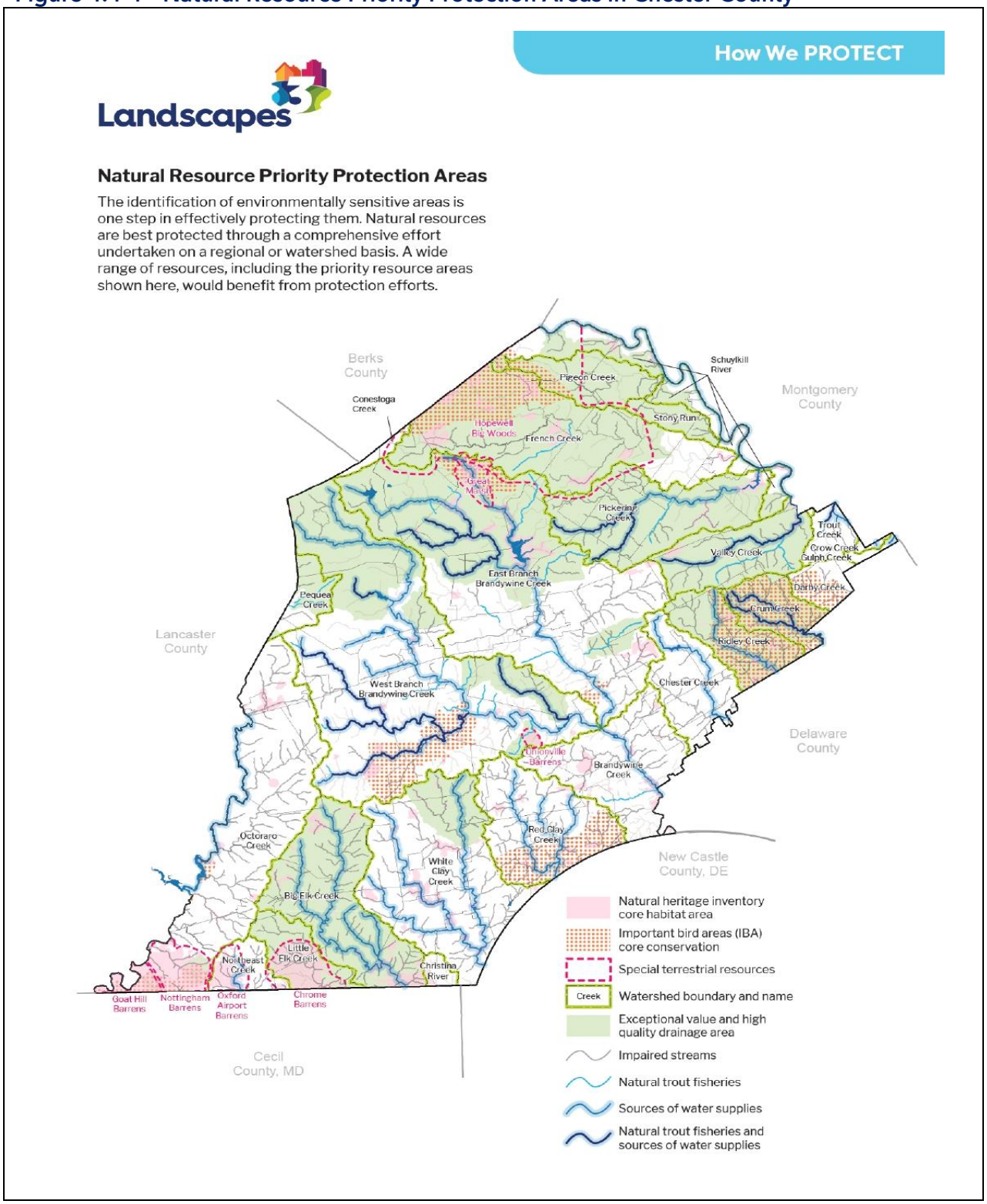
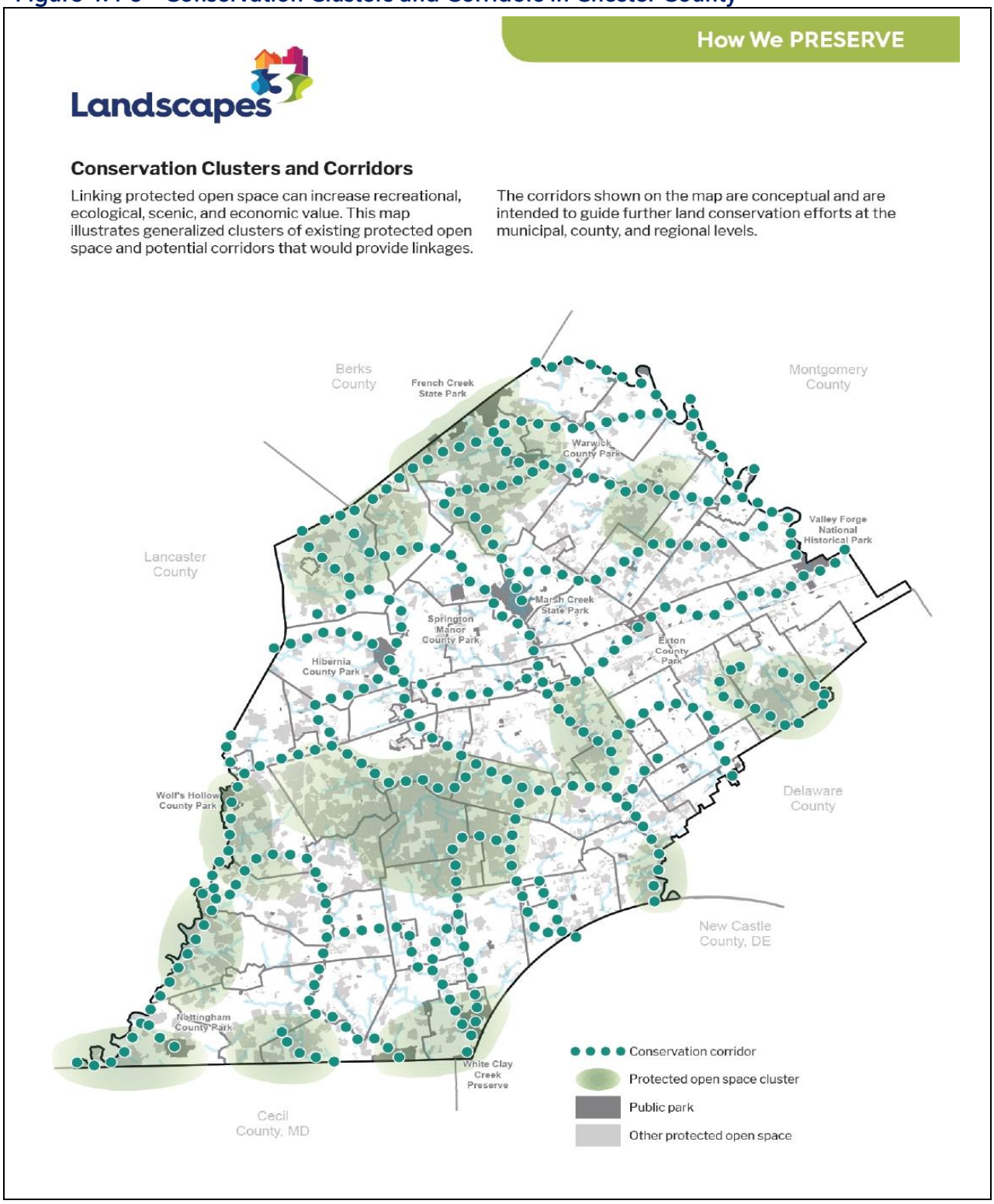


Figure 4.4-5 shows existing protected open space and presents potential corridors to link these areas to further conservation efforts and increase benefits.

Figure 4.4-5 Conservation Clusters and Corridors in Chester County



Making use of the analysis of Chester County's current and future population and development trends, it is important to explore how these projected changes may influence the County's future vulnerability to the profiled hazards. Hazard vulnerability and loss potential will be higher in the places of higher density throughout the County, so as areas continue to grow and densify, these communities might become more vulnerable to hazards. For example, population growth and its associated development is likely to create increases in loss potential, as more people may be living in areas prone to hazards.

This updated plan can be used to inform ongoing land use and other planning efforts by the County. The analysis and associated maps within this Plan Update can assist Chester County in accomplishing their goals of development and redevelopment and actions to make areas less prone to the negative impacts of hazards.

4.4.5. Community Survey

A community-wide survey was conducted to help understand the on-the-ground conditions and concerns of Chester County residents, therefore supporting the assessment of hazard risk and mitigation opportunities in the County. The survey asked respondents two types of questions: mitigation activities completed within the household and hazard concerns. Over 1,100 county residents took the survey with the largest cohort of respondents coming from those who live within East Goshen.

Across all respondents, 88% are homeowners and all have homeowner's insurance. Almost all renters have rental insurance. However, when it comes to insuring homes against any type of flooding, only 5% of individuals who responded to the survey have flood insurance. Other household preparedness and mitigation efforts included discussing what to do in the case of an emergency (56%) and preparing a family emergency plan (26%). However, 32% of respondents reported that they have done nothing to prepare for a potential hazard. This provides a good opportunity for public education training related to risk, mitigation, and preparedness with more than 91% of residents reporting they have some level of interest in attending a municipally led hazard mitigation-related event. Further, the relatively high volume of responses to the survey indicates that the community is interested in engaging in emergency preparedness activities.

Respondents were asked about how informed they are when it comes to the most pressing hazards within Chester County, and 38% said they are somewhat informed. Many (42%) stated that there is probably a lot they are not aware of, while 15% viewed themselves as very informed. The top reported hazards of concern included utility interruptions (62%), winter storm (52%), drought (51%), and flooding (47%). For

information on preparedness and potential hazard risk, email (newsletter or new blasts) and social media are the most desired.

5. Capability Assessment

5.1. Update Process Summary

The purpose of the capability assessment is to identify strengths and weaknesses that will affect the ability of the County and participating jurisdictions to implement mitigation actions. It is important to perform a capability assessment to develop a comprehensive and implementable mitigation strategy. Capabilities include a variety of regulations, existing planning mechanisms, and administrative capabilities provided through established agencies or authorities.

The capability assessment has three main components:

1. Document Review - an inventory of the County's existing planning and regulatory tools and a review and incorporation of existing plans and other technical information as appropriate.
2. Discussion of participation in the National Flood Insurance Program.
3. Municipal Capability Assessment - an analysis of municipal capacity from a planning, policy, staffing, training, outreach, and political will standpoint.

Based on these components as well as the vulnerability analysis identified earlier in the plan, Chester County can assess its current resources and begin to address the legal, regulatory, administrative, financial, and other capabilities which it currently has at its disposal to address the potential hazards the county and its local municipalities are vulnerable to.

Chester County has several resources it can access to implement hazard mitigation initiatives local planning and regulatory tools, administrative assistance and technical expertise, fiscal capabilities, and participation in local, regional, state, and federal programs. The presence of these resources enables community resiliency through mitigation actions taken before, during, and after a hazard event.

In 2021, the County, municipalities, and stakeholders, identified the suite of resources available in the County to support hazard mitigation, including regulatory, planning, and administrative resources. It also indicated the presence of local plans, ordinances, and codes in applicable municipalities. Finally, the 2021 plan specified the County's staff and training capabilities. For the 2026 plan, the HMPT updated the 2021 capability assessment by distributing a *Capability Assessment Survey* to all 73 municipalities and summarizing responses. In addition, the HMPT provided additional input into the 2026 capability assessment through feedback at meetings. This plan includes an analysis of how municipalities have implemented the NFIP in their communities to meet requirements that have changed since the last plan.

The 2026 capability assessment provides an updated inventory of the most critical local planning and regulatory tools available within each municipality, a summary of the fiscal and technical capabilities available through programs and organizations outside of the County and provides an opportunity to discuss any plan integration opportunities with the hazard mitigation plan. It also identifies emergency management capabilities, and the processes used for implementation of the NFIP.

While the capability assessment serves as a good instrument for identifying local capabilities, it also provides a means for recognizing gaps and weaknesses that can be resolved through future mitigation actions. The results of this assessment lend critical information for developing an effective mitigation strategy.

Additionally, a number of documents have been reviewed as part of this Plan Update. While some reviews have been carried over from past plan updates and revised where applicable, additional documents have been identified and reviewed for purposes of integration into other local planning mechanisms. Several plans and ordinances at the county and municipal level have been reviewed and a summary with options to integrate the data, information, and hazard mitigation goals and actions into other planning mechanisms are included.

The mitigation strategy, including the goals and actions, is incorporated into relevant planning mechanisms based on their pertinence and relevance to specific plans and ordinances. For example, all appropriate structural projects should be included in the Capital Improvements Program. Land use and zoning related projects should be incorporated into the next update of the community comprehensive plans and/or zoning ordinances through collaboration with the Planning and Zoning departments. Likewise, information from relevant planning documents was used to inform and update the HMP. A general list of relevant plans and documents and corresponding areas for incorporation are listed below:

Table 5.1-1 Relevant Departments and Documents

RELEVANT DOCUMENTS	HAZARD MITIGATION PLANNING ELEMENTS
Comprehensive Plan/Land Use Plan (Landscapes3), Zoning/Subdivision Regulations, Floodplain Ordinance	Demographic data, land use, development trends, and floodplain management information
Stormwater Management Plan (Watersheds 2045), Sediment and Erosion Control Plan, Long Range Transportation Plan, Transportation Improvement Inventory, Public Transportation Plan	Stormwater management and infrastructure data and projects
Emergency Operations/Response Plan	All-hazards information for evacuation, response,

Table 5.1-1 Relevant Departments and Documents

RELEVANT DOCUMENTS	HAZARD MITIGATION PLANNING ELEMENTS
	and recovery
Climate Action Plan, Dam Safety Regulations	Risk and vulnerability data, and storm/floodwater management
Trails Master Plan, Woodlands and Tree Protection, Conservation Subdivision Design Guide, Linking Landscapes	Land preservation strategies
2021 Chester County HMP	Mitigation progress and solutions

5.2. Capability Assessment Findings

Chester County and participating jurisdictions have a wide variety of plans, tools, and resources in place to support the goals of hazard mitigation planning, and the specific mitigation strategy presented in this HMP Update.

5.2.1. Planning and Regulatory Capabilities

The purpose of a plan/ordinance review as part of this planning process is trifold:

- Identify existing Commonwealth, regional/county, and municipal initiatives.
- Provide an inventory and review of sample plans and ordinances and identify sections in these documents that address hazard mitigation-related issues.
- Provide a platform to integrate plans and other documents so recommendations and strategies are not in contradiction with one another (e.g., between the HMP and comprehensive plan).

A review of current zoning and subdivision ordinances, comprehensive plans, open space and recreation plans, stormwater management plans, sediment and erosion control plans, and emergency operations plans, among others, are summarized below by level of administration (Commonwealth, regional/county, and municipal).

Commonwealth of Pennsylvania Document Review

- The 2023 Pennsylvania State Hazard Mitigation Plan Update goals and objectives that are applicable to this Chester County Plan Update including (PEMA, 2023):
    - Protect lives, property, environmental quality, and resources of the Commonwealth.
    - Enhance consistent coordination, collaboration, and communications among stakeholders.

- Provide a framework for active hazard mitigation planning and implementation.
- Increase awareness, understanding, and preparedness across all sectors.

Hazard identification and risk assessment data from the 2023 Pennsylvania State Hazard Mitigation Plan Update has been incorporated into the appropriate sections of this HMP.

- The Uniform Construction Code (UCC) is the statewide building code (Act 45 of 1999) that took effect in Pennsylvania in April of 2004. The UCC is mandated by the State for all municipalities in Pennsylvania and establishes minimum regulations for most new construction, including additions and renovations to existing structures. All new construction is required to meet the UCC requirements statewide. The current UCC is based on the 2018 International Building Code (IBC) and International Residential Code (IRC).

  Building codes relate to hazard mitigation through requirements about building materials and methods that have been professionally evaluated for quality and safety, as well as inspection requirements. Municipalities have the option to adopt more stringent requirements that enhance disaster-resistant or resilient building design practices.

- The Commonwealth of Pennsylvania Governor's Executive Order 1999-1 (Land Use Planning) provides the basis for the requirement to integrate hazard mitigation into comprehensive land use planning. As part of this executive order, the Interagency Land Use Team was established, comprising the following state agencies: Department of Agriculture; Department of Community and Economic Development; Department of Conservation and Natural Resources; Department of Environmental Protection; Governor's Green Government Council; Fish and Boat Commission; Game Commission; Department of Transportation; and PEMA. One of the most significant outcomes of PEMA's participation on the team is the integration of hazard mitigation goals and objectives into comprehensive land use planning processes.

- The Pennsylvania Governor's Invasive Species Council helps identify and manage invasive plant, insect, and animal species that are either currently posing a risk to Pennsylvania's natural and agricultural resources or could potentially threaten them. The council develops and implements the Invasive Species Management Plan, which provides guidance on the prevention and control of invasive species. They also draft and update the Aquatic Invasive Species Rapid Response Plan, which outlines procedures on how to respond to new invasive species threats.

This council is run by seven state agencies, including the Departments of Agriculture and Environmental Protection, and 14 non-governmental organizations, such as universities, environmental management groups, and port authorities. They provide education and outreach on identifying and managing invasive species.

- The Pennsylvania Erosion and Sediment Control Code requires all earthmoving projects in the Commonwealth to develop an erosion and sediment pollution control plan to ensure that proper site development practices are employed for land development and implement best management practices for the control of sediment pollution during construction. Pennsylvania Department of Environmental Protection requires a National Pollution Discharge Elimination System (NPDES) permit for earthmoving activities exceeding one acre. As well as erosion and sediment pollution control during construction, the permit also addresses post-construction stormwater management.
- Act 165: Hazardous Materials Emergency Planning and Response Act, amended in 2001, established a statewide hazardous materials safety program. This created the Hazardous Materials Response Fund, county Hazardous Material Emergency Response Accounts, and further provided duties to PEMA and the Pennsylvania Emergency Management Council. This Act requires facilities with extremely hazardous chemicals on site to create Off-site Emergency Response Plans, which are then presented to Local Emergency Planning Committees.

Regional/County Document Review

- The Chester County Comprehensive Plan, Landscapes3, was adopted in 2018. A comprehensive plan is a policy document that states objectives and guides the future growth and physical development of a municipality. The comprehensive plan is a blueprint for housing, transportation, community facilities, utilities, and land use. It examines how the past led to the present and charts the community's future path. The Pennsylvania Municipalities Planning Code (MPC) Act 247 of 1968, as reauthorized and amended, requires counties to prepare and maintain a comprehensive plan. In addition, the MPC requires counties to update the comprehensive plan every 10 years. The Chester County Commissioners annually approve a comprehensive 5-year capital improvement plan, which identifies both sources and uses of funds to support strategic objectives. Section 301a.(2) of the MPC requires comprehensive plans to include a plan for land use, which among other provisions suggests that the plan should give consideration to floodplains and other areas of special hazards and other similar uses. The MPC also requires comprehensive plans to include a plan for community facilities and

services and recommends giving consideration to storm drainage and floodplain management. The Landscapes3 Comprehensive Plan is slated to guide Chester County until 2028. It addresses the following elements:

  - Housing.
  - Social Services.
  - Economic Development.
  - Transportation.
  - Recreation / Open Space / Natural Resources / Historic Resources.
  - Public Utilities / Services / Facilities.
  - Land Use.

  Each element includes a profile, trends, conclusions, and policy statements as well as an implementation matrix.

- The Chester County Freight Plan was written in 2023 to further advance goals outlined in the above Landscapes3 Comprehensive Plan. The purpose of the freight plan is to protect and grow the County's freight infrastructure network that moves goods across regional, national, and global markets. This infrastructure includes railways, interstate highways, intermodal terminals where freight is transferred from one mode of transport to another, and pipelines. The plan identifies existing conditions of the County's freight infrastructure, which helps the County provide a better understanding of the role, network, and impact of freight on the County, its residents, and its industries. It also includes strategies to support freight-related activity and maintain living conditions in communities that help guide future plans.

In January 2024, Chester County developed its Act 167 Stormwater Management Plan, called Watersheds 2045. The purposes of the plan are provided below (Chester County, 2024c):

- Engage and educate individuals, communities, businesses, and governments to promote scientifically based watershed stewardship.
- Expand water-based recreational opportunities and access to local water features.
- Conserve and protect the County's natural resources for clean water.
- Improve surface water and groundwater quality.
- Reduce stormwater runoff and mitigate the impacts of flooding.

- Promote the integration of water resources, natural resources protection, and land use planning.
- Ensure safe, sustainable water supply and wastewater disposal systems.

The Pennsylvania General Assembly passed the Stormwater Management Act (Act 167) of 1978 (Pennsylvania State Data Center 1978). Act 167 requires counties to prepare stormwater management plans on a watershed-by-watershed basis. The plans must be developed in consultation with the affected municipalities. Each new plan is required to provide standards for control of runoff from new development, based on a detailed hydrologic assessment. A key objective of each plan is to coordinate the stormwater management decisions of the watershed municipalities. Implementation of each plan is through mandatory municipal adoption of ordinance provisions consistent with the plan. Plans prepared under Act 167 will not resolve all drainage issues. A key goal of the planning process is to maintain existing peak runoff rates throughout a watershed as land development continues to take place. While the planning process does not solve existing flooding problems, it aims to prevent these problems from getting worse. Each municipality is responsible for correcting existing flooding problems. According to Section 11(b) of Act 167, municipalities subject to the Stormwater Management Plan must enact or amend and implement such ordinances as necessary to regulate development in a manner consistent with the Stormwater Management Plan. Municipalities are encouraged to use the model ordinance included in the plan.

The Pennsylvania Emergency Management Services Code, Title 35, requires all political jurisdictions in the Commonwealth to have an Emergency Operations Plan (EOP), an Emergency Management Coordinator (EMC), and an EOC. The Chester County EOP documents the county's emergency preparedness planning. The EOP includes county-specific emergency response procedures during significant emergency events. Chester County's EOP complies with the National Incident Management System (NIMS) and is updated every 2 years. The updated risk assessment information from this HMP will be incorporated into subsequent updates to the EOP.

Chester County contains several plans regarding transportation planning. Chester County has the Transportation Improvement Inventory (TII), a comprehensive record of known transportation needs and projects within the county. The TII is updated biennially and contains projects that have been recommended to the Planning Commission. The 2023 TII included 534 proposed roadway, bridge, bicycle, pedestrian, freight, and transit projects with a total estimated cost of $4.55 billion (Chester County Planning Commission 2023). Along with the TII, Chester County also participates in the Delaware Valley Regional Planning Commission's Transportation Improvement Program (TIP). The TIP is the region's agreed-upon list of specific priority projects. The TIP lists all

projects that intend to use federal funds along with non-federally funded projects that are regionally significant. The list is multimodal; in addition to the more traditional highway and public transit projects, it includes bicycle, pedestrian, and freight- related projects as well. Chester County has also put more of a priority on public transportation in recent years, releasing the Public Transportation Plan in 2024. This plan identifies key issues found in the public transportation systems of Chester County (including bus and rail) and highlights ways to improve them through connectivity, reliability, and expansion (Chester County Planning Commission, 2024a).

Chester County has prepared several plans with the goal of preserving open space in the county for recreational and environmental purposes. These plans include chapters in the Chester County Comprehensive Plan Landscape3 (Chester County Planning Commission, 2018), Watersheds 2045, Linking Landscapes, Trails Master Plan, and Conservation Subdivision Design Guide. Linking Landscapes is a 2002 document that seeks to protect already existent open space throughout the County. In more recent years, Chester County published the Conservation Subdivision Design Guide in 2022. This guide was intended to help municipalities develop effective ordinances that permit conservation subdivisions, which preserves an area as open space (Chester County Planning Commission, 2022a). The Chester County Trails Master Plan was published in 2024 after the County was awarded a grant by the DCNR's Community Conservation Partnership Program. The Trails Master Plan establishes a framework for future trail development in Chester County, creating connections between different trail networks, providing more equitable trail access, and filling critical trail "gaps" in the trail network. In addition to mapping out the trail vision, the Master Plan includes information and resources on trail design, funding, and implementation to support trail development (Chester County Planning Commission, 2024b).

Chester County also has a Climate Action Plan, which was published in 2021. The Climate Action Plan provides a blueprint for reducing greenhouse gas emissions and increasing energy efficiency at County government facilities and community-wide. The overall goal of the plan is to reduce greenhouse gas emissions by 80% of 2005 emissions by 2050 (Chester County Planning Commission, 2021).

In 2025, the Brandywine Conservancy, an accredited land trust organization, published the Brandywine Flood Study. Though this organization is located in Delaware County, they partnered with the Chester County Water Resources Authority and the University of Delaware to study flooding along the Brandywine Creek, which runs through parts of the County in Downingtown Borough, Honey Brook Borough, and the City of Coatesville. This study identified frequent flood sites and made recommendations for

flood mitigation efforts. The Conservancy is looking to continue to study flood conditions, and they plan to conduct a similar study along White Clay Creek.

Chester County has mutual aid agreements (formal agreements) with the contiguous Pennsylvania counties as a result of the Pennsylvania Intrastate Mutual Assistance Program. Every county participates in this program. Chester County is part of a larger county consortium, the Southeastern Pennsylvania Regional Task Force (SEPA-RTF), which works together and shares resources during times of emergency. Originally formed in response to a growing awareness of the threat of terrorism, the Task Force's focus has broadened to include an all-hazards approach. SEPA-RTF works to prevent, prepare for, respond to, and recover from all types of emergencies and disasters. This intergovernmental agreement is between Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties.

The county is a participating member in Pulsepoint, an app that empowers everyday citizens to provide life-saving assistance to victims of sudden cardiac arrest. App users who have indicated they are trained in cardiopulmonary resuscitation (CPR) and willing to assist in case of an emergency can be notified if someone nearby is having a cardiac emergency and may require CPR. If the cardiac emergency is in a public place, the location-aware application will alert users in the vicinity of the need for CPR simultaneous with the dispatch of advanced medical care. The application also directs these potential rescuers to the exact location of the closest Automated External Defibrillator (AED) (Chester County n.d.).

Municipal Document Review

In addition to county and regional-scale plans, there are municipal-scale plans and studies that have been developed by municipalities in collaboration with the county and other organizations. The Chester County Planning Commission is particularly involved in assisting municipalities in planning efforts. To record municipal planning and regulatory capabilities, a capability survey was developed and administered to municipalities. Chester County received 40 completed surveys from 36 of the 73 municipalities; they are included in Appendix C. A summary of Planning and Regulatory capabilities for each municipality, taken from submitted surveys and discussions with County staff is provided in Table 5.2.1-1 below. An 'X' indicates that the municipality has that planning and/or regulatory capability in place; a 'U' indicates that the planning and/or regulatory capability is under development; a dash indicates that the municipality did not provide information on the capability. County capabilities, particularly through CCPC's technical assistance, can provide support as municipalities aim to expand their own planning and regulatory capabilities.

Table 5.2-1 Reported Planning and Regulatory Capabilities

MUNICIPALITY	EMERGENCY OPERATIONS PLAN	BUILDING CODE	CAPITAL IMPROVEMENT PLAN	CONTINUITY OF OPERATIONS PLAN	DISASTER RECOVERY PLAN	ECONOMIC DEVELOPMENT PLAN	EVACUATION PLAN	FARMLAND PRESERVATION	FIRE CODE	FLOODPLAIN MANAGEMENT PLAN	HISTORIC PRESERVATION PLAN	NATURAL RESOURCE PROTECTION PLAN	OPEN SPACE/ PARKS/RECREATION PLAN	STORMWATER MANAGEMENT PLAN	SUBDIVISION REGULATIONS	ZONING REGULATIONS
Atglen Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Avondale Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Birmingham Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Caln Township	X	X	U	U			X		X	X	X	X	X	X	X	X
Charlestown Township	X	X						X		X	X		X	X	X	X
Coatesville City	X	X	X		X	X	X		X	U	X		X	X	X	X
Downingtown Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
East Bradford Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
East Brandywine Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
East Caln Township	X	X							X					X	X	X
East Coventry Township		X				X		X			X	X	X	X	X	X
East Fallowfield Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
East Goshen Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
East Marlborough Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
East Nantmeal Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
East Nottingham Township	X	X					X	X	X			U		X	X	X
East Pikeland Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Easttown Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
East Vincent Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.2-1 Reported Planning and Regulatory Capabilities

MUNICIPALITY	EMERGENCY OPERATIONS PLAN	BUILDING CODE	CAPITAL IMPROVEMENT PLAN	CONTINUITY OF OPERATIONS PLAN	DISASTER RECOVERY PLAN	ECONOMIC DEVELOPMENT PLAN	EVACUATION PLAN	FARMLAND PRESERVATION	FIRE CODE	FLOODPLAIN MANAGEMENT PLAN	HISTORIC PRESERVATION PLAN	NATURAL RESOURCE PROTECTION PLAN	OPEN SPACE/ PARKS/RECREATION PLAN	STORMWATER MANAGEMENT PLAN	SUBDIVISION REGULATIONS	ZONING REGULATIONS
East Whiteland Township	X	X	X						X	X	X	X	X	X	X	X
Elk Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elverson Borough	X	X	X	U	U	U	X		X	X	X	U	X	X	X	X
Franklin Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Highland Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Honey Brook Borough	X	X	U				X		X					X	X	X
Honey Brook Township	X															
Kennett Township	X	X	X			X		X	X		X	X	X	X	X	X
Kennett Square Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
London Britain Township	X	X	X					X	X	X	X		X	X	X	X
Londonderry Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
London Grove Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lower Oxford Township	X	X	U	X	X	U	X	X	X	X	U	X	X	X	X	X
Malvern Borough	X	X					X		X	X	X		X	X	X	X
Modena Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Garden Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Newlin Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New London Township	X	X						X		X			X	X	X	X
North Coventry Township	X	X	X				X		X	X			X	X		X

Table 5.2-1 Reported Planning and Regulatory Capabilities

MUNICIPALITY	EMERGENCY OPERATIONS PLAN	BUILDING CODE	CAPITAL IMPROVEMENT PLAN	CONTINUITY OF OPERATIONS PLAN	DISASTER RECOVERY PLAN	ECONOMIC DEVELOPMENT PLAN	EVACUATION PLAN	FARMLAND PRESERVATION	FIRE CODE	FLOODPLAIN MANAGEMENT PLAN	HISTORIC PRESERVATION PLAN	NATURAL RESOURCE PROTECTION PLAN	OPEN SPACE/ PARKS/RECREATION PLAN	STORMWATER MANAGEMENT PLAN	SUBDIVISION REGULATIONS	ZONING REGULATIONS
Oxford Borough	X	X	X	U	U	U	X		U	X	U	U	U	X	X	X
Parkesburg Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Penn Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pennsbury Township	X	X	X				X		X		X					X
Phoenixville Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pocopson Township	X	X	U				X	X	X	X	X	X		X	X	X
Sadsbury Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Schuylkill Township	X	X	X	U	U	U	X	U	X	X	X	X	X	X	X	X
South Coatesville Borough	X	U	U	X	X	U	X	U	U	U	U	U	X	X	X	X
South Coventry Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spring City Borough	X	X				X	X			X				X	X	X
Thornbury Township	X	X	X	U	U	U	U	U	X	X	X	X	X	X	X	X
Tredyffrin Township	X	X	X	X	X	X	X	U	X	X	X	X	X	X	X	X
Upper Oxford Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper Uwchlan Township	X	X	X	U	U	U	U	X	X	X	X	U	X	X	X	X
Uwchlan Township	X	X	X	X	X	X	X	X	X	X	X	X	U	X	X	X
Valley Township	X	X	U	X	U	U	X	U	X	X	U	U	X	X	X	X
Wallace Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Warwick Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.2-1 Reported Planning and Regulatory Capabilities

MUNICIPALITY	EMERGENCY OPERATIONS PLAN	BUILDING CODE	CAPITAL IMPROVEMENT PLAN	CONTINUITY OF OPERATIONS PLAN	DISASTER RECOVERY PLAN	ECONOMIC DEVELOPMENT PLAN	EVACUATION PLAN	FARMLAND PRESERVATION	FIRE CODE	FLOODPLAIN MANAGEMENT PLAN	HISTORIC PRESERVATION PLAN	NATURAL RESOURCE PROTECTION PLAN	OPEN SPACE/ PARKS/RECREATION PLAN	STORMWATER MANAGEMENT PLAN	SUBDIVISION REGULATIONS	ZONING REGULATIONS
West Bradford Township	X	X	X					X	X	X	X	X	X	X	X	X
West Brandywine Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
West Caln Township	X	X	U	U	X	U	X	X	X	X	X	X	X	X	X	X
West Chester Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
West Fallowfield Township		X								X				X	X	X
West Goshen Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
West Grove Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
West Marlborough Township	X	X	U	X	X	U	U	X	U	X	U	X	U	X	X	X
West Nantmeal Township	X	X	X	X	U	X	U	X	X	X	X	X	X	X	X	X
West Nottingham Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
West Pikeland Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
West Sadsbury Township	X	X		X				X	X	X			X	X	X	X
West Vincent Township	X	X	X			X	X	X	X	X	X	X	X	X	X	X
West Whiteland Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Westtown Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Willistown Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

5.2.1.1. Participation in the National Flood Insurance Program

The Pennsylvania Floodplain Management Act (Act 166 of 1978) requires every municipality with flood hazard areas identified by FEMA to participate in the NFIP and permits all municipalities to adopt floodplain management regulations. It is in the interest of all property owners in the floodplain to keep development and land usage within the scope of the floodplain regulations for their community. This helps keep insurance rates low and makes sure that the risk of flood damage is not increased by property development.

FEMA Region 3 makes available to communities an ordinance review checklist which lists required provisions for floodplain management ordinances. This checklist helps communities develop an effective floodplain management ordinance that meets federal requirements for participation in the NFIP. The Pennsylvania Emergency Management Agency (PEMA) provides communities with a suggested model ordinance document to assist municipalities in meeting the minimum requirements of the NFIP and the Pennsylvania Flood Plain Management Act (Act 166), based on their 44 CFR 60.3 level of regulations. As new Flood Insurance Rate Maps (FIRMs) are published, the Pennsylvania State NFIP Coordinator at PEMA works with communities to ensure the timely and successful adoption of an updated floodplain management ordinance by reviewing and providing feedback on existing and draft ordinances. In addition, PEMA provides guidance and technical support through Community Assistance Contacts (CAC) and Community Assistance Visits (CAV).

All of the county's municipalities participate in the NFIP. FIRMs for Chester County's municipalities went effective in September 2017. All participating municipalities have adopted a floodplain ordinance, and many have adopted a stormwater management ordinance. Information on how municipalities administer their floodplain management programs was captured on an NFIP Survey. Chester County received completed surveys from 23 of the 73 municipalities; they are included in Appendix C.

Table 5.2.1-2 shows whether the municipality is participating in NFIP, the date of their current Flood Insurance Rate Map (FIRM), the number of policies they have, their total coverage, and what their average premium is. All communities in Chester County are in good standing, but several do not have any NFIP policies. Honey Brook Borough has no SFHAs, while Atglen Borough, Elk Township, Highland Township, Honey Brook Broough, South Coatesville Borough, South Coventry Borough, West Sadsbury Township have no policies according to data provided by PEMA in December 2025.

There are 1,287 policies that provide $365,056,000 in coverage for buildings and their contents. The average premium for policies in Chester County is $1,354. Downingtown Borough has the most policies with 152 and the most coverage with $38,656,000.

Tredyffrin Township is a close second in both categories. East Caln Township has by far the highest average premium at $9,504. This may be a function of the low number of policies and potential high-risk or non-residential properties with higher premiums.

NFIP Participation in Chester County (FEMA, 2026; PEMA, 2025).

MUNICIPALITY	EFFECTIVE FIRM DATE	NUMBER OF POLICIES	TOTAL COVERAGE	AVERAGE PREMIUM
Atglen Borough	9/29/2017	0	$0	$0
Avondale Borough	9/29/2017	10	$2,791,000	$4,756
Birmingham Township	9/29/2017	10	$3,021,000	$1,922
Caln Township	9/29/2017	53	$16,246,000	$1,502
Charlestown Township	9/29/2017	11	$2,803,000	$518
Coatesville City	9/29/2017	17	$5,218,000	$2,618
Downingtown Borough	9/29/2017	152	$38,656,000	$1,985
East Bradford Township	9/29/2017	12	$2,525,000	$1,247
East Brandywine Township	9/29/2017	16	$3,601,000	$982
East Caln Township	9/29/2017	8	$4,073,000	$9,504
East Coventry Township	9/29/2017	18	$5,136,000	$1,062
East Fallowfield Township	9/29/2017	12	$3,967,000	$518
East Goshen Township	9/29/2017	102	$19,778,000	$322
East Marlborough Township	9/29/2017	14	$4,542,000	$770
East Nantmeal Township	9/29/2017	1	$172,000	$611
East Nottingham Township	9/29/2017	5	$1,116,000	$1,194
East Pikeland Township	9/29/2017	9	$3,492,000	$1,199
Easttown Township	9/29/2017	44	$14,522,000	$569
East Vincent Township	9/29/2017	15	$3,713,000	$1,890
East Whiteland Township	9/29/2017	21	$6,289,000	$905
Elk Township	9/29/2017	0	$0	$0
Elverson Borough	9/29/2017	1	$350,000	$488
Franklin Township	9/29/2017	8	$2,045,000	$1,137
Highland Township	9/29/2017	0	$0	$0
Honey Brook Borough	(No SFHA)	N/A	N/A	N/A
Honey Brook Township	9/29/2017	8	$1,364,000	$773
Kennett Township	9/29/2017	8	$2,285,000	$1,924
Kennett Square Borough	9/29/2017	16	$4,629,000	$1,483
London Britain Township	9/29/2017	3	$982,000	$1,972
Londonderry Township	9/29/2017	3	$1,050,000	$381
London Grove Township	9/29/2017	17	$5,761,000	$1,816
Lower Oxford Township	9/29/2017	3	$576,000	$1,333
Malvern Borough	9/29/2017	11	$3,307,000	$291
Modena Borough	9/29/2017	9	$1,895,000	$2,359
New Garden Township	9/29/2017	19	$7,258,000	$1,551

NFIP Participation in Chester County (FEMA, 2026; PEMA, 2025).

MUNICIPALITY	EFFECTIVE FIRM DATE	NUMBER OF POLICIES	TOTAL COVERAGE	AVERAGE PREMIUM
Newlin Township	9/29/2017	9	$2,325,000	$1,270
New London Township	9/29/2017	2	$1,008,000	$2,178
North Coventry Township	9/29/2017	40	$9,008,000	$2,535
Oxford Borough	9/29/2017	1	$105,000	$532
Parkesburg Borough	9/29/2017	14	$4,031,000	$752
Penn Township	9/29/2017	6	$1,771,000	$1,199
Pennsbury Township	9/29/2017	40	$13,144,000	$3,101
Phoenixville Borough	9/29/2017	14	$5,445,000	$4,638
Pocopson Township	9/29/2017	6	$1,304,000	$493
Sadsbury Township	9/29/2017	18	$5,589,000	$1,178
Schuylkill Township	9/29/2017	8	$1,364,000	$773
South Coatesville Borough	9/29/2017	0	$0	$0
South Coventry Township	9/29/2017	0	$0	$0
Spring City Borough	9/29/2017	8	$2,034,000	$1,676
Thornbury Township	9/29/2017	7	$1,890,000	$767
Tredyffrin Township	9/29/2017	137	$38,179,000	$899
Upper Oxford Township	9/29/2017	3	$745,000	$2,336
Upper Uwchlan Township	9/29/2017	18	$5,224,000	$830
Uwchlan Township	9/29/2017	25	$7,101,000	$525
Valley Township	9/29/2017	12	$2,125,000	$1,383
Wallace Township	9/29/2017	5	$1,230,000	$539
Warwick Township	9/29/2017	9	$2,326,000	$1,320
West Bradford Township	9/29/2017	9	$2,989,000	$878
West Brandywine Township	9/29/2017	7	$2,583,000	$1,036
West Caln Township	9/29/2017	5	$1,546,000	$476
West Chester Borough	9/29/2017	37	$10,635,000	$735
West Fallowfield Township	9/29/2017	3	$732,000	$739
West Goshen Township	9/29/2017	51	$20,021,000	$881
West Grove Borough	9/29/2017	1	$350,000	$620
West Marlborough Township	9/29/2017	2	$358,000	$710
West Nantmeal Township	9/29/2017	3	$456,000	$372
West Nottingham Township	9/29/2017	1	$250,000	$1,372
West Pikeland Township	9/29/2017	13	$4,271,000	$768
West Sadsbury Township	9/29/2017	0	$0	$0
West Vincent Township	9/29/2017	13	$3,281,000	$819
West Whiteland Township	9/29/2017	75	$24,178,000	$1,566
Westtown Township	9/29/2017	19	$5,372,000	$605
Willistown Township	9/29/2017	38	$10,287,000	$664
TOTAL		1,287	$365,056,000	$1,354

For a community to participate in the NFIP, it must adopt and enforce floodplain management regulations that meet or exceed the minimum NFIP standards and requirements. These standards are intended to prevent loss of life and property, as well as economic and social hardships that result from flooding. Once FEMA provides communities with flood hazard information upon which floodplain management regulations are based, the community is required to adopt a floodplain ordinance that meets or exceeds the minimum NFIP requirements. All NFIP participating communities in Chester County have either adopted a stand-alone ordinance or arranged for County administration of floodplain regulations in 2017.

An important aspect of these regulations are substantial damage and substantial improvement determinations, which are required by local floodplain management ordinances. These provisions must be in place for residents of a community to purchase flood insurance through the NFIP. The determination about whether a structure is "substantially damaged" is made at the local government level, generally by a building official or floodplain manager. Substantial damage applies to a structure in the SFHA for which the total cost of repairs is 50 percent or more of the structure's market value before the disaster occurred, regardless of the cause of damage. This percentage could vary among jurisdictions but must not be below NFIP standards. Preliminary damage assessments conducted by Chester County after a disaster can be used when making substantial damage determinations. If a building within the floodplain is determined to be substantially damaged after a disaster, it will need to be brought into compliance through methods such as elevating the structure and floodproofing utilities. A structure is "substantially improved" when any reconstruction, rehabilitation, or other improvement that costs at least 50% of the structure's market value is completed. Substantial improvement regulations require these structures to be built to flood-resistant standards, which often includes elevating the structure up to or above the base flood elevation designated by FEMA. These should be monitored by the local community in order to stay in compliance with the NFIP. Municipalities typically enforce these regulations through a designated Floodplain Administrator. In addition, zoning officers or building code officials may enforce these regulations through the permit process. These officials may also be the designated Floodplain Administrator. More information on how municipalities enforce these regulations can be found in NFIP Survey responses located in Appendix C.

Table 5.2-4 below presents the designated individual or agency responsible for implementing the requirements of the NFIP for each participating municipality. In some cases, municipalities have contracts in place for floodplain management.

TABLE 5.2-3 Floodplain Administrators by Municipality (PA DCED, 2025).

MUNICIPALITY	INDIVIDUAL OR AGENCY
Atglen Borough	Craig Kologie, Castle Valley Consultants
Avondale Borough	Sharon Norris
Birmingham Township	Mark Gordon
Caln Township	Raymond Stackhouse
Charlestown Township	Linda Csete
Coatesville City	Currently Vacant
Downingtown Borough	JMR Engineering
East Bradford Township	Ayman Shehata
East Brandywine Township	Luke Reven
East Caln Township	Michael O'Brien
East Coventry Township	Michael Cosentino
East Fallowfield Township	Scott Swichar
East Goshen Township	Kelly Krause
East Marlborough Township	Charles Shock
East Nantmeal Township	LTL. Consultants, LTD
East Nottingham Township	Rachel Greer
East Pikeland Township	Kimberly Moretti
Easttown Township	Don Curley, PhD, PE, AICP
East Vincent Township	Haley Baer
East Whiteland Township	John Mateja
Elk Township	Michael Corcoran
Elverson Borough	Kraft Municipal Group
Franklin Township	Pennoni Engineering
Highland Township	Ted Jasiniski
Honey Brook Borough	Matthew Halvorsen
Honey Brook Township	Jennifer McConnel
Kennett Township	Kate Morgenstern
Kennett Square Borough	Rob Moran
London Britain Township	Dave Gargula
Londonderry Township	Louis Simone
London Grove Township	Kenneth Battin
Lower Oxford Township	Deborah J. Kinney
Malvern Borough	Nicole S. Whitaker
Modena Borough	Jennifer Daywalt
New Garden Township	Pennoni Engineering
Newlin Township	Craig Kologie
New London Township	Michael Corcoran
North Coventry Township	LTL Consultants
Oxford Borough	Pauline Garcia-Allen
Parkesburg Borough	Arro Consulting

TABLE 5.2-3 Floodplain Administrators by Municipality (PA DCED, 2025).

MUNICIPALITY	INDIVIDUAL OR AGENCY
Penn Township	Karen Versuk
Pennsbury Township	Russell Drumheller
Phoenixville Borough	E. Jean Krack
Pocopson Township	Craig Kologie
Sadsbury Township	Tammy Russell
Schuylkill Township	Kimberly J. Yocom
South Coatesville Borough	Steven Plaugher
South Coventry Township	Amanda Shaner
Spring City Borough	Kisha Tyler
Thornbury Township	Mike Conrad
Tredyffrin Township	Stephen Burgo
Upper Oxford Township	Jane Daggett
Upper Uwchlan Township	Rhys Lloyd
Uwchlan Township	Tara Giordano
Valley Township	Patrice Proctor
Wallace Township	Craig Kologie, Castle Valley Consultants
Warwick Township	Currently Vacant
West Bradford Township	Chris Adamek
West Brandywine Township	Dale Barnett
West Caln Township	Kim Milane-Sauro
West Chester Borough	Sean Metrick
West Fallowfield Township	Solanco Engineering Associates, LLC
West Goshen Township	Bryan Kulakowsky
West Grove Borough	Greg McCummings
West Marlborough Township	Yerkes Engineering
West Nantmeal Township	Castle Valley Consultants
West Nottingham Township	LTL Consultants
West Pikeland Township	Michael Cosentino
West Sadsbury Township	Edgar "Ted" Nelson
West Vincent Township	Tommy Ryan
West Whiteland Township	John Weller
Westtown Township	Currently Vacant
Willistown Township	Robert Smiley

The following information is summarized to document how the County currently assists municipalities in addressing NFIP compliance and requirements:

- The County makes FIRMs and FIS Reports available to the public for review online at https://www.chesco.org/3458/FEMA-Floodplains. The Chester County Water Resources Authority also provides assistance in viewing FIRMs and FIS Reports.

- Out of 73 total municipalities in the County, there are XX municipalities that are under the jurisdiction of the Chester County Zoning Ordinance and there are XX municipalities that are under the jurisdiction of the Chester County SALDO. Local municipalities, not under the jurisdiction of the County, are responsible for all third party LOMR requests to either be: 1) submitted to FEMA through the local municipality, or 2) provided with evidence that the local municipality has been notified of the LOMR request to FEMA.

Community Rating System

The NFIP's Community Rating System (CRS) provides discounts on flood insurance premiums in communities that establish floodplain management programs that go beyond NFIP requirements. Under the CRS, communities receive credit for more restrictive regulations; acquisition; relocation, or flood-proofing of flood-prone buildings, preservation of open space; and other measures that reduce flood damage or protect the natural resources and functions in floodplains.

The CRS was implemented in 1990 to recognize and encourage community floodplain management activities that exceed the minimum NFIP standards. Section 541 of the 1994 Act amends Section 1315 of the 1968 Act to codify the CRS in the NFIP, and expands the CRS goals to specifically include incentives to reduce the risk of flood-related erosion and to encourage measures that protect natural and beneficial floodplain functions. These goals have been incorporated into the CRS, and communities now receive credit toward premium reductions for activities that contribute to them.

Under CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet a minimum of three of the following CRS goals:

- Reduce flood losses.
- Reduce damage to property.
- Protect public health and safety.
- Prevent increases in flood damage from new construction.
- Reduce the risk of erosion damage.
- Protect natural and beneficial floodplain functions.
- Facilitate accurate insurance rating.
- Promote the awareness of flood insurance.

There are 10 CRS classes that provide varied reduction in insurance premiums. Class 1 requires the most credit points and gives the largest premium reduction; Class 10 receives no premium reduction. CRS premium discounts on flood insurance range from

5 percent for Class 9 communities up to 45 percent for Class 1 communities. The CRS recognizes 18 creditable activities that are organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness.

Currently, no Chester County municipalities participate in the CRS Program. Based on conversations with the County and the municipality, the administrative documentation procedures and their associated costs may be a hindrance to municipalities in using this program. When applicable, the County will help provide information on the program to interested municipalities.

5.2.2. Administrative and Technical Capability

Administrative capability is described by an adequacy of departmental and personnel resources for the implementation of mitigation-related activities. Technical capability relates to an adequacy of knowledge and technical expertise of local government employees or the ability to contract outside resources for this expertise to effectively execute mitigation activities. Common examples of skill sets and technical personnel needed for hazard mitigation include: planners with knowledge of land development/management practices, engineers or professionals trained in construction practices related to buildings and/or infrastructure (e.g. building inspectors), planners or engineers with an understanding of natural and/or human caused hazards, emergency managers, floodplain administrators, land surveyors, scientists familiar with hazards in the community, staff with the education or expertise to assess community vulnerability to hazards, personnel skilled in geographic information systems, resource development staff or grant writers, fiscal staff to handle complex grant application processes.

These capabilities can exist at the municipal level, but municipalities are often further supported by county, regional, state, and federal administrative and technical capabilities. The majority of support agencies and resources have been identified and referenced throughout this HMP update.

County Administrative and Technical Capabilities

- The Chester County Department of Emergency Services (DES) maintains a strong emergency management capability that supports Chester County. The county operates an emergency 9-1-1 call center and activates its own emergency operations center (EOC) during emergencies. In addition, the county provides or supports emergency service programs and measures, including emergency response; training coordination and administration; disaster response planning, coordination, recovery, and mitigation; hazardous materials emergency response; and fire prevention and investigation. Capabilities include the 9-1-1

center, Pulsepoint, EOC, emergency service measures, emergency response planning, public information programs, and GIS services, which are described in the sections below.

- The Chester County Planning Commission partners with federal, state, and regional agencies, as well as local municipalities. Their main goal is to improve the quality of life of all County residents, as outlined in their comprehensive plan, Landscapes3. The Chester County Planning Commission provides technical assistance to municipalities, which can be found on their Municipal Corner page. Technical assistance can be awarded through programs like the Vision Partnership Program. The Planning Commission also offers grants, planning guides, and education and outreach services. This page houses planning resources, eTools, and project examples.

  The CCPC must partner with all local municipalities for all subdivision and land development proposals, in accordance with the Pennsylvania Municipalities Planning Code (Act 247). The County Planning Commission must review, approve, and endorse all subdivision and land development proposals before municipalities can take action. The County has created a subdivision and land development activity tracking map and also maintains monthly reports.

  The commission is also required to review local municipality sewage facility plans and amendments, according to the Pennsylvania Sewage Facility Act (Act 537). The Chester County Planning Commission reviews all agricultural security area proposals to comply with the Pennsylvania Agricultural Security Area Law (Act 43). The County planning commission encourages local leaders to meet with them for planning ideas by creating and submitting community sketch plans.

- The Chester County Board of Commissioners established the Chester County Water Resources Authority (CCWRA) in 1961 under the PA Municipal Authorities Act as a county-wide municipal authority for the purposes of providing flood protection and water resources management for Chester County. CCWRA owns and operates four regional flood control facilities that provide flood protection for 23 municipalities, and a water supply reservoir that serves as a water source for the greater Coatesville region. CCWRA provides planning and technical information; guidance; and assistance to municipalities in other aspects of water resources management, including flood mitigation, stormwater management, water supply planning, source water management and protection, groundwater management and protection, and stream water quality restoration and protection.

In 2024, CCWRA received a state-funded grant that allowed them to lead planning efforts on developing an interactive stormwater "hot spots" map, conduct a baseline inventory of publicly owned stormwater infrastructure (basins, pipes, etc.), and conduct additional hydrologic & hydraulic models for the White Clay Creek, Valley Creek, and Trout Creek watershed. In 2025, CCWRA partnered with the Brandywine Conservancy to develop the Brandywine Flood Study, and they plan to conduct similar studies of other watersheds in the County. In addition, CCWRA also develops and maintains several Emergency Action Plans for municipalities with high hazard dams, develops the County's GIS database with infrastructure, critical facilities, land use, and hazard zones, and implements the County-wide Stormwater Management Plan. CCWRA runs numerous education and outreach events, including workshops, festivals and community days. They plan to start a "Catch the Rain" program to provide small grants to residents to help mitigate damage from stormwater flooding.

- The mission of the Chester County Health Department is to provide personal and environmental health services to residents and visitors so that they may grow, live, and work in healthy and safe communities. The Health Department is responsible to the County Commissioners through a five-member Board of Health, all Chester County residents. Services are available to all Chester County residents regardless of race, color, religious creed, ancestry, national origin, age, handicap, or sex. They help mitigate and respond to public health emergencies, including pandemics. They may also assist in communicating information and educating residents on risks associated with certain hazards.
- The Chester County Department of Human Services houses multiple departments to support their residents: Aging; Children, Youth, and Families; Community Development; Community Transit; Drug & Alcohol; Human Needs Network; Managed Behavior Healthcare; and Veterans Affairs. This department is described in further detail under the socially vulnerable population section.
- The Chester County Agricultural Land Preservation Board manages the Commonwealth Agricultural Conservation Easement Purchase Program and the Chester County Challenge Grant Program. These programs help the County preserve viable agricultural lands and protect the County's agriculture economy and resources, which are particularly vulnerable to the natural hazards discussed throughout the Risk Assessment.
- The Chester County Conservation District works with landowners and land users to protect the County's natural resources. They assist builders, contractors,

farmers and residents with protecting clean water, maintaining healthy farming soils, and sustaining other natural resources through education and technical assistance.

- The Chester County Economic Development Council promotes local business within Chester County. They assist with financing solutions, such as helping local business secure state and local funding programs and grants. The council also helps businesses who are interested in relocating to Chester County, recruiting local employees, and assists start-ups and entrepreneurs through the County's Ideas x Innovation Network (i2n), which also partners with Delaware County.
- The Chester County Local Emergency Planning Committee focuses on protecting the County from hazardous materials. This committee helps the County stay compliant under state and federal law and provides public outreach and training for safe management of hazardous materials.
- The Transportation Management Association of Chester County advances safe and equitable multimodal transportation solutions. They provide resources, collaborate with public, private, and non-profit sectors, and implement best practices for transportation, such as bike and pedestrian safety, walking trails, and public transportation infrastructure.

Chester County also assists in the preparation of local (municipal) EOPs and in planning for emergency preparedness and response regionally for medical facilities, dams, airports, schools, day care and special needs facilities, and special events, such as concerts, parades, etc. The county also supports county and regionally planning for pandemics, mass casualty/fatality incidents, terrorism events. Additionally, in cooperation with the American Red Cross, the county has designated shelters that may be used during emergencies and disasters.

Municipal Administrative and Technical Capabilities

Based on assessment results, municipalities in Chester County have mostly moderate to limited administrative and technical staff needed to conduct hazard mitigation-activities. The municipalities vary in staff size, resource availability, fiscal status, service provision, population, overall size, and vulnerability to the profiled hazards. Each municipality carries out its own daily operations and provides various community services according to their local needs and limitations. Some of these municipalities have formed cooperative agreements and work jointly with their neighboring municipalities to provide such services as police protection, fire and emergency medical response, solid waste disposal, recreational opportunities, wastewater treatment, water supply management and infrastructure maintenance. Many jurisdictions rely on

consulting firms for GIS personnel, scientists, and land surveying capabilities. This means that jurisdictions may only have access to their provider's capabilities when there is budget available. All municipalities in the county have an identified emergency management coordinator, although some of these coordinators are responsible for more than one jurisdiction. The current administrative and technical capabilities may create a challenge for some municipalities to expand or improve their current overall capabilities. That said, the county's capabilities in this area can supplement and even support the municipalities' ability to expand their own.

Engineering

A municipal engineer performs duties as directed in the areas of construction, reconstruction, maintenance, and repair of streets, roads, pavements, sanitary sewers, bridges, culverts, and other engineering work. The municipal engineer reviews and/or prepares plans, specifications, and estimates of the work undertaken within the municipality.

When staff responsible for planning and engineering the structures, people rely on are familiar with the hazards that can impact the community, there is a great potential for synergy. These staff members will design communities and structures with hazard impacts in mind, resulting in more sustainable communities and stronger structures. Although some individual municipalities do not have a staff member with an understanding of hazards (natural or otherwise), the County Planning Department and CCPC can provide consultation in many facets of planning and mitigation of natural hazards.

Floodplain Administrator

Floodplain Administrators (FPAs) are experts in the rules and regulations of development in a floodplain and can provide vast amounts of information on the risks and impacts of building within those hazard areas. They are an integral part of mitigation planning and can make recommendations based on the needs and conditions of the community. All 73 municipalities participate in the NFIP and have a designated FPA. In some municipalities floodplain management duties are assigned to a staff position with several roles. Floodplain Administrators may be contracted engineering firms.

Grant-Writing Staff or Other Fiscal Staff

Few communities have the financial resources that are required to implement all of their potential programs (e.g., mitigation measures). Therefore, they must rely on grants and other fundraising opportunities to obtain the money necessary to perform mitigation projects. Employing or having access to staff specializing in grants management will help the community ensure that it does not lose a grant opportunity because it did not meet the administrative requirements of that grant.

This may be difficult but having a specialist on staff will likely increase the community's chances of receiving funding. In meetings with municipalities, grant-writing was a capability concern raised by attendees. The Chester County Economic Development Council helps businesses and municipalities with writing grant proposals and administering funds. CCPC also provides assistance on grant writing.

Staff with Experience Using Mapping (GIS) Software

Spatial and tabular data are linked in a computerized, visual format through the use of sophisticated GIS technology. Through GIS projects, it is possible to accomplish environmental restoration, economic development, Smart Growth land use planning, infrastructure development, and training to use GIS for decision support. Chester County has GIS capabilities and can assist municipalities as needed. The county has a GIS HUB that provides municipalities and their residents access to a variety of relevant land use, assessment, and floodplain layers/data. Various maps can be accessed at the following link: https://chester-county-s-gis-hub-chesco.hub.arcgis.com/

Municipal Planning Commissions

As established by the Municipalities Planning Code (MPC), municipal planning commissions advise municipal staff on matters relating to land use, zoning, or development decisions, providing recommendations for action after reviewing plans, proposals, and applications. Through this, they play a role in guiding community development. Planning commissions may also be responsible for implementing any general or comprehensive plans in the community. Members are typically appointed by the municipal board or council.

The 36 municipalities that returned assessment forms were more likely to rate their administrative capabilities as limited or moderate, with only three rating themselves as having high administrative capabilities. Table 5.2.2-1 below shows the self-reported Administrative and Technical capabilities. An 'X' indicates that the municipality has that administrative and technical capability in place; a 'U' indicates that the administrative and technical capability is under development; a dash indicates that the municipality did not provide information on the capability.

Table 5.2-4 Reported Administrative and Technical Capabilities

MUNICIPALITY	ENGINEERS	GIS PERSONNEL	GRANT WRITERS/ FISCAL STAFF
Atglen Borough	-	-	-
Avondale Borough	-	-	-
Birmingham Township	X	X	X
Caln Township	X		X
Charlestown Township	X		X

Table 5.2-4 Reported Administrative and Technical Capabilities

MUNICIPALITY	ENGINEERS	GIS PERSONNEL	GRANT WRITERS/ FISCAL STAFF
Coatesville City	X	X	X
Downingtown Borough	-	-	-
East Bradford Township	-	-	-
East Brandywine Township	-	-	-
East Caln Township	X		
East Coventry Township	X		X
East Fallowfield Township	-	-	-
East Goshen Township	-	-	-
East Marlborough Township	-	-	-
East Nantmeal Township	-	-	-
East Nottingham Township	X	X	
East Pikeland Township	-	-	-
Easttown Township	-	-	-
East Vincent Township	-	-	-
East Whiteland Township	X		X
Elk Township	-	-	-
Elverson Borough	X		X
Franklin Township	-	-	-
Highland Township	-	-	-
Honey Brook Borough	X		X
Honey Brook Township	X		X
Kennett Township	X	X	X
Kennett Square Borough	-	-	-
London Britain Township	X		X
Londonderry Township	-	-	-
London Grove Township	-	-	-
Lower Oxford Township	X		
Malvern Borough	-	-	-
Modena Borough	-	-	-
New Garden Township	-	-	-
Newlin Township	-	-	-
New London Township	X		
North Coventry Township	-	-	-
Oxford Borough	X	X	X
Parkesburg Borough	-	-	-
Penn Township	-	-	-
Pennsbury Township			X
Phoenixville Borough	-	-	-
Pocopson Township	X		U

Table 5.2-4 Reported Administrative and Technical Capabilities

MUNICIPALITY	ENGINEERS	GIS PERSONNEL	GRANT WRITERS/ FISCAL STAFF
Sadsbury Township	-	-	-
Schuylkill Township	X	X	
South Coatesville Borough	X	X	
South Coventry Township	-	-	-
Spring City Borough	X		X
Thornbury Township	X		
Tredyffrin Township	X	X	
Upper Oxford Township	-	-	-
Upper Uwchlan Township	X	X	X
Uwchlan Township	X	X	X
Valley Township	X		X
Wallace Township	-	-	-
Warwick Township	-	-	-
West Bradford Township	X		X
West Brandywine Township	-	-	-
West Caln Township	X		U
West Chester Borough	-	-	-
West Fallowfield Township	X		
West Goshen Township	-	-	-
West Grove Borough	-	-	-
West Marlborough Township	X	X	
West Nantmeal Township	X		X
West Nottingham Township	-	-	-
West Pikeland Township	-	-	-
West Sadsbury Township	X		
West Vincent Township	X	X	X
West Whiteland Township	X	X	X
Westtown Township	-	-	-
Willistown Township	-	-	-

5.2.3. Financial Capability

A critical part of implementing any plan is having the financial resources to accomplish the projects identified. The implementation of mitigation actions requires time and fiscal resources. While some mitigation actions are less costly than others, it is important that money is available locally to implement policies and projects. Financial resources are particularly important if communities need to have local matching funds for state or federal grant funding. Based on the *Capability Assessment Survey* results received, most municipalities within the County perceive fiscal capability to be limited or moderate. No

communities listed their fiscal capability as high. Additionally, none of the municipalities are identified as "fiscally distressed" using the Pennsylvania Municipalities Financial Recovery Act (Act 47 of 1987) criteria.

Though the smaller, less populous municipalities do not have sufficient budgets to do costly mitigation projects without financial assistance, this does not preclude these municipalities from participating in hazard mitigation activities. Cooperative arrangements, coordinated efforts, and resource efficiency may serve as effective avenues for overcoming fiscal constraints and accomplishing hazard mitigation objectives at the local level.

There are also partnering opportunities at the local level to implement mitigation. These would include a Council of Governments (COG), which is a general, multi-purpose, cooperative organization established to enable a group of municipalities to work together on mutually beneficial projects. A COG has a broad responsibility; it may study and propose new joint programs and projects and is almost always composed of elected officials. A variety of organizations work across municipal boundaries within Chester County and with the Western Chester County COG. In addition, regional emergency management groups have been developed in various areas usually centered on school district boundaries.

Financial support for mitigation actions is often provided by the Commonwealth of Pennsylvania and the federal government.

Pennsylvania administered programs include:

- Municipal Assistance Program (MAP), which provides grant funds to implement a variety of services and improvements to manage development with intergovernmental strategies.
- Land Use Planning and Technical Assistance Program, which provides grant funds for the preparation of community comprehensive plans and ordinances to implement them.
- Flood Mitigation Program (FMP), which provides grants and technical assistance for projects that address flood mitigation.
- The Growing Green Plus Grants Program is an extension to the Growing Greener Grant Program administered by the PA DEP. Programs covered with these funds are: Growing Greener Watershed Restoration and Protection, Surface Mining Conservation and Reclamation Act Bond Forfeiture, and Abandoned Mine Drainage Set-Aside Grants.

- The Environmental Education grant administered by the PA DEP was established by the Environmental Education Act of 1993, which mandates that five percent of all pollution fines and penalties collected annually be set aside for environmental education.
- The Alternative Fuels Incentive Grant (AFIG) Program was established by the PA DEP in 1992 under Act 166. This program provides funding to create new markets for alternative fuels in Pennsylvania. Municipalities and agencies are eligible to apply for grant funding for alternative fuels through this grant program.
    - Individuals may be eligible for funding through the Alternative Fuel Vehicle Rebate program administered by the PA DEP. The program provides rebates for individuals when purchasing new, pre-owned, and demonstration vehicles that use alternative fuel sources such as hydrogen fuel cells, compressed natural gas, or battery electric. AFV Rebates have been awarded to several individuals in Centre County.
- Pennsylvania Infrastructure Investment Authority (PennVEST) administers a low interest loan and grant program for new construction or improvements to publicly or privately-owned drinking water, storm water, or sewage treatment facilities, as well as non-point source pollution prevention best management practices (BMPs).
- DCNR administers Community Conservation Partnerships Program Grants. This program is funded with a variety of state and federal funding sources, including the Keystone Recreation, Park and Conservation Fund (Key 93) which encompasses several environmental and conservation related funds.
- DCED manages the PA Small Water and Sewer Grant which funds small water, sewer, storm sewer, and flood control infrastructure projects. Funding is made available by the Commonwealth Financing Authority.

Federal programs that support mitigation include:

- FEMA's Hazard Mitigation Assistance Program, which provides grants for cost-effective mitigation projects either before or after a disaster declaration has occurred. Currently, the available programs are the Flood Mitigation Assistance program (FMA), Hazard Mitigation Grant Program (HMGP), and HMGP Post Fire. FMA provides mitigation funding for NFIP-insured properties on an annual basis, while HMGP and HMGP Post Fire provide mitigation funding after Presidentially

declared disasters and Fire Management Assistance Grant declared disasters, respectively.

- Community Development Block Grants (CDBG), which provides funds to address a wide range of community development needs, including community development activities directed toward revitalizing neighborhoods, economic development, and providing improved community facilities and services. CDBG funds may be used for activities such as acquisition of real property; relocation and demolition; rehabilitation of residential and non-residential structures; and construction of public facilities and improvements to facilities such as water, sewer, and streets. After a major disaster, Congress may appropriate CDBG Disaster Recovery (CDBG-DR) funds, which many Pennsylvania communities leverage for both recovery and resilience. Since 2021, this has included a mitigation set-aside to focus efforts on long-term risk reduction.
- Weatherization Assistance Program, which enables low-income households to make their homes more energy efficient. This can help mitigate extreme temperatures. Upgrades included in weatherization can also support reducing utility interruptions.
- The Emergency Watershed Protection (EWP) Program is administered by the USDA Natural Resources Conservation Services to help communities quickly address serious and long-lasting damage to infrastructure and the environment. These funds are allocated soon after disasters to assist with immediate recovery needs.
- The Homeland Security Grant Program (HSPG) assists communities in implementing the National Preparedness System by supporting the building, sustainment, and delivery of core capabilities essential to achieving the National Preparedness Goal of a secure and resilient Nation. The HSGP's allowable costs support efforts to build and sustain core capabilities across the prevention, protection, mitigation, response, and recovery, including priorities towards preventing terrorism and enhancing state and major urban area fusion centers.
- The Assistance to Firefighters Grant (AFG) administered by FEMA provides funds to help firefighters and other first responders obtain essential resources to protect the public and emergency responders in hazard events.

Besides federal and state programs, municipalities may have their own local programs to provide financial support for mitigation activities. These types of programs include:

- *Capital Improvement Planning:* Capital improvement plans are multiyear policy documents that identify needed capital projects and are used to coordinate the financing and timing of public improvements. Capital improvements relate to streets, stormwater systems, water distribution, sewage treatment, and other major public facilities. A capital improvement plan should be prepared by the respective county's planning commission and should include a capital budget. While the capital improvement plan is not a funding source, this budget identifies the highest priority projects recommended for funding in the next annual budget. The capital improvement plan is dynamic and can be tailored to specific circumstances. As such, during this update process, the county and its municipalities have been encouraged to consider the mitigation benefits associated with their known or anticipated capital projects to help prioritize their execution and to develop awareness that mitigation grants may be available to help fund such projects.
- *Special Purpose Taxes:* Communities may exercise their taxing authority to raise funds for any project they see fit. This includes special purpose taxes to fund mitigation measures. Spreading the cost of a community project among the community's taxpayers helps provide the greatest public good for relatively low individual cost.
- *Gas/Electric Utility Fees:* In the same way that special taxes can be levied to fund mitigation projects, a community can use another avenue for financing a project, which includes dedicating a portion of homeowners' gas and electric utilities fees to upgrade and maintain the related infrastructure. Burying transmission lines, thereby mitigating from the effects of winds and ice storms, is expensive. These fees help to offset that cost.
- *Water Authorities and Fees:* Water authorities are multipurpose authorities with water projects, many of which operate both water and sewer systems. The financing of water systems for lease back to the municipality is among the principal activities of the local government facilities' financing authorities. An operating water authority issues bonds to purchase existing facilities or to construct, extend, or improve a system. The primary source of revenue is user fees based on metered usage. The cost of constructing or extending water supply lines can be funded by special assessments against abutting property owners. Tapping fees also help fund water system capital costs. Water utilities are directly operated by municipal governments and by privately owned public utilities regulated by the Pennsylvania Public Utility Commission. The PA Department of Environmental Protection has a program to assist with

consolidation of small individual water systems to make system upgrades more cost-effective.

- *Sewer Authorities and Fees:* Sewer authorities include multipurpose authorities with sewer projects. The authorities issue bonds to finance acquisition of existing systems or to finance construction, extension, and improvements. Sewer authority operating revenues originate from user fees. The fee frequently is based on the amount of water consumed, and payment is enforced by the ability to terminate service or the imposition of liens against real estate. In areas with no public water supply, flat rate charges are calculated on average use per dwelling unit.
- *Stormwater Utility Fees:* Stormwater utility fees are assessed and collected to offset the cost of maintaining and upgrading stormwater management structures such as drains, retention ponds, and culverts.
- *Development Impact Fees:* Development impact fees are one-time fees assessed to offset the cost of providing public services to a new development. They may be directed to fund new water or sewer infrastructure, roads, parks and recreational areas, libraries, schools, etc. required by a new development. If mitigation is taken into account during design and construction, the new infrastructure may be less vulnerable to hazard impacts.
- *General Obligation, Revenue, and/or Special Tax Bonds:* Jurisdictions may decide to dedicate general funds or use bonds as a financing mechanism to implement hazard mitigation projects.

The County provides funding for municipalities to fund comprehensive plans and other planning programs as outlined in the Landscapes3 plan through the Vision Partnership Program. Since 2018, this program awards two municipalities each year with a cash grant for plans, ordinances, ordinance amendments, and planning studies. This program also offers technical assistance, technical grants, and mini grants to municipalities. In addition, CCPC acts in accordance with Pennsylvania Acts 67 and 68 to direct state agencies to consider local land-use plans and ordinances for funding and creating permits for any state infrastructure or facilities.

Table 5.2.3-1 below summarizes the self-reported financial capabilities of municipalities in Chester County. An 'X' indicates that the municipality has that financial capability in place; a 'U' indicates that the financial capability is under development; a dash indicates that the municipality did not provide information on the capability.

Table 5.2-5 Reported Financial Capabilities

MUNICIPALITY	CAPITAL IMPROVEMENT PLANNING	DEVELOPMENT IMPACT FEES	GAS/ELECTRIC UTILITY FEES	GENERAL OBLIGATION, REVENUE, OR SPECIAL TAX BONDS	PARTNERING ARRANGEMENTS OR INTERGOVERNMENTAL AGREEMENTS	SPECIAL PURPOSE TAXES	STORMWATER UTILITY FEES	WATER/SEWER FEES
Atglen Borough	-	-	-	-	-	-	-	-
Avondale Borough	-	-	-	-	-	-	-	-
Birmingham Township	X			X				
Caln Township	U	X			X	X		X
Charlestown Township		X		X		X		
Coatesville City	X	X	X	X	X	X		X
Downingtown Borough	-	-	-	-	-	-	-	-
East Bradford Township	-	-	-	-	-	-	-	-
East Brandywine Township	-	-	-	-	-	-	-	-
East Caln Township								X
East Coventry Township	X	X		X	X	X		X
East Fallowfield Township	-	-	-	-	-	-	-	-
East Goshen Township	-	-	-	-	-	-	-	-
East Marlborough Township	-	-	-	-	-	-	-	-
East Nantmeal Township	-	-	-	-	-	-	-	-
East Nottingham Township						X		
East Pikeland Township	-	-	-	-	-	-	-	-
Easttown Township	-	-	-	-	-	-	-	-
East Vincent Township	-	-	-	-	-	-	-	-
East Whiteland Township	X					X		
Elk Township	-	-	-	-	-	-	-	-
Elverson Borough	X	U	U	U	X	U	X	X
Franklin Township	-	-	-	-	-	-	-	-
Highland Township	-	-	-	-	-	-	-	-
Honey Brook Borough	X							X
Honey Brook Township	X	X		X	X	X		X
Kennett Township	X	X	X	X	X	X	U	X
Kennett Square Borough	-	-	-	-	-	-	-	-
London Britain Township	X			X	X			X
Londonderry Township	-	-	-	-	-	-	-	-

Table 5.2-5 Reported Financial Capabilities

MUNICIPALITY	CAPITAL IMPROVEMENT PLANNING	DEVELOPMENT IMPACT FEES	GAS/ELECTRIC UTILITY FEES	GENERAL OBLIGATION, REVENUE, OR SPECIAL TAX BONDS	PARTNERING ARRANGEMENTS OR INTERGOVERNMENTAL AGREEMENTS	SPECIAL PURPOSE TAXES	STORMWATER UTILITY FEES	WATER/SEWER FEES
London Grove Township	-	-	-	-	-	-	-	-
Lower Oxford Township	U	U	X	X	X	X	X	X
Malvern Borough	-	-	-	-	-	-	-	-
Modena Borough	-	-	-	-	-	-	-	-
New Garden Township	-	-	-	-	-	-	-	-
Newlin Township	-	-	-	-	-	-	-	-
New London Township				X				X
North Coventry Township	X				X			
Oxford Borough	X	U			X		U	X
Parkesburg Borough	-	-	-	-	-	-	-	-
Penn Township	-	-	-	-	-	-	-	-
Pennsbury Township	X							
Phoenixville Borough	-	-	-	-	-	-	-	-
Pocopson Township	U				X	X		X
Sadsbury Township	-	-	-	-	-	-	-	-
Schuylkill Township	X	X	X	X	X	U	U	X
South Coatesville Borough	U	U	U	U	X	X	U	X
South Coventry Township	-	-	-	-	-	-	-	-
Spring City Borough	-	-	-	-	-	-	-	-
Thornbury Township	U	U	U	U	U	U	U	X
Tredyffrin Township	X	X	X	X	X	X	X	X
Upper Oxford Township	-	-	-	-	-	-	-	-
Upper Uwchlan Township	X	X		X		X		X
Uwchlan Township	X	U	X	X	X	X	U	X
Valley Township	X		U	X	X	X	U	X
Wallace Township	-	-	-	-	-	-	-	-
Warwick Township	-	-	-	-	-	-	-	-
West Bradford Township	X	X	X	X	X		X	X
West Brandywine Township	-	-	-	-	-	-	-	-
West Caln Township	U	X	U	X	X	X	U	X

Table 5.2-5 Reported Financial Capabilities

MUNICIPALITY	CAPITAL IMPROVEMENT PLANNING	DEVELOPMENT IMPACT FEES	GAS/ELECTRIC UTILITY FEES	GENERAL OBLIGATION, REVENUE, OR SPECIAL TAX BONDS	PARTNERING ARRANGEMENTS OR INTERGOVERNMENTAL AGREEMENTS	SPECIAL PURPOSE TAXES	STORMWATER UTILITY FEES	WATER/SEWER FEES
West Chester Borough	-	-	-	-	-	-	-	-
West Fallowfield Township								X
West Goshen Township	-	-	-	-	-	-	-	-
West Grove Borough	-	-	-	-	-	-	-	-
West Marlborough Township	U				X			X
West Nantmeal Township	X	X	U	X	X	X	U	X
West Nottingham Township	-	-	-	-	-	-	-	-
West Pikeland Township	-	-	-	-	-	-	-	-
West Sadsbury Township				X	X			X
West Vincent Township	X	X			X	X		X
West Whiteland Township	X	X	U	X	X	U	U	X
Westtown Township	-	-	-	-	-	-	-	-
Willistown Township	-	-	-	-	-	-	-	-

5.2.4. Education and Outreach

Education and outreach programs and methods are used to implement mitigation activities and communicate hazard-related information. Examples include obtaining certification in existing, national programs like StormReady® and developing and communicating hazard awareness and safety information to residents.

At the municipal level, education and outreach capabilities vary. Some municipalities have the capability to handle outreach initiatives, while others rely on county resources. Several municipal websites post local plans and ordinances, and many municipalities post information regarding hazard-related topics. The local fire departments and emergency managers are active in the schools participating in programs, such as fire safety in the fall and attending other community activities to conduct outreach through the Youth Fire and Injury Reduction and Education Program (Y-FIRE).

Reported education and outreach activities in Chester County are summarized below.

Maps and Geospatial Data

Flood maps and flood data, including 2017 digital maps for Chester County, are available on FEMA's Map Service Center website as well as at the Chester County Water Resources Authority. County and municipality maps, tax maps, and property assessment records are available at the Assessment Office and the GIS Office, and deeds are available at the Register and Recorder Office. The County's GIS HUB can be accessed at https://chester-county-s-gis-hub-chesco.hub.arcgis.com/.

Chester County Government Weekly Newsletter

This newsletter is available to residents to keep them updated on official news and information from the County, such as veterans program updates, election news, and stormwater education events. Residents can subscribe to this weekly newsletter through the County's website.

ReadyChesCo

ReadyChesCo is the County's official emergency notification system. This free service provides a source for emergency and government notifications through text messages, such as shelter-in-place notifications, evacuation notices, missing persons notifications, and other emergency information. This program is run by the Chester County Department of Emergency Services.

Chester County Public Preparedness Guide

The Public Preparedness Guide is prepared by the Chester County Department of Emergency Services. This guide offers important information to residents on what to do during emergencies caused by events like severe weather, active shooter, and hazardous materials. It offers information on the County's pipelines, how to communicate with 911 services, and how families can plan for emergencies.

Outreach Projects

Several organizations (both public and private sector) have developed outreach projects, educational tools, and training programs. The county promotes both online and traditional in-person programs to appeal to as wide an audience as possible.

- ReadyPA Campaign: Established by the Commonwealth of Pennsylvania, www.readypa.org is a website that aims to prepare the public for times of disaster by providing education on the risks within Pennsylvania, template emergency plans and kits, and information on ways to get involved with community organizations to help others.
- Emergency management courses are provided through the county DES to local coordinators and elected officials, including Basic Orientation, Duties and

Responsibilities of the Local Emergency Management Coordinator (LEMC), and Damage Assessment.

Firewise

Firewise is an optional recognition program that empowers neighbors to take action to reduce wildfire risk. It is a five-step, voluntary process that helps communities develop an action plan that minimizes wildfire risk and helps build more safely. The following communities identified themselves as Firewise communities: Birmingham Township, City of Coatesville, South Coatesville Borough, Uwchlan Township, Valley Township, and West Whiteland Township. Elverson Borough, Lower Oxford Township, Oxford Borough, Schuylkill Township, Thornbury Township, Tredyffrin Township, West Caln Township, West Marlborough Township, and West Nantmeal Township expressed interest in becoming Firewise communities.

StormReady®

The StormReady® program helps communities with communication and safety skills to prepare for storm events. Counties, Indian nations, universities and colleges, military bases, government sites, commercial enterprises and other groups that work to be better prepared through planning, education and awareness can become officially StormReady. The program is administered by the National Weather Service of the National Oceanic and Atmosphere Administration (NOAA).

The requirements to become an official StormReady® community are:

- Establish a 24-hour warning point and emergency operations center;
- Have more than one way to receive severe weather warnings and forecasts and to alert the public;
- Create a system that monitors weather conditions locally;
- Promote the importance of public readiness through community seminars;
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

Chester County and the Main Line Health System are both participants in the program. Longwood Gardens, located in East Marlborough, Kennett, and Pennsbury Townships, is a supporter of the program.

Chester County Planning Commission

The CCPC produces a planning and sustainability newsletter, available at https://www.chescoplanning.org/News/SustainabilityNews.cfm. They also host a

biannual sustainability summit, the Chester County Sustainability Summit and Expo, biannually. The latest summit was held on May 17, 2025, at West Chester University's Sciences and Engineering Center. Agenda items included presentations on energy efficiency and sustainable landscapes along with university tours and exhibitions by 40 vendors. Lastly, CCPC provides updates to the Pipeline Information Center website.

Local Emergency Planning Committee

The Local Emergency Planning Committee (LEPC) for the Emergency Planning District of Chester County is a partnership to protect the public against risks from hazardous materials. The following features of the LEPC demonstrate the capability of the LEPC to support county emergency management and preparedness initiatives.

These LEPCs must include elected officials; fire, police, civil defense, and public health professionals; and environmental, hospital, and transportation officials, as well as representatives of the facilities, community groups, and the media. The objectives of Chester County's LEPC include:

1. Establish procedures for receiving and processing requests from the public for information under The Emergency Planning and Community Right to Know Act of 1986; Develop, implement, and exercise the emergency plan required by The Emergency Planning and Community Right to Know Act of 1986; and carry out the duties enumerated in Act 1990- 165.
2. Develop and organize a systematic, efficient, and effective method for providing public education and training opportunities to residents to make communities safer, stronger, and better prepared to respond to the threats of terrorism, crime, public health issues and disasters of all kinds.
3. Chemicals and other hazardous materials are here to stay. Our economy and lifestyle depend on their use. Most of us are aware of the risks involved but accept them because there are prevention and response plans in place that minimize this risk. The Chester County LEPC is very active in carrying out their responsibilities.
4. As a citizen, you can be aware of the risks that affect you. Support industry efforts to reduce or manage the risk. Manage the risk at home. Read labels; buy only what you really need to do the job. Volunteer as an emergency responder with your local fire company or ambulance service.
5. Match the needs of emergency services first responders with the skills and abilities of volunteers.
6. Promote Citizen Corps activities, programs, and projects.
7. Enhance community awareness and Citizen Corps participation (Chester County LEPC, n.d.).

Municipal Websites

Each municipality in Chester County has a website that hosts a variety of information. Websites typically display information such as news, public notices, calendars, agendas and minutes from municipal meetings, links to important resources, and newsletters. Websites can be used to communicate information to residents and house mitigation resources such as brochures or pamphlets on how residents can engage in property-level mitigation activities to protect themselves from hazard events.

Links to each municipality's website can be found on the county website at https://www.chesco.org/1742/Municipality-Listing.

5.2.5. Socially Vulnerable or Underserved Communities

This section provides an overview of the county's capabilities of service and assistance to socially vulnerable and underserved communities. These capabilities may be leveraged to mitigate the impacts of hazards discussed in this plan.

The Chester County Department of Human Services provides a number of services through different programs and departments that directly support vulnerable and underserved populations.

- The Chester County Department of Aging Services assists residents aged 60 or over and their families for housing, independent living, and abuse reporting. They manage community services to enable residents to remain in their homes, offer caregiver support, and make assessments for nursing home placement. This department also provides personal home care services and protective services, such as investigating reports of abuse and neglect for residents aged 60 and over.
- Chester County Children, Youth, and Families promotes the safety, well-being, and permanency of all children in Chester County through collaboration with families and the community. The agency will also intervene to provide for children who cannot be assisted through family. In addition, the County also runs four specialized programs for youth residents out of their Youth Center.
- The Chester County Department of Community Development (DCD) assists residents with affordable housing, provides outreach to the homeless, and invests in neighborhood revitalization.
- Chesco Connect provides community transportation services, specializing in door-to-door transportation for residents. Residents aged 65 and older; residents with disabilities, and residents with a Medical Assistance card can

request services for a reduced fare. This program is also open to the general public, but they must pay the full fare.

- The Chester County Department of Drug and Alcohol Services provides comprehensive care for residents and communities dealing with substance abuse. The department has been designated by the Pennsylvania Department of Drug and Alcohol Programs as the Single County Authority (SCA) for drug and alcohol services in prevention, intervention, and treatment.
- The Chester County Human Needs Network provides mental health emergency services. The department partners with PA211 to provide a single contact point for information and referral support for 211 callers, who are calling for health, housing and human services. The department also assists residents with 988 suicidal calls and Mobile Crisis Response Teams. In addition, Chester County also has a Managed Behavioral Healthcare department for mental health and other services for vulnerable residents.
- The Chester County Mental Health/Intellectual and Developmental Disabilities Department provides a full range of mental health and intellectual disability services responsive to individual and community needs. This department also provides early intervention services for infants and toddler and early childhood services.
- The Chester County Veteran Affairs Office serves veterans and their families by providing services such as disability compensation, medical coverage, tax exemptions, temporary assistance, burial benefits, and housing assistance.

5.2.6. Plan Integration

Plan integration recognizes that hazard mitigation is most effective when it works in concert with other plans, regulations, and programs. Per FEMA, plan integration is described as the regular consideration and management of hazard risks in a community's existing planning framework. Plan integration is the process by which communities critically analyze their existing planning framework and align efforts to build a safer, smarter community. Plan integration involves a two-way exchange of information and incorporation of ideas and concepts between hazard mitigation plans (state and local) and other community plans. Specifically, plan integration involves the incorporation of hazard mitigation principles and actions into community plans and community planning mechanisms into hazard mitigation plans (FEMA, 2015). For information on how the last plan was integrated into planning mechanisms across the county, see Section 6.1.3.

While not all regulatory tools are relevant to every municipality in Chester County, each municipality should evaluate what tools are available to them related to their vulnerability identified in this HMP. This Capability Assessment provides a summary of

the resources communities have to mitigate hazards. Communities should continue to review and revise building codes, zoning ordinances, floodplain ordinances, and subdivision and land development ordinances with the results of the 2026 HMP risk assessment in mind. For example, a municipality could revise its zoning ordinance to restrict the density of new development in hazard-prone areas or guide development away from these areas. Some tools may also be useful for addressing multiple hazards in these municipalities; for example, the presence of a stormwater management plan would greatly enhance mitigation capabilities needed to address flood hazards.

Implementation actions will include incorporating the goals of the HMP into ongoing planning, zoning, building, and engineering activities. Specifically, the county will urge municipalities to take the following actions to integrate the results of this HMP into other planning mechanisms:

- Fund hazard mitigation projects or actions in operating budgets to the extent possible.
- Notify other municipalities about grant and other funding opportunities as they arise.
- Use data and maps from this HMP as supporting documentation in grant applications.
- Review mitigation actions when allocating funding for the municipal budgets.
- Include hazard mitigation when updating municipal ordinances.
- Identify hazard areas in updates of comprehensive plans to identify land use issues.
- Review the HMP prior to land use or zoning changes and permitting or development decisions.

The information on hazards, risk, vulnerability, and mitigation contained in this HMP is based on the best science and technology available at the time of the plan's preparation. Additionally, certain plans were incorporated directly into this HMP update. All participating jurisdictions recognize that this information can be invaluable in making decisions under other planning programs, such as comprehensive, capital improvement, and emergency management plans. Figure 5.2.6-1, also presented at the beginning of this section, illustrates the interrelationships between the HMP, the Chester County comprehensive plan, the county EOP, and other community planning mechanisms. Existing processes and programs through which the HMP should be implemented are described below.

Table 5.2-6 Relevant Departments and Documents

RELEVANT DOCUMENTS	HAZARD MITIGATION PLANNING ELEMENTS
Comprehensive Plan/Land Use Plan (Landscapes3), Zoning/Subdivision Regulations, Floodplain Ordinance	Demographic data, land use, development trends, and floodplain management information
Stormwater Management Plan (Watersheds 2045), Sediment and Erosion Control Plan, Long Range Transportation Plan, Transportation Improvement Inventory, Public Transportation Plan	Stormwater management and infrastructure data and projects
Emergency Operations/Response Plan	All-hazards information for evacuation, response, and recovery
Climate Action Plan, Dam Safety Regulations	Risk and vulnerability data, and storm/floodwater management
Trails Master Plan, Woodlands and Tree Protection, Conservation Subdivision Design Guide, Linking Landscapes	Land preservation strategies

Integration with Existing Planning Mechanisms

As mentioned above, Chester County adopted its updated Comprehensive Plan in 2018, called Landscapes3. The "How We Live" section recommends providing exemplary emergency services. This includes continuing to "update services (such as operating the 911 system and providing countywide hazardous material spill response) and plans (including the Emergency Operations Plan and Hazard Mitigation Plan) as needed" (Chester County Planning Commission, 2018). Each municipality in the county also has a comprehensive plan that can integrate mitigation goals and activities. As future updates are made to comprehensive plans, the county and municipalities can leverage the data and analysis in this plan to account for hazard risk when planning for long-term growth. Any updates should continue to include and consider hazard mitigation as an element and incorporate high-priority mitigation projects as appropriate.

Hazard mitigation planning can be integrated into Chester County's Stormwater Management Regulations. The municipalities that are regulated by the County's stormwater management requirements in its SALDO could also opt to develop their own, more stringent stormwater management ordinances that address stormwater and urban flooding. Municipalities can provide recommendations for proper long-term operation and maintenance of stormwater management facilities within the land development subdivision ordinances, work closely with the County to assure that

stormwater facilities are maintained over the long-term, and can ensure any new hydrology studies are adopted upon completion.

The Chester County Emergency Operations Plan is based on the National Incident Management System (NIMS), which utilizes incident command systems and local emergency responders. The plan outlines how local municipalities and state government can partner while using the framework established by the federal government. It embraces an "all-hazards" principle. As these plans are updated, they should incorporate relevant information from the Chester County HMP Risk Assessment to provide a more detailed overview of potential hazards. Most emergency response functions are similar, regardless of the hazard, and the EMC is required to mobilize functions and personnel as required by the emergency. This plan mentions that mitigation opportunities will be considered throughout disaster operations. Implementation includes a combination of conservation tools including land management plans and easements; regulatory methods like density transfers, zoning overlays, buffer zones, and subdivision exactions, and land acquisition made possible through donation, purchase, and purchase of development rights. Emergency Operations Plans should also incorporate long-term mitigation strategies, such as those outlined in this HMP Update, in addition to short-term response and recovery.

Integration Since the 2021 Plan

All of Chester County's jurisdictions have some form of local land use controls. As is discussed in Section 6.1, upon review of the 2021 mitigation actions, it became clear that several municipalities completed mitigation actions that achieve plan integration by furthering hazard mitigation goals through various land development regulations.

Some other land use tools in municipalities have not been updated recently. As municipalities work to update comprehensive plans and land use ordinances, local governments can go further to use land use regulations to direct development away from hazard-prone areas.

Ongoing Integration Capabilities

A barrier to plan integration and expanding mitigation capabilities is often the lack of resources to accomplish activities that integration requires. Several municipalities noted on the Capability Assessment Surveys that lack of financial resources precludes development of some planning tools. The self-assessment portion of the survey provided each municipality with an opportunity to conduct its own self-assessment of its capability to effectively implement hazard mitigation activities. As part of this process, County and municipal officials were encouraged to consider the barriers to implementing proposed mitigation strategies in addition to the mechanisms that could

enhance or further such strategies. In response to the survey questionnaire, local officials classified each of the capabilities as either "limited," "moderate," or "high." "N/A" indicates that the municipality did not submit a capability assessment as part of the plan update process. Table 5.2-2 lists the results for each municipality while Table 5.2-3 summarizes the results of the self-assessment survey as a percentage of responses received. With available resources being limited and stretched into the foreseeable future, plan integration is extremely relevant and will help leverage existing resources to the maximum extent possible. The support provided by county departments and CCPC, summarized throughout this section, is crucial for each municipality's ability to expand on its current capabilities. In particular, the administrative, technical, and financial capabilities of the county can be leveraged by municipalities to identify grant opportunities, begin planning processes, develop their own technical skills,

Municipal Responses to Capability Questionnaire

MUNICIPALITY	PLANNING & REGULATORY	ADMINISTRATIVE & TECHNICAL	FINANCIAL
Atglen Borough	N/A	N/A	N/A
Avondale Borough	N/A	N/A	N/A
Birmingham Township	Moderate	Moderate	Moderate
Caln Township	Moderate	Moderate	Moderate
Charlestown Township	Moderate	Moderate	Moderate
Coatesville City	Moderate	Moderate	Limited
Downingtown Borough	N/A	N/A	N/A
East Bradford Township	N/A	N/A	N/A
East Brandywine Township	N/A	N/A	N/A
East Caln Township	Limited	Limited	Limited
East Coventry Township	Moderate	Moderate	Limited
East Fallowfield Township	N/A	N/A	N/A
East Goshen Township	N/A	N/A	N/A
East Marlborough Township	N/A	N/A	N/A
East Nantmeal Township	Moderate	Moderate	Moderate
East Nottingham Township	Moderate	Moderate	Moderate
East Pikeland Township	N/A	N/A	N/A
Easttown Township	N/A	N/A	N/A
East Vincent Township	N/A	N/A	N/A
East Whiteland Township	Moderate	Moderate	Moderate
Elk Township	N/A	N/A	N/A
Elverson Borough	Moderate	Moderate	Limited
Franklin Township	N/A	N/A	N/A

Municipal Responses to Capability Questionnaire

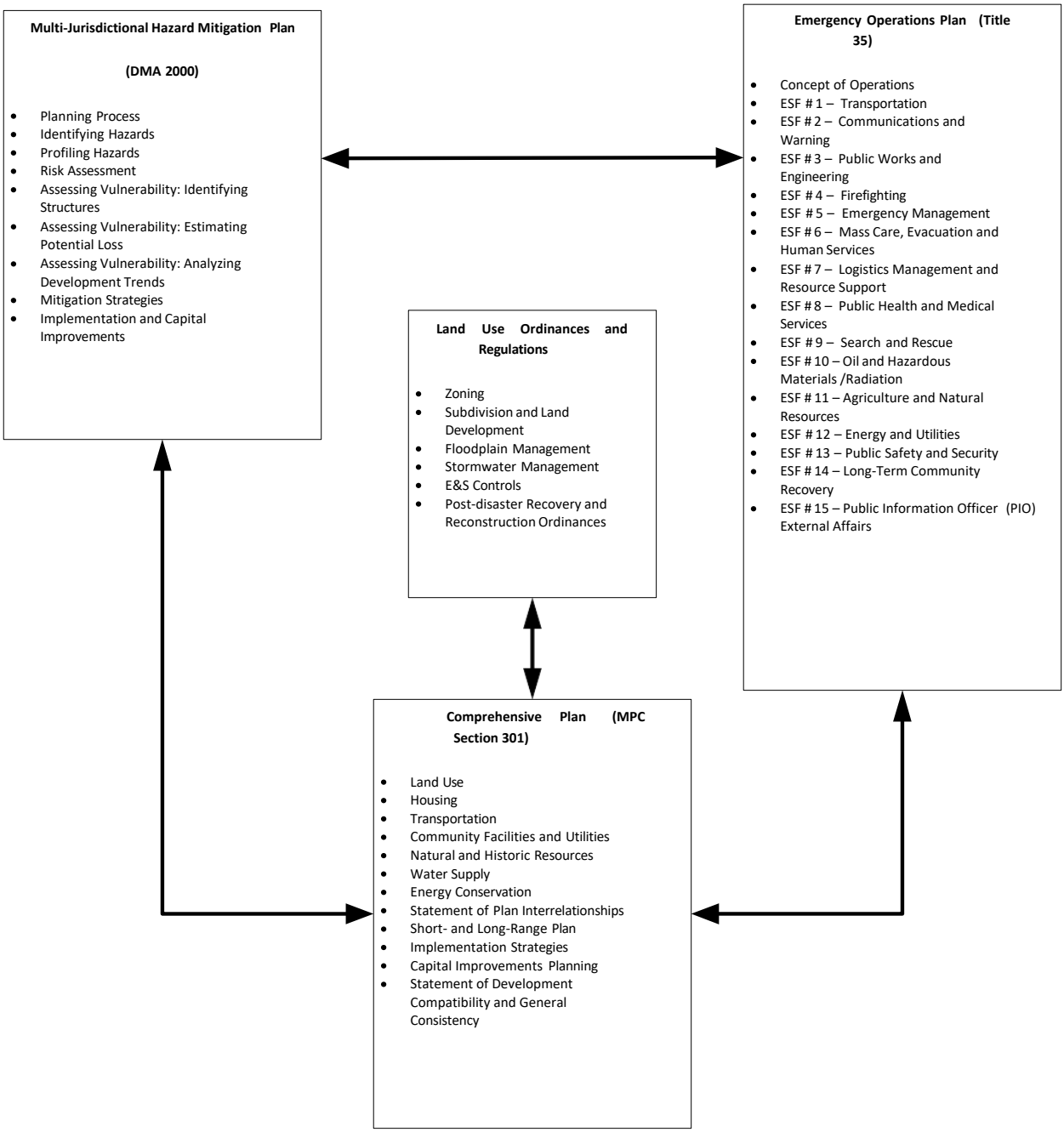
MUNICIPALITY	PLANNING & REGULATORY	ADMINISTRATIVE & TECHNICAL	FINANCIAL
Highland Township	N/A	N/A	N/A
Honey Brook Borough	Moderate	Limited	Limited
Honey Brook Township	Moderate	Moderate	Limited
Kennett Township	Moderate	Moderate	Moderate
Kennett Square Borough	N/A	N/A	N/A
London Britain Township	Moderate	Moderate	Moderate
Londonderry Township	N/A	N/A	N/A
London Grove Township	N/A	N/A	N/A
Lower Oxford Township	Moderate	Moderate	Moderate
Malvern Borough	Moderate	Moderate	Moderate
Modena Borough	N/A	N/A	N/A
New Garden Township	N/A	N/A	N/A
Newlin Township	N/A	N/A	N/A
New London Township	High	Moderate	Limited
North Coventry Township	Moderate	Moderate	Moderate
Oxford Borough	High	Moderate	Moderate
Parkesburg Borough	N/A	N/A	N/A
Penn Township	N/A	N/A	N/A
Pennsbury Township	Moderate	Moderate	Moderate
Phoenixville Borough	N/A	N/A	N/A
Pocopson Township	Moderate	Moderate	Moderate
Sadsbury Township	N/A	N/A	N/A
Schuylkill Township	Moderate	Limited	Limited
South Coatesville Borough	Limited	Limited	Limited
South Coventry Township	N/A	N/A	N/A
Spring City Borough	Limited	Limited	Limited
Thornbury Township	High	Limited	Limited
Tredyffrin Township	Moderate	Moderate	Moderate
Upper Oxford Township	N/A	N/A	N/A
Upper Uwchlan Township	Moderate	Moderate	Moderate
Uwchlan Township	Moderate	Limited	Limited
Valley Township	Moderate	Moderate	Limited
Wallace Township	N/A	N/A	N/A
Warwick Township	N/A	N/A	N/A
West Bradford Township	High	Moderate	Moderate
West Brandywine Township	N/A	N/A	N/A

Municipal Responses to Capability Questionnaire

MUNICIPALITY	PLANNING & REGULATORY	ADMINISTRATIVE & TECHNICAL	FINANCIAL
West Caln Township	High	High	High
West Chester Borough	N/A	N/A	N/A
West Fallowfield Township	Moderate	Moderate	Moderate
West Goshen Township	N/A	N/A	N/A
West Grove Borough	N/A	N/A	N/A
West Marlborough Township	Limited	Limited	Limited
West Nantmeal Township	Moderate	Moderate	Moderate
West Nottingham Township	N/A	N/A	N/A
West Pikeland Township	N/A	N/A	N/A
West Sadsbury Township	Limited	Limited	Limited
West Vincent Township	High	High	High
West Whiteland Township	High	High	High
Westtown Township	N/A	N/A	N/A
Willistown Township	N/A	N/A	N/A

Table 5.2-8 Summary of self-assessment capability responses expressed as a percentage of responses received.

CAPABILITY CATEGORY	LIMITED	MODERATE	HIGH
Planning & Regulatory	13.5%	67.6%	18.9%
Administrative & Technical	24.3%	67.6%	8.1%
Financial	40.5%	51.4%	8.1%


Multi-Jurisdictional Hazard Mitigation Plan
(DMA 2000)
Planning Process
Identifying Hazards
Profiling Hazards
Risk Assessment
Assessing Vulnerability: Identifying Structures
Assessing Vulnerability: Estimating Potential Loss
Assessing Vulnerability: Analyzing Development Trends
Mitigation Strategies
Implementation and Capital Improvements
Emergency Operations Plan (Title 35)
Concept of Operations
ESF # 1 – Transportation
ESF # 2 – Communications and Warning
ESF # 3 – Public Works and Engineering
ESF # 4 – Firefighting
ESF # 5 – Emergency Management
ESF # 6 – Mass Care, Evacuation and Human Services
ESF # 7 – Logistics Management and Resource Support
ESF # 8 – Public Health and Medical Services
ESF # 9 – Search and Rescue
ESF # 10 – Oil and Hazardous Materials /Radiation
ESF # 11 – Agriculture and Natural Resources
ESF # 12 – Energy and Utilities
ESF # 13 – Public Safety and Security
ESF # 14 – Long-Term Community Recovery
ESF # 15 – Public Information Officer (PIO) External Affairs
Land Use Ordinances and Regulations
Zoning
Subdivision and Land Development
Floodplain Management
Stormwater Management
E&S Controls
Post-disaster Recovery and Reconstruction Ordinances
Comprehensive Plan (MPC Section 301)
Land Use
Housing
Transportation
Community Facilities and Utilities
Natural and Historic Resources
Water Supply
Energy Conservation
Statement of Plan Interrelationships
Short- and Long-Range Plan
Implementation Strategies
Capital Improvements Planning
Statement of Development Compatibility and General Consistency

6. MITIGATION STRATEGY

6.1. UPDATE PROCESS SUMMARY

The mitigation strategy serves as the long-term road map to reduce the potential losses, vulnerabilities, and gaps identified in the risk and capability assessments. A typical mitigation strategy includes a list of goals and objectives, with mitigation actions to address the goals and objectives, that are then prioritized, based on the community's need.

- ✓ **Goals** are long-term aspirations about the resiliency of the community given the potential effects of hazards.
- ✓ **Objectives** are measurable strategies that the Chester County and its communities and partners have determined will be necessary to move closer to attaining each goal.
- ✓ **Actions** are the tasks that are proposed for realizing each objective.

6.1.1. Mitigation Goal and Objective Review

There were 4 goals and 16 objectives identified in the 2021 Chester County Hazard Mitigation Plan Update. The Steering Committee reviewed goals and objectives during a Steering Committee Review Meeting on October 1, 2025. The summary of changes to the goals and objectives based on that meeting are found in Table 6.1-1.

Goals and objectives from the 2021 Plan remain relevant and were largely carried over to the 2026 HMP. Three additional goals were added. The full list of the updated goals and objectives for 2026 is in Table 6.2-1 (Section 6.2). This table shows that three new goals were added to address continuity of operations, consistency, and the mitigation of High Hazard Potential Dams. One objective addressing socially vulnerable and underserved communities was added under Goal 1. Three objectives were added to address increased public awareness and education through strategic media channels.

Table 6.1-1 List and review summary of 2021 mitigation strategy goals and objectives

Goal 1: Prevent injury/death, physical damage, and other impacts from hazards in Chester County		Continued to 2026 HMP.
Objective 1.1	Enhance regulations for addressing development in hazard-prone areas.	Continued to 2026 HMP with minor text revisions.
Objective 1.2	Upgrade infrastructure to reduce the likelihood of hazards from impacting Chester County.	Combined with Objective 2.1.

Objective 1.3	Support government agencies and non-governmental organizations to provide aid to vulnerable populations before, during, and after a hazard.	Continued to 2026 HMP.
Goal 2: Protect the citizens of Chester County as well as public and private property from the impacts of natural and human-caused hazards.		Continues to 2026 HMP.
Objective 2.1	Protect existing structures, including critical facilities and culturally or historically significant assets, from damage that can be caused by hazards.	Combined with Objective 1.2.
Objective 2.2	Acquire, relocate, elevate, and/or retrofit existing structures, including repetitive loss properties, located in hazard areas.	Removed; worded as an action, not an objective.
Objective 2.3	Improve existing stormwater management systems to reduce flooding.	Continued to 2026 HMP with minor text revisions.
Objective 2.4	Provide resources that encourage regular inspection and maintenance of existing stormwater facilities to reduce flooding.	Continued to 2026 HMP.
Objective 2.5	Assist with updating local stormwater management standards to reduce flooding.	Continued to 2026 HMP with minor text revisions.
Objective 2.6	Encourage homeowners, renters, and businesses to insure their properties against all hazards, including purchasing flood coverage under the National Flood Insurance Program (NFIP).	Moved under new Goal 6.
Goal 3: To protect and restore existing natural resources including wetlands, floodplains, and riparian buffers.		Continued to 2026 HMP with minor text revisions.
Objective 3.1	Lessen impacts on natural resources and open space from natural and human-caused hazards by promoting sustainable land use and water resources management practices.	Continued to 2026 HMP.
Objective 3.2	Provide appropriate safeguards for the preservation of the quality of water resources, stream corridors, watershed areas, and floodplains.	Continued to 2026 HMP.

Goal 4: To promote public awareness on the potential impacts of natural and human-caused hazards, and actions to reduce those impacts.		Continued to 2026 HMP with minor text revisions.
Objective 4.1	Develop public education and outreach programs on hazards and hazard mitigation.	Continued to 2026 HMP with minor text revisions.
Objective 4.2	Educate property owners in hazard-risk areas regarding their risks and the precautions they can take.	Continued to 2026 HMP.
Objective 4.3	Encourage residents to implement hazard mitigation and preparedness measures on their properties.	Continued to 2026 HMP.
Objective 4.4	Encourage local participation in the Community Rating System (CRS) Program.	Moved under new goal 6.
Objective 4.5	Provide outreach and educational opportunities to the community about where to find comprehensive information on hazards.	Continued to 2026 HMP.

6.1.2. Mitigation Action Review

The HMP is a long-term strategy, and not everything will be complete in the five-year period between plans. This section reviews the status of all mitigation actions from the 2021 plan.

County and municipal actions in the 2021 plan were distributed at the March workshops and the municipal participation meetings and calls, as appropriate, for review and update. Each action has been assigned one of the following categories:

- ✓ **"Completed"** – Actions that were completed since the adoption of the 2021 plan.
- ✓ **"Cancelled"** – Actions that were terminated and would not be carried into the 2026 HMP.
- ✓ **"Deferred"** – Actions that had not been started since the adoption of the 2021 plan.
- ✓ **"On-Going"** – Actions that are performed on a regular and continuous basis by the County or community.

Most existing mitigation actions have been carried over into the 2026 Hazard Mitigation Plan as they are continuous actions or actions that were not completed. A list of these actions as well as their status is included in Table 6.1-2. Actions were evaluated by the HMPT and municipal officials with the intent of producing a usable mitigation action plan in 2026 with actions and projects that could be completed over the next five years. **Appendix C** contains a summary of responses provided by municipalities to the *Mitigation Action Progress Report Form*.

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
As opportunities arise, elevate, or acquire properties within flood-prone areas. In addition, wet and dry proof commercial structures if they cannot be elevated or acquired	Chester County				X
Coordinate utilization of privately-owned digital billboards for emergency usages	Chester County	X			
Create a website to assist landowners and municipalities to navigate FEMA resources	Chester County				X
Develop a countywide Debris Management Plan	Chester County				X
Develop a plan to stagger traffic and implement delays/early releases for schools, government, and private sector during a disaster	Chester County				X
Develop an outreach and awareness program and provide to municipalities, where residents and potential homeowners could access to identify any risks they might have to address	Chester County				X
Develop and implement a model natural conservation ordinance for municipal adoption	Chester County	X			
Educate county residents on the NFIP following flood events	Chester County				X
Educate the public on all the hazards they face	Chester County				X
Encourage municipal Code Enforcement Officials to become trained in Floodplain Management and NFIP Programs	Chester County				X
Encourage municipalities to adopt an ordinance outlining the process to implement a snow emergency declaration	Chester County				X
Encourage municipalities to require radon testing at the time sale of homes	Chester County				X
Encourage new development planning to include burying of utility cables	Chester County				X
Encourage upgrades and improvements to stormwater runoff capabilities when reconstructing roads	Chester County				X
Enhance the household hazard waste program to reduce post-event hazardous debris	Chester County			X	

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Ensure that the county has a COOP/COG Plan and procedures in place for off-site hazmat releases that can affect the buildings.	Chester County	X			
Ensure that the municipal EMAs have COOP/COG plans	Chester County				X
Identify snow emergency routes in all municipalities to increase clearing efforts and travel ability of residents	Chester County				X
Improve storm drains throughout the county to handle snow melt	Chester County				X
Include flood mitigation recommendations and NFIP program information in public education materials prepared by the Department of Emergency Services for Chester County	Chester County	X			
Increase cell coverage and telecommunications bandwidth in areas with poor coverage	Chester County				X
Increase mutual aid and interagency agreements to support preparedness, mitigation, and response activities in Chester County	Chester County	X			
Install back-up power sources for traffic signals (generator, battery, solar)	Chester County				X
Install roadway gates to close off flood-prone intersections/ roads during flood incidents and signage to warn motorists of the closed road	Chester County				X
Investigate the interaction of public agencies and camera data from private companies/citizens	Chester County			X	
Plan for replenishment fuel for generators	Chester County	X			
Plant bushes/other vegetation to stop drifting snow in known problem areas	Chester County				X
Produce a map to be used for public outreach and education showing the relative frequency that county roads/bridges are subject to flooding.	Chester County	X			
Provide education to the municipalities on flood gauges.	Chester County				X
Provide education to the municipalities on resident evacuation processes and need.	Chester County				X
Provide public education on traffic accident reduction.	Chester County				X

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Provide public information on debris management	Chester County				X
Purchase backup generators for critical infrastructure/ key resources	Chester County				X
Pursue local mitigation efforts to improve areas that are vulnerable to flooding including both repetitive and non-repetitive loss structures within floodplains	Chester County				X
Retrofit critical public facilities with safe rooms	Chester County			X	
Study traffic control boxes that would be exposed to riverine or stormwater flooding to determine if they are able to withstand the water	Chester County				X
Sustain tree management programs around power lines	Chester County				X
The county and all municipalities will work with their major businesses to ensure they have continuity plans in place.	Chester County				X
The county and all municipalities with a dam will work with dam operators to ensure they are protected to the 0.2% annual chance flood level.	Chester County				X
The county and municipalities will work with the higher education facility operators to discuss the hazards they face and ensure their emergency plans address those hazards.	Chester County				X
The county and municipalities will work with the intermediate care facility operators to discuss the hazards they face and ensure their emergency plans address those hazards.	Chester County				X
The county and municipalities will work with the long-term care facility operators to discuss the hazards they face and ensure their emergency plans address those hazards.	Chester County				X
The county and municipalities will work with the senior living facility operators to discuss the hazards they face and ensure their emergency plans address those hazards.	Chester County				X
The county will assess their bridges to determine what measures can be taken to protect them to the 0.2% annual chance flood level.	Chester County				X

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
The county will work with all municipalities that have a child care facility exposed to any of the hazards to work with the child care facility operators to discuss hazards they face and ensure their emergency plans address those hazards	Chester County				X
Update countywide Model Stormwater Ordinance	Chester County	X			
When provided by FEMA, evaluate and apply FEMA non-regulatory electronic floodplain mapping and mitigation tools, where appropriate	Chester County				X
Work with district courts to ensure they have plans in place for off-site hazmat releases that can affect the courts.	Chester County				X
Work with hazmat facilities to inform them of the hazards they face and ensure emergency plans are current.	Chester County				X
Work with hospitals to ensure they have plans in place for off-site hazmat releases that can affect hospitals.	Chester County				X
Work with schools and school districts to inform them of the hazards they face and ensure emergency plans are current.	Chester County				X
Work with the municipalities to develop a map of the stormwater system, including intakes and outflows	Chester County				X
Work with the railroad industry to address safety concerns and aging rail infrastructure	Chester County				X
Work with the USPS on options for protecting the post offices from flooding and possible inundation from dam failure.	Chester County			X	
Work with Verizon to protect the facilities from flood or dam failure.	Chester County			X	
Educate the public about resources available to combat the opioid abuse/addiction.	Chester County				X
Improve telecommunications infrastructure, including accessibility of high-speed Internet connectivity, throughout the county	Chester County				X
The municipal FPA will work with the Atglen Borough Sewer Plant facility owner/operator to protect the facility to at least the 0.2% chance flood level	Atglen Borough			X	

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Work with the property owner to determine what flood protection measures can be taken to protect the structure to the 0.2% annual chance flood level.	Atglen Borough			X	
The municipal FPA will work with the Avondale Sewer Authority facility owner/operator to protect the facility to at least the 0.2% chance flood level	Avondale Borough			X	
Build an access road to Masters Way to Webb Rd	Birmingham Township			X	
Work with PennDOT to reengineer intersection at Street Road (PA 926) bridge over Brandywine Creek	Birmingham Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Brinton's Mill, Lenape Bridge, and Painter, Joseph, Farm	Birmingham Township			X	
Acquire/Elevate the building located on 135 Seltzer Road	Caln Township			X	
Caln Township has major businesses that are vulnerable to dam failure and will work with management to protect the buildings.	Caln Township				X
Protect the Caln Radio Tower to the 0.2% annual chance flood level and from a potential dam failure.	Caln Township				X
Work with Downingtown Middle School to determine specific vulnerability to dam failure and determine appropriate mitigation measures.	Caln Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Pennsylvania Railroad Bridge (No.205), Pickering Dam	Charlestown Township				X
Emergency Alert System - the City of Coatesville will implement an emergency alert system that will inform residents in the event of an emergency in an effort to improve public safety.	Coatesville City			X	
Install gates to be closed during flood incidents and signage at 11th Avenue and railroad underpass	Coatesville City			X	

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
West End Fire Station Generator - obtain a backup generator in order ensure that emergency operations are maintained during a power outage.	Coatesville City			X	
Protect ArcelorMital Emergency Services to the 0.2% annual chance flood level.	Coatesville City			X	
Gibbons Run Culvert Flooding and Structural Stability – evaluate the culverts and repair, rehabilitate, or replace them as necessary.	Coatesville City			X	
The municipal FPA will work with the Martin- Brower facility owner/operator to protect the facility to the 0.2% annual chance flood level and dam failure.	Coatesville City			X	
Upgrade City Hall Command Center - these upgrades include upgrades to the existing generator to allow for increased functionality of City Hall, the Police Station and the Emergency Command Center during a power outage and upgrades to the communication utilities to permit full functionality during an emergency.	Coatesville City			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: High Bridge, Huston, Abram, House & Carriage House, Lukens Main Office Building	Coatesville City			X	
Amtrak Keystone Corridor Underpass Flooding – evaluate and improve drainage and eroding areas along the corridor.	Coatesville City			X	
S. 5th Avenue Stormwater Improvements	Coatesville City			X	
63 S. 5th Ave. Property Protection - protect the existing grocery store on the corner of Olive St. and S 5th Ave.	Coatesville City			X	
Pre-Plan Emergency Access Routes	Coatesville City			X	
Ash Park Stormwater Improvements - improve infiltration and mitigate floodwaters that pose a threat for travelers during/after storm events.	Coatesville City			X	
Downtown Stormwater Improvements - upgrade Coatesville's existing stormwater infrastructure in the downtown business district	Coatesville City			X	
Millview Basin - restore proper stormwater detention basin function with added water quality improvements	Coatesville City			X	

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Public Information Programs - develop education packages, classes, meetings, programs, etc. with the goal of improving public knowledge of potential hazards are dealt with. within the City and how these hazards	Coatesville City			X	
Create a Capital Improvements Plan	Coatesville City			X	
Provide backup power at the City's traffic signals, including developing a plan for implementation and refueling.	Coatesville City			X	
Route 82 Slope Stability - ensure the stability of the slopes along the eastern side of Route 82 in order to maintain unimpeded direct access into and out of the City.	Coatesville City			X	
Determine the specific vulnerability of the Downingtown Borough Building to dam failure and determine appropriate mitigation measures.	Downingtown Borough			X	
Downingtown Borough has major businesses that are vulnerable to dam failure and will work with management to protect the buildings	Downingtown Borough			X	
Protect Alert FC Fire Station from dam failure.	Downingtown Borough			X	
Protect Downingtown - Jefferson Ave Electrical Substation to the 0.2% annual chance flood level and from the vulnerability to dam failure.	Downingtown Borough			X	
Protect Downingtown Boro PD from potential dam failure.	Downingtown Borough			X	
Protect Minquas Ambulance Fire Station from dam failure and determine appropriate mitigation measures.	Downingtown Borough			X	
Protect Minquas FC from potential dam failure.	Downingtown Borough			X	
Protect the Downingtown Municipal Waste from dam failure.	Downingtown Borough			X	
The municipal FPA will work with AT&T Mobility Downingtown - USID53712 facility owner/operator to protect the facility from its vulnerability to dam failure.	Downingtown Borough			X	
The Municipal FPA will work with the Downingtown Municipal Water Authority owner/operator to the 0.2% annual chance flood level and from vulnerability to dam failure.	Downingtown Borough			X	

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
The municipal FPA will work with the Inland Flexo, LLC facility owner/operator to protect the facility from its vulnerability to dam failure.	Downingtown Borough			X	
The municipal FPA will work with the Johnson Matthey AGT facility owner/operator to protect the facility from vulnerability to dam failure.	Downingtown Borough			X	
The municipal FPA will work with the Verizon Downingtown CO owner/operator to protect the facility from vulnerability to dam failure.	Downingtown Borough			X	
The municipal FPA will work with the Victory Brewing Company, LLC owner/operator to protect the facility from vulnerability to dam failure.	Downingtown Borough			X	
Work with Beaver Creek Elementary School to determine specific vulnerability to dam failure and determine appropriate mitigation measures.	Downingtown Borough			X	
Work with Downingtown High School West to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	Downingtown Borough			X	
Work with East Ward Elementary School to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	Downingtown Borough			X	
Work with Lori Petrie's Pre School to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	Downingtown Borough			X	
Work with Regina Luminis Academy to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	Downingtown Borough			X	
Work with SEPTA and Amtrak to protect the station from dam failure	Downingtown Borough			X	
Work with St. Joseph School to determine specific vulnerability to dam failure and determine appropriate mitigation measures.	Downingtown Borough			X	
Work with STEM Academy to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	Downingtown Borough			X	
Work with Step by Step Children's House to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	Downingtown Borough			X	

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect the, to the 0.2% annual chance flood level and vulnerability to dam failure: Downingtown Log House, Hunt, Roger, and Mill Complex	Downingtown Borough			X	
Work with the United States Marine Recruiting Office to protect the structure from the vulnerabilities of dam failure.	Downingtown Borough			X	
Acquisition/elevation of structure at 414 Cottage Lane	East Bradford Township				X
Acquisition/elevation of structure located at 402 Cottage Lane	East Bradford Township				X
Acquisition/elevation of structure located at 406 Cottage Lane	East Bradford Township				X
Acquisition/elevation of structure located at 418 Cottage Lane	East Bradford Township				X
Acquisition/Elevation of structure located at 502 River Bed Lane	East Bradford Township				X
Acquisition/Elevation of structure located at 530 River Bend Lane	East Bradford Township				X
Acquisition/Elevation of structure located at 550 River Bend Lane	East Bradford Township				X
Acquisition/Elevation of structure located at 558 River Bend Lane	East Bradford Township				X
Install battery back-up and/or generator hookup on traffic signal on South Bradford Avenue and West Nields Street	East Bradford Township	X			
Install gates to be closed during flood incidents and signage on Allerton Road between North Creek Road and Lucky Hill Road	East Bradford Township			X	
Install gates to be closed during flood incidents and signage on North Creek Road between Jefferis Bridge Road and Hillsdale Road	East Bradford Township			X	
Install gates to be closed during flood incidents and signage on South Creek Road between Cottage Lane and Withers Way	East Bradford Township			X	
Install gates to be closed during flood incidents and signage on Valley Creek Road between Harmony Hill Road and Ravine Road	East Bradford Township			X	
Municipal FPA to work with the Aqua Ingrams Mill Plant facility owner/operator to protect the facility from the vulnerabilities to dam failure.	East Bradford Township		X		
Property protection of structure located at 1010 Valley Creek Road	East Bradford Township				X

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Protect East Bradford Electrical Substation from vulnerability to dam failure.	East Bradford Township				X
Protect Good Fellowship Ambulance (Sub-Station) from the vulnerabilities from dam failure.	East Bradford Township				X
The municipal FPA to work with the PECO Bradford Substation facility owner/operator to protect the facility from vulnerabilities to dam failure.	East Bradford Township				X
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Cope's Bridge, East Bradford Historic District- HDA, Gibson's Covered Bridge, Hance, Joseph, House & Barn, Hannum, Col. John House, Jefferis Ford Bridge, Paradise Valley Historic District, Strode's Mill, Strode's Mill Historic District, and Taylor-Cope Historic District	East Bradford Township		X		
Acquire/elevate structure at 745 Creek Road	East Brandywine Township		X		
Acquire/elevate structure at 755 Creek Road	East Brandywine Township		X		
Acquire/elevate structure at 765 Creek Road	East Brandywine Township		X		
Acquire/elevate structure at 775 Creek Road	East Brandywine Township		X		
Acquire/elevate structure at 785 Creek Road	East Brandywine Township		X		
Beaver Creek Dam Rehabilitation Project	East Brandywine Township	X			
Increase size of culvert crossing at 2069 Bondsville Road	East Brandywine Township		X		
Install a flood wall protecting homes along Brandywine Creek from flooding along Creek Road at Crawford Road	East Brandywine Township		X		
Install generator connection at East Brandywine Baptist Church	East Brandywine Township		X		
Install generator connection at Hopewell United Methodist Church	East Brandywine Township		X		
Property protection of structure located at 1051 Creek Road	East Brandywine Township		X		
Property protection of structure located at 1061 Creek Road	East Brandywine Township		X		
Property protection of structure located at 1081 Creek Road	East Brandywine Township		X		

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to flooding: Bridge Mill Farm, Dowlin Farm, and Marshall's Bridge	East Brandywine Township		X		
Determine the specific vulnerability to dam failure and determine appropriate mitigation measures for the Downingtown Sewer Authority	East Caln Township				X
The municipal FPA to work with the D.R.W.P.C.C facility owner/operator to protect the facility from vulnerabilities to flooding.	East Caln Township				X
Acquisition/elevation of structure located at 285 Linfield Road	East Coventry Township			X	
Install emergency alerting systems for East Coventry Township	East Coventry Township			X	
Project East Coventry - Linfield Road Electrical Substation from the vulnerabilities of dam failure.	East Coventry Township			X	
The municipal FPA to work with Taylor Industries Inc facility owner/operator to protect the facility to at least the 0.2% chance flood level and from the vulnerabilities to dam failure	East Coventry Township			X	
Work with the property owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	East Coventry Township			X	
Improve drainage to reduce flooding along Mortonville Road including intersection of Mortonville Road and Sawmill Road	East Fallowfield Township				X
Improve drainage to reduce flooding on Timacula Road	East Fallowfield Township				X
Protect East Fallowfield - Spring Dell Road Electrical Substation to the 0.2% annual chance flood event	East Fallowfield Township				X
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Strasburg Rd Bridge, Speakman No.2, and the Gorden Farm	East Fallowfield Township				X

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Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Work with the Goodwin Acres owner to determine what protection measures can be taken to protect them from vulnerabilities to dam failure.	East Goshen Township			X	
Emergency alerting systems for East Marlborough Township	East Marlborough Township			X	
Conduct power assessment for critical infrastructure/key resources to determine emergency generator needs and coordinate information with the Army Corps of Engineers	East Pikeland Township			X	
Monitor and manage reservoirs and stream flows to sustain water sources needed to meet public water supply needs	East Pikeland Township			X	
Plant bushes/other vegetation to stop drifting snow in known problem areas	East Pikeland Township			X	
Purchase temporary mobile camera to set up for events and use to monitor safety and security	East Pikeland Township			X	
Retrofit critical public facilities with safe rooms	East Pikeland Township			X	
The municipal FPA to work with the Cromby Generating Station facility owner/operator to protect the facility to at least the 0.2% chance flood level and from vulnerabilities to dam failure.	East Pikeland Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and vulnerabilities to dam failure: Bernard Property, Hare's Hill Road Bridge, Hartman, Peter, Residence, Kimberton Historic District, and Rapp's Covered Bridge	East Pikeland Township			X	
Work with the railroad industry to address safety concerns and aging rail infrastructure	East Pikeland Township			X	
Protect the Shady Lane Water Treatment Plant from dam failure	East Vincent Township			X	
The municipal FPA to work with the Columbia Gas Transmission/Birdsboro Heater facility owner/operator to protect the facility to at least the 0.2% chance flood level and from the vulnerabilities of potential dam failure.	East Vincent Township			X	

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
The municipal FPA to work with the Oehlert Bros., Inc facility owner/operator to protect the facility to at least the 0.2% chance flood level	East Vincent Township			X	
The municipal FPA to work with the Shady Lane Plant-Royersford facility owner/operator to protect the facility from the vulnerabilities of dam failure	East Vincent Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Kennedy Covered Bridge and Parker's Ford	East Vincent Township			X	
Increase stormwater pipe size at Hillbrook Circle	East Whiteland Township		X		
Install a generator at the Meadowview pump station	East Whiteland Township			X	
Install a generator at the pump station on Flat Road	East Whiteland Township			X	
Install gates to be closed during flood incidents and signage at Church Road	East Whiteland Township				X
Install gates to be closed during flood incidents and signage at Old Morehall Road	East Whiteland Township				X
Work with management of major businesses to protect the buildings to the 0.2% annual chance flood level.	East Whiteland Township			X	
Work with the Spring Mill Complex owner to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood event.	East Whiteland Township			X	
Construct new stormwater management systems to address uncontrolled water runoff creating flooding of Darby Creek and its tributaries at Darby Creek Watershed	Easttown Township			X	
Work with Sugartown Road Bridge owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level	Easttown Township			X	

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Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Glen Hope Covered Bridge, Rudolph & Arthur Covered Bridge, and Stephens, Linton Covered Bridge	Elk Township			X	
Clear out blocked inlets at 896 between Goodhope Road and Gypsey Hill	Franklin Township	X			
Divert water on 512 Chesterville Road during heavy rain events	Franklin Township	X			
Improve drainage on North Clay Creek and Churchill Road	Franklin Township				X
Improve drainage to reduce flooding at Green Bridge on Strickersville Road and Appleton Road	Franklin Township	X			
Work with PennDOT to improve US-322 corridors to mitigate traffic accidents	Honey Brook Borough			X	
The municipal FPA to work with the Honey Brook Borough Authority facility owner/operator to protect the facility to at least the 0.2% chance flood level.	Honey Brook Township				X
Improve drainage on East South Street between S Walnut and Broad Street to prevent flooding	Kennett Square Borough		X		
Improve drainage on South Street at Lafayette and Grant Way	Kennett Square Borough			X	
Improve drainage on Walnut Street between Birch and East South St	Kennett Square Borough		X		
Improve/install drainage systems to handle rain to reduce localized flooding from Cypress St to Cedar St, west of Union St	Kennett Square Borough			X	
The municipal FPA will work with Comcast Cable- Kennell Square Hubsite owner/operator to protect the facility to the 0.2% annual chance flood level.	Kennett Square Borough			X	
Acquisition/elevation of structure located at 611 Creek Road	Kennett Township			X	
Acquisition/elevation of structure located at 903 Creek Road	Kennett Township			X	
Acquisition/elevation of structure located at 909 Creek Road	Kennett Township			X	
Assess and determine the best action to prevent East Hillendale Rd from flooding	Kennett Township			X	

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Assess and determine the best action to prevent flooding of Kaolin Rd from stream	Kennett Township			X	
Assess and determine the best action to prevent flooding of Marshall Bridge a Route 82 South	Kennett Township			X	
Assess and determine the best action to prevent flooding of the West Hillendale stream from Chandler Mill to Scarlet	Kennett Township			X	
Assess and determine the best action to prevent further erosion of Bucktoe Road stream banks and prevent flooding of the road	Kennett Township			X	
Assess and determine the best action to prevent Rosedale Road stream from overflowing onto the road	Kennett Township			X	
Assess and determine the best action to prevent the stream on Center Mill Road from overflowing	Kennett Township			X	
Install gates to be closed during flood incidents and signaled at flood intersections within the township	Kennett Township			X	
Install warning signs to be utilized during flood incidents at flood-prone bridges within the township	Kennett Township			X	
The municipal FPA to work with the AT&T SBA Kennett Square facility owner/operator to protect the facility to at least the 0.2% chance flood level	Kennett Township			X	
The municipal FPA to work with the Kennett Square Borough Sewage Treatment Plant facility owner/operator to protect the facility to at least the 0.2% chance flood level	Kennett Township			X	
Work with county to improve drainage on Bayard Road	Kennett Township			X	
Work with the county to improve drainage on Pemberton Road Bridge from Mill Road to Cedar Springs to prevent flooding	Kennett Township			X	
Work with the county to improve drainage on South Street from Scarlet to Chandler Mill	Kennett Township			X	
Emergency alerting systems for London Britain Township	London Britain Township	X			
Install a snow fence during snow season to prevent snow drifting on South Bank Rd	London Britain Township			X	

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Install a snow fence during snow season to prevent snow drifting on Strickersville Rd	London Britain Township			X	
Install gates to be closed during flood incidents and signage at Flint Hill Rd & Mercer Mill Rd	London Britain Township			X	
Install gates to be closed during flood incidents and signage at Good Hope & London Tract Rd/Broad Run Rd	London Britain Township			X	
Install gates to be closed during flood incidents and signage at London Tract Rd & New Peltier Rd	London Britain Township			X	
Install gates to be closed during flood incidents and signage at Mercer Mill Rd and N. Creek Rd	London Britain Township			X	
Install gates to be closed during flood incidents and signage at Yeatmans Station Rd	London Britain Township			X	
Emergency alerting systems/public notification system for London Grove Township	London Grove Township				X
Install alerting system/public notification system to profiteering/notification of potentially dangerous and damaging weather. Area is populated with outdoor activities and large population.	London Grove Township				X
Install gates and signage within flood-prone areas to reduce the risk of motorist and other traveling public from becoming entrapped in the flood waters.	London Grove Township				X
Protect West Grove Sewage Treatment Plant to the 0.2% annual chance flood level.	London Grove Township				X
Reconfigure stream channel at Sullivan Rd & Clay Creek Rd	London Grove Township				X
Reconstruct stream and roadway elevations to reduce the ability of flooding during rain and flash flood events.	London Grove Township				X
Supply electrical connections for a portable generator at each of the wastewater facilities. Providing alternative power during power outages utilizing a portable until as opposed to three permanent generators providing additional costs savings.	London Grove Township				X

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Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
The municipal FPA to work with the West Grove Wastewater Treatment facility owner/operator to protect the facility to at least the 0.2% chance flood level	London Grove Township				X
To remove an existing failed culvert and replace it with a new structure to span the base flood elevation. Portions or all of structure removal and replacement could be completed utilizing Municipal Public Works Resources.	London Grove Township				X
To remove an existing narrow culvert and replace with a structure to span the base flood elevations. Portions or all the structure removal and replacements could be completed utilizing Municipal Public Works.	London Grove Township				X
Widen bridge and bridge approaches at Indian Run Rd	London Grove Township				X
Work with PennDOT to clear the brush in roadway lines of sight at Rt 796 and Rt 41	Londonderry Township			X	
Work with PennDOT to construct a roundabout at the intersection of PA Route 41 and PA route 926	Londonderry Township			X	
Emergency alerting systems/public notification system for Londonderry Township	Londonderry Township			X	
Improve and enhance culverts on Jackson Rd and Faggs Manor Rd	Londonderry Township			X	
Improve plans and communication in case of emergency.	Londonderry Township			X	
Increase the height of the bridge at Whitehorse Rd near Creek Rd	Londonderry Township			X	
Install a generator in the Township Building	Londonderry Township			X	
Obtain approximately 1 mile of snow fencing or install natural landscapes to stop snow drifting along White Horse Rd by Power Station	Londonderry Township			X	
Purchase 2-way radios to assist in communication during emergency events in the township	Londonderry Township			X	
Purchase and install a backup generator at the Municipal Building	Londonderry Township			X	
Work with PennDOT to reconstruct the intersection to allow for better water drainage and strength the road at Fernwood Rd and Jackson Rd	Londonderry Township			X	

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Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Octoraro Water Company and Pine Grove Covered Bridge	Lower Oxford Township			X	
Elevation/Acquisition of structure located at 135 Powelton Ave	Malvern Borough			X	
Elevation/Acquisition of structure located at 145 Powelton Ave	Malvern Borough			X	
Elevation/Acquisition of structures 10 through 142 W First Ave	Malvern Borough			X	
Elevation/Acquisition of structures 193 through 323 Paoli Pike	Malvern Borough			X	
Elevation/Acquisition of structures 2 through 10 Remington Ln	Malvern Borough			X	
Elevation/Acquisition of structures 217 through 545 S. Warren Ave	Malvern Borough			X	
Increase culvert size at 313 S Warren Ave	Malvern Borough			X	
Work with management of Malvern Preparatory School to protect the buildings to the 0.2% annual chance flood level.	Malvern Borough			X	
Determine the specific vulnerability of the Modena Borough Building to dam failure and determine appropriate mitigation measures.	Modena Borough			X	
Protect Modena Ambulance EMS Station from vulnerabilities to dam failure.	Modena Borough			X	
Protect Modena FC Fire Station from a potential dam failure.	Modena Borough			X	
The Municipal FPA will work with the Mahoney- Modena owner/operator to protect the facility to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	Modena Borough			X	
The Municipal FPA will work with the Sealed Air Corporation owner/operator to protect the facility to the 0.2% annual chance flood level and from the vulnerabilities of dam failure.	Modena Borough			X	
Work with the Mode Paper Mill owner to determine what flood protection measures can be taken to protect it from the vulnerabilities of dam failure.	Modena Borough			X	
Construct larger culvert at Cedar Springs Rd at Pemberton Rd	New Garden Township			X	
Construct larger culvert at Egypt Run Road	New Garden Township			X	
Emergency alerting systems for New Garden Township	New Garden Township			X	

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Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Purchase portable generator for traffic signal at Chambers Rd and Baltimore Pike	New Garden Township			X	
Purchase portable generator for traffic signal at Newark Rd and Baltimore Pike	New Garden Township			X	
Purchase portable generator for traffic signal at Newark Rd and Rt 41	New Garden Township			X	
Purchase portable generator for traffic signal at Penn Green Rd and Rt 41	New Garden Township			X	
Purchase portable generator for traffic signal at Scarlett Rd and Baltimore Pike	New Garden Township			X	
Purchase portable generator for traffic signal at Southwood Rd and Rt 7	New Garden Township			X	
Work with To-jo Mushrooms Inc. management to protect the building to the 0.2% annual chance flood level.	New Garden Township			X	
Determine the specific vulnerability of the Newlin Township Building to dam failure and determine appropriate mitigation measures.	Newlin Township				X
Fix and pave road that has been destroyed on Laurel Road including three driveways	Newlin Township				X
Protect the Embreeville Sewage Treatment from dam failure and protect it to the 0.2% annual chance flood event and from vulnerabilities to dam failure.	Newlin Township				X
Replant Ash Trees that were lost to the Ash Borer and determine the best actions to prevent invasive species in the future	Newlin Township				X
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Embreeville Historic District, House at Upper Laurel Iron Works, Marlborough Village Historic District, Spruce Groce School House, Worker's House at Lower Laurel Iron Works	Newlin Township				X
Protect the North Coventry Municipal Authority from dam failure and to the 0.2% annual chance flood level.	North Coventry Township			X	

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Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
The municipal FPA to work with the North Coventry Municipal Authority facility owner/operator to protect the facility to at least the 0.2% chance flood level and from the vulnerabilities to dam failure	North Coventry Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Schuylkill Navigation Company Canal and historic structure located on SR 7046	North Coventry Township			X	
Rain gardens to be installed in recently created bump- outs on Broad Street at intersection with 8th Street.	Oxford Borough			X	
The municipal FPA will work with the Hayes Heating and Cooling Bulk owner/operator to protect the facility to the 0.2% annual chance flood level.	Parkesburg Borough			X	
Work with power company to protect Parkesburg - N Church St Electrical Substation to the 0.2% annual chance flood level.	Parkesburg Borough			X	
Enhance stormwater management regulations	Penn Township			X	
Work with power company to protect Penn - Neward Road Electrical Substation to the 0.2% annual chance flood level.	Penn Township			X	
Install warning signals at unguarded railroad crossing at US Rt 1 at the railroad tracks by Fairville Rd	Pennsbury Township			X	
Install warning signals for times when road is closed due to flooding on US Rt 1 in the area of the Brandywine creek	Pennsbury Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Bissel/Hill Girt/Beverly Rural Historic District and Delaware Boundary Makers.	Pennsbury Township			X	
Improve drainage at the intersection of Bridge and Church St.	Phoenixville Borough			X	
Protect the District Court 15-2-01 to the 0.2% annual chance flood level.	Phoenixville Borough			X	
Protect the Phoenixville Boro PD to the 0.2% annual chance flood level.	Phoenixville Borough			X	

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Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Protect the Phoenixville Water Treatment to the 0.2% annual chance flood event and from dam failure.	Phoenixville Borough			X	
The municipal FPA to work with the Phoenixville Water Plant facility owner/operator to protect the facility to at least the 0.2% chance flood level and from the vulnerabilities to dam failure.	Phoenixville Borough			X	
Work with the management of major businesses to protect the buildings from dam failure and to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	Phoenixville Borough			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Black Rock Bridge, Lobok, John, Property, Mansion House, and Phoenixville Canal Spur	Phoenixville Borough			X	
Assess and determine the best action to prevent flooding around Brandywine Creek on Northbrook Road, one lane historical bridge	Pocopson Township				X
Stabilize existing roadway in danger of collapse from damage due to frequent flooding of Brandywine Creek, with retaining wall and guide rail system. This will improve traffic safety for local residents, allow for better access by EMS vehicles, and mitigate the damage from future flooding	Pocopson Township				X
The municipal FPA to work with the Lenape Forged Products Corp facility owner/operator to protect the facility from the vulnerabilities of dam failure.	Pocopson Township				X
Work with power company to protect the Pocopson - Lenape Unionville Road Electrical Substation to the 0.2% annual chance flood level.	Pocopson Township				X
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Pocopson Station, State Route 3027, and Wilkinson House	Pocopson Township				X

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Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Assess and determine the best action to improve drainage and reduce flooding on Greenbelt Drive	Sadsbury Township			X	
Install gates to be closed during flood incidents and signage on sections of Old Mill Road	Sadsbury Township			X	
Acquisition/Elevation of the structure located at 493 State Creek Road	Schuylkill Township			X	
Construct Larger Culvert at East Phillip Drive	Schuylkill Township			X	
Construct larger culvert at S Whitehorse Road	Schuylkill Township			X	
Determine specific vulnerability to dam failure and determine appropriate mitigation measures for the Valley Forge Sewage Treatment Plant	Schuylkill Township			X	
Plant bushes/other vegetation to stop drifting snow in known problem areas	Schuylkill Township			X	
Protect Structure with Barrier at Creek Road Bridge	Schuylkill Township			X	
Retrofit critical public facilities with safe rooms	Schuylkill Township			X	
The municipal FPA to work with the Aqua Pickering Water Treatment facility owner/operator to protect the facility to at least the 0.2% chance flood level	Schuylkill Township			X	
The municipal FPA to work with the Valley Forge Sewer Authority facility owner/operator to protect the facility to at least the 0.2% chance flood level	Schuylkill Township			X	
Work with power company to protect Schuylkill - Valley Forge Road to the 0.2% annual chance flood level.	Schuylkill Township			X	
Work with YMCA management to protect the building to the 0.2% annual chance flood level.	Schuylkill Township			X	
Investigate stormwater management options and identify mitigati Coatesville Boroughon or structural projects to reduce vulnerability to stormwater flooding incidents throughout South	South Coatesville Borough				X
Protect the Coatesville Sewer Authority from dam failure and to the 0.2% annual chance flood level.	South Coatesville Borough				X

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Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
The municipal FPA will work with the Scrap Metal Services owner/operator to protect the facility to the 0.2% annual chance level.	South Coatesville Borough				X
Construct larger culvert at Bealor Road	South Coventry Township			X	
Determine the best action to prevent downhill flooding on Coventryville Rd & Harmonyville Road, close to North Cov. Border	South Coventry Township			X	
Install flood water collection boxes and piping on Schoolhouse Road and Porter's Mill Road	South Coventry Township			X	
Purchase and install a backup generator for the Woodridge Sewer Plant at 190 Ridgeview Drive	South Coventry Township			X	
Work with power company to protect South Coventry - Porters Mill Road Electrical Substation to the 0.2% annual chance flood level.	South Coventry Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Coventryville Historic District and Coventryville Historic District (1975)- HAD	South Coventry Township			X	
Protect the Spring City Sewer Plan from the vulnerably to dam failure and to the 0.2% annual chance flood level.	Spring City Borough				X
The municipal FPA will work with the Hydromotion owner/operator to protect the facility from the vulnerabilities of dam failure	Spring City Borough				X
Work with management of major businesses to protect the buildings from the vulnerably to dam failure and to the 0.2% annual chance flood level.	Spring City Borough				X
Work with the Textile Mill owner to determine what flood protection measures can be taken to protect the facility from the vulnerabilities from dam failure	Spring City Borough				X
Work with PennDOT to conduct an assessment of flood-prone areas along roadway Rt 926 from Rt 202 to Cheyney Rd	Thornbury Township			X	
Install gates to be closed during flood incidents and signage at Rt 926 and Creek Road	Thornbury Township			X	

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Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Install gates to be closed during flood incidents and signage at Rt 926 and S. Westtown Rd	Thornbury Township			X	
Install gates to be closed during flood incidents and signage at Rt 926 and Westtown-Thornton Rd	Thornbury Township			X	
Install gates to be closed during flood incidents and signage at Westtown-Thornton Rd north of Railroad Bridge	Thornbury Township			X	
Install gates to be closed during flood incidents and signage at Westtown- Thornton Rd south of Railroad Bridge	Thornbury Township			X	
Work with power company to protect Thornbury - Westtown Road Electrical Substation to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	Thornbury Township			X	
Clogged inverts throughout the township causing flooding	Tredyffrin Township			X	
Improve drainage to reduce flooding on Hadwick Road and Upper Weedly Road	Tredyffrin Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Cedar Hollow Industrial Track: Bridge, County Bridge No. 171, Great Valley Mill, Jerman, Thomas, Property, and historic structure on SR 7015	Tredyffrin Township			X	
Improve drainage to reduce flooding on Wills Lane, Woodcrest Drive, and Saunders Drive	Tredyffrin Township			X	
Acquisition/elevation of the structure located at 2 Kiloran Wynd	Upper Uwchlan Township			X	
Acquisition/elevation of the structure located at 80 Saint Andrews Ln	Upper Uwchlan Township			X	
Protect Larkins Bridge with barrier	Upper Uwchlan Township			X	
Protect structure with barrier on Dorothy Lane	Upper Uwchlan Township			X	
Protect structure with barrier on Font Road	Upper Uwchlan Township				X
Protect structure with barrier on Lyndell Road	Upper Uwchlan Township				X
Protect structure with barrier on Moore Road and Turnstone Way	Upper Uwchlan Township				X
Protect structure with barrier on St Andrews Lane	Upper Uwchlan Township				X
Protect Windsor Schoolhouse with barrier	Upper Uwchlan Township		X		

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Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Raise Fellowship Road roadway at Red Bone Road	Upper Uwchlan Township				X
Stormwater culvert and basin re-sizing on Greenridge Road	Upper Uwchlan Township		X		
Stormwater culvert and basin re-sizing on Krauser Rd	Upper Uwchlan Township				X
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from vulnerabilities to dam failure: County Bridge No. 101 and Scott Farm Property	Valley Township			X	
Assess and determine the best action to protect Wagontown Road near the West Branch of the Brandywine Creek, and implement the action.	Valley Township			X	
Assess drainage into Sucker Run near South Park Avenue and PA-372 to identify the best action to prevent flooding during heavy rainfall events, and implement the action.	Valley Township			X	
Protect Glenmoore FC Fire Station from a potential dam failure	Wallace Township			X	
The municipal FPA to work with the Verizon Glenmoore ESS Bldg. facility owner/operator to protect the facility from the vulnerabilities to dam failure	Wallace Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Glenmoore Historic District and Steels Bridge	Wallace Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Hockley Mill Farm, Knauer Patent Thematic District, North Warwick Historic & Archaeological District (HDA), North Warwick HDA, and historic structure located on SR 7015	Warwick Township			X	
Acquire and install back-up generator at Wastewater Treatment Plant	West Bradford Township				X
Improve drainage on Broad Run Road between Beacon Hill	West Bradford Township				X
Install 4 gates to be closed during flood incidents and signage at Downingtown Pike between Harmony Hill Rd and Skelp Level Rd	West Bradford Township			X	

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Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Protect the Broad Run Sewage Treatment Plant from dam failure and to the 0.2% annual chance flood level.	West Bradford Township			X	
Work with the management of Ram-t Construction Specialist to protect the buildings from dam failure.	West Bradford Township				X
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to flooding: Derbydown Homestead, Northbrook Historic District, Pennsylvania Railroad: Morrisville Lien: Viaduct	West Bradford Township				X
Work with the Grow, James, House property owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	West Brandywine Township			X	
Obtain a backup generator for Goodwill Fire Company	West Chester Borough	X			
The municipal FPA to work with the National Foam facility owner/operator to protect the facility to at least the 0.2% chance flood level	West Chester Borough			X	
Work with the Ross Fording Road Bridge property owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	West Fallowfield Township			X	
Improve culvert at 103 Oak Lane	West Goshen Township			X	
Install 3 gates to be closed during flood incidents and signage at East Chestnut and Montgomery	West Goshen Township			X	
The municipal FPA to work with the A. Duie Plyle PB II Warehouse facility owner/operator to protect the facility to at least the 0.2% chance flood level	West Goshen Township			X	
The municipal FPA to work with the A. Duie Plye Bolmar Street Warehouse facility owner/operator to protect the facility to at least the 0.2% chance flood level	West Goshen Township			X	
The municipal FPA to work with the A. Duie Pyle West Chester Truck Terminal facility owner/operator to protect the facility to at least the 0.2% chance flood level	West Goshen Township			X	

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
The municipal FPA to work with the Wire and Cable Specialties facility owner/operator to protect the facility to at least the 0.2% chance flood level	West Goshen Township			X	
Work with the Greystone Hall property owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	West Goshen Township			X	
Assess and determine the best actions to prevent flooding on bridges along Rt 82 from Unionville to Coatesville	West Marlborough Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: House at Springdell, Pennock, Martha House & Industrial Site, and Speakman No.1 Covered Bridge	West Marlborough Township			X	
Work with the Isabella Furnace owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	West Nantmeal Township			X	
Install gates to be closed during flood incidents and signage at Fremont Road between Willow Road and King Pen Road	West Nottingham Township			X	
Install gates to be closed during flood incidents and signage at Park Road between Veteran's Drive and Sand Hill Road	West Nottingham Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Anselma Mill District-HDA, Clinger-Moses Mill Complex, Lightfoot Mill, and Vitale House	West Pikeland Township				X
Backup Generators (2) Acquisition and Installation at Matthews Meadows Sewer Plant	West Vincent Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Halls Covered Bridge, Tyson's Bridge, and historic structure on Kimberton Road	West Vincent Township			X	
Elevation/acquisition of structure located at 116 N. Locust Lane	West Whiteland Township			X	

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Elevation/acquisition of structure located at 117 N. Locust Lane	West Whiteland Township			X	
Elevation/acquisition of structure located at 117 Valley Road	West Whiteland Township			X	
Elevation/acquisition of structure located at 118 Valley Road	West Whiteland Township			X	
Elevation/acquisition of structure located at 120 Valley Road	West Whiteland Township			X	
Elevation/Acquisition of structure located at 510 Winding Way	West Whiteland Township			X	
Elevation/acquisition of structure located at 512 Winding Way	West Whiteland Township			X	
Elevation/acquisition of structure located at 513 Winding Way	West Whiteland Township			X	
Remove silt/clean Valley Creek bed	West Whiteland Township			X	
The municipal FPA to work with the Verizon Exton ESS Bldg. facility owner/operator to protect the facility to at least the 0.2% chance flood level	West Whiteland Township			X	
Work with power company to protect West Whiteland - S Whitford Road Electrical Substation to the 0.2% annual chance flood event.	West Whiteland Township			X	
Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Colebrook Manor, Exton Hotel, Thomas, John Roberts, Tennant Farmstead, Turnpike Station House, Whitford Station House, and William's Deluxe Cabins	West Whiteland Township			X	
Acquire/elevate roadways/properties along Chester Creek - Skiles Blvd, Kolbe Lane, Piedmont Road, Tower Course Drive, Blenheim Road, Wood Lane, Westbourne Road, Westtown Road, Westtown Way, Ponds Edge Road, Diane Drive, Leslie Lane, Robin Drive	Westtown Township			X	
Conduct a wildlands/forestry survey of township-owned forested areas, to determine need for strategies for mitigating invasive species risks.	Westtown Township			X	
Conduct flood mitigation analysis of the township WWTP on Westtown Road, and pump stations on Rt. 926 (Rustin) and Rt. 3 (Kirkwood)	Westtown Township			X	
Develop/maintain a hazard risk management webpage on the municipal website where information and mapping can be posted.	Westtown Township			X	

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Encourage regular offerings of the American Red Cross Citizen's Disaster Course and other relevant classes.	Westtown Township			X	
Enhance public outreach to residents in areas subject to flooding to inform them of annual grant opportunities; this may include distributing periodic articles and including handouts in the annual newsletter.	Westtown Township			X	
Work with PennDOT to conduct an assessment on how to improve design of Route 352/Rt. 3 intersection	Westtown Township			X	
Work with PennDOT to conduct an assessment to improve the design of Route 202 at 926 intersection and High Street/202 merge	Westtown Township			X	
Post flyers and other readily available informational materials at municipal hall or distribute at regular civic meetings.	Westtown Township			X	
Protect critical infrastructures (Schools, daycare, apartment buildings, and nursing home) on Rt. 202 around Skiles Blvd from HAZMAT transportation accidents	Westtown Township			X	
Protect the following properties from a potential pipeline incident: Pipeline - Avonlea and Overhill neighborhoods, Sts. Simon and Jude Church and School (8 Cavanaugh Ct West Chester, PA 19382) . Advent Lutheran Church at Green Lane on 352, Chesterfield Condominiums at Rt. 3 and 352	Westtown Township			X	
Protect the Westtown Wastewater Treatment Plant from dam failure and to the 0.2% annual chance flood level.	Westtown Township			X	
Provide general hazard risk preparedness and mitigation information in regular newsletters and mailings.	Westtown Township			X	
Work with PennDOT to redesign of the 926 intersection, elimination of the East Pleasant Grove Road/Rt. 202 connection, further improvements to the Skiles Road intersection, High Street/202 Northbound merge	Westtown Township			X	
Work with PennDOT to redesign the intersection of SR 926 and Avonlea Circle and Tanguy Road to improve line of sight.	Westtown Township			X	

2021 Mitigation Action Progress

Mitigation Action	County / Municipality	Completed	Canceled	Deferred	Ongoing
Retrofit WWTP on Westtown Road, Pump Stations at Kirkwood Highway and Rustin H.S.	Westtown Township			X	
Work with the County Bridge No. 148 owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	Westtown Township			X	
Elevation/Acquisition of the structure located at 1 Eisenhower Dr	Willistown Township			X	
Elevation/Acquisition of the structure located at 116 Davis Rd	Willistown Township			X	
Emergency alerting systems for Willistown Township	Willistown Township				X
Increase Culvert Size on Hillview Rd between Fox Chase and Bar Rd	Willistown Township				X
Increase drainage basin size at Rustmont Homeowners Association	Willistown Township			X	
Increase drainage basin size behind Malvern Fire Company	Willistown Township			X	
Increase drainage basin size of the Family Life Basin	Willistown Township			X	
Increase size of drainage pipe crossing under road at Paoli Pike west of Rustin Ln and Devon Rd	Willistown Township			X	
Install gates to be closed during flood incidents and signage on Jaffery Rd over Crum Creek	Willistown Township			X	
Install gates to be closed during flood incidents and signage on Whitehorse Rd between Rabbit Run Rd and Grubbs Mill Rd	Willistown Township			X	
Strengthen Bridge/Re- engineer bridge approaches at Jaffery Rd over Crum Creek	Willistown Township				X
Strengthen Bridge/Re- engineer bridge approaches at Whitehorse Rd between Davis Rd and Fox Chase Rd	Willistown Township				X
Strengthen Bridge/Re- engineer bridge approaches at Whitehorse Rd between Rabbit Run Rd and Grubbs Mill Rd	Willistown Township	X			
Installation of a storm water management system in Ronnie Park section of the Township to mitigate surface water runoff impacts during severe weather events that have resulted in past flooding of the neighborhood; and prevent damage to property, housing, and infrastructure in the project area.	Willistown Township				X

6.1.3. Mitigation Successes

Chester County and its partners and municipalities have made a great deal of progress on hazard mitigation projects and actions in the last five years. Details on numerous actions marked as "Completed" since the 2021 plan update are summarized below.

Structure and Infrastructure Efforts

- The Brandywine Flood Study, a joint effort between The Brandywine Conservancy, Chester County Water Resources Authority, and the University of Delaware, was adopted in April 2025. The study serves as an aid to better protect people and property from the impacts of future floods, providing a broader analysis of flood risk in the Brandywine watershed, including historic flooding, projections for future floods, potential impacts of future precipitation and storm events, and land use based on population projections. Additionally, the report provides an actionable suite of proposed flood mitigation recommendations throughout the watershed.
- Willistown Township worked to strengthen and re-engineer the bridge approaching Whitehorse Rd between Rabbit Run Rd and Grubbs Mill Rd. Guiderails and curbing were installed to prevent overtopping of the road by the creek.
- The Chester Water Authority completed the reconstruction of the spillway at Beaver Creek Dam.
- Franklin Township improved drainage systems at Green Bridge on Strickersville Road and Appleton Road to reduce flooding during and after heavy rain events.
- A backup battery for a traffic signal was installed at the intersection of South Bradford Avenue and West Nields Street in East Bradford Township to prevent outages during heavy rain and wind events.
- Franklin Township cleared out blocked inlets at 896 between Goodhope Road and Gypsey Hill.

Local Plans and Regulations

- Chester County developed and approved a model natural conservation ordinance for municipal adoption.
- Chester County updated the countywide Model Stormwater Ordinance.
- Chester County developed a COOP/COG Plan and procedures for off-site hazmat releases that can impact buildings.
- Chester County continued to develop mutual aid and interagency agreements to support preparedness, mitigation, and response activities in the county.
- Chester County developed a plan for replenishment fuel for generators.
- Penn Township, East Caln Township, Oxford Borough, Willistown Township, Highland Township, Malvern Borough, and Modena Borough all adopted their

respective Comprehensive Plan with key planning elements of their plans including preserving open space and protecting natural resources, guiding growth, and resilience preparedness.

- West Vincent Township adopted a new Forest Protection Ordinance to help safeguard the Townships woodlands and forests from development. The ordinance sets tree replacement standards, such as when trees are damaged through wildfires. Additionally, it sets standards for cutting declined, damaged, or diseased trees that present hazards to existing structures, which can reduce structural risks during wildfires or windstorms.
- London Britain Township Subdivision and Land Development Ordinance Update was updated in 2022 with notable provisions were included in the updated ordinance to further protect riparian buffers in the Township.
- New Garden Township is working to update its zoning ordinance to aid in the protection of the Township's open spaces and agricultural landscape through the enhanced regulation of development. Additionally, the zoning ordinance will aid in the reduction of risk from hazards like floods and source water protection through its restrictions on development near riparian buffers.

Natural Systems Protections

- Water releases from Marsh Creek Dam (managed by PA DCNR) and Hibernia Dam (managed by CCWRA) are strategically managed to protect downstream flows that support aquatic life and drinking water withdrawals.
- The County supports the USGS's Pennsylvania Drought Conditions Monitoring program and helps to fund one of the most robust county-wide observation-well networks in Pennsylvania.

Education and Awareness

- Chester County updated Department of Emergency Services public education materials to include flood mitigation recommendations and NFIP program information.
- To support public education efforts, Chester County developed a map showing the relative frequency that county roads and bridges are subject to flooding.
- Chester County coordinated with owners of privately-owned digital billboards for emergency uses.
- London Britain Township set up emergency alerting systems for its residents to increase awareness of potential hazards.

6.2. Mitigation Goals and Objectives

Based on results of the review of the 2021 HMP mitigation goals and objectives established, a new set of goals and objectives were developed in 2026. Table 6.1-1 explains how goals and objectives were updated and revised. Table 6.2-1 lists the

mitigation goals and objectives established for the 2026 plan. There are seven goals, and 29 objectives identified.

Table 6.2-1 Chester County 2026 Mitigation Goals and Actions

GOAL 1	Prevent injury/death, physical damage, and other impacts from hazards in Chester County.
Objective 1.1	Enhance regulations for addressing development in hazard-prone areas. Encourage high construction standards on all structural projects to reduce risk from all natural and human caused hazards.
Objective 1.2	Support government agencies and non-governmental organizations to provide aid to vulnerable populations before, during, and after a hazard.
GOAL 2	Protect the citizens of Chester County as well as public and private property from the impacts of natural and human-caused hazards.
Objective 2.1	Develop a comprehensive approach to upgrade infrastructure to reduce the possibility of damage to and loss of function to infrastructure, critical facilities and culturally or historically significant assets located in high-hazard areas.
Objective 2.2	Improve existing stormwater management systems and implement new warning systems and tools to reduce flooding.
Objective 2.3	Provide resources that encourage regular inspection and maintenance of existing stormwater facilities to reduce flooding.
Objective 2.4	Assist with updating local stormwater management standards to reduce flooding and education of stormwater management/ flooding.
Objective 2.5	Protect existing structures in the Special Flood Hazard Area.
GOAL 3	Protect and restore existing natural resources including wetlands, floodplains, and riparian buffers.
Objective 3.1	Lessen impacts on natural resources and open space from natural and human-caused hazards by promoting sustainable land use and water resources management practices.
Objective 3.2	Provide appropriate safeguards for the preservation of the quality of water resources, stream corridors, watershed areas, and floodplains.
GOAL 4	Promote public awareness on the potential impacts of natural and human-caused hazards, and actions to reduce those impacts.
Objective 4.1	Develop public education and outreach programs on hazards and hazard mitigation and develop and distribute public awareness materials about natural hazard risks, preparedness, and mitigation.

Objective 4.2	Educate property owners in hazard-risk areas regarding their risks and the precautions they can take.
Objective 4.3	Encourage residents to implement hazard mitigation and preparedness measures on their properties.
Objective 4.4	Provide outreach and educational opportunities to the community about where to find comprehensive information on hazards.
Objective 4.5	Work with media partners to promote public awareness on the potential impacts of natural hazards and actions to reduce those impacts.
Objective 4.6	Consider education campaigns and workshops to promote 'safe' development and other hazard mitigation principles.
Objective 4.7	Develop an understanding of increased risk from climate change impacts to natural hazards and promote education on potential impacts from increased risk.
GOAL 5	Ensure adequacy and continuity of emergency management services during hazard events.
Objective 5.1	Continue to provide residents with adequate warning of potential hazards.
Objective 5.2	Identify safe and efficient evacuation routes during hazard events to ensure continued service.
Objective 5.3	Provide for adequate shelters during hazard events.
Objective 5.4	Conduct damage assessments and provide flood mitigation resources to municipalities and the public.
GOAL 6	Ensure hazard mitigation goals and objectives are consistent with goals of other plans and ordinances in the county and municipalities.
Objective 6.1	Promote responsible growth and development via proper enforcement and through the incorporation of hazard mitigation principles in municipal plans, and zoning, subdivision and land development, stormwater ordinances, and floodplain ordinances, as appropriate.
Objective 6.2	Incorporate hazard mitigation planning projects into capital improvement plans.
Objective 6.3	Continue to regulate development in conservation areas and within floodplains to prevent flood damage.
Objective 6.4	Integrate plans and ordinances to ensure concurrency and harmony between them.

Objective 6.5	Encourage homeowners, renters, and businesses to insure their properties against all hazards, including purchasing flood coverage under the NFIP.
Objective 6.6	Encourage local participation in FEMA's Community Rating System (CRS) Program.
GOAL 7	Protect people and assets from the potential impacts of High Hazard Potential Dams.
Objective 7.1	Coordinate with High Hazard Potential Dam owners and affected officials on dam rehabilitation and funding.
Objective 7.2	Ensure High Hazard Potential Dams are mitigated to decrease potential hazard risks.
Objective 7.3	Continue planning efforts and emergency preparedness surrounding high hazard dams.

6.3. Identification and Analysis of Mitigation Techniques

The mitigation strategy in the updated Hazard Vulnerability Assessment and Mitigation Plan Update should include analysis of a comprehensive range of specific techniques or actions. FEMA, through the June 2025 Local Mitigation Handbook, and PEMA, through the 2020 Standard Operating Guide (SOG), identify four categories of hazard mitigation techniques.

- Local plans and regulations: Government authorities, policies, or codes that influence the way land and buildings are developed and built. Examples include, but are not limited to, comprehensive plans, subdivision regulations, building codes and enforcement, and NFIP and CRS.
- Structure and infrastructure: Modifying existing structures and infrastructure or constructing new structures to reduce hazard vulnerability. Examples include, but are not limited to, acquisition and elevation of structures in flood prone areas, utility undergrounding, structural retrofits, floodwalls and retaining walls, detention and retention structures, and culverts.
- Natural systems protection: Actions that minimize damage and losses and preserve or restore the functions of natural systems. Examples include, but are not limited to, sediment and erosion control, stream corridor restoration, forest management, conservation easements, and wetland restoration and preservation.
- Education and awareness: Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate the

hazards and may also include participation in national programs. Examples include, but are not limited to, radio or television spots, websites with maps and information, provide information and training, NFIP outreach, StormReady®, and Firewise® Communities.

The HMPT reviewed the four types of mitigation techniques and examples of actions at the Regional Municipal Workshops and ensured that all mitigation technique types were applied across hazards. Table 6.3-1 provides a matrix identifying the mitigation techniques used for the hazards identified in the Risk Assessment. The specific actions associated with these techniques are included in Table 6.4-1 in the next section.

Table 6.3-1 Mitigation techniques for all hazards in Chester County

HAZARD (IN ORDER OF RISK FACTOR RANKING)	MITIGATION TECHNIQUE			
	PLANS AND REGULATIONS	STRUCTURE AND INFRASTRUCTURE	NATURAL SYSTEMS PROTECTION	EDUCATION AND AWARENESS
Utility Interruption (M)	X	X		X
Flood, Flash Flood, and Ice Jam (N)	X	X	X	X
Pandemic and Infectious Disease (N)	X	X		X
Drought (N)	X	X		X
Transportation Incidents (M)	X	X	X	X
Urban Fire and Explosion (M)	X	X		X
Substance Use Disorder (M)	X	X		X
Extreme Temperatures (N)	X	X		X
Tornado, Windstorm (N)	X	X		X
Winter Storm (N)	X	X		X
Nuclear Incident (N)	X	X		X
Environmental Hazards: Hazardous Materials Release (M)	X	X		X
Wildfire (N)	X	X		X
Invasive Species (N)	X	X	X	X
Hurricane, Tropical Storm, Nor'easter (N)	X	X		X
Terrorism (M)	X	X		X
Dam failure (M)	X	X		X
Earthquake (N)	X	X		X

Table 6.3-1 Mitigation techniques for all hazards in Chester County

HAZARD (IN ORDER OF RISK FACTOR RANKING)	MITIGATION TECHNIQUE			
	PLANS AND REGULATIONS	STRUCTURE AND INFRASTRUCTURE	NATURAL SYSTEMS PROTECTION	EDUCATION AND AWARENESS
Environmental Hazards: Gas and Liquid Pipelines (M)	X	X		X
Radon Exposure (N)	X	X		X
Cyber-Terrorism (M)	X	X		X

Table 6.3-2 provides a matrix identifying which municipalities have mitigation actions for each hazard identified in the Risk Assessment. Each municipality has:

- At least one action for each hazard identified for their community.
- At least one action for any hazards that the municipality identified as being at equal to or greater risk than the County overall in Table 4.4-3.

The specific actions are detailed in Table 6.4-1 in the next section.

Table 6.3-2 Hazards Addressed by Mitigation Actions by Municipality

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
Atglen Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Avondale Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Birmingham Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6.3-2 Hazards Addressed by Mitigation Actions by Municipality

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
Caln Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Charlestown Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Coatesville City	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Downingtown Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
East Bradford Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
East Brandywine Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
East Caln Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
East Coventry Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
East Fallowfield Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
East Goshen Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
East Marlborough Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
East Nantmeal Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
East Nottingham Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6.3-2 Hazards Addressed by Mitigation Actions by Municipality

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
East Pikeland Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Easttown Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
East Vincent Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
East Whiteland Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Elk Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Elverson Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Franklin Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Highland Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Honey Brook Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Honey Brook Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Kennett Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Kennett Square Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
London Britain Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Londonderry Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6.3-2 Hazards Addressed by Mitigation Actions by Municipality

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
London Grove Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lower Oxford Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Malvern Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Modena Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
New Garden Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Newlin Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
New London Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
North Coventry Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Oxford Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Parkesburg Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Penn Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pennsbury Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Phoenixville Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pocopson Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6.3-2 Hazards Addressed by Mitigation Actions by Municipality

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
Sadsbury Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Schuylkill Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
South Coatesville Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
South Coventry Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Spring City Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Thornbury Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tredyffrin Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Upper Oxford Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Upper Uwchlan Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Uwchlan Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Valley Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Wallace Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Warwick Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6.3-2 Hazards Addressed by Mitigation Actions by Municipality

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
West Bradford Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Brandywine Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Caln Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Chester Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Fallowfield Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Goshen Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Grove Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Marlborough Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Nantmeal Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Nottingham Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Pikeland Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6.3-2 Hazards Addressed by Mitigation Actions by Municipality

MUNICIPALITY	Utility Interruption (M)	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Drought (N)	Transportation Incidents (M)	Urban Fire and Explosion (M)	Substance Use Disorder (M)	Extreme Temperature (N)	Tornado, Windstorm (N)	Winter Storm (N)	Nuclear Incidents (M)	Hazardous Materials Release (M)	Wildfire (N)	Invasive Species (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Dam Failure (M)	Earthquake (N)	Gas and Liquid Pipelines	Radon Exposure (N)	Cyber-Terrorism (M)
West Sadsbury Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Vincent Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
West Whiteland Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Westtown Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Willistown Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

6.4. Mitigation Action Plan

Mitigation actions have been carried over from the 2021 Plan and have been newly developed for the County and participating jurisdictions. While some actions are more general in nature and could apply to more than one jurisdiction, other actions are specific to individual projects or jurisdictions. Mitigation actions were developed based on issues identified in the risk assessment, gaps identified in the mitigation capability analysis, input from HMSC, and feedback from the HMPT.

During the Regional Municipal Workshops held on February 24, March 10 and 13, 2025, mitigation techniques and actions were discussed. After the meetings, municipalities were provided with their respective Mitigation Action Progress Form, which listed mitigation actions for their municipality from the 2021 HMP for review and update as described in Section 6.1. Actions that have been deferred or ongoing have been carried over to the 2026 Action Plan and are again proposed for implementation.

In addition, each participating jurisdiction was given New Mitigation Action Forms to provide any new actions or projects to be included in the plan update. New Mitigation Action Forms were also posted to the project website and set out via email. Meeting participants who were not affiliated with a municipality, organization or agency that had any actions identified in the 2021 plan were provided with New Mitigation Action Forms to include new actions in the 2026 Plan if they wished.

The final list of 452 mitigation actions is described in Table 6.4-1 below. This table provides an overview of the strategy that will be used to implement each of the proposed mitigation actions. For each action listed in the table, the associated strategy identifies the agency or job title that will be responsible for initiating the work and potential sources of funding for the work. Each strategy also indicates a timeframe for when the action will happen. At least one mitigation action was established for each hazard in Chester County. More than one action is identified for several hazards. Every participating jurisdiction has at least one mitigation action for each high-risk hazard they identified for their community (see Table 6.3-2).

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
1	Adopt the latest published editions of relevant consensus-based codes and standards, such as the International Building Code (IBC), International Residential Code (IRC), and International Existing Building Code (IEBC).	All Municipalities	1,2,6	Local Plans and Regulations	Earthquake; Hurricane, Tropical Storm, Nor'Easter; Radon Exposure; Tornado, Windstorm; Winter Storm; Urban Fire and Explosion	Municipal Planning and Zoning Departments	Long	Staff Time
2	Coordinate with county and state officials on invasive species of concern, including the development of messaging and outreach materials for how residents can mitigate risks on their property. Materials should be created in all languages relevant to the community.	All Municipalities	3,4	Education and Awareness	Invasive Species	Municipal EMAs	Short	Staff Time
3	Coordinate with county, state and federal agencies to stay up-to-date on training and exercise opportunities and coordinating potential mitigation actions for terrorist activities.	All Municipalities	1,5,6	Education and Awareness	Terrorism	DES, Municipal EMAs	Short	Staff Time
4	Develop and maintain a stockpile of PPE for distribution during	All Municipalities	1,5	Local Plans and Regulations	Pandemic and Infectious Disease	Municipal EMAs	Long	General Funds

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	pandemic or infectious disease events.							
5	Develop and maintain adequate road clearing capabilities.	All Municipalities	1,2	Structure and Infrastructure	Winter Storm	Municipal Public Works Departments	Long	Public Works Budgets, Staff Time
6	Develop/maintain a hazard risk management webpage on the municipal website where information and mapping can be posted, including property-level mitigation measures that homeowners and other residents can take. Materials will be posted in all languages relevant to the community.	All Municipalities	2,4,5,6	Education and Awareness	All Hazards	Municipalities	Short	Staff Time
7	Identify or develop cyber security awareness training and require all municipal staff to complete yearly. Develop certificate and tracking database to ensure all employees are up to date on trainings.	All Municipalities	4,6	Education and Awareness	Cyber-Terrorism	Municipal EMAs	Short	Staff Time
8	Improve coordination to reduce risk from hazardous material incidents and conduct information sessions and trainings to educate and prepare local officials and first responders.	All Municipalities	1,2,5	Education and Awareness	Environmental Hazards - Hazardous Materials	DES, Municipal EMAs	Short	Staff Time

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
9	Include messaging about water monitoring and conservation in water bills. For example: Regularly checking for leaks to minimize water supply losses or installing low-flow water saving showerheads and toilets. Messaging should be provided in all languages relevant to the community.	All Municipalities	4	Education and Awareness	Drought	Municipal EMAs	Short	Staff Time
10	Install traffic calming measures along roads and intersections that have higher incident risk.	All Municipalities	1,2	Structure and Infrastructure	Transportation Incidents	Municipal Public Works Departments	Long	Public Works Budgets, PennDOT
11	Organize outreach to vulnerable populations to inform them of resources available during power outages and periods of extreme wetaher, including establishing and promoting accessible heating or cooling centers in the community.	All Municipalities	1,2,4,5	Structure and Infrastructure	Extreme Temperatures; Winter Storm; Utility Interruption	Municipal EMAs	Long	FEMA HMGP, Non-Disaster funds; Operating Budget
12	Stormwater Infrastructure Upgrades: Upgrade drainage, add retention basins, and implement green infrastructure.	Atglen Borough	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Atglen Borough	Long	FEMA Non-Disaster Funding, HMGP; PA DCED FMP, H2O PA; Capital Improvement Budget; Operating

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Budget; Chester County DCD (CDBG, CRP)
13	The municipal FPA will work with the Atglen Borough Sewer Plant facility owner/operator to protect the facility to at least the 0.2% chance flood level.	Atglen Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
14	Work with the property owner to determine what flood protection measures can be taken to protect the structure to the 0.2% annual chance flood level.	Atglen Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
15	The municipal FPA will work with the Avondale Sewer Authority facility owner/operator to protect the facility to at least the 0.2% chance flood level.	Avondale Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
16	Build an access road to Masters Way to Webb Rd.	Birmingham Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Birmingham Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
17	Work with PennDOT to reengineer intersection at Street Road (PA 926) bridge over Brandywine Creek.	Birmingham Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Birmingham Township	Long	PennDOT, Municipal Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
18	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Brinton's Mill, Lenape Bridge, and Painter, Joseph, Farm.	Birmingham Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams, Dam Failure	FPA	Short	Operating Budget
19	Acquire/Elevate the building located on 135 Seltzer Road.	Caln Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
20	Caln Township has major businesses that are vulnerable to dam failure and will work with management to protect the buildings.	Caln Township	1,2,4	Structure and Infrastructure	Dam Failure	EMC	Short	Operating Budget
21	Protect the Caln Radio Tower to the 0.2% annual chance flood level and from a potential dam failure.	Caln Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams, Dam Failure	FPA	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
22	Stormwater assessments and maintenance program, several stormwater system repairs.	Caln Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Caln Township	Long	FEMA Non-Disaster Funding, HMGP; PA DCED FMP, H2O PA; Capital

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Improvement Budget; Operating Budget; Chester County DCD (CDBG, CRP)
23	Work with Downingtown Middle School to determine specific vulnerability to dam failure and determine appropriate mitigation measures.	Caln Township	1,2,4	Structure and Infrastructure	Dam Failure	EMC	Short	Operating Budget
24	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Pennsylvania Railroad Bridge (No.205), Pickering Dam.	Charlestown Township	1,2,4	Structure and Infrastructure	Dam Failure	EMC	Short	FEMA HMGP, PDM, FMA; PA DCED FMP; Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
25	Upgrade or repair stormwater infrastructure in areas of concern for flooding.	Charlestown Township, East Caln Township, East Goshen Township, East Nantmeal Township, East Nottingham Township, Highland Township, Honey Brook Borough, New London Township, Upper Oxford Township, Uwchlan Township, West Caln Township, West Grove Borough	2	Education and Awareness	Environmental Hazards - Hazardous Materials	DES, Municipal EMAs	Short	FEMA Non-Disaster Funding, HMGP; PA DCED FMP, H2O PA; Capital Improvement Budget; Operating Budget; Chester County DCD (CDBG, CRP)
26	As opportunities arise, elevate, or acquire properties within flood-prone areas. In addition, wet and dry proof commercial structures if they cannot be elevated or acquired.	Chester County	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams	Municipalities	Short	FEMA HMGP
27	Create a website to assist landowners and municipalities to navigate FEMA resources.	Chester County	4	Education and Awareness	All Hazards	DES	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
28	Develop a countywide Debris Management Plan.	Chester County	2,6	Local Plans and Regulations	Tornado and Windstorms	DES	Short	Operating Budget
29	Develop a plan to stagger traffic and implement delays/early releases for schools, government, and private sector during a disaster.	Chester County	2	Local Plans and Regulations	Transportation Accidents	DES	Long	Operating Budget
30	Develop an outreach and awareness program and provide to municipalities, where residents and potential homeowners could access to identify any risks they might have to address.	Chester County	2, 4	Education and Awareness	All Hazards	DES	Short	Operating Budget
31	Educate county residents on the NFIP following flood events.	Chester County	2, 4	Education and Awareness	Flood, Flash Flood, and Ice Jams	DES	Ongoing	Staff Time
32	Educate the public about resources available to combat the opioid abuse/addiction.	Chester County	1,4	Education and Awareness	Opioid Addiction Response	Health Department	Short	Operating Budget
33	Educate the public on all the hazards they face.	Chester County	2, 4	Education and Awareness	All Hazards	DES	Short	Staff Time, Operating Budget
34	Encourage municipal Code Enforcement Officials to become trained in Floodplain Management and NFIP Programs.	Chester County	2, 4	Education and Awareness	Flood, Flash Flood, and Ice Jam	Municipal FPA	Short	Operating Budget
35	Encourage municipalities to adopt an ordinance outlining the process	Chester County	2, 4,6	Local Plans and Regulations	Winter Storms	Municipalities	Short	Staff Time

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	to implement a snow emergency declaration.							
36	Encourage municipalities to require radon testing at the time sale of homes.	Chester County	2, 4	Local Plans and Regulations	Radon Exposure	DES	Short	Staff Time, Operating Budget
37	Encourage new development planning to include burying of utility cables.	Chester County	2,4,6	Structure and Infrastructure	Utility Interruption	Municipalities	Ongoing	Staff Time, Operating Budget
38	Encourage upgrades and improvements to stormwater runoff capabilities when reconstructing roads.	Chester County	2,6	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams	DES	Ongoing	Operating Budget
39	Enhance the household hazard waste program to reduce post-event hazardous debris.	Chester County	2	Education and Awareness	Environmental Hazards Hazardous Material Releases, Tornado and Windstorms	DES	Short	Operating Budget
40	Ensure that the municipal EMAs have COOP/COG plans.	Chester County	1,6	Local Plans and Regulations	All Hazards	DES	Short	SEPA RTF Funding
41	Identify snow emergency routes in all municipalities to increase clearing efforts and travel ability of residents.	Chester County	2,4,5	Local Plans and Regulations	Winter Storms	DES	Ongoing	Staff Time, Operating Budget, FEMA HMGP

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
42	Improve storm drains throughout the county to handle snow melt.	Chester County	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams, Winter Storms	DES	Long	FEMA Non-Disaster Funding, HMGP; PA DCED FMP, H2O PA; Capital Improvement Budget; Operating Budget; Chester County DCD (CDBG, CRP)
43	Improve telecommunications infrastructure, including accessibility of high-speed Internet connectivity, throughout the county.	Chester County	1	Structure and Infrastructure	Pandemic and Infectious Disease; Utility Interruption	CCPC	Long	PA DCED; Operating Budget
44	Increase cell coverage and telecommunications bandwidth in areas with poor coverage.	Chester County	4	Structure and Infrastructure	Utility Interruption	DES	Short	FEMA HMGP, Non-Disaster Funding, PA DCED, Operating Budget
45	Install back-up power sources for traffic signals (generator, battery, solar).	Chester County	2	Structure and Infrastructure	Transportation Accidents	DES, Municipalities, PennDOT	Short	Agency Budgets, FEMA HMGP
46	Install roadway gates to close off flood-prone intersections/ roads during flood incidents and	Chester County	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams	DES, Municipalities	Short	Operating Budget, FEMA HMGP

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	signage to warn motorists of the closed road.							
47	Investigate the interaction of public agencies and camera data from private companies/citizens.	Chester County	1,2	Education and Awareness	Terrorist Attacks	Sheriff's Office, DA's Office, DES	Long	Operating Budget
48	Maintain a GIS layer of the location of all permitted dams within the County, categorized by priority concern. Utilize dam location layer, inundation data, building footprints, and tax parcel information to develop potential evacuation measures in the event of a breach or failure.	Chester County	7	Local Plans and Regulations	Dam Failure	Chester County DES	Long	Staff Time
49	Obtain and compile updated Department of Environmental Protection inundation data and Emergency Action Plan vulnerability data as it becomes available to inform plan update.	Chester County	7	Local Plans and Regulations	Dam Failure	Chester County DES	Long	Staff Time
50	Plant bushes/other vegetation to stop drifting snow in known problem areas.	Chester County	2, 4	Structure and Infrastructure	Winter Storms	Municipalities	Short	Capital Funding
51	Provide education to the municipalities on flood gauges.	Chester County	2,3	Education and Awareness	Flood, Flash Flood, and Ice Jam	DES	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
52	Provide education to the municipalities on resident evacuation processes and need.	Chester County	4,5	Education and Awareness	All Hazards	DES	Short	Staff Time, Operating Budget
53	Provide public education on traffic accident reduction.	Chester County	2,4	Education and Awareness	Transportation Accidents	DES, Planning Department	Ongoing	Staff Time, County Budget
54	Provide public information on debris management.	Chester County	1,4	Education and Awareness	Tornado and Windstorms	DES, Health Department, Planning Department	Short	Operating Budget
55	Purchase backup generators for critical infrastructure/ key resources.	Chester County	2	Structure and Infrastructure	Utility Interruption	DES	Short	Agency Budgets, FEMA HMGP
56	Pursue local mitigation efforts to improve areas that are vulnerable to flooding including both repetitive and non-repetitive loss structures within floodplains.	Chester County	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams	Municipalities	Ongoing	FEMA HMGP, FMA, Non-Disaster Funding, CDBG
57	Retrofit critical public facilities with safe rooms.	Chester County	1,2	Structure and Infrastructure	Tornado and Windstorms	DES	Long	FEMA HMGP, Operating Budget
58	Study traffic control boxes that would be exposed to riverine or stormwater flooding to determine if they are able to withstand the water.	Chester County	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Transportation Accident	DES, Planning Department	Long	FEMA HMGP, Operating Budget
59	Sustain tree management programs around power lines.	Chester County	2,6	Structure and Infrastructure	Utility Interruption	Municipalities, private sector	Ongoing	Staff Time, Agency Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
60	The county and all municipalities will work with their major businesses to ensure they have continuity plans in place.	Chester County	2	Local Plans and Regulations	Environmental Hazard Hazardous Material Releases, Environmental Hazard Gas and Liquid Pipelines	DES	Short	Operating Budget
61	The county and all municipalities with a dam will work with dam operators to ensure they are protected to the 0.2% annual chance flood level.	Chester County	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	DPW	Long	Operating Budget
62	The county and municipalities will work with the higher education facility operators to discuss the hazards they face and ensure their emergency plans address those hazards.	Chester County	1	Local Plans and Regulations	Environmental Hazard Hazardous Material Releases, Environmental Hazard Gas and Liquid Pipelines, Nuclear Incident	County DES	Short	Operating Budget
63	The county and municipalities will work with the intermediate care facility operators to discuss the hazards they face and ensure their emergency plans address those hazards.	Chester County	1	Local Plans and Regulations	Environmental Hazard Hazardous Material Releases, Environmental Hazard Gas and	County DES	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
					Liquid Pipelines			
64	The county and municipalities will work with the long-term care facility operators to discuss the hazards they face and ensure their emergency plans address those hazards.	Chester County	1	Local Plans and Regulations	Dam Failure, Environmental Hazard Hazardous Releases, Environmental Hazard Gas and Liquid Pipelines, Nuclear Incident	County DES	Short	Operating Budget
65	The county and municipalities will work with the senior living facility operators to discuss the hazards they face and ensure their emergency plans address those hazards.	Chester County	1	Local Plans and Regulations	Environmental Hazard Hazardous Material Releases, Environmental Hazard Gas and Liquid Pipelines, Nuclear Incident	County DES	Short	Operating Budget
66	The county will assess their bridges to determine what measures can be taken to protect them to the 0.2% annual chance flood level.	Chester County	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams, Dam Failure	DES	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
67	The county will work with all municipalities that have a child care facility exposed to any of the hazards to work with the child care facility operators to discuss hazards they face and ensure their emergency plans address those hazards.	Chester County	1	Local Plans and Regulations	Dam Failure, Environmental Hazards- Hazmat Release, Environmental Hazards- Pipeline, Flood, Flash Flood, and Ice Jams, Nuclear Incident	County DES	Short	Operating Budget
68	When provided by FEMA, evaluate and apply FEMA non-regulatory electronic floodplain mapping and mitigation tools, where appropriate.	Chester County	2,3,4	Local Plans and Regulations	Flood, Flash Flood, and Ice Jams	DES, CCWRA	Short	Operating Budget
69	Work with district courts to ensure they have plans in place for off-site hazmat releases that can affect the courts.	Chester County	2	Local Plans and Regulations	Environmental Hazard Hazardous Material Releases	DES	Short	Operating Budget, Act 165 funds
70	Work with hazmat facilities to inform them of the hazards they face and ensure emergency plans are current.	Chester County	1,2	Local Plans and Regulations	Environmental Hazard Hazardous Material Releases	DES	Short	Operating Budget, Act 165 funds

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
71	Work with hospitals to ensure they have plans in place for off-site hazmat releases that can affect hospitals.	Chester County	2	Local Plans and Regulations	Environmental Hazard Hazardous Material Releases	DES	Short	Operating Budget, Act 165 funds
72	Work with schools and school districts to inform them of the hazards they face and ensure emergency plans are current.	Chester County	1	Local Plans and Regulations	Environmental Hazard Hazardous Material Releases, Environmental Hazard Gas and Liquid Pipelines	County DES	Short	Operating Budget, Act 165 funds
73	Work with the municipalities to develop a map of the stormwater system, including intakes and outflows.	Chester County	2,4	Local Plans and Regulations	Flood, Flash Flood, and Ice Jams	CCWRA, Planning Department, DES, Municipalities	Short	Operating Budget
74	Work with the railroad industry to address safety concerns and aging rail infrastructure.	Chester County	1,6	Structure and Infrastructure	Transportation Accidents	DES, Planning Department	Short	Operating Budget, PHMSA

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
75	Work with the USPS on options for protecting the post offices from flooding and possible inundation from dam failure.	Chester County	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams, Dam Failure	DPW	Short	Operating Budget, Act 165 funds
76	Work with Verizon to protect the facilities from flood or dam failure.	Chester County	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams, Dam Failure	DES	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
77	Coordinate with PEMA and power plants on updated public information materials and a public information campaign to inform people in the 10-mile EPZ about evacuation plans and people in the 50-mile EPZ about their risks and preparations they can make. Make sure to provide materials in all languages relevant to the community.	Chester County, All Municipalities	4,5	Education and Awareness	Substance Use Disorder	DES, Municipal EMAs	Short	Staff Time
78	Encourage municipalities and operators of critical facilities to reduce their vulnerability to wildfires by: increasing buffers and introducing defensible spaces; identifying farm roads, service roads, and other private access corridors in high hazard areas that could be used as fire breaks; and providing assistance to the County	Chester County, All Municipalities	1,2	Education and Awareness	Wildfire	DES, Municipal EMAs	Medium	Staff Time

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	Emergency Management to identify vulnerable structures. Ensure outreach is completed to critical facilities that serve socially vulnerable populations such as elder care facilities and retirement homes, schools, youth and adult correctional facilities, hospitals, mental health treatment facilities, shelters, and youth and adult daycare facilities.							
79	Work with local fire departments to conduct fire prevention seminars for schools and other critical facilities. Topics may include the proper use of fire extinguishers, fire evacuation procedures, common fire code violations, and specific concerns for cageteria personnel.	Chester County, All Municipalities	1,4	Education and Awareness	Wildfire; Urban Fire and Explosion	DES, Municipal EMAs	Short	Staff Time
80	Work with Pennsylvania Department of Health to increase awareness about treating and preventing substance use disorde, including using county and municipal websites to share resources.	Chester County, All Municipalities	1,4,6	Education and Awareness	Substance Use Disorder	Chester County DOH, Municipal EMCs	Short	Staff Time
81	Build partnerships with dam owners. For dams with poor condition assessments, work with	Chester County, Atglen Borough, Avondale	1,2,4	Structure and Infrastructure	Dam Failure	Chester County DES	Long	Staff Time

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	dam owners to identify and prioritize the repairs needed to bring the dams into compliance with dam safety standards.	Borough, Birmingham Township, Caln Township, Charlestown Township, Coatesville City, Downingtown Borough, East Bradford Township, East Brandywine Township, East Caln Township, East Coventry Township, East Fallowfield Township, East Goshen Township, East Marlborough Township, East Nantmeal Township, East Nottingham Township, East Pikeland Township, Easttown Township, East						

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
		Vincent Township, East Whiteland Township, Highland Township, Honey Brook Township, Kennett Township, London Britain Township, Londonderry Township, London Grove Township, Lower Oxford Township, Malvern Borough, Modena Borough, New Garden Township, Newlin Township, North Coventry Township, Parkesburg Borough, Penn Township, Pennsbury Township, Phoenixville Borough,							

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
		Pocopson Township, Schuylkill Township, South Coatesville Borough, South Coventry Township, Spring City Borough, Thornbury Township, Tredyffrin Township, Upper Oxford Township, Upper Uwchlan Township, Uwchlan Township, Valley Township, Wallace Township, Warwick Township, West Bradford Township, West Caln Township, West Fallowfield Township, West Goshen Township, West							

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
		Marlborough Township, West Nantmeal Township, West Nottingham Township, West Pikeland Township, West Vincent Township, West Whiteland Township, Westtown Township, Willistown Township						
82	Once structures in dam hazard areas are identified, support mitigation projects that will result in the projection of public and private property from floods of specific magnitudes. Eligible projects include but are not limited to: 1) acquisition of hazard-prone structures 2) Elevation of flood-prone structures. 3) Minor structural flood control projects 4) Relocation of structures from hazard-prone areas 5) Retrofitting of existing buildings, facilities, and infrastructure.	Chester County, Downingtown Borough, East Brandywine Township, East Goshen Township, East Marlborough Township, East Nantmeal Township, Easttown Township, Honey Brook Township, Lower Oxford	7	Structure and Infrastructure	Dam Failure	Municipal EMAs	Long	FEMA HHPD, PA DCED PDFAP

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
		Township, New Garden Township, Schuylkill Township, Tredyffrin Township, Upper Uwchlan Township, Uwchlan Township, Wallace Township, West Caln Township, West Caln Township, West Goshen Township, West Nottingham Township						
83	Once dam hazard areas are identified, consider updating land use ordinances and the implications of recognizing dam inundation areas as sensitive areas in zoning ordinances.	Chester County, Downingtown Borough, East Brandywine Township, East Goshen Township, East Marlborough Township, East Nantmeal	7	Local Plans and Regulations	Dam Failure	Municipal Planning and Zoning Departments	Medium	Staff Time

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
		Township, Easttown Township, Honey Brook Township, Lower Oxford Township, New Garden Township, Schuylkill Township, Tredyffrin Township, Upper Uwchlan Township, Uwchlan Township, Wallace Township, West Caln Township, West Caln Township, West Goshen Township, West Nottingham Township						
84	Participate in the development and continued update of Emergency Action Plans.	Chester County, Downingtown Borough, East Brandywine Township, East	7	Structure and Infrastructure	Dam Failure	Chester County DES	Long	Staff Time

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
		Goshen Township, East Marlborough Township, East Nantmeal Township, Easttown Township, Honey Brook Township, Lower Oxford Township, New Garden Township, Schuylkill Township, Tredyffrin Township, Upper Uwchlan Township, Uwchlan Township, Wallace Township, West Caln Township, West Caln Township, West Goshen Township, West Nottingham Township						

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
85	Provide HHPD notice of funding opportunity and supporting documentation from the County HMP to EMCs, municipalities, and dam owners to promote rehabilitation and safety in Chester County.	Chester County, Downingtown Borough, East Brandywine Township, East Goshen Township, East Marlborough Township, East Nantmeal Township, Easttown Township, Honey Brook Township, Lower Oxford Township, New Garden Township, Schuylkill Township, Tredyffrin Township, Upper Uwchlan Township, Uwchlan Township, Wallace Township, West Caln Township, West Caln	7	Structure and Infrastructure	Dam Failure	Chester County DES	Long	Staff Time

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
		Township, West Goshen Township, West Nottingham Township						
86	63 S. 5th Ave. Property Protection - protect the existing grocery store on the corner of Olive St. and S 5th Ave.	Coatesville City	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams	City of Coatesville Public Works Department	Short	FEMA Non-Disaster Funding, HMGP
87	Amtrak Keystone Corridor Underpass Flooding – evaluate and improve drainage and eroding areas along the corridor.	Coatesville City	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams	City of Coatesville Public Works Department	Long	FEMA Non-Disaster Funding, HMGP; PA DCED FMP, Water and Sewers Program, H2O PA; Capital Improvement Budget; Operating Budget; Chester County DCD (CDBG, CRP)
88	Ash Park Stormwater Improvements - improve infiltration and mitigate	Coatesville City	2,3	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams	City of Coatesville Public Works Department	Long	FEMA Non-Disaster Funding, HMGP; PA

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	floodwaters that pose a threat for travelers during/after storm events.							DCED FMP, Water and Sewers Program, H2O PA; Capital Improvement Budget; Operating Budget; Chester County DCD (CDBG, CRP)

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
89	Create a Capital Improvements Plan.	Coatesville City	2,4,6	Local Plans and Regulations	Flood, Flash Flood, and Ice Jams	City of Coatesville Public Works Department	Short	Operating Budget, Chester County Vision Partnership Program; PADCED Municipal Assistance Program

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
90	Downtown Stormwater Improvements - upgrade Coatesville's existing stormwater infrastructure in the downtown business district.	Coatesville City	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams	City of Coatesville Public Works Department	Long	FEMA Non-Disaster Funding, HMGP; PA DCED Water and Sewers Program, H2O PA; Capital Improvement Budget; Operating Budget; Chester County DCD (CDBG, CRP)
91	Emergency Alert System - the City of Coatesville will implement an emergency alert system that will inform residents in the event of an emergency in an effort to improve public safety.	Coatesville City	4,5	Education and Awareness	All Hazards	City of Coatesville Office of Emergency Management	Short	Capital Improvement Budget; Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
92	Gibbons Run Culvert Flooding and Structural Stability – evaluate the culverts and repair, rehabilitate, or replace them as necessary.	Coatesville City	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	City of Coatesville Public Works Department	Long	FEMA Non-Disaster Funding, HMGP; PA DCED FMP, H2O PA; Capital Improvement Budget; Operating Budget; Chester County DCD (CDBG, CRP)
93	Install gates to be closed during flood incidents and signage at 11th Avenue and railroad underpass.	Coatesville City	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Coatesville City	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
94	Millview Basin - restore proper stormwater detention basin function with added water quality improvements.	Coatesville City	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams	City of Coatesville Public Works Department	Short	FEMA Non-Disaster Funding, HMGP; PA DCED FMP, H2O PA, WRPP; Capital

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Improvement Budget; Operating Budget; Chester County DCD (CDBG, CRP)
95	Pre-Plan Emergency Access Routes.	Coatesville City	1,2,4,5	Local Plans and Regulations	Dam Failure; Earthquake; Environmental Hazards; Flood, Flash Flood, and Ice Jams; Hurricane, Tropical Storm; Nuclear Incidents; Terrorism	City of Coatesville Public Works Department	Short	Operating Budget
96	Protect ArcelorMital Emergency Services to the 0.2% annual chance flood level.	Coatesville City	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams, Dam Failure	FPA	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
97	Provide backup power at the City's traffic signals, including developing a plan for implementation and refueling.	Coatesville City	1,2,4	Local Plans and Regulations; Structure and Infrastructure	Dam Failure; Earthquake; Environmental Hazards; Flood, Flash Flood, and Ice Jams; Hurricane,	City of Coatesville Public Works Department	Short	Capital Improvement Budget; Operating Budget; PADOT ARLE; PADOT Green Light Go;

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
					Tropical Storm; Nuclear Incidents; Terrorism; Transportation Accident; Utility Interruption; Winter Storms			PADCED Municipal Assistance Program
98	Public Information Programs - develop education packages, classes, meetings, programs, etc. with the goal of improving public knowledge of potential hazards are dealt with within the City.	Coatesville City	4	Education and Awareness	All hazards	City of Coatesville Office of Emergency Management	Short	Operating Budget
99	Route 82 Slope Stability - ensure the stability of the slopes along the eastern side of Route 82 in order to maintain unimpeded direct access into and out of the City.	Coatesville City	1,2,4	Structure and Infrastructure	Dam Failure; Earthquake; Environmental Hazards; Flood, Flash Flood, and Ice Jams; Hurricane, Tropical Storm; Nuclear Incidents; Terrorism; Transportation Accident; Utility Interruption; Winter Storms	City of Coatesville Public Works Department	Short	PennDOT; FEMA Non-Disaster Funding, HMGP; Capital Improvement Budget; Operating Budget; Chester County DCD (CDBG, CRP).

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
100	S. 5th Avenue Stormwater Improvements.	Coatesville City	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams	City of Coatesville Public Works Department	Long	FEMA Non-Disaster Funding, HMGP; PA DCED FMP, H2O PA; Capital Improvement Budget; Operating Budget; Chester County DCD (CDBG, CRP)
101	The municipal FPA will work with the Martin- Brower facility owner/operator to protect the facility to the 0.2% annual chance flood level and dam failure.	Coatesville City	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams, Dam Failure	FPA	Short	Operating Budget
102	Upgrade City Hall Command Center - these upgrades include upgrades to the existing generator to allow for increased functionality of City Hall, the Police Station and the Emergency Command Center during a power outage and upgrades to the communication utilities to permit full functionality during an emergency.	Coatesville City	2	Structure and Infrastructure	Tornado, Windstorm; Utility Interruption; Winter Storm	City Office of Emergency Management	Short	FEMA Non-Disaster Funding, HMGP; Capital Improvement Budget; Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
103	West End Fire Station Generator - obtain a backup generator in order ensure that emergency operations are maintained during a power outage.	Coatesville City	2	Structure and Infrastructure	Tornado, Windstorm; Utility Interruption; Winter Storm	City of Coatesville Office of Emergency Management	Short	FEMA HMGP, Non-Disaster Funding; Capital Improvement Budget; Operating Budget
104	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: High Bridge, Huston, Abram, House & Carriage House, Lukens Main Office Building.	Coatesville City	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams, Dam Failure	FPA	Short	Operating Budget
105	Install emergency alerting systems.	Coatesville City, East Coventry Township, East Marlborough Township, London Grove Township, Londonderry Township, New Garden Township, Willistown Township	4,5	Education and Awareness; Structure and Infrastructure	All Hazards	Municipalities	Short	FEMA Non-Disaster Funding, HMGP; Operating Budget; Chester County DCD (CDBG, CRP)

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
106	Determine the specific vulnerability of the Downingtown Borough Building to dam failure and determine appropriate mitigation measures.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
107	Downingtown Borough has major businesses that are vulnerable to dam failure and will work with management to protect the buildings.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC	Short	Operating Budget
108	Protect Alert FC Fire Station from dam failure.	Downingtown Borough	1,2,4,5	Structure and Infrastructure	Dam Failure	EMC	Short	Operating Budget
109	Protect Downingtown - Jefferson Ave Electrical Substation to the 0.2% annual chance flood level and from the vulnerability to dam failure.	Downingtown Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams, Dam Failure	EMC	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
110	Protect Downingtown Boro PD from potential dam failure.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC	Short	Operating Budget
111	Protect Minquas Ambulance Fire Station from dam failure and determine appropriate mitigation measures.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC	Short	Operating Budget
112	Protect Minquas FC from potential dam failure.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC	Short	Operating Budget
113	Protect the Downingtown Municipal Waste from dam failure.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC	Short	Operating Budget
114	The municipal FPA will work with AT&T Mobility Downingtown - USID53712 facility owner/operator to protect the facility from its vulnerability to dam failure.	Downingtown Borough	1,2,4	Education and Awareness	Dam Failure	EMC	Short	Operating Budget
115	The Municipal FPA will work with the Downingtown Municipal Water Authority owner/operator to the 0.2% annual chance flood level	Downingtown Borough	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jams, Dam Failure	FPA, EMC	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	and from vulnerability to dam failure.							
116	The municipal FPA will work with the Inland Flexo, LLC facility owner/operator to protect the facility from its vulnerability to dam failure.	Downingtown Borough	1,2,4	Education and Awareness	Dam Failure	FPA, EMC	Short	Operating Budget
117	The municipal FPA will work with the Johnson Matthey AGT facility owner/operator to protect the facility from vulnerability to dam failure.	Downingtown Borough	1,2,4	Education and Awareness	Dam Failure	FPA, EMC	Short	Operating Budget
118	The municipal FPA will work with the Verizon Downingtown CO owner/operator to protect the facility from vulnerability to dam failure.	Downingtown Borough	1,2,4	Education and Awareness	Dam Failure	FPA, EMC	Short	Operating Budget
119	The municipal FPA will work with the Victory Brewing Company, LLC owner/operator to protect the facility from vulnerability to dam failure.	Downingtown Borough	1,2,4	Education and Awareness	Dam Failure	FPA, EMC	Short	Operating Budget
120	Work with Beaver Creek Elementary School to determine specific vulnerability to dam failure and determine appropriate mitigation measures.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
121	Work with Downingtown High School West to determine specific vulnerability to dam failure and	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	determine appropriate mitigation actions.							
122	Work with East Ward Elementary School to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
123	Work with Lori Petrie's Pre School to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
124	Work with Regina Luminis Academy to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
125	Work with SEPTA and Amtrak to protect the station from dam failure.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
126	Work with St. Joseph School to determine specific vulnerability to dam failure and determine appropriate mitigation measures.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
127	Work with STEM Academy to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
128	Work with Step by Step Children's House to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	Downingtown Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
129	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect the, to the 0.2% annual chance flood level and vulnerability to dam failure: Downingtown Log House, Hunt, Roger, and Mill Complex.	Downingtown Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jams, Dam Failure	EMC, FPA	Short	Operating Budget
130	Work with the United States Marine Recruiting Office to protect the structure from the vulnerabilities of dam failure.	Downingtown Borough	1,2,4	Local Plans and Regulations	Dam Failure	EMC, FPA	Short	Operating Budget
131	Acquisition/elevation of structure at 414 Cottage Lane.	East Bradford Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
132	Acquisition/elevation of structure located at 402 Cottage Lane.	East Bradford Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
133	Acquisition/elevation of structure located at 406 Cottage Lane.	East Bradford Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
134	Acquisition/elevation of structure located at 418 Cottage Lane.	East Bradford Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
135	Acquisition/Elevation of structure located at 502 River Bed Lane.	East Bradford Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
136	Acquisition/Elevation of structure located at 530 River Bend Lane.	East Bradford Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
137	Acquisition/Elevation of structure located at 550 River Bend Lane.	East Bradford Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
138	Acquisition/Elevation of structure located at 558 River Bend Lane.	East Bradford Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
139	Install battery back-up and/or generator hookup on traffic signal on South Bradford Avenue and West Nields Street.	East Bradford Township	2	Structure and Infrastructure	Utility Interruption	Department of Public Works	Short	Operating budget
140	Install gates to be closed during flood incidents and signage on Allerton Road between North Creek Road and Lucky Hill Road.	East Bradford Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	East Bradford Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
141	Install gates to be closed during flood incidents and signage on North Creek Road between Jefferis Bridge Road and Hillsdale Road.	East Bradford Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	East Bradford Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
142	Install gates to be closed during flood incidents and signage on South Creek Road between Cottage Lane and Withers Way.	East Bradford Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	East Bradford Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
143	Install gates to be closed during flood incidents and signage on Valley Creek Road between Harmony Hill Road and Ravine Road.	East Bradford Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	East Bradford Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
144	Property protection of structure located at 1010 Valley Creek Road.	East Bradford Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
145	Protect East Bradford Electrical Substation from vulnerability to dam failure.	East Bradford Township	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
146	Protect Good Fellowship Ambulance (Sub-Station) from the vulnerabilities from dam failure.	East Bradford Township	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
147	The municipal FPA to work with the PECO Bradford Substation facility owner/operator to protect the facility from vulnerabilities to dam failure.	East Bradford Township	1,2,4	Education and Awareness	Dam Failure	EMC, FPA	Short	Operating Budget
148	Beaver Creek Dam Rehabilitation Project.	East Brandywine Township	1,2,4	Structure and Infrastructure	Dam Failure	CC WRA	Short	USDA Natural Resources Conservation Service and Chester County Commissioners
149	Complete McQueen structure removal process.	East Brandywine Township	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	East Branydwine Township	Ongoing	State Gaming Fund, Chester County C2P2

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
150	Complete Old Horsehoe Pike Culvert Replacement.	East Brandywine Township	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	East Branydwine Township	Ongoing	FEMA Non-Disaster Funding, HMGP, FMA, Capital Budget
151	Remediate and repair Bondsville Mill South Bridge.	East Brandywine Township	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Transportation Incidents	East Branydwine Township	Ongoing	FEMA Non-Disaster Funding, HMGP, FMA Capital Budget
152	Determine the specific vulnerability to dam failure and determine appropriate mitigation measures for the Downingtown Sewer Authority.	East Caln Township	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
153	The municipal FPA to work with the D.R.W.P.C.C facility owner/operator to protect the facility from vulnerabilities to flooding.	East Caln Township	1,2,4	Education and Awareness	Dam Failure	FPA, EMC	Short	Operating Budget
154	Acquisition/elevation of structure located at 285 Linfield Road.	East Coventry Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
155	Project East Coventry - Linfield Road Electrical Substation from the vulnerabilities of dam failure.	East Coventry Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP,

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Operating Budget
156	The municipal FPA to work with Taylor Industries Inc facility owner/operator to protect the facility to at least the 0.2% chance flood level and from the vulnerabilities to dam failure.	East Coventry Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
157	Work with the property owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	East Coventry Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
158	Improve drainage to reduce flooding along Mortonville Road including intersection of Mortonville Road and Sawmill Road.	East Fallowfield Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	East Fallowfield Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
159	Improve drainage to reduce flooding on Timacula Road.	East Fallowfield Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	East Fallowfield Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
160	Protect East Fallowfield - Spring Dell Road Electrical Substation to	East Fallowfield Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice	EMC, FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA;

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	the 0.2% annual chance flood event.				Jam; Utility Interruption			PA DCED FMP, Operating Budget
161	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Strasburg Rd Bridge, Speakman No.2, and the Gorden Farm.	East Fallowfield Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	EMA	Short	Operating Budget
162	Work with the Goodwin Acres owner to determine what protection measures can be taken to protect them from vulnerabilities to dam failure.	East Goshen Township	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
163	Address French Creek flooding that impacts access and use of Rapps Dam Road, Hares Hill Road, Mary Snowden Bridge, and local trail system.	East Pikeland Township	2	Structure and Infrastructure; Natural Systems Protection	Flood, Flash Flood, Ice Jam	East Pikeland Township	Long	FEMA Non-Disaster Funding, HMGP, FMA
164	Address stormwater pipe erosion and sinkhole issues along 450 linear foot section of Spring Hollow Road.	East Pikeland Township	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Transportation Incident	East Pikeland Township	Ongoing	FEMA Non-Disaster Funding, HMGP, FMA
165	Conduct power assessment for critical infrastructure/key resources to determine emergency generator needs and coordinate	East Pikeland Township	2	Structure and Infrastructure	Utility Interruption	Department of Public Works	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	information with the Army Corps of Engineers.							
166	Develop tree maintenance program that identifies and addresses potential problem trees on public property.	East Pikeland Township	2	Structure and Infrastructure	Tornado, Windstorm; Winter Storms; Utility Interruption	East Pikeland Township	Medium	Operating Budget
167	Install new bridge on Pickering Road that crosses Piegon Run Creek to restore emergency service access.	East Pikeland Township	2,5	Structure and Infrastructure	All Hazards	East Pikeland Township	Long	FEMA Non-Disaster Funding, HMGP, FMA
168	Monitor and manage reservoirs and stream flows to sustain water sources needed to meet public water supply needs.	East Pikeland Township	1,2	Structure and Infrastructure	Drought	East Pikeland Township	Short	Operating Funds
169	Plant bushes/other vegetation to stop drifting snow in known problem areas.	East Pikeland Township	2	Structure and Infrastructure	Winter Storms	Department of Public Works	Short	General Fund
170	Purchase temporary mobile camera to set up for events and use to monitor safety and security.	East Pikeland Township	5	Structure and Infrastructure	Terrorism	East Pikeland Township	Short	General Fund
171	Repair and potentially expand stormwater basin along Seven Starts Road.	East Pikeland Township	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	East Pikeland Township	Medium	FEMA Non-Disaster Funding, HMGP, FMA
172	Repair section of Pickering Road impacted by flooding and strembank erosion, install rip-rap	East Pikeland Township	2,3	Structure and Infrastructure; Natural	Flood, Flash Flood, Ice Jam;	East Pikeland Township	Long	FEMA Non-Disaster

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	along Pickering Road to stablize streambank.			Systems Protection	Transportation Incident			Funding, HMGP, FMA
173	Replace Camp Council Road Bridge and culvert.	East Pikeland Township	2,5	Structure and Infrastructure	All Hazards	East Pikeland Township	Long	FEMA Non-Disaster Funding, HMGP, FMA
174	Retrofit critical public facilities with safe rooms.	East Pikeland Township	2	Structure and Infrastructure	Tornado, Windstorm; Terrorism	East Pikeland Township	Long	FEMA HMGP, Non-Disaster funds; Operating Budget
175	The municipal FPA to work with the Cromby Generating Station facility owner/operator to protect the facility to at least the 0.2% chance flood level and from vulnerabilities to dam failure.	East Pikeland Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
176	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and vulnerabilities to dam failure: Bernard Property, Hare's Hill Road Bridge, Hartman, Peter, Residence, Kimberton Historic District, and Rapp's Covered Bridge.	East Pikeland Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
177	Work with the railroad industry to address safety concerns and aging rail infrastructure.	East Pikeland Township	1	Structure and Infrastructure	Transportation Incident; Environmental Hazards - Hazardous Materials	East Pikeland Township	Long	FEMA HMGP, Non-Disaster funds; Operating Budget
178	Protect the Shady Lane Water Treatment Plant from dam failure.	East Vincent Township	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
179	The municipal FPA to work with the Columbia Gas Transmission/Birdsboro Heater facility owner/operator to protect the facility to at least the 0.2% chance flood level and from the vulnerabilities of potential dam failure.	East Vincent Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
180	The municipal FPA to work with the Oehlert Bros., Inc facility owner/operator to protect the facility to at least the 0.2% chance flood level.	East Vincent Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
181	The municipal FPA to work with the Shady Lane Plant-Royersford facility owner/operator to protect the facility from the vulnerabilities of dam failure.	East Vincent Township	1,2,4	Education and Awareness	Dam Failure	EMC, FPA	Short	Operating Budget
182	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect	East Vincent Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Kennedy Covered Bridge and Parker's Ford.							
183	Complete streambank restoration projects at Valley Creek Park, the Township Building, and Ecology Park.	East Whiteland Township	2,3	Natural Systems Protection	Flood, Flash Flood, Ice Jam	East Whiteland Township	Medium	PA DCED, FEMA Non-Disaster Funding, HMGP, FMA
184	Install a generator at the Meadowview pump station.	East Whiteland Township	2	Structure and Infrastructure	Utility Interruption	East Whiteland Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
185	Install a generator at the pump station on Flat Road.	East Whiteland Township	2	Structure and Infrastructure	Utility Interruption	East Whiteland Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
186	Install gates to be closed during flood incidents and signage at Church Road.	East Whiteland Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	East Whiteland Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
187	Install gates to be closed during flood incidents and signage at Old Morehall Road.	East Whiteland Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	East Whiteland Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
188	Install generator at Frazer Mennonite Church, which serves as a comfort care center.	East Whiteland Township	2,5	Structure and Infrastructure	Utility Interruption	East Pikeland Township	Medium	
189	Repair sinkholes impacting road usage.	East Whiteland Township	2	Structure and Infrastructure	Transportation Incident	East Whiteland Township	Short	
190	Work with management of major businesses to protect the buildings to the 0.2% annual chance flood level.	East Whiteland Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
191	Work with the Spring Mill Complex owner to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood event.	East Whiteland Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
192	Construct new stormwater management systems to address uncontrolled water runoff creating flooding of Darby Creek and its tributaries at Darby Creek Watershed.	Easttown Township	2,3	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA
193	Work with Sugartown Road Bridge owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	Easttown Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
194	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect	Elk Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	them to the 0.2% annual chance flood level: Glen Hope Covered Bridge, Rudolph & Arthur Covered Bridge, and Stephens, Linton Covered Bridge.							
195	Address flooding along Conestoga Road & South Brick Lane.	Elverson Borough	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Elverson Borough	Long	FEMA Non-Disaster Funding, HMGP, FMA
196	Implement updated pipeline annex in Borough Emergency Operations Plan.	Elverson Borough	2,6	Local Plans and Regulations	Emvironmental Hazards - Gas and Liquid Pipelines	Elverson Borough	Medium	Operating Budget
197	Update threat assessment and implement security recommendations for Twin Valley Elementary Center.	Elverson Borough	2,5,6	Local Plans and Regulations	Terrorism	Elverson Borough	Medium	Operating Budget, School District Funding, PEMA
198	Complete improvements to Walker Road Bridge to address flooding.	Franklin Townhip	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Franklin Townhip	Long	
199	Complete road improvements to address flooding along North Clay Creek Road.	Franklin Townhip	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Franklin Townhip	Long	
200	Improve drainage on North Clay Creek and Churchill Road.	Franklin Townhip	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Franklin Townhip	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
201	Work with PennDOT to improve US-322 corridors to mitigate traffic accidents.	Honey Brook Borough	2	Structure and Infrastructure	Transportation Incidents	Honey Brook Borough	Long	PennDOT, Operating Budget
202	The municipal FPA to work with the Honey Brook Borough Authority facility owner/operator to protect the facility to at least the 0.2% chance flood level.	Honey Brook Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	FPA, EMC	Short	Operating Budget
203	Advise residents to help keep storm drains clear of debris during storms through borough communication channels as appropriate (including Ready ChesCo).	Kennett Square Borough	4	Education and Awareness	Flood, Flash Flood, Ice Jam	Kennett Square Borough	Short	Operating Budget
204	Develop "master list" of infrastructure projects to address flooding to share with borough grant consultant so they can monitor funding opportunities to implement projects. Present list to borough Infrastructure Committee.	Kennett Square Borough	2,6	Local Plans and Regulations	Flood, Flash Flood, Ice Jam	Kennett Square Borough	Long	Operating Budget
205	Improve drainage on D Street to address flooding.	Kennett Square Borough	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Kennett Square Borough	Long	Flood Mitigation Program (Commonwealth Financing Authority), Flood Mitigation Program (PA or Federal Emergency

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Management Agency), PA Small Water and Sewer Program (Commonwealth Financing Authority), Watershed Restoration and Protection Program (Commonwealth Financing Authority), FEMA non-disaster funding
206	Improve drainage on E. South Street between S. Walnut and Broad Street.	Kennett Square Borough	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Kennett Square Borough	Long	Flood Mitigation Program (Commonwealth Financing Authority), Flood Mitigation Program (PA or Federal Emergency Management Agency), PA Small Water and Sewer

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Program (Commonwealth Financing Authority), Watershed Restoration and Protection Program (Commonwealth Financing Authority), FEMA non-disaster funding
207	Improve drainage on South Street at Lafayette and Grant Way.	Kennett Square Borough	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Square Borough	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
208	Improve drainage on W. South Street between Lafayette Street and Grant Way.	Kennett Square Borough	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Kennett Square Borough	Long	Flood Mitigation Program (Commonwealth Financing Authority), Flood Mitigation Program (PA or Federal Emergency Management Agency),

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								PA Small Water and Sewer Program (Commonwealth Financing Authority), Watershed Restoration and Protection Program (Commonwealth Financing Authority), FEMA non-disaster funding
209	Improve drainage on Walnut Street between Birch and E. South Streets.	Kennett Square Borough	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Kennett Square Borough	Long	Flood Mitigation Program (Commonwealth Financing Authority), Flood Mitigation Program (PA or Federal Emergency Management Agency), PA Small Water and Sewer Program (Commonwealth

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Financing Authority), Watershed Restoration and Protection Program (Commonwealth Financing Authority), FEMA non-disaster funding
210	Improve or install drainage systems along Cypress Street to Cedar Street.	Kennett Square Borough	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Kennett Square Borough	Long	Flood Mitigation Program (Commonwealth Financing Authority), Flood Mitigation Program (PA or Federal Emergency Management Agency), PA Small Water and Sewer Program (Commonwealth Financing Authority), Watershed Restoration and

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Protection Program (Commonwealth Financing Authority), FEMA non-disaster funding
211	Improve/install drainage systems to handle rain to reduce localized flooding from Cypress St to Cedar St, west of Union St.	Kennett Square Borough	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Square Borough	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
212	The municipal FPA will work with Comcast Cable- Kennell Square Hubsite owner/operator to protect the facility to the 0.2% annual chance flood level.	Kennett Square Borough	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	FPA, EMC	Short	Operating Budget
213	Acquisition/elevation of structure located at 611 Creek Road.	Kennett Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
214	Acquisition/elevation of structure located at 903 Creek Road.	Kennett Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
215	Acquisition/elevation of structure located at 909 Creek Road.	Kennett Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
216	Assess and determine the best action to prevent East Hillendale Rd from flooding.	Kennett Township	1,5	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Township	Mediu m	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
217	Assess and determine the best action to prevent flooding of Kaolin Rd from stream.	Kennett Township	1,5	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Township	Mediu m	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
218	Assess and determine the best action to prevent flooding of Marshall Bridge a Route 82 South.	Kennett Township	1,5	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Township	Mediu m	FEMA HMGP, Non-Disaster Funding, FMA;

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								PA DCED FMP, Operating Budget
219	Assess and determine the best action to prevent flooding of the West Hillendale stream from Chandler Mill to Scarlet.	Kennett Township	1,5	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Township	Mediu m	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
220	Assess and determine the best action to prevent further erosion of Bucktoe Road stream banks and prevent flooding of the road.	Kennett Township	1,5	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
221	Assess and determine the best action to prevent Rosedale Road stream from overflowing onto the road.	Kennett Township	1,5	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Township	Mediu m	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
222	Assess and determine the best action to prevent the stream on Center Mill Road from overflowing.	Kennett Township	1,5	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Township	Mediu m	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
223	Install gates to be closed during flood incidents and signaled at flood intersections within the township.	Kennett Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
224	Install warning signs to be utilized during flood incidents at flood-prone bridges within the township.	Kennett Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
225	The municipal FPA to work with the AT&T SBA Kennett Square facility owner/operator to protect the facility to at least the 0.2% chance flood level	Kennett Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	EMC, FPA	Short	Operating Budget
226	The municipal FPA to work with the Kennett Square Borough Sewage Treatment Plant facility owner/operator to protect the facility to at least the 0.2% chance flood level.	Kennett Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	FPA, EMC	Short	Operating Budget
227	Work with county to improve drainage on Bayard Road.	Kennett Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Township	Short	Operating Budget
228	Work with the county to improve drainage on Pemberton Road Bridge from Mill Road to Cedar Springs to prevent flooding.	Kennett Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Township	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
229	Work with the county to improve drainage on South Street from Scarlet to Chandler Mill.	Kennett Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Kennett Township	Short	Operating Budget
230	Install a snow fence during snow season to prevent snow drifting on South Bank Rd.	London Britain Township	2	Structure and Infrastructure	Winter Storms	London Britain Township	Short	General Fund
231	Install a snow fence during snow season to prevent snow drifting on Strickersville Rd.	London Britain Township	2	Structure and Infrastructure	Winter Storms	London Britain Township	Short	General Fund
232	Install gates to be closed during flood incidents and signage at Flint Hill Rd & Mercer Mill Rd.	London Britain Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	London Britain Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
233	Install gates to be closed during flood incidents and signage at Good Hope & London Tract Rd/Broad Run Rd.	London Britain Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	London Britain Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
234	Install gates to be closed during flood incidents and signage at London Tract Rd & New Peltier Rd.	London Britain Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	London Britain Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
235	Install gates to be closed during flood incidents and signage at Mercer Mill Rd and N. Creek Rd.	London Britain Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	London Britain Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
236	Install gates to be closed during flood incidents and signage at Yeatmans Station Rd.	London Britain Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	London Britain Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
237	Install alerting system/public notification system to profiteering/notification of potentially dangerous and damaging weather. Area is populated with outdoor activities and large population.	London Grove Township	4,5	Structure and Infrastructure	All Hazards	EMC	Short	FEMA Non-Disaster Funding, HMGP; Operating Budget; Chester County DCD (CDBG, CRP)
238	Install gates and signage within flood-prone areas to reduce the risk of motorist and other traveling public from becoming entrapped in the flood waters.	London Grove Township	2,3	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	London Grove Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
239	Protect West Grove Sewage Treatment Plant to the 0.2% annual chance flood level.	London Grove Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA, EMC	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget, Sewer Grant; Sewer Fees
240	Reconfigure stream channel at Sullivan Rd & Clay Creek Rd.	London Grove Township	3	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	London Grove DPW	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP;

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Operating Budget
241	Reconstruct stream and roadway elevations to reduce the ability of flooding during rain and flash flood events.	London Grove Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Department of Public Works	Long	FEMA HMGP, Non-Disaster funds; Operating Budget
242	Supply electrical connections for a portable generator at each of the wastewater facilities. Providing alternative power during power outages utilizing a portable until as opposed to three permanent generators providing additional costs savings.	London Grove Township	2	Structure and Infrastructure	Utility Interruption	Department of Public Works	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
243	The municipal FPA to work with the West Grove Wastewater Treatment facility owner/operator to protect the facility to at least the 0.2% chance flood level.	London Grove Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	FPA, EMC	Short	Operating Budget
244	To remove an existing failed culvert and replace it with a new structure to span the base flood elevation. Portions or all of structure removal and replacement could be completed utilizing Municipal Public Works Resources.	London Grove Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Department of Public Works	Short	FEMA HMGP, Non-Disaster funds; Operating Budget

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#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
245	To remove an existing narrow culvert and replace with a structure to span the base flood elevations. Portions or all the structure removal and replacements could be completed utilizing Municipal Public Works.	London Grove Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Department of Public Works	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
246	Widen bridge and bridge approaches at Indian Run Rd.	London Grove Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Department of Public Works	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
247	Improve and enhance culverts on Jackson Rd and Faggs Manor Rd.	Londonderry Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Londonderry Township	Short	State funding
248	Improve plans and communication in case of emergency.	Londonderry Township	1,4,5	Local Plans and Regulations	Environmental Hazards - Gas and Liquid Pipelines	ESNG	Short	ESNG
249	Increase the height of the bridge at Whitehorse Rd near Creek Rd.	Londonderry Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Londonderry Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
250	Install a generator in the Township Building.	Londonderry Township	2	Structure and Infrastructure	Utility Interruption	Londonderry Township	Short	FEMA HMGP, Non-Disaster Funding;

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Operating Budget
251	Obtain approximately 1 mile of snow fencing or install natural landscapes to stop snow drifting along White Horse Rd by Power Station.	Londonderry Township	2	Structure and Infrastructure	Winter Storms	Department of Public Works	Short	General Fund
252	Purchase 2-way radios to assist in communication during emergency events in the township.	Londonderry Township	2	Structure and Infrastructure	All Hazards	Londonderry Township	Short	CCPC; SEPA RTF
253	Purchase and install a backup generator at the Municipal Building.	Londonderry Township	2	Structure and Infrastructure	Utility Interruption	Londonderry Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
254	Work with PennDOT to clear the brush in roadway lines of sight at Rt 796 and Rt 41.	Londonderry Township	2	Structure and Infrastructure	Transportation Incidents	Londonderry Township	Short	Operating Budget; PA DEP
255	Work with PennDOT to construct a roundabout at the intersection of PA Route 41 and PA route 926.	Londonderry Township	1,2	Structure and Infrastructure	Transportation Incidents	Londonderry Township	Short	PennDOT, Londonderry Township
256	Work with PennDOT to reconstruct the intersection to allow for better water drainage and strength the road at Fernwood Rd and Jackson Rd.	Londonderry Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Londonderry Township	Long	PennDOT, Operating Budget
257	Work with the property owners of the following facilities to	Lower Oxford Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice	EMC, FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Octoraro Water Company and Pine Grove Covered Bridge.				Jam, Dam Failure			
258	Elevation/Acquisition of structure located at 135 Powelton Ave.	Malvern Borough	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
259	Elevation/Acquisition of structure located at 145 Powelton Ave.	Malvern Borough	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
260	Elevation/Acquisition of structures 10 through 142 W First Ave.	Malvern Borough	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
261	Elevation/Acquisition of structures 193 through 323 Paoli Pike.	Malvern Borough	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
262	Elevation/Acquisition of structures 2 through 10 Remington Ln.	Malvern Borough	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
263	Elevation/Acquisition of structures 217 through 545 S. Warren Ave.	Malvern Borough	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
264	Increase culvert size at 313 S Warren Ave.	Malvern Borough	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Malvern Borough	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
265	Work with management of Malvern Preparatory School to protect the buildings to the 0.2% annual chance flood level.	Malvern Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
266	Determine the specific vulnerability of the Modena Borough Building to dam failure and determine appropriate mitigation measures.	Modena Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
267	Protect Modena Ambulance EMS Station from vulnerabilities to dam failure.	Modena Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
268	Protect Modena FC Fire Station from a potential dam failure.	Modena Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
269	The Municipal FPA will work with the Mahoney- Modena owner/operator to protect the facility to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	Modena Borough	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
270	The Municipal FPA will work with the Sealed Air Corporation owner/operator to protect the facility to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	Modena Borough	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
271	Work with the Mode Paper Mill owner to determine what flood protection measures can be taken	Modena Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	to protect it from the vulnerabilities of dam failure.							
272	Construct larger culvert at Cedar Springs Rd at Pemberton Rd.	New Garden Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	New Garden Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
273	Construct larger culvert at Egypt Run Road.	New Garden Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	New Garden Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
274	Purchase portable generator for traffic signal at Chambers Rd and Baltimore Pike.	New Garden Township	2	Structure and Infrastructure	Transportation Incident; Utility Interruption	Department of Public Works	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
275	Purchase portable generator for traffic signal at Newark Rd and Baltimore Pike.	New Garden Township	2	Structure and Infrastructure	Transportation Incident; Utility Interruption	Department of Public Works	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
276	Purchase portable generator for traffic signal at Newark Rd and Rt 41.	New Garden Township	2	Structure and Infrastructure	Transportation Incident; Utility Interruption	Department of Public Works	Short	FEMA HMGP, Non-Disaster Funding; Operating

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Budget, PennDOT
277	Purchase portable generator for traffic signal at Penn Green Rd and Rt 41.	New Garden Township	2	Structure and Infrastructure	Transportation Incident; Utility Interruption	Department of Public Works	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget, PennDOT
278	Purchase portable generator for traffic signal at Scarlett Rd and Baltimore Pike.	New Garden Township	2	Structure and Infrastructure	Transportation Incident; Utility Interruption	Department of Public Works	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget, PennDOT
279	Purchase portable generator for traffic signal at Southwood Rd and Rt 7.	New Garden Township	2	Structure and Infrastructure	Transportation Incident; Utility Interruption	Department of Public Works	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget, PennDOT
280	Work with To-jo Mushrooms Inc. management to protect the building to the 0.2% annual chance flood level.	New Garden Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	EMC, FPA	Short	Operating Budget
281	Determine the specific vulnerability of the Newlin Township Building to dam failure and determine appropriate mitigation measures.	Newlin Township	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
282	Fix and pave road that has been destroyed on Laurel Road including three driveways.	Newlin Township	2	Structure and Infrastructure	Transportation Incidents	DES	Long	Operating Budget
283	Protect the Embreeville Sewage Treatment from dam failure and protect it to the 0.2% annual chance flood event and from vulnerabilities to dam failure.	Newlin Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam; Dam Failure	EMC, FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget, Sewer Grant; Sewer Fees
284	Replant Ash Trees that were lost to the Ash Borer and determine the best actions to prevent invasive species in the future.	Newlin Township	2,3	Natural Systems Protection	Invasive Species	Newlin Township	Short	Operating budget
285	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Embreeville Historic District, House at Upper Laurel Iron Works, Marlborough Village Historic District, Spruce Groce School House, Worker's House at Lower Laurel Iron Works.	Newlin Township	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
286	Protect the North Coventry Municipal Authority from dam failure and to the 0.2% annual chance flood level.	North Coventry Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP,

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Operating Budget
287	The municipal FPA to work with the North Coventry Municipal Authority facility owner/operator to protect the facility to at least the 0.2% chance flood level and from the vulnerabilities to dam failure.	North Coventry Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
288	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Schuylkill Navigation Company Canal and historic structure located on SR 7046.	North Coventry Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
289	Construct and gain permit for Well #14 in the Sycamore Crossing development, including the construction of a new raw waterline to the treatment plant.	Oxford Borough	2	Structure and Infrastructure	Drought; Utility Interruption	Oxford Borough	Medium	PA DCED, PENNVEST, Oxford Borough
290	Develop and execute a street trees planting program within the public right of way to increase tree canopy coverage, reduce temperatures and improve urban environment.	Oxford Borough	2,3	Structure and Infrastructure	Extreme Temperatures; Flood, Flash Flood, Ice Jam	Oxford Borough	Long	Operating and Capital Budget, GRANTS
291	Expand Borough water treatment plant to increase capacity, improve	Oxford Borough	2	Structure and Infrastructure	Drought; Flood, Flash Flood, Ice Jam; Terrorism;	Oxford Borough	Medium	PA DCED, PENNVEST, Oxford Borough

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	filtration capabilities, and enhance property security.				Utility Interruption			
292	Improve/upgrade water system interconnect with Chester Water Authority to ensure efficient and safe operations and improve reliability.	Oxford Borough	2	Structure and Infrastructure	Drought; Utility Interruption	Oxford Borough	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
293	Rain gardens to be installed in recently created bump- outs on Broad Street at intersection with 8th Street.	Oxford Borough	3	Natural Systems Protection	Flood, Flash Flood, and Ice Jam	Oxford Borough	Short	Operating Budget; Chester County DCD (CDBG, CRP)
294	Reconstruct ~700 linear feet of grey stormwater infrastructure along Broad Street to Whitehall Way, incoprating green infrastructure where possible.	Oxford Borough	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Oxford Borough	Short	FEMA Non-Disaster Funding, HMGP; PA DCED Water and Sewers Program, H2O PA; Capital Improvement Budget; Operating Budget; Chester County DCD (CDBG, CRP)

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
295	The municipal FPA will work with the Hayes Heating and Cooling Bulk owner/operator to protect the facility to the 0.2% annual chance flood level.	Parkesburg Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	EMC, FPA	Short	Operating Budget
296	Work with power company to protect Parkesburg - N Church St Electrical Substation to the 0.2% annual chance flood level.	Parkesburg Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
297	Enhance stormwater management regulations.	Penn Township	1,2	Local Plans and Regulations	Flood, Flash Flood, and Ice Jam	FPA	Short	Staff Time
298	Work with power company to protect Penn - Neward Road Electrical Substation to the 0.2% annual chance flood level.	Penn Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
299	Install warning signals at unguarded railroad crossing at US Rt 1 at the railroad tracks by Fairville Rd.	Pennsbury Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Pennsbury Township	Short	PennDOT, Operating Budget
300	Install warning signals for times when road is closed due to flooding on US Rt 1 in the area of the Brandywine creek.	Pennsbury Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Pennsbury Township	Short	PennDOT, Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
301	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Bissel/Hill Girt/Beverly Rural Historic District and Delaware Boundary Makers.	Pennsbury Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
302	Improve drainage at the intersection of Bridge and Church St.	Phoenixville Borough	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Borough	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
303	Protect the District Court 15-2-01 to the 0.2% annual chance flood level.	Phoenixville Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
304	Protect the Phoenixville Boro PD to the 0.2% annual chance flood level.	Phoenixville Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
305	Protect the Phoenixville Water Treatment to the 0.2% annual	Phoenixville Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice	EMC, FPA	Short	FEMA HMGP, Non-Disaster

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	chance flood event and from dam failure.				Jam, Dam Failure			Funding, FMA; PA DCED FMP, Operating Budget
306	The municipal FPA to work with the Phoenixville Water Plant facility owner/operator to protect the facility to at least the 0.2% chance flood level and from the vulnerabilities to dam failure.	Phoenixville Borough	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
307	Work with the management of major businesses to protect the buildings from dam failure and to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	Phoenixville Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
308	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Black Rock Bridge, Lobok, John, Property, Mansion House, and Phoenixville Canal Spur.	Phoenixville Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
309	Assess and determine the best action to prevent flooding around Brandywine Creek on Northbrook Road, one lane historical bridge.	Pocospon Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Pocospon Township	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
310	Create a Capital Improvement Plan (CIP) for the Township to forecast the needed funds for flood mitigation projects.	Pocospon Township	1,2,6	Local Plans and Regulations	Flood, Flash Flood, Ice Jam	Pocospon Township	Short	Operating Budget
311	Increase floodplain restoration/management and flood mitigation controls across the township.	Pocospon Township	1,2	Local Plans and Regulations, Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Pocospon Township	Long	Operating and Capital Budget, PA DCED, PENNVEST, FEMA HMA
312	Provide ongoing Public Education to Township residents regarding disasters/emergency management. Public education for flood prevention and mitigation.	Pocospon Township	4	Education and Awareness	Flood, Flash Flood, Ice Jam	Pocospon Township	Ongoing	Operating Budget, GRANTS
313	Stabilize existing roadway in danger of collapse from damage due to frequent flooding of Brandywine Creek, with retaining wall and guide rail system. This will improve traffic safety for local residents, allow for better access by EMS vehicles, and mitigate the damage from future flooding.	Pocospon Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam; Transportation Incidents	Pocospon Township	Short	PennDOT, CCPC, FEMA Non-Disaster Funding
314	The municipal FPA to work with the Lenape Forged Products Corp facility owner/operator to protect the facility from the vulnerabilities of dam failure.	Pocospon Township	1,2,4	Education and Awareness	Dam Failure	FPA, EMC	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
315	Work with power company to protect the Pocopson - Lenape Unionville Road Electrical Substation to the 0.2% annual chance flood level.	Pocospon Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
316	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Pocopson Station, State Route 3027, and Wilkinson House.	Pocospon Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam; Dam Failure	EMC, FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
317	Assess and determine the best action to improve drainage and reduce flooding on Greenbelt Drive.	Sadsbury Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Sadsbury Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
318	Install gates to be closed during flood incidents and signage on sections of Old Mill Road.	Sadsbury Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Sadsbury Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
319	Remove rock obstruction causing stream flow and flooding issues along Old Mill Road, north of Route 30.	Sadsbury Township	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Sadsbury Township	Short	Capital, Storm Water Funds, ARPA funding, DCNR grants, FEMA/PEMA

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								FMA and HMGP, Non-Disaster Funding, Waterway and Watershed Grants, Operating Budget, LSA
320	Replace bridge over Buck Run along Octara Road & Old Mill Road.	Sadsbury Township	2,5	Structure and Infrastructure	All Hazards	Sadsbury Township	Long	Operating and Capital Budget, PA DCED, PENNVEST, FEMA HMA
321	Acquisition/Elevation of the structure located at 493 State Creek Road.	Schuylkill Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
322	Construct Larger Culvert at East Phillip Drive.	Schuylkill Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Schuylkill Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
323	Construct larger culvert at S Whitehorse Road.	Schuylkill Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Schuylkill Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
324	Determine specific vulnerability to dam failure and determine appropriate mitigation measures for the Valley Forge Sewage Treatment Plant.	Schuylkill Township	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
325	Plant bushes/other vegetation to stop drifting snow in known problem areas.	Schuylkill Township	2	Structure and Infrastructure	Winter Storms	Department of Public Works	Short	General Fund
326	Protect Structure with Barrier at Creek Road Bridge.	Schuylkill Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Schuylkill Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
327	Retrofit critical public facilities with safe rooms.	Schuylkill Township	2	Structure and Infrastructure	Tornado, Windstorm; Terrorism	Schuylkill Township	Long	FEMA HMGP, Non-Disaster funds; Operating Budget
328	The municipal FPA to work with the Aqua Pickering Water Treatment facility owner/operator	Schuylkill Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	to protect the facility to at least the 0.2% chance flood level.							
329	The municipal FPA to work with the Valley Forge Sewer Authority facility owner/operator to protect the facility to at least the 0.2% chance flood level.	Schuylkill Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
330	Work with power company to protect Schuylkill - Valley Forge Road to the 0.2% annual chance flood level.	Schuylkill Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
331	Work with YMCA management to protect the building to the 0.2% annual chance flood level.	Schuylkill Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
332	Investigate stormwater management options and identify mitigati Coatesville Boroughon or structural projects to reduce vulnerability to stormwater flooding incidents throughout South.	South Coatesville Borough	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	South Coatesville Borough	Long	FEMA HMGP, Non-Disaster Funding; Operating Budget
333	Protect the Coatesville Sewer Authority from dam failure and to the 0.2% annual chance flood level.	South Coatesville Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget, Sewer

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Grant; Sewer Fees
334	The municipal FPA will work with the Scrap Metal Services owner/operator to protect the facility to the 0.2% annual chance level.	South Coatesville Borough	1,2,4	Education and Awareness	Dam Failure	EMC, FPA	Short	Operating Budget
335	Construct larger culvert at Bealor Road.	South Coventry Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	South Coventry Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
336	Determine the best action to prevent downhill flooding on Coventryville Rd & Harmonyville Road, close to North Cov. Border.	South Coventry Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	South Coventry Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
337	Install flood water collection boxes and piping on Schoolhouse Road and Porter's Mill Road.	South Coventry Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	South Coventry Township	Short	Capital, Storm Water Funds, ARPA funding, DCNR grants, FEMA/PEMA FMA and HMGP, Non-Disaster Funding, Waterway and

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Watershed Grants, Operating Budget, LSA
338	Purchase and install a backup generator for the Woodridge Sewer Plant at 190 Ridgeview Drive.	South Coventry Township	2	Structure and Infrastructure	Utility Interruption	Department of Public Works	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
339	Work with power company to protect South Coventry - Porters Mill Road Electrical Substation to the 0.2% annual chance flood level.	South Coventry Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
340	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Coventryville Historic District and Coventryville Historic District (1975)- HAD.	South Coventry Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
341	Protect the Spring City Sewer Plan from the vulnerably to dam failure and to the 0.2% annual chance flood level.	Spring City Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget, Sewer

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Grant; Sewer Fees
342	The municipal FPA will work with the Hydromotion owner/operator to protect the facility from the vulnerabilities of dam failure.	Spring City Borough	1,2,4	Education and Awareness	Dam Failure	FPA, EMC		Operating Budget
343	Work with management of major businesses to protect the buildings from the vulnerably to dam failure and to the 0.2% annual chance flood level.	Spring City Borough	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
344	Work with the Textile Mill owner to determine what flood protection measures can be taken to protect the facility from the vulnerabilities from dam failure.	Spring City Borough	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget
345	Install gates to be closed during flood incidents and signage at Rt 926 and Creek Road.	Thornbury Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	PennDOT	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
346	Install gates to be closed during flood incidents and signage at Rt 926 and S. Westtown Rd.	Thornbury Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	PennDOT	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
347	Install gates to be closed during flood incidents and signage at Rt 926 and Westtown-Thornton Rd.	Thornbury Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	PennDOT	Short	FEMA HMGP, Non-Disaster Funding;

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Operating Budget
348	Install gates to be closed during flood incidents and signage at Westtown- Thornton Rd south of Railroad Bridge.	Thornbury Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	PennDOT	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
349	Install gates to be closed during flood incidents and signage at Westtown-Thornton Rd north of Railroad Bridge.	Thornbury Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	PennDOT	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
350	Work with PennDOT to conduct an assessment of flood-prone areas along roadway Rt 926 from Rt 202 to Cheyney Rd.	Thornbury Township	1,2,5	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	PennDOT	Short	PennDOT, Municipal Budget
351	Work with power company to protect Thornbury - Westtown Road Electrical Substation to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	Thornbury Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
352	Clogged inverts throughout the township causing flooding.	Tredyffrin Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Tredyffrin Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
353	Improve drainage to reduce flooding on Hadwick Road and Upper Weedly Road.	Tredyffrin Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Tredyffrin Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
354	Improve drainage to reduce flooding on Wills Lane, Woodcrest Drive, and Saunders Drive.	Tredyffrin Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Tredyffrin Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
355	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Cedar Hollow Industrial Track: Bridge, County Bridge No. 171, Great Valley Mill, Jerman, Thomas, Property, and historic structure on SR 7015.	Tredyffrin Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
356	Acquisition/elevation of the structure located at 2 Kiloran Wynd.	Upper Uwchlan Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
357	Acquisition/elevation of the structure located at 80 Saint Andrews Ln.	Upper Uwchlan Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
358	Protect Larkins Bridge with barrier.	Upper Uwchlan Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	EMC	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
359	Protect structure with barrier on Dorothy Lane.	Upper Uwchlan Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	EMC	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
360	Protect structure with barrier on Font Road.	Upper Uwchlan Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	EMC	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
361	Protect structure with barrier on Lyndell Road.	Upper Uwchlan Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	EMC	Short	FEMA HMGP, Non-Disaster Funding, FMA;

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								PA DCED FMP; Capital Improvement Budget
362	Protect structure with barrier on Moore Road and Turnstone Way.	Upper Uwchlan Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	EMC	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
363	Protect structure with barrier on St Andrews Lane.	Upper Uwchlan Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	EMC	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
364	Raise Fellowship Road roadway at Red Bone Road.	Upper Uwchlan Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Upper Uwchlan Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
365	Stormwater culvert and basin re-sizing on Krauser Rd.	Upper Uwchlan Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Upper Uwchlan Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Improvement Budget
366	Assess and determine the best action to protect Wagontown Road near the West Branch of the Brandywine Creek, and implement the action..	Valley Township	1, 2,5	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam; Hurricane and Tropical Storm; Utility Interruption	EMC	Short	Capital Improvement Program; CDBG; Non-Disaster Funding
367	Assess drainage into Sucker Run near South Park Avenue and PA-372 to identify the best action to prevent flooding during heavy rainfall events, and implement the action.	Valley Township	2, 3,5	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Capital Improvement Program; CDBG; Non-Disaster Funding
368	Complete stormwater improvements and upgrades to address issues identified in 2009 study.	Valley Township	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Transportation Incidents	Valley Township	Long	Capital, Storm Water Funds, ARPA funding, DCNR grants, FEMA/PEMA FMA and HMGP, Non-Disaster Funding, Waterway and Watershed Grants, Operating Budget, LSA

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
369	Develop and deploy a dam failure alert system to automatically notify the affected area.	Valley Township	1,2,4,5	Education and Awareness	Dam Failure; Flood, Flash Flood, Ice Jam	Valley Township	Long	FEMA Non-Disaster Funding, HMGP; Operating Budget; Chester County DCD (CDBG, CRP)
370	Develop plan to address stormwater issues identified in 2009 study.	Valley Township	2,6	Local Plans and Regulations	Flood, Flash Flood, Ice Jam; Transportation Incidents	Valley Township	Medium	Capital, Storm Water Funds, ARPA funding, DCNR grants, FEMA/PEMA FMA and HMGP, Non-Disaster Funding, Waterway and Watershed Grants, Operating Budget, LSA
371	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from vulnerabilities to dam failure: County Bridge No. 101 and Scott Farm Property.	Valley Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	FPA, EMC	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
372	Protect Glenmoore FC Fire Station from a potential dam failure.	Wallace Township	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
373	The municipal FPA to work with the Verizon Glenmoore ESS Bldg. facility owner/operator to protect the facility from the vulnerabilities to dam failure.	Wallace Township	1,2,4	Education and Awareness	Dam Failure	FPA	Short	Operating Budget
374	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Glenmoore Historic District and Steels Bridge.	Wallace Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
375	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Hockley Mill Farm, Knauer Patent Thematic District, North Warwick Historic & Archaeological District (HDA),	Warwick Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	North Warwick HDA, and historic structure located on SR 7015.							
376	Acquire and install back-up generator at Wastewater Treatment Plant.	West Bradford Township	2	Structure and Infrastructure	Utility Interruption	Department of Public Works	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
377	Improve drainage on Broad Run Road between Beacon Hill.	West Bradford Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	West Bradford Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
378	Install 4 gates to be closed during flood incidents and signage at Downingtown Pike between Harmony Hill Rd and Skelp Level Rd.	West Bradford Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	West Bradford Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
379	Protect the Broad Run Sewage Treatment Plant from dam failure and to the 0.2% annual chance flood level.	West Bradford Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget, Sewer Grant; Sewer Fees
380	Work with the management of Ram-t Construction Specialist to protect the buildings from dam failure.	West Bradford Township	1,2,4	Structure and Infrastructure	Dam Failure	EMC, FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
381	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to flooding: Derbydown Homestead, Northbrook Historic District, Pennsylvania Railroad: Morrisville Lien: Viaduct.	West Bradford Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	Operating Budget
382	Work with the Grow, James, House property owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	West Brandywine Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	EMC, FPA	Short	Operating Budget
383	Provide a generator-capable facility, likely Wagontown Fire Department, as a safe space for residents experiencing decreasing home temperatures as a result of a prolonged power outage. Develop emergency food source and sleeping capabilities.	West Caln Township	1,2,4,5	Local Plans and Regulations	Extreme Temperatures; Winter Storm; Utility Interruption	West Caln Township	Short	General Fund
384	Eliminate hyrdaulic bottnecks that are causing flooding along Goose Creek.	West Chester Borough	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	West Chester Borough	Medium	Operating Budget; Chester County DCD (CDBG, CRP)

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
385	The municipal FPA to work with the National Foam facility owner/operator to protect the facility to at least the 0.2% chance flood level.	West Chester Borough	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
386	Work with the Ross Fording Road Bridge property owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	West Fallowfield Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
387	Improve culvert at 103 Oak Lane.	West Goshen Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	West Goshen Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
388	Install 3 gates to be closed during flood incidents and signage at East Chestnut and Montgomery.	West Goshen Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	West Goshen Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
389	The municipal FPA to work with the A. Duie Plye Bolmar Street Warehouse facility owner/operator to protect the facility to at least the 0.2% chance flood level.	West Goshen Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
390	The municipal FPA to work with the A. Duie Plye PB II Warehouse facility owner/operator to protect the facility to at least the 0.2% chance flood level.	West Goshen Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
391	The municipal FPA to work with the A. Duie Pyle West Chester Truck Terminal facility owner/operator to protect the facility to at least the 0.2% chance flood level.	West Goshen Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
392	The municipal FPA to work with the Wire and Cable Specialties facility owner/operator to protect the facility to at least the 0.2% chance flood level.	West Goshen Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
393	Work with the Greystone Hall property owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	West Goshen Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
394	Assess and determine the best actions to prevent flooding on bridges along Rt 82 from Unionville to Coatesville.	West Marlborough Township	1,5	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	West Marlborough Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
395	Complete PennDOT bridge repair for failing bridge in the township.	West Marlborough Township	2,5	Structure and Infrastructure	All Hazards	West Marlborough Township	Short	PennDOT Funds

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
396	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: House at Springdell, Pennock, Martha House & Industrial Site, and Speakman No.1 Covered Bridge.	West Marlborough Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
397	Coordinate with Pennsylvania Department of Transportation (PennDOT) with stormwater management, addressing flooding and washout problems along state-owned roads such as Route 401 and Chestnut Tree Road.	West Nantmeal Township	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Transportation Incidents	West Nantmeal Township	Long	PennDOT Funds, PA DCED, Capital, Storm Water Funds, ARPA funding, DCNR grants, FEMA/PEMA FMA and HMGP, Non-Disaster Funding, Waterway and Watershed Grants, Operating Budget, LSA
398	Implement strategies identified in Pipeline Emergency Annex is Township Emergency Operations Plan, including annual trainings for	West Nantmeal Township	2,6	Education and Awareness	Environmental Hazards - Gas and Liquid Pipelines	West Nantmeal Township	Ongoing	Staff Time

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	local emergency responders and pipelines operations and the development of community awareness programs.							
399	Work with the Isabella Furnace owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	West Nantmeal Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
400	Install gates to be closed during flood incidents and signage at Fremont Road between Willow Road and King Pen Road.	West Nottingham Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	West Nottingham Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
401	Install gates to be closed during flood incidents and signage at Park Road between Veteran's Drive and Sand Hill Road.	West Nottingham Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	West Nottingham Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
402	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Anselma Mill District-HDA, Clinger- Moses Mill Complex, Lightfoot Mill, and Vitale House.	West Pikeland Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
403	Replace undersized culverts in the Township to address flooding and road damage.	West Sadsbury Township	2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Transportation Incidents	West Sadsbury Township	Long	PA DCED, PENNVEST, General Fund
404	Backup Generators (2) Acquisition and Installation at Matthews Meadows Sewer Plant.	West Vincent Township	2	Structure and Infrastructure	Utility Interruption	Department of Public Works	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
405	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Halls Covered Bridge, Tyson's Bridge, and historic structure on Kimberton Road.	West Vincent Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
406	Develop and deliver a Township Open House for the public to receive resources and information on erosion hazards in the township.	West Whiteland Township	4	Education and Awareness	Subsidence, Sinkhole; Landslide	West Whiteland Township	Medium	Staff Time
407	Elevation/acquisition of structure located at 116 N. Locust Lane.	West Whiteland Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
408	Elevation/acquisition of structure located at 117 N. Locust Lane.	West Whiteland Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
409	Elevation/acquisition of structure located at 117 Valley Road.	West Whiteland Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
410	Elevation/acquisition of structure located at 118 Valley Road.	West Whiteland Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
411	Elevation/acquisition of structure located at 120 Valley Road.	West Whiteland Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
412	Elevation/Acquisition of structure located at 510 Winding Way.	West Whiteland Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
413	Elevation/acquisition of structure located at 512 Winding Way.	West Whiteland Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
414	Elevation/acquisition of structure located at 513 Winding Way.	West Whiteland Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
415	Remove silt/clean Valley Creek bed.	West Whiteland Township	2	Natural Systems Protection	Flood, Flash Flood, and Ice Jam	West Whiteland Township	Short	Operating Budget; PA DEP
416	The municipal FPA to work with the Verizon Exton ESS Bldg. facility owner/operator to protect the facility to at least the 0.2% chance flood level.	West Whiteland Township	1,2,4	Education and Awareness	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget
417	Work with power company to protect West Whiteland - S Whitford Road Electrical Substation to the 0.2% annual chance flood event.	West Whiteland Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
418	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect	West Whiteland Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
	them to the 0.2% annual chance flood level: Colebrook Manor, Exton Hotel, Thomas, John Roberts, Tennant Farmstead, Turnpike Station House, Whitford Station House, and William's Deluxe Cabins.							
419	Acquire/elevate roadways/properties along Chester Creek - Skiles Blvd, Kolbe Lane, Piedmont Road, Tower Course Drive, Blenheim Road, Wood Lane, Westbourne Road, Westtown Road, Westtown Way, Ponds Edge Road, Diane Drive, Leslie Lane, Robin Drive.	Westtown Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	DES	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP
420	Conduct a wildlands/forestry survey of township-owned forested areas, to determine need for strategies for mitigating invasive species risks.	Westtown Township	2,3	Natural Systems Protection	Invasive Species	Westtown Township	Short	FEMA HMGP, PA DCNR Grants, Staff Time
421	Conduct flood mitigation analysis of the township WWTP on Westtown Road, and pump stations on Rt. 926 (Rustin) and Rt. 3 (Kirkwood).	Westtown Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Westtown Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP
422	Encourage regular offerings of the American Red Cross Citizen's Disaster Course and other relevant classes.	Westtown Township	2,4	Education and Awareness	All Hazards	Westtown Township	Short	Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
423	Enhance public outreach to residents in areas subject to flooding to inform them of annual grant opportunities; this may include distributing periodic articles and including handouts in the annual newsletter.	Westtown Township	2,4	Education and Awareness	Flood, Flash Flood, Ice Jam	Westtown Township	Short	Operating Budget
424	Post flyers and other readily available informational materials at municipal hall or distribute at regular civic meetings.	Westtown Township	2,4	Education and Awareness	All Hazards	Westtown Township	Short	Operating Budget
425	Protect critical infrastructures (Schools, daycare, apartment buildings, and nursing home) on Rt. 202 around Skiles Blvd from HAZMAT transportation accidents.	Westtown Township	1	Local Plans and Regulations	Environment Hazards - Hazardous Materials, Transportation Incidents	EMC	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
426	Protect the following properties from a potential pipeline incident: Pipeline - Avonlea and Overhill neighborhoods, Sts. Simon and Jude Church and School (8 Cavanaugh Ct West Chester, PA 19382) . Advent Lutheran Church at Green Lane on 352, Chesterfield Condominiums at Rt. 3 and 352.	Westtown Township	1	Local Plans and Regulations	Environmental Hazard Gas and Liquid Pipelines	EMC	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
427	Protect the Westtown Wastewater Treatment Plant from dam failure and to the 0.2% annual chance flood level.	Westtown Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam, Dam Failure	EMC, FPA	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP,

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Operating Budget
428	Provide general hazard risk preparedness and mitigation information in regular newsletters and mailings.	Westtown Township	2,4	Education and Awareness	All Hazards	Westtown Township	Short	Operating Budget
429	Retrofit WWTP on Westtown Road, Pump Stations at Kirkwood Highway and Rustin H.S.	Westtown Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	EMC, FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP
430	Work with PennDOT to conduct an assessment on how to improve design of Route 352/Rt. 3 intersection.	Westtown Township	1	Structure and Infrastructure	Transportation Incidents	Westtown Township	Long	PennDOT, Municipal Budget
431	Work with PennDOT to conduct an assessment to improve the design of Route 202 at 926 intersection and High Street/202 merge.	Westtown Township	1	Structure and Infrastructure	Transportation Incidents	Westtown Township	Long	PennDOT, Municipal Budget
432	Work with PennDOT to redesign of the 926 intersection, elimination of the East Pleasant Grove Road/Rt. 202 connection, further improvements to the Skiles Road intersection, High Street/202 Northbound merge.	Westtown Township	1	Structure and Infrastructure	Transportation Incidents	Westtown Township	Long	PennDOT, Municipal Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
433	Work with PennDOT to redesign the intersection of SR 926 and Avonlea Circle and Tanguy Road to improve line of sight.	Westtown Township	1	Structure and Infrastructure	Transportation Incidents	Westtown Township	Long	PennDOT, Municipal Budget
434	Work with the County Bridge No. 148 owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	Westtown Township	1,2,4	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	EMC, FPA	Short	Operating Budget
435	Complete feasibility study of drainage improvements at the intersection of Industrial Boulevard and Jacqueline Drive, including integrating solutions with ongoing project at Jacqueline Drive.	Willistown Township	2,6	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter, Winter Storm, Utility Interruption	Willistown Township	Long	Capital, Storm Water Funds, ARPA funding, DCNR grants, FEMA/PEMA FMA and HMGP, Non-Disaster Funding, Waterway and Watershed Grants, Operating Budget, LSA
436	Complete feasibility study of drainage improvements throughout the contributory drainage basin, such as new storm sewer infrastructure rate control structures or in line storage, along Bryan Avenue.	Willistown Township	2,6	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter, Winter Storm,	Willistown Township	Long	Capital, Storm Water Funds, ARPA funding, DCNR grants, FEMA/PEMA FMA and HMGP, Non-

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
					Utility Interruption			Disaster Funding, Waterway and Watershed Grants, Operating Budget, LSA
437	Complete feasibility study of drainage improvements throughout the contributory drainage basin, such as new storm sewer infrastructure rate control structures, in line storage, concrete swale removal and replacement with bioinfiltration swale, along Chetwynd Road.	Willistown Township	2,6	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter, Winter Storm, Utility Interruption	Willistown Township	Long	Capital, Storm Water Funds, ARPA funding, DCNR grants, FEMA/PEMA FMA and HMGP, Non-Disaster Funding, Waterway and Watershed Grants, Operating Budget, LSA
438	Elevation/Acquisition of the structure located at 1 Eisenhower Dr.	Willistown Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP, Operating Budget
439	Elevation/Acquisition of the structure located at 116 Davis Rd.	Willistown Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	FPA	Long	FEMA HMGP, Non-Disaster Funding, FMA;

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								PA DCED FMP, Operating Budget
440	Increase Culvert Size on Hillview Rd between Fox Chase and Bar Rd.	Willistown Township	2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Willistown Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Capital Improvement Budget
441	Increase drainage basin size at Rustmont Homeowners Association.	Willistown Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Willistown Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
442	Increase drainage basin size behind Malvern Fire Company.	Willistown Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Willistown Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
443	Increase drainage basin size of the Family Life Basin.	Willistown Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Willistown Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
444	Increase size of drainage pipe crossing under road at Paoli Pike west of Rustin Ln and Devon Rd.	Willistown Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Willistown Township	Short	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
445	Install gates to be closed during flood incidents and signage on Jaffery Rd over Crum Creek.	Willistown Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Willistown Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
446	Install gates to be closed during flood incidents and signage on Whitehorse Rd between Rabbit Run Rd and Grubbs Mill Rd.	Willistown Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Willistown Township	Short	FEMA HMGP, Non-Disaster Funding; Operating Budget
447	Installation of a storm water management system in Ronnie Park section of the Township to mitigate surface water runoff impacts during severe weather events that have resulted in past flooding of the neighborhood; and prevent damage to property, housing, and infrastructure in the project area.	Willistown Township	1,2	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Public Works	Medium	Capital, Storm Water Funds, ARPA funding, DCNR grants, FEMA/PEMA FMA and HMGP, Non-Disaster Funding, Waterway and Watershed Grants,

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Operating Budget, LSA
448	Replacement of existing double-barrel culvert with a reinforced concrete single-cell box culvert to address 100 year storm events and mitigate flooding along Forest Lane at the crossing of Crum Creek.	Willistown Township	1,2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter, Winter Storm, Utility Interruption	Willistown Township	Short	Capital, Storm Water Funds, ARPA funding, DCNR grants, FEMA/PEMA FMA and HMGP, Non-Disaster Funding, Waterway and Watershed Grants, Operating Budget, LSA
449	Replacement of existing double-barrel culvert with a reinforced concrete single-cell box culvert to address 100 year storm events and mitigate flooding along Spring Road at the crossing.	Willistown Township	1,2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter, Winter Storm, Utility Interruption	Willistown Township	Short	Capital, Storm Water Funds, ARPA funding, DCNR grants, FEMA/PEMA FMA and HMGP, Non-Disaster Funding, Waterway and Watershed

Table 6.4-1 Chester County 2026 Mitigation Action Plan

#	Mitigation Initiative	Municipality	Goals	Category	Hazard(s) Mitigated	Lead Agency	Timeline	Funding Sources
								Grants, Operating Budget, LSA
450	Replacement of existing double-barrel culvert with a reinforced concrete single-cell box culvert to address 50 year storm events and mitigate flooding along Hillview Road at the crossing of Crum Creek.	Willistown Township	1,2	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter, Winter Storm, Utility Interruption	Willistown Township	Long	Capital, Storm Water Funds, ARPA funding, DCNR grants, FEMA/PEMA FMA and HMGP, Non-Disaster Funding, Waterway and Watershed Grants, Operating Budget, LSA
451	Strengthen Bridge/Re- engineer bridge approaches at Jaffery Rd over Crum Creek.	Willistown Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Public Works	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget
452	Strengthen Bridge/Re- engineer bridge approaches at Whitehorse Rd between Davis Rd and Fox Chase Rd.	Willistown Township	1	Structure and Infrastructure	Flood, Flash Flood, and Ice Jam	Public Works	Long	FEMA HMGP, Non-Disaster Funding, FMA; PA DCED FMP; Operating Budget

Many of these mitigation actions will require substantial time commitments from staff at the County and local municipalities. While all these activities will be pursued over the next five years, the reality of limited time and resources requires the identification of the feasibility and priority level of mitigation actions. Prioritization allows the individuals and organizations involved to focus their energies and ensure progress on mitigation activities.

Evaluating mitigation actions involves judging each action against certain criteria to determine its feasibility and potential impact. Actions evaluated and prioritized by applying the Multi-Objective Mitigation Action Prioritization criteria. This method includes considerations for cost vs benefit as the efficiency metric addresses costs while the other four metrics analyze the benefits for each action. For each action, scores were assigned to each criterion using the following weighted, multi-objective mitigation action prioritization criteria.

- Effectiveness (weight: 20% of score): The extent to which an action reduces the vulnerability of people and property.
- Efficiency (weight: 30% of score): The extent to which time, effort, and cost is well used as a means of reducing vulnerability.
- Multi-Hazard Mitigation (weight: 20% of score): The action reduces vulnerability for more than one hazard.
- Addresses High Risk Hazard (weight: 15% of score): The action reduces vulnerability for people and property from a hazard(s) identified as high risk.
- Addresses Critical Communications/Critical Infrastructure (weight: 15% of score): The action pertains to the maintenance of critical functions and structures such as transportation, supply chain management, data circuits, etc.

Scores of 1, 2, or 3 were assigned for each multi-objective mitigation action prioritization criterion where 1 is a low score and 3 is a high score. The Efficiency criterion, which considers the cost and effort of each action versus its overall vulnerability reduction benefit, is the most highly weighted criterion as part of the total prioritization score. Actions were prioritized using the cumulative score assigned to each. Each mitigation action was then given a priority ranking (Low, Medium, and High) based on the following:

- Low Priority: 1.0 – 1.8
- Medium Priority: 1.9 – 2.4
- High Priority: 2.5 – 3.0

Table 6.4-2 presents the cumulative results of the prioritization of mitigation actions. 82 actions were ranked High Priority, 323 are ranked Medium Priority, with the remaining 55 ranked as Low Priority.

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
1	Adopt the latest published editions of relevant consensus-based codes and standards, such as the International Building Code (IBC), International Residential Code (IRC), and International Existing Building Code (IEBC).	2	3	3	3	3	2.8
2	Coordinate with county and state officials on invasive species of concern, including the development of messaging and outreach materials for how residents can mitigate risks on their property. Materials should be created in all languages relevant to the community.	2	2	1	3	1	1.8
3	Coordinate with county, state and federal agencies to stay up-to-date on training and exercise opportunities and coordinating potential mitigation actions for terrorist activities.	3	2	1	2	3	2.15
4	Develop and maintain a stockpile of PPE for distribution during pandemic or infectious disease events.	3	2	1	3	2	2.15
5	Develop and maintain adequate road clearing capabilities.	2	2	1	3	2	1.95
6	Develop/maintain a hazard risk management webpage on the municipal website where information and mapping can be posted, including property-level mitigation measures that homeowners and other residents can take. Materials will be posted in all languages relevant to the community.	1	3	3	3	1	2.3
7	Identify or develop cyber security awareness training and require all municipal staff to complete yearly. Develop certificate and tracking database to ensure all employees are up to date on trainings.	2	3	1	1	3	2.1

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
8	Improve coordination to reduce risk from hazardous material incidents and conduct information sessions and trainings to educate and prepare local officials and first responders.	2	1	1	3	1	1.5
9	Include messaging about water monitoring and conservation in water bills. For example: Regularly checking for leaks to minimize water supply losses or installing low-flow water saving showerheads and toilets. Messaging should be provided in all languages relevant to the community.	2	2	1	3	1	1.8
10	Install traffic calming measures along roads and intersections that have higher incident risk.	3	2	1	3	2	2.15
11	Organize outreach to vulnerable populations to inform them of resources available during power outages and periods of extreme wetaher, including establishing and promoting accessible heating or cooling centers in the community.	3	2	3	3	2	2.55
12	Stormwater Infrastructure Upgrades: Upgrade drainage, add retention basins, and implement green infrastructure.	3	2	1	3	2	2.15
13	The municipal FPA will work with the Atglen Borough Sewer Plant facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	1	3	3	2.3
14	Work with the property owner to determine what flood protection measures can be taken to protect the structure to the 0.2% annual chance flood level.	3	2	1	3	1	2
15	The municipal FPA will work with the Avondale Sewer Authority facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	1	3	3	2.3
16	Build an access road to Masters Way to Webb Rd.	3	1	1	3	2	1.85

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
17	Work with PennDOT to reengineer intersection at Street Road (PA 926) bridge over Brandywine Creek.	3	2	1	3	3	2.3
18	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Brinton's Mill, Lenape Bridge, and Painter, Joseph, Farm.	3	2	2	3	1	2.2
19	Acquire/Elevate the building located on 135 Seltzer Road.	3	1	1	3	1	1.7
20	Caln Township has major businesses that are vulnerable to dam failure and will work with management to protect the buildings.	3	1	2	2	3	2.05
21	Protect the Caln Radio Tower to the 0.2% annual chance flood level and from a potential dam failure.	3	2	2	3	3	2.5
22	Stormwater assessments and maintenance program, several stormwater system repairs.	3	1	1	3	3	2
23	Work with Downingtown Middle School to determine specific vulnerability to dam failure and determine appropriate mitigation measures.	3	2	2	2	3	2.35
24	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Pennsylvania Railroad Bridge (No.205), Pickering Dam.	3	2	2	2	3	2.35
25	Upgrade or repair stormwater infrastructure in areas of concern for flooding.	3	2	1	3	2	2.15
26	As opportunities arise, elevate, or acquire properties within flood-prone areas. In addition, wet and dry proof commercial structures if they cannot be elevated or acquired.	3	1	1	3	1	1.7
27	Create a website to assist landowners and municipalities to navigate FEMA resources.	1	3	3	3	1	2.3
28	Develop a countywide Debris Management Plan.	2	1	1	3	2	1.65

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
29	Develop a plan to stagger traffic and implement delays/early releases for schools, government, and private sector during a disaster.	2	1	2	3	2	1.85
30	Develop an outreach and awareness program and provide to municipalities, where residents and potential homeowners could access to identify any risks they might have to address.	1	3	3	3	1	2.3
31	Educate county residents on the NFIP following flood events.	1	3	1	3	1	1.9
32	Educate the public about resources available to combat the opioid abuse/addiction.	1	3	1	3	1	1.9
33	Educate the public on all the hazards they face.	1	3	3	3	1	2.3
34	Encourage municipal Code Enforcement Officials to become trained in Floodplain Management and NFIP Programs.	2	2	1	3	2	1.95
35	Encourage municipalities to adopt an ordinance outlining the process to implement a snow emergency declaration.	1	3	1	3	2	2.05
36	Encourage municipalities to require radon testing at the time sale of homes.	1	3	1	2	1	1.75
37	Encourage new development planning to include burying of utility cables.	3	1	3	3	3	2.4
38	Encourage upgrades and improvements to stormwater runoff capabilities when reconstructing roads.	1	3	1	3	2	2.05
39	Enhance the household hazard waste program to reduce post-event hazardous debris.	2	2	2	3	1	2
40	Ensure that the municipal EMAs have COOP/COG plans.	3	2	3	3	3	2.7
41	Identify snow emergency routes in all municipalities to increase clearing efforts and travel ability of residents.	2	2	1	3	2	1.95

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
42	Improve storm drains throughout the county to handle snow melt.	2	2	2	3	2	2.15
43	Improve telecommunications infrastructure, including accessibility of high-speed Internet connectivity, throughout the county.	2	1	2	3	3	2
44	Increase cell coverage and telecommunications bandwidth in areas with poor coverage.	3	1	3	3	3	2.4
45	Install back-up power sources for traffic signals (generator, battery, solar).	3	3	1	3	2	2.45
46	Install roadway gates to close off flood-prone intersections/ roads during flood incidents and signage to warn motorists of the closed road.	3	2	1	3	2	2.15
47	Investigate the interaction of public agencies and camera data from private companies/citizens.	1	1	1	2	3	1.45
48	Maintain a GIS layer of the location of all permitted dams within the County, categorized by priority concern. Utilize dam location layer, inundation data, building footprints, and tax parcel information to develop potential evacuation measures in the event of a breach or failure.	2	3	2	2	3	2.45
49	Obtain and compile updated Department of Environmental Protection inundation data and Emergency Action Plan vulnerability data as it becomes available to inform plan update.	1	2	2	2	3	1.95
50	Plant bushes/other vegetation to stop drifting snow in known problem areas.	2	2	1	3	1	1.8
51	Provide education to the municipalities on flood gauges.	1	3	1	3	2	2.05
52	Provide education to the municipalities on resident evacuation processes and need.	2	3	3	3	2	2.65

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
53	Provide public education on traffic accident reduction.	1	3	1	3	1	1.9
54	Provide public information on debris management.	1	3	1	3	1	1.9
55	Purchase backup generators for critical infrastructure/ key resources.	3	3	3	3	3	3
56	Pursue local mitigation efforts to improve areas that are vulnerable to flooding including both repetitive and non-repetitive loss structures within floodplains.	2	1	1	3	1	1.5
57	Retrofit critical public facilities with safe rooms.	2	1	1	3	3	1.8
58	Study traffic control boxes that would be exposed to riverine or stormwater flooding to determine if they are able to withstand the water.	2	2	2	3	2	2.15
59	Sustain tree management programs around power lines.	2	1	3	3	3	2.2
60	The county and all municipalities will work with their major businesses to ensure they have continuity plans in place.	2	2	3	3	3	2.5
61	The county and all municipalities with a dam will work with dam operators to ensure they are protected to the 0.2% annual chance flood level.	3	2	1	3	3	2.3
62	The county and municipalities will work with the higher education facility operators to discuss the hazards they face and ensure their emergency plans address those hazards.	2	2	3	3	3	2.5
63	The county and municipalities will work with the intermediate care facility operators to discuss the hazards they face and ensure their emergency plans address those hazards.	2	2	3	3	3	2.5

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
64	The county and municipalities will work with the long-term care facility operators to discuss the hazards they face and ensure their emergency plans address those hazards.	2	2	3	3	3	2.5
65	The county and municipalities will work with the senior living facility operators to discuss the hazards they face and ensure their emergency plans address those hazards.	2	2	3	3	3	2.5
66	The county will assess their bridges to determine what measures can be taken to protect them to the 0.2% annual chance flood level.	2	2	2	3	3	2.3
67	The county will work with all municipalities that have a child care facility exposed to any of the hazards to work with the child care facility operators to discuss hazards they face and ensure their emergency plans address those hazards.	2	2	3	3	3	2.5
68	When provided by FEMA, evaluate and apply FEMA non-regulatory electronic floodplain mapping and mitigation tools, where appropriate.	2	2	1	3	2	1.95
69	Work with district courts to ensure they have plans in place for off-site hazmat releases that can affect the courts.	2	2	1	3	2	1.95
70	Work with hazmat facilities to inform them of the hazards they face and ensure emergency plans are current.	2	2	1	3	3	2.1
71	Work with hospitals to ensure they have plans in place for off-site hazmat releases that can affect hospitals.	2	2	1	3	3	2.1
72	Work with schools and school districts to inform them of the hazards they face and ensure emergency plans are current.	2	2	3	3	3	2.5
73	Work with the municipalities to develop a map of the stormwater system, including intakes and outflows.	1	2	1	3	2	1.75

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
74	Work with the railroad industry to address safety concerns and aging rail infrastructure.	3	2	1	3	3	2.3
75	Work with the USPS on options for protecting the post offices from flooding and possible inundation from dam failure.	1	3	2	3	2	2.25
76	Work with Verizon to protect the facilities from flood or dam failure.	2	1	2	3	3	2
77	Coordinate with PEMA and power plants on updated public information materials and a public information campaign to inform people in the 10-mile EPZ about evacuation plans and people in the 50-mile EPZ about their risks and preparations they can make. Make sure to provide materials in all languages relevant to the community.	2	2	1	3	1	1.8
78	Encourage municipalities and operators of critical facilities to reduce their vulnerability to wildfires by: increasing buffers and introducing defensible spaces; identifying farm roads, service roads, and other private access corridors in high hazard areas that could be used as fire breaks; and providing assistance to the County Emergency Management to identify vulnerable structures. Ensure outreach is completed to critical facilities that serve socially vulnerable populations such as elder care facilities and retirement homes, schools, youth and adult correctional facilities, hospitals, mental health treatment facilities, shelters, and youth and adult daycare facilities.	1	3	1	3	3	2.2
79	Work with local fire departments to conduct fire prevention seminars for schools and other critical facilities. Topics may include the proper use of fire extinguishers, fire evacuation procedures, common fire code violations, and specific concerns for cageteria personnel.	2	2	2	3	3	2.3

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
80	Work with Pennsylvania Department of Health to increase awareness about treating and preventing substance use disorde, including using county and municipal websites to share resources.	2	3	1	3	1	2.1
81	Build partnerships with dam owners. For dams with poor condition assessments, work with dam owners to identify and prioritize the repairs needed to bring the dams into compliance with dam safety standards.	2	1	2	2	3	1.85
82	Once structures in dam hazard areas are identified, support mitigation projects that will result in the projection of public and private property from floods of specific magnitudes. Eligible projects include but are not limited to: 1) acquisition of hazard-prone structures 2) Elevation of flood-prone structures. 3) Minor structural flood control projects 4) Relocation of structures from hazard-prone areas 5) Retrofitting of existing buildings, facilities, and infrastructure.	3	2	2	2	3	2.35
83	Once dam hazard areas are identified, consider updating land use ordinances and the implications of recognizing dam inundation areas as sensitive areas in zoning ordinances.	3	1	2	2	3	2.05
84	Participate in the development and continued update of Emergency Action Plans.	1	2	2	2	3	1.95
85	Provide HHPD notice of funding opportunity and supporting documentation from the County HMP to EMCs, municipalities, and dam owners to promote rehabilitation and safety in Chester County.	2	3	2	2	3	2.45

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
86	63 S. 5th Ave. Property Protection - protect the existing grocery store on the corner of Olive St. and S 5th Ave.	3	2	1	3	3	2.3
87	Amtrak Keystone Corridor Underpass Flooding – evaluate and improve drainage and eroding areas along the corridor.	3	2	1	3	3	2.3
88	Ash Park Stormwater Improvements - improve infiltration and mitigate floodwaters that pose a threat for travelers during/after storm events.	3	2	1	3	2	2.15
89	Create a Capital Improvements Plan.	3	3	3	3	3	3
90	Downtown Stormwater Improvements - upgrade Coatesville's existing stormwater infrastructure in the downtown business district.	3	2	1	3	2	2.15
91	Emergency Alert System - the City of Coatesville will implement an emergency alert system that will inform residents in the event of an emergency in an effort to improve public safety.	2	2	3	3	3	2.5

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
92	Gibbons Run Culvert Flooding and Structural Stability – evaluate the culverts and repair, rehabilitate, or replace them as necessary.	3	2	1	3	3	2.3
93	Install gates to be closed during flood incidents and signage at 11th Avenue and railroad underpass.	3	2	1	3	2	2.15
94	Millview Basin - restore proper stormwater detention basin function with added water quality improvements.	3	2	1	3	2	2.15
95	Pre-Plan Emergency Access Routes.	2	3	3	3	2	2.65
96	Protect ArcelorMital Emergency Services to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
97	Provide backup power at the City's traffic signals, including developing a plan for implementation and refueling.	2	2	3	3	2	2.35
98	Public Information Programs - develop education packages, classes, meetings, programs, etc. with the goal of improving public knowledge of potential hazards are dealt with within the City.	1	3	3	3	1	2.3
99	Route 82 Slope Stability - ensure the stability of the slopes along the eastern side of Route 82 in order to maintain unimpeded direct access into and out of the City.	2	1	3	3	3	2.2
100	S. 5th Avenue Stormwater Improvements.	3	2	1	3	2	2.15
101	The municipal FPA will work with the Martin- Brower facility owner/operator to protect the facility to the 0.2% annual chance flood level and dam failure.	3	2	2	3	1	2.2

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
102	Upgrade City Hall Command Center - these upgrades include upgrades to the existing generator to allow for increased functionality of City Hall, the Police Station and the Emergency Command Center during a power outage and upgrades to the communication utilities to permit full functionality during an emergency.	3	3	3	3	3	3
103	West End Fire Station Generator - obtain a backup generator in order ensure that emergency operations are maintained during a power outage.	3	3	3	3	3	3
104	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: High Bridge, Huston, Abram, House & Carriage House, Lukens Main Office Building.	3	2	2	3	1	2.2
105	Install emergency alerting systems.	2	2	3	3	3	2.5
106	Determine the specific vulnerability of the Downingtown Borough Building to dam failure and determine appropriate mitigation measures.	3	2	2	2	3	2.35
107	Downingtown Borough has major businesses that are vulnerable to dam failure and will work with management to protect the buildings.	2	2	2	2	3	2.15
108	Protect Alert FC Fire Station from dam failure.	3	2	2	2	3	2.35
109	Protect Downingtown - Jefferson Ave Electrical Substation to the 0.2% annual chance flood level and from the vulnerability to dam failure.	3	2	2	3	3	2.5
110	Protect Downingtown Boro PD from potential dam failure.	3	2	2	2	3	2.35

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
111	Protect Minquas Ambulance Fire Station from dam failure and determine appropriate mitigation measures.	3	2	2	2	3	2.35
112	Protect Minquas FC from potential dam failure.	3	2	2	2	3	2.35
113	Protect the Downingtown Municipal Waste from dam failure.	3	2	2	2	3	2.35
114	The municipal FPA will work with AT&T Mobility Downingtown - USID53712 facility owner/operator to protect the facility from its vulnerability to dam failure.	3	2	2	2	3	2.35
115	The Municipal FPA will work with the Downingtown Municipal Water Authority owner/operator to the 0.2% annual chance flood level and from vulnerability to dam failure.	3	2	2	3	3	2.5
116	The municipal FPA will work with the Inland Flexo, LLC facility owner/operator to protect the facility from its vulnerability to dam failure.	3	2	2	2	2	2.2
117	The municipal FPA will work with the Johnson Matthey AGT facility owner/operator to protect the facility from vulnerability to dam failure.	3	2	2	2	2	2.2
118	The municipal FPA will work with the Verizon Downingtown CO owner/operator to protect the facility from vulnerability to dam failure.	3	2	2	2	3	2.35
119	The municipal FPA will work with the Victory Brewing Company, LLC owner/operator to protect the facility from vulnerability to dam failure.	3	2	2	2	2	2.2
120	Work with Beaver Creek Elementary School to determine specific vulnerability to dam failure and determine appropriate mitigation measures.	3	2	2	2	3	2.35

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
121	Work with Downingtown High School West to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	3	2	2	2	3	2.35
122	Work with East Ward Elementary School to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	3	2	2	2	3	2.35
123	Work with Lori Petrie's Pre School to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	3	2	2	2	3	2.35
124	Work with Regina Luminis Academy to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	3	2	2	2	3	2.35
125	Work with SEPTA and Amtrak to protect the station from dam failure.	3	2	2	2	3	2.35
126	Work with St. Joseph School to determine specific vulnerability to dam failure and determine appropriate mitigation measures.	3	2	2	2	3	2.35
127	Work with STEM Academy to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	3	2	2	2	3	2.35
128	Work with Step by Step Children's House to determine specific vulnerability to dam failure and determine appropriate mitigation actions.	3	2	2	2	3	2.35
129	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect the, to the 0.2% annual chance flood level and vulnerability to dam failure: Downingtown Log House, Hunt, Roger, and Mill Complex.	3	2	2	3	1	2.2
130	Work with the United States Marine Recruiting Office to protect the structure from the vulnerabilities of dam failure.	3	2	2	2	2	2.2

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
131	Acquisition/elevation of structure at 414 Cottage Lane.	3	2	1	3	1	2
132	Acquisition/elevation of structure located at 402 Cottage Lane.	3	2	1	3	1	2
133	Acquisition/elevation of structure located at 406 Cottage Lane.	3	2	1	3	1	2
134	Acquisition/elevation of structure located at 418 Cottage Lane.	3	2	1	3	1	2
135	Acquisition/Elevation of structure located at 502 River Bed Lane.	3	2	1	3	1	2
136	Acquisition/Elevation of structure located at 530 River Bend Lane.	3	2	1	3	1	2
137	Acquisition/Elevation of structure located at 550 River Bend Lane.	3	2	1	3	1	2
138	Acquisition/Elevation of structure located at 558 River Bend Lane.	3	2	1	3	1	2
139	Install battery back-up and/or generator hookup on traffic signal on South Bradford Avenue and West Nields Street.	2	3	1	3	2	2.25
140	Install gates to be closed during flood incidents and signage on Allerton Road between North Creek Road and Lucky Hill Road.	3	2	1	3	2	2.15
141	Install gates to be closed during flood incidents and signage on North Creek Road between Jefferis Bridge Road and Hillsdale Road.	3	2	1	3	2	2.15

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
142	Install gates to be closed during flood incidents and signage on South Creek Road between Cottage Lane and Withers Way.	3	2	1	3	2	2.15
143	Install gates to be closed during flood incidents and signage on Valley Creek Road between Harmony Hill Road and Ravine Road.	3	2	1	3	2	2.15
144	Property protection of structure located at 1010 Valley Creek Road.	3	2	1	3	1	2
145	Protect East Bradford Electrical Substation from vulnerability to dam failure.	3	2	2	2	3	2.35
146	Protect Good Fellowship Ambulance (Sub-Station) from the vulnerabilities from dam failure.	3	2	2	2	3	2.35
147	The municipal FPA to work with the PECO Bradford Substation facility owner/operator to protect the facility from vulnerabilities to dam failure.	3	2	2	2	3	2.35
148	Beaver Creek Dam Rehabilitation Project.	3	2	2	2	3	2.35
149	Complete McQueen structure removal process.	3	3	1	3	1	2.3
150	Complete Old Horsehoe Pike Culvert Replacement.	3	2	1	3	3	2.3
151	Remediate and repair Bondsville Mill South Bridge.	3	2	2	3	3	2.5
152	Determine the specific vulnerability to dam failure and determine appropriate mitigation measures for the Downingtown Sewer Authority.	3	2	2	2	3	2.35
153	The municipal FPA to work with the D.R.W.P.C.C facility owner/operator to protect the facility from vulnerabilities to flooding.	3	2	2	2	3	2.35

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
154	Acquisition/elevation of structure located at 285 Linfield Road.	3	1	1	3	1	1.7
155	Project East Coventry - Linfield Road Electrical Substation from the vulnerabilities of dam failure.	3	2	2	3	3	2.5
156	The municipal FPA to work with Taylor Industries Inc facility owner/operator to protect the facility to at least the 0.2% chance flood level and from the vulnerabilities to dam failure.	3	2	2	3	1	2.2
157	Work with the property owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	3	2	2	3	1	2.2
158	Improve drainage to reduce flooding along Mortonville Road including intersection of Mortonville Road and Sawmill Road.	3	2	1	3	2	2.15
159	Improve drainage to reduce flooding on Timacula Road.	3	2	1	3	2	2.15
160	Protect East Fallowfield - Spring Dell Road Electrical Substation to the 0.2% annual chance flood event.	3	2	2	3	3	2.5
161	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Strasburg Rd Bridge, Speakman No.2, and the Gorden Farm.	3	2	2	3	2	2.35
162	Work with the Goodwin Acres owner to determine what protection measures can be taken to protect them from vulnerabilities to dam failure.	3	2	2	2	2	2.2
163	Address French Creek flooding that impacts access and use of Rapps Dam Road, Hares Hill Road, Mary Snowden Bridge, and local trail system.	3	2	1	3	3	2.3

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
164	Address stormwater pipe erosion and sinkhole issues along 450 linear foot section of Spring Hollow Road.	3	2	2	3	2	2.35
165	Conduct power assessment for critical infrastructure/key resources to determine emergency generator needs and coordinate information with the Army Corps of Engineers.	3	3	1	3	3	2.6
166	Develop tree maintenance program that identifies and addresses potential problem trees on public property.	2	2	1	3	3	2.1
167	Install new bridge on Pickering Road that crosses Piegon Run Creek to restore emergency service access.	3	1	3	3	3	2.4
168	Monitor and manage reservoirs and stream flows to sustain water sources needed to meet public water supply needs.	3	2	1	3	3	2.3
169	Plant bushes/other vegetation to stop drifting snow in known problem areas.	1	2	1	3	1	1.6
170	Purchase temporary mobile camera to set up for events and use to monitor safety and security.	2	3	1	2	3	2.25
171	Repair and potentially expand stormwater basin along Seven Starts Road.	3	2	1	3	2	2.15
172	Repair section of Pickering Road impacted by flooding and strembank erosion, install rip-rap along Pickering Road to stablize streambank.	3	2	2	3	2	2.35
173	Replace Camp Council Road Bridge and culvert.	3	1	3	3	3	2.4
174	Retrofit critical public facilities with safe rooms.	3	2	2	3	3	2.5

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
175	The municipal FPA to work with the Cromby Generating Station facility owner/operator to protect the facility to at least the 0.2% chance flood level and from vulnerabilities to dam failure.	3	2	2	3	3	2.5
176	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and vulnerabilities to dam failure: Bernard Property, Hare's Hill Road Bridge, Hartman, Peter, Residence, Kimberton Historic District, and Rapp's Covered Bridge.	3	2	2	3	2	2.35
177	Work with the railroad industry to address safety concerns and aging rail infrastructure.	3	2	1	3	3	2.3
178	Protect the Shady Lane Water Treatment Plant from dam failure.	3	2	2	2	3	2.35
179	The municipal FPA to work with the Columbia Gas Transmission/Birdsboro Heater facility owner/operator to protect the facility to at least the 0.2% chance flood level and from the vulnerabilities of potential dam failure.	3	2	2	3	2	2.35
180	The municipal FPA to work with the Oehlert Bros., Inc facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	1	3	1	2
181	The municipal FPA to work with the Shady Lane Plant-Royersford facility owner/operator to protect the facility from the vulnerabilities of dam failure.	3	2	2	2	3	2.35
182	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Kennedy Covered Bridge and Parker's Ford.	3	2	2	3	2	2.35
183	Complete streambank restoration projects at Valley Creek Park, the Township Building, and Ecology Park.	3	2	1	3	1	2

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
184	Install a generator at the Meadowview pump station.	3	3	1	3	3	2.6
185	Install a generator at the pump station on Flat Road.	3	3	1	3	3	2.6
186	Install gates to be closed during flood incidents and signage at Church Road.	3	2	1	3	2	2.15
187	Install gates to be closed during flood incidents and signage at Old Morehall Road.	3	2	1	3	2	2.15
188	Install generator at Frazer Mennonite Church, which serves as a comfort care center.	3	3	1	3	3	2.6
189	Repair sinkholes impacting road usage.	3	2	1	3	2	2.15
190	Work with management of major businesses to protect the buildings to the 0.2% annual chance flood level.	3	2	1	3	2	2.15
191	Work with the Spring Mill Complex owner to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood event.	3	2	1	3	1	2
192	Construct new stormwater management systems to address uncontrolled water runoff creating flooding of Darby Creek and its tributaries at Darby Creek Watershed.	3	2	1	3	2	2.15
193	Work with Sugartown Road Bridge owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	3	2	1	3	2	2.15
194	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood	3	2	1	3	2	2.15

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
	level: Glen Hope Covered Bridge, Rudolph & Arthur Covered Bridge, and Stephens, Linton Covered Bridge.						
195	Address flooding along Conestoga Road & South Brick Lane.	3	2	1	3	2	2.15
196	Implement updated pipeline annex in Borough Emergency Operations Plan.	3	2	1	2	2	2
197	Update threat assessment and implement security recommendations for Twin Valley Elementary Center.	3	2	1	2	3	2.15
198	Complete improvements to Walker Road Bridge to address flooding.	3	2	1	3	2	2.15
199	Complete road improvements to address flooding along North Clay Creek Road.	3	2	1	3	2	2.15
200	Improve drainage on North Clay Creek and Churchill Road.	3	2	1	3	2	2.15
201	Work with PennDOT to improve US-322 corridors to mitigate traffic accidents.	3	2	1	3	3	2.3
202	The municipal FPA to work with the Honey Brook Borough Authority facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	1	3	3	2.3
203	Advise residents to help keep storm drains clear of debris during storms through borough communication channels as appropriate (including Ready ChesCo).	2	3	1	3	1	2.1
204	Develop "master list" of infrastructure projects to address flooding to share with borough grant consultant so they can monitor funding opportunities to implement projects. Present list to borough Infrastructure Committee.	3	2	1	3	3	2.3
205	Improve drainage on D Street to address flooding.	3	2	1	3	2	2.15

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
206	Improve drainage on E. South Street between S. Walnut and Broad Street.	3	2	1	3	2	2.15
207	Improve drainage on South Street at Lafayette and Grant Way.	3	2	1	3	2	2.15
208	Improve drainage on W. South Street between Lafayette Street and Grant Way.	3	2	1	3	2	2.15
209	Improve drainage on Walnut Street between Birch and E. South Streets.	3	2	1	3	2	2.15
210	Improve or install drainage systems along Cypress Street to Cedar Street.	3	2	1	3	2	2.15
211	Improve/install drainage systems to handle rain to reduce localized flooding from Cypress St to Cedar St, west of Union St.	3	2	1	3	2	2.15
212	The municipal FPA will work with Comcast Cable- Kennell Square Hubsite owner/operator to protect the facility to the 0.2% annual chance flood level.	3	2	1	3	2	2.15
213	Acquisition/elevation of structure located at 611 Creek Road.	3	1	1	3	1	1.7
214	Acquisition/elevation of structure located at 903 Creek Road.	3	1	1	3	1	1.7
215	Acquisition/elevation of structure located at 909 Creek Road.	3	1	1	3	1	1.7
216	Assess and determine the best action to prevent East Hillendale Rd from flooding.	1	3	1	3	2	2.05
217	Assess and determine the best action to prevent flooding of Kaolin Rd from stream.	1	3	1	3	2	2.05
218	Assess and determine the best action to prevent flooding of Marshall Bridge a Route 82 South.	1	3	1	3	2	2.05
219	Assess and determine the best action to prevent flooding of the West Hillendale stream from Chandler Mill to Scarlet.	1	3	1	3	2	2.05
220	Assess and determine the best action to prevent further erosion of Bucktoe Road stream banks and prevent flooding of the road.	1	3	1	3	2	2.05

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
221	Assess and determine the best action to prevent Rosedale Road stream from overflowing onto the road.	1	3	1	3	2	2.05
222	Assess and determine the best action to prevent the stream on Center Mill Road from overflowing.	1	3	1	3	2	2.05
223	Install gates to be closed during flood incidents and signaled at flood intersections within the township.	3	2	1	3	2	2.15
224	Install warning signs to be utilized during flood incidents at flood-prone bridges within the township.	2	2	1	3	2	1.95
225	The municipal FPA to work with the AT&T SBA Kennett Square facility owner/operator to protect the facility to at least the 0.2% chance flood level	3	2	1	3	3	2.3
226	The municipal FPA to work with the Kennett Square Borough Sewage Treatment Plant facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	1	3	3	2.3
227	Work with county to improve drainage on Bayard Road.	3	2	1	3	2	2.15
228	Work with the county to improve drainage on Pemberton Road Bridge from Mill Road to Cedar Springs to prevent flooding.	3	2	1	3	2	2.15
229	Work with the county to improve drainage on South Street from Scarlet to Chandler Mill.	3	2	1	3	2	2.15
230	Install a snow fence during snow season to prevent snow drifting on South Bank Rd.	1	2	1	3	1	1.6
231	Install a snow fence during snow season to prevent snow drifting on Strickersville Rd.	1	2	1	3	1	1.6
232	Install gates to be closed during flood incidents and signage at Flint Hill Rd & Mercer Mill Rd.	3	2	1	3	2	2.15

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
233	Install gates to be closed during flood incidents and signage at Good Hope & London Tract Rd/Broad Run Rd.	3	2	1	3	2	2.15
234	Install gates to be closed during flood incidents and signage at London Tract Rd & New Peltier Rd.	3	2	1	3	2	2.15
235	Install gates to be closed during flood incidents and signage at Mercer Mill Rd and N. Creek Rd.	3	2	1	3	2	2.15
236	Install gates to be closed during flood incidents and signage at Yeatmans Station Rd.	3	2	1	3	2	2.15
237	Install alerting system/public notification system to profiteering/notification of potentially dangerous and damaging weather. Area is populated with outdoor activities and large population.	2	2	3	3	3	2.5
238	Install gates and signage within flood-prone areas to reduce the risk of motorist and other traveling public from becoming entrapped in the flood waters.	3	2	1	3	2	2.15
239	Protect West Grove Sewage Treatment Plant to the 0.2% annual chance flood level.	3	2	1	3	3	2.3
240	Reconfigure stream channel at Sullivan Rd & Clay Creek Rd.	3	1	1	3	2	1.85
241	Reconstruct stream and roadway elevations to reduce the ability of flooding during rain and flash flood events.	3	1	1	3	2	1.85
242	Supply electrical connections for a portable generator at each of the wastewater facilities. Providing alternative power during power outages utilizing a portable until as opposed to three permanent generators providing additional costs savings.	3	3	1	3	3	2.6
243	The municipal FPA to work with the West Grove Wastewater Treatment facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	2	3	3	2.5

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
244	To remove an existing failed culvert and replace it with a new structure to span the base flood elevation. Portions or all of structure removal and replacement could be completed utilizing Municipal Public Works Resources.	3	2	1	3	3	2.3
245	To remove an existing narrow culvert and replace with a structure to span the base flood elevations. Portions or all the structure removal and replacements could be completed utilizing Municipal Public Works.	3	2	1	3	3	2.3
246	Widen bridge and bridge approaches at Indian Run Rd.	3	2	1	3	3	2.3
247	Improve and enhance culverts on Jackson Rd and Faggs Manor Rd.	3	2	1	3	3	2.3
248	Improve plans and communication in case of emergency.	2	2	1	2	2	1.8
249	Increase the height of the bridge at Whitehorse Rd near Creek Rd.	3	2	1	3	3	2.3
250	Install a generator in the Township Building.	3	3	1	3	3	2.6
251	Obtain approximately 1 mile of snow fencing or install natural landscapes to stop snow drifting along White Horse Rd by Power Station.	1	2	1	3	1	1.6
252	Purchase 2-way radios to assist in communication during emergency events in the township.	1	3	3	3	2	2.45
253	Purchase and install a backup generator at the Municipal Building.	3	3	1	3	3	2.6
254	Work with PennDOT to clear the brush in roadway lines of sight at Rt 796 and Rt 41.	3	2	1	3	3	2.3

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#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
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		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
255	Work with PennDOT to construct a roundabout at the intersection of PA Route 41 and PA route 926.	3	2	1	3	3	2.3
256	Work with PennDOT to reconstruct the intersection to allow for better water drainage and strength the road at Fernwood Rd and Jackson Rd.	3	2	1	3	2	2.15
257	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Octoraro Water Company and Pine Grove Covered Bridge.	3	2	2	3	3	2.5
258	Elevation/Acquisition of structure located at 135 Powelton Ave.	3	1	1	3	1	1.7
259	Elevation/Acquisition of structure located at 145 Powelton Ave.	3	1	1	3	1	1.7
260	Elevation/Acquisition of structures 10 through 142 W First Ave.	3	1	1	3	1	1.7
261	Elevation/Acquisition of structures 193 through 323 Paoli Pike.	3	1	1	3	1	1.7
262	Elevation/Acquisition of structures 2 through 10 Remington Ln.	3	1	1	3	1	1.7
263	Elevation/Acquisition of structures 217 through 545 S. Warren Ave.	3	1	1	3	1	1.7
264	Increase culvert size at 313 S Warren Ave.	3	2	1	3	3	2.3
265	Work with management of Malvern Preparatory School to protect the buildings to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
266	Determine the specific vulnerability of the Modena Borough Building to dam failure and determine appropriate mitigation measures.	3	2	2	2	3	2.35

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
267	Protect Modena Ambulance EMS Station from vulnerabilities to dam failure.	3	2	2	2	3	2.35
268	Protect Modena FC Fire Station from a potential dam failure.	3	2	2	2	3	2.35
269	The Municipal FPA will work with the Mahoney- Modena owner/operator to protect the facility to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	3	2	2	3	1	2.2
270	The Municipal FPA will work with the Sealed Air Corporation owner/operator to protect the facility to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	3	2	2	3	1	2.2
271	Work with the Mode Paper Mill owner to determine what flood protection measures can be taken to protect it from the vulnerabilities of dam failure.	3	2	2	2	2	2.2
272	Construct larger culvert at Cedar Springs Rd at Pemberton Rd.	3	2	1	3	3	2.3
273	Construct larger culvert at Egypt Run Road.	3	2	1	3	3	2.3
274	Purchase portable generator for traffic signal at Chambers Rd and Baltimore Pike.	2	3	2	3	2	2.45
275	Purchase portable generator for traffic signal at Newark Rd and Baltimore Pike.	2	3	2	3	2	2.45
276	Purchase portable generator for traffic signal at Newark Rd and Rt 41.	2	3	2	3	2	2.45
277	Purchase portable generator for traffic signal at Penn Green Rd and Rt 41.	2	3	2	3	2	2.45
278	Purchase portable generator for traffic signal at Scarlett Rd and Baltimore Pike.	2	3	2	3	2	2.45
279	Purchase portable generator for traffic signal at Southwood Rd and Rt 7.	2	3	2	3	2	2.45

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#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
280	Work with To-jo Mushrooms Inc. management to protect the building to the 0.2% annual chance flood level.	3	2	2	3	1	2.2
281	Determine the specific vulnerability of the Newlin Township Building to dam failure and determine appropriate mitigation measures.	3	2	2	2	3	2.35
282	Fix and pave road that has been destroyed on Laurel Road including three driveways.	2	2	1	3	1	1.8
283	Protect the Embreeville Sewage Treatment from dam failure and protect it to the 0.2% annual chance flood event and from vulnerabilities to dam failure.	3	2	2	3	3	2.5
284	Replant Ash Trees that were lost to the Ash Borer and determine the best actions to prevent invasive species in the future.	2	1	1	3	1	1.5
285	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Embreeville Historic District, House at Upper Laurel Iron Works, Marlborough Village Historic District, Spruce Groce School House, Worker's House at Lower Laurel Iron Works.	3	2	2	2	2	2.2
286	Protect the North Coventry Municipal Authority from dam failure and to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
287	The municipal FPA to work with the North Coventry Municipal Authority facility owner/operator to protect the facility to at least the 0.2% chance flood level and from the vulnerabilities to dam failure.	3	2	2	3	3	2.5
288	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Schuylkill Navigation Company Canal and historic structure located on SR 7046.	3	2	2	3	2	2.35

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
289	Construct and gain permit for Well #14 in the Sycamore Crossing development, including the construction of a new raw waterline to the treatment plant.	3	2	3	3	3	2.7
290	Develop and execute a street trees planting program within the public right of way to increase tree canopy coverage, reduce temperatures and improve urban environment.	2	1	2	3	1	1.7
291	Expand Borough water treatment plant to increase capacity, improve filtration capabilities, and enhance property security.	3	2	3	3	3	2.7
292	Improve/upgrade water system interconnect with Chester Water Authority to ensure efficient and safe operations and improve reliability.	3	2	3	3	3	2.7
293	Rain gardens to be installed in recently created bump- outs on Broad Street at intersection with 8th Street.	2	2	1	3	2	1.95
294	Reconstruct ~700 linear feet of grey stormwater infrastructure along Broad Street to Whitehall Way, incoprating green infrastructure where possible.	3	2	1	3	3	2.3
295	The municipal FPA will work with the Hayes Heating and Cooling Bulk owner/operator to protect the facility to the 0.2% annual chance flood level.	3	2	2	3	2	2.35
296	Work with power company to protect Parkesburg - N Church St Electrical Substation to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
297	Enhance stormwater management regulations.	2	3	1	3	3	2.4

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
298	Work with power company to protect Penn - Neward Road Electrical Substation to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
299	Install warning signals at unguarded railroad crossing at US Rt 1 at the railroad tracks by Fairville Rd.	2	2	1	3	2	1.95
300	Install warning signals for times when road is closed due to flooding on US Rt 1 in the area of the Brandywine creek.	2	2	1	3	1	1.8
301	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Bissel/Hill Girt/Beverly Rural Historic District and Delaware Boundary Makers.	3	2	2	3	1	2.2
302	Improve drainage at the intersection of Bridge and Church St.	3	2	1	3	2	2.15
303	Protect the District Court 15-2-01 to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
304	Protect the Phoenixville Boro PD to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
305	Protect the Phoenixville Water Treatment to the 0.2% annual chance flood event and from dam failure.	3	2	2	3	3	2.5
306	The municipal FPA to work with the Phoenixville Water Plant facility owner/operator to protect the facility to at least the 0.2% chance flood level and from the vulnerabilities to dam failure.	3	2	2	3	3	2.5

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
307	Work with the management of major businesses to protect the buildings from dam failure and to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	3	2	2	3	1	2.2
308	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Black Rock Bridge, Lobok, John, Property, Mansion House, and Phoenixville Canal Spur.	3	2	2	3	1	2.2
309	Assess and determine the best action to prevent flooding around Brandywine Creek on Northbrook Road, one lane historical bridge.	1	3	1	3	3	2.2
310	Create a Capital Improvement Plan (CIP) for the Township to forecast the needed funds for flood mitigation projects.	3	3	1	3	3	2.6
311	Increase floodplain restoration/management and flood mitigation controls across the township.	2	2	1	3	3	2.1
312	Provide ongoing Public Education to Township residents regarding disasters/emergency management. Public education for flood prevention and mitigation.	2	2	1	3	1	1.8
313	Stabilize existing roadway in danger of collapse from damage due to frequent flooding of Brandywine Creek, with retaining wall and guide rail system. This will improve traffic safety for local residents, allow for better access by EMS vehicles, and mitigate the damage from future flooding.	3	2	2	3	2	2.35
314	The municipal FPA to work with the Lenape Forged Products Corp facility owner/operator to protect the facility from the vulnerabilities of dam failure.	3	2	2	2	2	2.2

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
315	Work with power company to protect the Pocopson - Lenape Unionville Road Electrical Substation to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
316	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Pocopson Station, State Route 3027, and Wilkinson House.	3	2	2	3	2	2.35
317	Assess and determine the best action to improve drainage and reduce flooding on Greenbelt Drive.	1	3	1	3	2	2.05
318	Install gates to be closed during flood incidents and signage on sections of Old Mill Road.	3	2	1	3	2	2.15
319	Remove rock obstruction causing stream flow and flooding issues along Old Mill Road, north of Route 30.	3	3	1	3	1	2.3
320	Replace bridge over Buck Run along Octara Road & Old Mill Road.	3	1	3	3	3	2.4
321	Acquisition/Elevation of the structure located at 493 State Creek Road.	3	1	1	3	1	1.7
322	Construct Larger Culvert at East Phillip Drive.	3	2	1	3	3	2.3
323	Construct larger culvert at S Whitehorse Road.	3	2	1	3	3	2.3
324	Determine specific vulnerability to dam failure and determine appropriate mitigation measures for the Valley Forge Sewage Treatment Plant.	3	2	2	2	3	2.35

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
325	Plant bushes/other vegetation to stop drifting snow in known problem areas.	1	2	1	3	1	1.6
326	Protect Structure with Barrier at Creek Road Bridge.	3	2	1	3	1	2
327	Retrofit critical public facilities with safe rooms.	3	2	2	3	3	2.5
328	The municipal FPA to work with the Aqua Pickering Water Treatment facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	2	3	3	2.5
329	The municipal FPA to work with the Valley Forge Sewer Authority facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	2	3	3	2.5
330	Work with power company to protect Schuylkill - Valley Forge Road to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
331	Work with YMCA management to protect the building to the 0.2% annual chance flood level.	3	2	2	3	2	2.35
332	Investigate stormwater management options and identify mitigati Coatesville Boroughon or structural projects to reduce vulnerability to stormwater flooding incidents throughout South.	3	2	1	3	2	2.15
333	Protect the Coatesville Sewer Authority from dam failure and to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
334	The municipal FPA will work with the Scrap Metal Services owner/operator to protect the facility to the 0.2% annual chance level.	3	2	2	2	2	2.2
335	Construct larger culvert at Bealor Road.	3	2	1	3	3	2.3
336	Determine the best action to prevent downhill flooding on Coventryville Rd & Harmonyville Road, close to North Cov. Border.	3	2	1	3	2	2.15

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
337	Install flood water collection boxes and piping on Schoolhouse Road and Porter's Mill Road.	3	2	1	3	2	2.15
338	Purchase and install a backup generator for the Woodridge Sewer Plant at 190 Ridgeview Drive.	3	3	1	3	3	2.6
339	Work with power company to protect South Coventry - Porters Mill Road Electrical Substation to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
340	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Coventryville Historic District and Coventryville Historic District (1975)- HAD.	3	2	2	3	1	2.2
341	Protect the Spring City Sewer Plan from the vulnerably to dam failure and to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
342	The municipal FPA will work with the Hydromotion owner/operator to protect the facility from the vulnerabilities of dam failure.	3	2	2	2	2	2.2
343	Work with management of major businesses to protect the buildings from the vulnerably to dam failure and to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
344	Work with the Textile Mill owner to determine what flood protection measures can be taken to protect the facility from the vulnerabilities from dam failure.	3	2	2	2	2	2.2
345	Install gates to be closed during flood incidents and signage at Rt 926 and Creek Road.	3	2	1	3	2	2.15
346	Install gates to be closed during flood incidents and signage at Rt 926 and S. Westtown Rd.	3	2	1	3	2	2.15
347	Install gates to be closed during flood incidents and signage at Rt 926 and Westtown-Thornton Rd.	3	2	1	3	2	2.15

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
348	Install gates to be closed during flood incidents and signage at Westtown- Thornton Rd south of Railroad Bridge.	3	2	1	3	2	2.15
349	Install gates to be closed during flood incidents and signage at Westtown-Thornton Rd north of Railroad Bridge.	3	2	1	3	2	2.15
350	Work with PennDOT to conduct an assessment of flood-prone areas along roadway Rt 926 from Rt 202 to Cheyney Rd.	1	3	1	3	2	2.05
351	Work with power company to protect Thornbury - Westtown Road Electrical Substation to the 0.2% annual chance flood level and from the vulnerabilities to dam failure.	3	2	2	3	3	2.5
352	Clogged inverts throughout the township causing flooding.	3	2	1	3	3	2.3
353	Improve drainage to reduce flooding on Hadwick Road and Upper Weedly Road.	3	2	1	3	2	2.15
354	Improve drainage to reduce flooding on Wills Lane, Woodcrest Drive, and Saunders Drive.	3	2	1	3	2	2.15
355	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Cedar Hollow Industrial Track: Bridge, County Bridge No. 171, Great Valley Mill, Jerman, Thomas, Property, and historic structure on SR 7015.	3	2	2	3	2	2.35
356	Acquisition/elevation of the structure located at 2 Kiloran Wynd.	3	1	1	3	1	1.7
357	Acquisition/elevation of the structure located at 80 Saint Andrews Ln.	3	1	1	3	1	1.7
358	Protect Larkins Bridge with barrier.	3	2	1	3	2	2.15

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
359	Protect structure with barrier on Dorothy Lane.	3	2	1	3	1	2
360	Protect structure with barrier on Font Road.	3	2	1	3	1	2
361	Protect structure with barrier on Lyndell Road.	3	2	1	3	1	2
362	Protect structure with barrier on Moore Road and Turnstone Way.	3	2	1	3	1	2
363	Protect structure with barrier on St Andrews Lane.	3	2	1	3	1	2
364	Raise Fellowship Road roadway at Red Bone Road.	3	2	1	3	2	2.15
365	Stormwater culvert and basin re-sizing on Krauser Rd.	3	2	1	3	3	2.3
366	Assess and determine the best action to protect Wagontown Road near the West Branch of the Brandywine Creek, and implement the action..	2	3	3	3	2	2.65
367	Assess drainage into Sucker Run near South Park Avenue and PA-372 to identify the best action to prevent flooding during heavy rainfall events, and implement the action.	2	3	1	3	2	2.25
368	Complete stormwater improvements and upgrades to address issues identified in 2009 study.	3.00	2.00	3.00	3.00	2.00	2.55
369	Develop and deploy a dam failure alert system to automatically notify the affected area.	2	2	1	2	3	1.95
370	Develop plan to address stormwater issues identified in 2009 study.	3	2	2	3	2	2.35
371	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from vulnerabilities to dam failure: County Bridge No. 101 and Scott Farm Property.	3	2	2	3	2	2.35

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
372	Protect Glenmoore FC Fire Station from a potential dam failure.	3	2	2	2	3	2.35
373	The municipal FPA to work with the Verizon Glenmoore ESS Bldg. facility owner/operator to protect the facility from the vulnerabilities to dam failure.	3	2	2	2	3	2.35
374	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to dam failure: Glenmoore Historic District and Steels Bridge.	3	2	2	3	1	2.2
375	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Hockley Mill Farm, Knauer Patent Thematic District, North Warwick Historic & Archaeological District (HDA), North Warwick HDA, and historic structure located on SR 7015.	3	2	1	3	1	2
376	Acquire and install back-up generator at Wastewater Treatment Plant.	3	3	1	3	3	2.6
377	Improve drainage on Broad Run Road between Beacon Hill.	2	2	2	2	3	2.15
378	Install 4 gates to be closed during flood incidents and signage at Downingtown Pike between Harmony Hill Rd and Skelp Level Rd.	3	2	2	2	2	2.2
379	Protect the Broad Run Sewage Treatment Plant from dam failure and to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
380	Work with the management of Ram-t Construction Specialist to protect the buildings from dam failure.	3	2	2	2	2	2.2

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
381	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level and from the vulnerabilities to flooding: Derbydown Homestead, Northbrook Historic District, Pennsylvania Railroad: Morrisville Lien: Viaduct.	3	2	2	3	3	2.5
382	Work with the Grow, James, House property owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	3	2	2	3	1	2.2
383	Provide a generator-capable facility, likely Wagontown Fire Department, as a safe space for residents experiencing decreasing home temperatures as a result of a prolonged power outage. Develop emergency food source and sleeping capabilities.	3	3	3	3	3	3
384	Eliminate hyrdaulic bottnecks that are causing flooding along Goose Creek.	3	2	1	3	2	2.15
385	The municipal FPA to work with the National Foam facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	2	3	1	2.2
386	Work with the Ross Fording Road Bridge property owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	3	2	2	3	2	2.35
387	Improve culvert at 103 Oak Lane.	3	2	1	3	3	2.3
388	Install 3 gates to be closed during flood incidents and signage at East Chestnut and Montgomery.	3	2	1	3	2	2.15
389	The municipal FPA to work with the A. Duie Plye Bolmar Street Warehouse facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	2	3	1	2.2

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
390	The municipal FPA to work with the A. Duie Plye PB II Warehouse facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	2	3	1	2.2
391	The municipal FPA to work with the A. Duie Pyle West Chester Truck Terminal facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	2	3	2	2.35
392	The municipal FPA to work with the Wire and Cable Specialties facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	2	3	1	2.2
393	Work with the Greystone Hall property owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	3	2	2	3	1	2.2
394	Assess and determine the best actions to prevent flooding on bridges along Rt 82 from Unionville to Coatesville.	1	3	1	3	2	2.05
395	Complete PennDOT bridge repair for failing bridge in the township.	3	1	3	3	3	2.4
396	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: House at Springdell, Pennock, Martha House & Industrial Site, and Speakman No.1 Covered Bridge.	3	2	2	3	2	2.35
397	Coordinate with Pennsylvania Department of Transportation (PennDOT) with stormwater management, addressing flooding and washout problems along state-owned roads such as Route 401 and Chestnut Tree Road.	3	2	2	3	2	2.35
398	Implement strategies identified in Pipeline Emergency Annex is Township Emergency Operations Plan, including annual trainings for local emergency responders and pipelines operations and the development of community awareness programs.	3	2	1	2	2	2

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
399	Work with the Isabella Furnace owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	3	2	2	3	1	2.2
400	Install gates to be closed during flood incidents and signage at Fremont Road between Willow Road and King Pen Road.	3	2	1	3	2	2.15
401	Install gates to be closed during flood incidents and signage at Park Road between Veteran's Drive and Sand Hill Road.	3	2	1	3	2	2.15
402	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Anselma Mill District-HDA, Clinger- Moses Mill Complex, Lightfoot Mill, and Vitale House.	3	2	2	3	1	2.2
403	Replace undersized culverts in the Township to address flooding and road damage.	3	2	1	3	3	2.3
404	Backup Generators (2) Acquisition and Installation at Matthews Meadows Sewer Plant.	3	3	1	3	3	2.6
405	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood level: Halls Covered Bridge, Tyson's Bridge, and historic structure on Kimberton Road.	3	2	2	3	2	2.35
406	Develop and deliver a Township Open House for the public to receive resources and information on erosion hazards in the township.	2	2	1	3	1	1.8
407	Elevation/acquisition of structure located at 116 N. Locust Lane.	3	1	1	3	1	1.7

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
408	Elevation/acquisition of structure located at 117 N. Locust Lane.	3	1	1	3	1	1.7
409	Elevation/acquisition of structure located at 117 Valley Road.	3	1	1	3	1	1.7
410	Elevation/acquisition of structure located at 118 Valley Road.	3	1	1	3	1	1.7
411	Elevation/acquisition of structure located at 120 Valley Road.	3	1	1	3	1	1.7
412	Elevation/Acquisition of structure located at 510 Winding Way.	3	1	1	3	1	1.7
413	Elevation/acquisition of structure located at 512 Winding Way.	3	1	1	3	1	1.7
414	Elevation/acquisition of structure located at 513 Winding Way.	3	1	1	3	1	1.7
415	Remove silt/clean Valley Creek bed.	2	2	1	3	2	1.95
416	The municipal FPA to work with the Verizon Exton ESS Bldg. facility owner/operator to protect the facility to at least the 0.2% chance flood level.	3	2	2	3	3	2.5
417	Work with power company to protect West Whiteland - S Whitford Road Electrical Substation to the 0.2% annual chance flood event.	3	2	2	3	3	2.5
418	Work with the property owners of the following facilities to determine what flood protection measures can be taken to protect them to the 0.2% annual chance flood	3	2	2	3	1	2.2

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
	level: Colebrook Manor, Exton Hotel, Thomas, John Roberts, Tennant Farmstead, Turnpike Station House, Whitford Station House, and William's Deluxe Cabins.						
419	Acquire/elevate roadways/properties along Chester Creek - Skiles Blvd, Kolbe Lane, Piedmont Road, Tower Course Drive, Blenheim Road, Wood Lane, Westbourne Road, Westtown Road, Westtown Way, Ponds Edge Road, Diane Drive, Leslie Lane, Robin Drive.	3	1	1	3	1	1.7
420	Conduct a wildlands/forestry survey of township-owned forested areas, to determine need for strategies for mitigating invasive species risks.	2	2	1	3	1	1.8
421	Conduct flood mitigation analysis of the township WWTP on Westtown Road, and pump stations on Rt. 926 (Rustin) and Rt. 3 (Kirkwood).	3	2	1	3	3	2.3
422	Encourage regular offerings of the American Red Cross Citizen's Disaster Course and other relevant classes.	2	2	3	3	1	2.2
423	Enhance public outreach to residents in areas subject to flooding to inform them of annual grant opportunities; this may include distributing periodic articles and including handouts in the annual newsletter.	1	3	1	3	1	1.9
424	Post flyers and other readily available informational materials at municipal hall or distribute at regular civic meetings.	1	3	3	3	1	2.3
425	Protect critical infrastructures (Schools, daycare, apartment buildings, and nursing home) on Rt. 202 around Skiles Blvd from HAZMAT transportation accidents.	3	2	2	3	3	2.5
426	Protect the following properties from a potential pipeline incident: Pipeline - Avonlea and Overhill neighborhoods, Sts. Simon and Jude Church and School (8 Cavanaugh Ct West Chester, PA 19382) . Advent Lutheran Church at Green Lane on 352, Chesterfield Condominiums at Rt. 3 and 352.	3	2	2	3	3	2.5

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
427	Protect the Westtown Wastewater Treatment Plant from dam failure and to the 0.2% annual chance flood level.	3	2	2	3	3	2.5
428	Provide general hazard risk preparedness and mitigation information in regular newsletters and mailings.	1	3	3	3	1	2.3
429	Retrofit WWTP on Westtown Road, Pump Stations at Kirkwood Highway and Rustin H.S.	3	2	1	3	3	2.3
430	Work with PennDOT to conduct an assessment on how to improve design of Route 352/Rt. 3 intersection.	2	2	1	3	3	2.1
431	Work with PennDOT to conduct an assessment to improve the design of Route 202 at 926 intersection and High Street/202 merge.	2	2	1	3	3	2.1
432	Work with PennDOT to redesign of the 926 intersection, elimination of the East Pleasant Grove Road/Rt. 202 connection, further improvements to the Skiles Road intersection, High Street/202 Northbound merge.	2	2	1	3	3	2.1
433	Work with PennDOT to redesign the intersection of SR 926 and Avonlea Circle and Tanguy Road to improve line of sight.	2	2	1	3	3	2.1
434	Work with the County Bridge No. 148 owner to determine what flood protection measures can be taken to protect it to the 0.2% annual chance flood level.	2	2	1	3	3	2.1
435	Complete feasibility study of drainage improvements at the intersection of Industrial Boulevard and Jacqueline Drive, including integrating solutions with ongoing project at Jacqueline Drive.	3	2	3	3	2	2.55

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
436	Complete feasibility study of drainage improvements throughout the contributory drainage basin, such as new storm sewer infrastructure rate control structures or in line storage, along Bryan Avenue.	3	2	3	3	2	2.55
437	Complete feasibility study of drainage improvements throughout the contributory drainage basin, such as new storm sewer infrastructure rate control structures, in line storage, concrete swale removal and replacement with bioinfiltration swale, along Chetwynd Road.	3	2	3	3	2	2.55
438	Elevation/Acquisition of the structure located at 1 Eisenhower Dr.	3	1	1	3	1	1.7
439	Elevation/Acquisition of the structure located at 116 Davis Rd.	3	1	1	3	1	1.7
440	Increase Culvert Size on Hillview Rd between Fox Chase and Bar Rd.	3	2	1	3	3	2.3
441	Increase drainage basin size at Rustmont Homeowners Association.	3	2	1	3	2	2.15
442	Increase drainage basin size behind Malvern Fire Company.	3	2	1	3	2	2.15
443	Increase drainage basin size of the Family Life Basin.	3	2	1	3	2	2.15
444	Increase size of drainage pipe crossing under road at Paoli Pike west of Rustin Ln and Devon Rd.	3	2	1	3	2	2.15

Table 6.4-2 2026 Mitigation Action Plan Prioritization

#	Mitigation Action	Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0.0-1.8		Medium = 1.9-2.4		High = 2.5-3.0	
		Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Communication W/ Critical Infrastructure	Total Score
445	Install gates to be closed during flood incidents and signage on Jaffery Rd over Crum Creek.	3	2	1	3	2	2.15
446	Install gates to be closed during flood incidents and signage on Whitehorse Rd between Rabbit Run Rd and Grubbs Mill Rd.	3	2	1	3	2	2.15
447	Installation of a storm water management system in Ronnie Park section of the Township to mitigate surface water runoff impacts during severe weather events that have resulted in past flooding of the neighborhood; and prevent damage to property, housing, and infrastructure in the project area.	3	2	1	3	3	2.3
448	Replacement of existing double-barrel culvert with a reinforced concrete single-cell box culvert to address 100 year storm events and mitigate flooding along Forest Lane at the crossing of Crum Creek.	3	2	3	3	2	2.55
449	Replacement of existing double-barrel culvert with a reinforced concrete single-cell box culvert to address 100 year storm events and mitigate flooding along Spring Road at the crossing.	3	2	3	3	2	2.55
450	Replacement of existing double-barrel culvert with a reinforced concrete single-cell box culvert to address 50 year storm events and mitigate flooding along Hillview Road at the crossing of Crum Creek.	3	2	3	3	2	2.55
451	Strengthen Bridge/Re- engineer bridge approaches at Jaffery Rd over Crum Creek.	3	2	1	3	2	2.15
452	Strengthen Bridge/Re- engineer bridge approaches at Whitehorse Rd between Davis Rd and Fox Chase Rd.	3	2	1	3	2	2.15

6.5. MITIGATION STRATEGY EQUITY REVIEW

To ensure that mitigation actions and strategies in this plan serve the whole community, a robust equity review was conducted. This review identified ways that the plan can best serve socially vulnerable groups and underserved populations. Some methods identified include:

- Ensuring that outreach and engagement efforts are conducted in a variety of formats and in all languages relevant to each community participating in the plan. This will help residents who may have limited or no internet or computer access; those with limited or no access to transportation; community members who may have access and functional needs, including people with disabilities and people who may not speak English well or at all; and houseless residents.
- Keeping the needs of all community members at the forefront of mitigation action development. For example, an action such as "Develop brochures to communicate hazard risk to homeowners," could be updated to "Develop outreach and engagement materials in a variety of formats to communicate hazard risks to homeowners, renters, seasonal workers, visitors, and houseless individuals. Formats may include radio, social media, mailing inserts in utility bills, bus stop poster advertisements, and the jurisdiction's website. Make sure to develop all materials and communications in all languages relevant to the community." Making sure that the needs of socially vulnerable groups and underserved populations are met can improve risk reduction outcomes for the entire community.
- Expanding the definition of critical facilities to include facilities which serve vulnerable populations, such as schools, prisons, elder care facilities, hospitals, and homeless shelters. This will help to make sure facilities which serve the most vulnerable community members do not experience a gap in service delivery due to hazard events.
- Communicating early and often with residents in high-hazard areas such as floodplains, subsidence zones, and urban heat islands to empower community members with information needed to make informed decisions about lowering their hazard risk.
- Acknowledging the structural systems in place which have historically impacted, and which continue to impact, marginalized groups and socially vulnerable populations. By tailoring mitigation strategies in a way that acknowledges historical and ongoing systems of oppression, the plan can help to make sure vulnerable residents feel heard and seen. This could include transforming actions like, "Acquire and demolish private residences in floodplains," to "Consult with community members about their needs and limitations regarding community-

driven relocation. Prioritize technical and financial assistance to low-income residents, people of color, people with disabilities, older adults, families with children, those living in group quarters, and residents who may not speak English. Residents within floodplains are more likely to belong to underserved groups and socially vulnerable populations, so acknowledging their needs will encourage buy-in to planned community-driven relocation initiatives while supporting more equitable relocation outcomes." Doing so helps to ensure that actions are equitable and spur positive outcomes for affected residents of all backgrounds, needs, and demographic.

7. PLAN MAINTENANCE

7.1. Update Process Summary

Once this plan has received approval from PEMA and FEMA, the plan will be adopted by the Chester County Board of Commissioners and all participating jurisdictions. This HMP Update is intended to be a 'living document.' Plan adoption is not considered the final step in the planning process, but rather as a first step to 'realization.' The plan monitoring and maintenance schedule is a cycle of events that involve periodic review, adjustments, and improvement. Plan monitoring also provides an opportunity to recognize other planning initiatives within the county that may benefit from the incorporation of risk and/or mitigation objectives detailed in this HMP. This section establishes a method to monitor how the plan will be evaluated and maintained in the future.

Monitoring, evaluating, and updating this plan is critical to maintaining its value and success in Chester County's hazard mitigation efforts. Ensuring effective implementation of mitigation activities paves the way for continued momentum in the planning process and gives direction for the future. This section explains who will be responsible for maintenance activities and what those responsibilities entail. It also provides a methodology and schedule of maintenance activities including a description of how the public will be involved on a continued basis. The County and municipalities will continue to put more emphasis on integrating the mitigation goals, objectives, and actions identified in the Mitigation Strategy into the other ongoing planning efforts to ensure implementation and tracking of actions throughout the five-year plan maintenance process.

7.2. Monitoring, Evaluating, and Updating the Plan

Chester County DES is designated to lead plan maintenance processes of monitoring, evaluation, and updating with support and representation from all participating municipalities. Chester County DES will coordinate maintenance efforts, but the input needed for effective periodic evaluations will come from community representatives, local emergency management coordinators and planners, the general public, and other stakeholders, including state agencies. Chester County DES will oversee the progress made on the implementation of action items identified in the 2026 HMP and modify actions, as needed, to reflect changing conditions. Chester County DES will meet with municipalities annually to discuss specific coordination efforts that may be needed with other stakeholders. A Chester County DES Emergency Planning Coordinator will lead the annual reviews.

Chester County DES will lead the effort to integrate mitigation goals, objectives, and actions into the county and regional comprehensive planning efforts. Specifically, Chester County DES will ensure risk assessments and applicable mitigation actions are included in the development of comprehensive planning documents. Chester County DES will review progress of these actions and will identify if there are changes that need to be made to the risk assessment or the mitigation strategy based on information developed during the comprehensive planning process.

Each municipality will designate a community representative to monitor mitigation activities and hazard events within their respective communities. The local Emergency Management Coordinator would be suitable for this role. This individual will be asked to work with Chester County DES to provide updates on applicable mitigation actions and feedback on changing hazard vulnerabilities within their community.

In addition, the community representative will be responsible for reviewing the planning and land use regulatory element of the municipality's capability assessment to identify potential opportunities for continued incorporation of the HMP into local planning mechanisms and will also identify locally generated plans, information, reports, etc. that may be capable of being incorporated into the update of the 2026 HMP.

Chester County DES will oversee the progress made on the implementation of action items at least annually, but also as deemed necessary based on the occurrence of a disaster or another occasion that necessitates the review of the HMP. Evaluation of the 2026 HMP will not only include an investigation of whether mitigation actions were completed, but also an assessment of how effective those actions were in mitigating losses. A review of the qualitative and quantitative benefits (or avoided losses) of mitigation activities will support this assessment. Results of the evaluation will then be compared to the goals and objectives established in the plan and decisions will be made regarding whether actions should be discontinued or modified in any way in light of new developments in the community. Progress will be documented by Chester County DES for use in the next HMP Update.

Upon each HMP evaluation, Chester County DES will consider whether applications should be submitted for existing mitigation grant programs. A decision to apply for funding will be based on appropriate eligibility and financial need requirements. All state and federal mitigation funding provided to the County or local municipalities will be reported in subsequent plan updates.

The 2026 HMP will be updated by the FEMA approved five-year anniversary date, as required by the Disaster Mitigation Act of 2000, or following a disaster event. This update will include working with both PEMA and FEMA on the development of a Scope

of Work. Future plan updates will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. This may include additional data that can make hazard vulnerability analysis more detailed, leading to a better understanding of risk and how to both identify and prioritize mitigation actions. During the five-year review process, the following questions will be considered as criteria for assessing the effectiveness of the Chester County HMP:

- Has the nature or magnitude of hazards affecting the county changed?
- Are there new hazards that have the potential to impact the county?
- Is there updated, or more quantitative, risk assessment data available related to the identified hazards in the plan? Can this data be integrated into the analysis to better assess the vulnerability, and depict the risk, of communities to the hazards?
- Do the identified goals and actions address current and expected conditions?
- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the plan?
- Should additional local resources be committed to address identified hazards?
- Are there current or upcoming planning mechanisms or initiatives in which the mitigation strategy should be considered for integration?

Issues that arise during monitoring and evaluation which require changes to the risk assessment, mitigation strategy, and other components of the plan will be incorporated during future updates.

Comprehensive Plans, Capital Improvements Programs, Building Codes, Municipal Floodplain Management Regulations, Emergency Operations Plans, Zoning Ordinances, and other planning mechanisms are identified for incorporation of hazard mitigation actions once the 2026 HMP is adopted. Each of these mechanisms will continue to be used to meet the intent of this Plan, as appropriate. Likewise, as these planning mechanisms are updated, they will be considered for incorporation into the HMP during the annual review process and/or the five-year cycle update.

The County and participating jurisdictions may propose additional mitigation actions for inclusion throughout the five-year cycle but must submit new mitigation actions through Chester County DES, which will request an HMP amendment by contacting the PEMA State Hazard Mitigation Planner. FEMA must officially approve all additions and will amend the HMP by issuing an HMP Amendment Approval letter.

7.3. Continued Public Involvement

As was done during development of this 2026 HMP, Chester County DES plans to involve the public during annual review periods by providing an opportunity to review and submit feedback. The public will have access to the current HMP through their local municipal office or on the Chester County government website. Information on upcoming events related to the HMP or solicitation for comments, such as the annual plan review, will be announced via newsletters, newspapers, mailings, and the county website. The public will be informed of meetings and will be encouraged to submit comments on the HMP at any time. Chester County DES will incorporate all relevant comments during the next update of the hazard mitigation plan.

8. PLAN ADOPTION

The Plan was submitted to the Pennsylvania State Hazard Mitigation Planner on Month X, 2026. The Plan was forwarded to FEMA for final review and approval-pending-adoption on Month X, 2026. FEMA granted approval-pending-adoption on Month X, 2026. Full approval from FEMA was received after each jurisdiction adopted the plan.

This section of the plan includes copies of the local adoption resolutions passed by Chester County and its municipal governments as well as a completed Local Mitigation Plan Review Crosswalk. Adoption resolution templates are provided to assist the county and municipal governments with recommended language for future adoption of the HMP.

Chester County Hazard Mitigation Plan

County Adoption Resolution

Resolution No. _____

Chester County, Pennsylvania

WHEREAS, the municipalities of Chester County, Pennsylvania, are most vulnerable to natural and human-made hazards which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, Chester County acknowledges the requirement of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the Chester County Hazard Mitigation Plan has been developed by the Chester County Department of Emergency Services, in cooperation with other County departments, local municipal officials, and the citizens of Chester County, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Chester County Hazard Mitigation Plan, and

WHEREAS, the Chester County Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-made hazards that face the county and its municipal governments,

NOW THEREFORE BE IT RESOLVED by the governing body for Chester County that:

- The Chester County Hazard Mitigation Plan is hereby adopted as the official Hazard Mitigation Plan of the county, and
- The respective officials and agencies identified in the implementation strategy of the Chester County Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this _____ day of _____, 2026

ATTEST:

_____

CHESTER COUNTY COMMISSIONERS

By _____

By _____

By _____

Chester County Hazard Mitigation Plan

Municipal Adoption Resolution

Resolution No. _____

<Borough/Township of Municipality Name>, Chester County, Pennsylvania

WHEREAS, the *<Borough/Township of Municipality Name>*, Chester County, Pennsylvania, is most vulnerable to natural and human-made hazards which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, the *<Borough/Township of Municipality Name>* acknowledges the requirement of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the Chester County Hazard Mitigation Plan has been developed by the Chester County Department of Emergency Services, in cooperation with other County departments, and officials and citizens of *<Borough/Township of Municipality Name>*, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Chester County Hazard Mitigation Plan, and

WHEREAS, the Chester County Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-made hazards that face the county and its municipal governments,

NOW THEREFORE BE IT RESOLVED by the governing body for the *<Borough/Township of Municipality Name>*:

- The Chester County Hazard Mitigation Plan is hereby adopted as the official Hazard Mitigation Plan of the *<Borough/Township>*, and
- The respective officials and agencies identified in the implementation strategy of the Chester County Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this _____ day of _____, 2026

ATTEST: *<BOROUGH/TOWNSHIP OF MUNICIPALITY NAME>*

_____ By _____

By _____

By _____

Chester County Hazard Mitigation Plan

Special District Adoption Resolution

Resolution No. _____

<Special District Name>, Chester County, Pennsylvania

WHEREAS, the *<Special District Name>*, Chester County, Pennsylvania, is most vulnerable to natural and human-made hazards which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, the *<Special District Name>* acknowledges the requirement of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the Chester County Hazard Mitigation Plan has been developed by the Chester County Department of Emergency Services, in cooperation with other County departments, and leaders and citizens within and/or serviced by *<Special District Name>*, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Chester County Hazard Mitigation Plan, and

WHEREAS, the Chester County Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-made hazards that face the county, its municipal governments, and its special districts,

NOW THEREFORE BE IT RESOLVED by the governing body for the *<Special District Name>*:

- The Chester County Hazard Mitigation Plan is hereby adopted as the official Hazard Mitigation Plan of the *<Special District Name>*, and
- The respective officials and agencies identified in the implementation strategy of the Chester County Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this _____ day of _____, 2026

ATTEST: *<SPECIAL DISTRICT NAME>*

_____ By _____

By _____

By _____