

Resolution 2026-24
A Resolution Adopting the New Castle County Multi-Jurisdictional All Hazard Mitigation Plan 2026 Update as Approved By FEMA

WHEREAS, The City of New Castle, located in New Castle County, and the State of Delaware, like other jurisdictions in the Mid-Atlantic region, are vulnerable to hurricanes, flooding, severe storms, extreme heat, winter storms, drought, and other natural and technological hazards that may cause significant loss of life, property damage, economic hardship, and disruption to essential services; and

WHEREAS, past hazard events have caused property damage, economic loss, and threats to public health and safety within New Castle County and its municipalities; and

WHEREAS, billions of dollars' worth of residential, commercial, and coastal property in Delaware are at risk from hurricanes and weather-related damages; and

WHEREAS, the Stafford Act was amended by the Disaster Mitigation Act of 2000, Section 322 (DMA 2000) (Public Law 106-390), which provides approaches to mitigation planning and emphasizes the need for state, local, and tribal entities to closely coordinate mitigation planning and implementation efforts as outlined in 44 CFR Part 201; and

WHEREAS, the New Castle County Office of Emergency Management regularly participates with the Delaware Hazard Mitigation Council, the Delaware Yellowjackets Group led by Army Corps of Engineers, and County and State Floodplain Managers, to address hazard planning and mitigation efforts in a collaborative effort; and

WHEREAS, in October 2020, the City of New Castle adopted the New Castle County Multi-Jurisdictional All Hazard Mitigation Plan 2020 update as approved by FEMA; and

WHEREAS, New Castle County, through the Office of Emergency Management, in coordination with participating municipalities, state agencies, and other stakeholders, has completed an update to the New Castle County Multi-Jurisdictional All-Hazard Mitigation Plan (2025 Update) for submission to the Federal Emergency Management Agency (FEMA); and

WHEREAS, the planning process included public outreach, risk assessment, vulnerability analysis, and the development of mitigation strategies to reduce long-term risk to people and property; and

WHEREAS, the City of New Castle participated in the planning process and provided input regarding local hazards, vulnerabilities, and mitigation actions; and

WHEREAS, adoption of the Hazard Mitigation Plan is required for the City of New Castle to maintain eligibility for certain federal pre- and post-disaster mitigation funding programs;

NOW, THEREFORE, BE IT RESOLVED, That the City Council of the City of New Castle hereby adopts the New Castle County Multi-Jurisdictional All-Hazard Mitigation Plan 2025 Update.

PASSED this 14th day of April, 2026.

Suzanne Souder, City Council President

Joseph F. Day, III, Councilperson

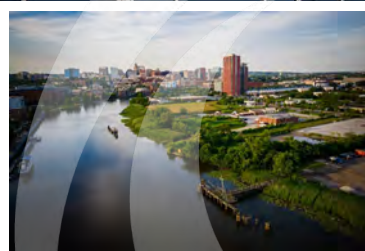
Nermin Zubaca, Councilperson

Andrew Zeltt, Councilperson

Brian Mattaway, Councilperson

Attest:

Courtaney Taylor, City Clerk



2026 Hazard Mitigation Plan Update

New Castle County, Delaware



January 2026



Source: Delaware Business Times

January 2026

Acknowledgements

This Hazard Mitigation Plan was prepared under the guidance of the New Castle County Department of Public Safety and the Hazard Mitigation Plan Steering Committee, municipal hazard mitigation representatives. Organizations invited to be on the County Steering Committee are listed in Chapter 3.



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1.0 CHAPTER 1 – INTRODUCTION

1.1 Background

In an effort to reduce the Nation's mounting natural disaster losses, the United States Congress passed the Disaster Mitigation Act of 2000 (DMA 2000 or DMA2K) to provide new and revitalized approaches to mitigation planning. Section 322 of DMA 2000 emphasizes the need for state and local entities to closely coordinate mitigation planning and makes the development of a hazard mitigation plan a specific eligibility requirement for any local government applying for Federal mitigation grant funds.

This 2020 New Castle County (NCC) Hazard Mitigation Plan Update (HMP) is conducted in coordination with the Federal Emergency Management Agency (FEMA) and the Delaware Emergency Management Agency (DEMA) to ensure that it meets all applicable DMA 2000 planning requirements. A Local Mitigation Plan Review Tool, included in the Plan Update, provides a summary of FEMA's current minimum standards of acceptability, and notes the location within this Plan where each planning requirement is met.

Hazard Mitigation is defined by the Federal Emergency Management Agency (FEMA) as "sustained action taken to reduce or eliminate long-term risk to people and property from hazards and their effects." The hazard mitigation planning process involves the coordination of actions taken to reduce injuries, deaths, property damage, economic losses, and degradation of natural resources due to natural and human-caused disasters. Hazard mitigation is considered one of four phases in emergency management activities. This includes:

- Preparedness - activities that involve planning and preparing for when a disaster strikes and include response capability actions to ensure an effective and efficient use of resources and efforts to minimize damage.
- Mitigation - activities that involve actions that reduce or eliminate the probability of an occurrence or reduce the impact of a disaster. The goal of the mitigation phase is to decrease the need for a respective response.
- Response - activities that involve providing emergency assistance to victims and minimizing property loss and can include preliminary or initial damage assessments. The response phase begins during or immediately after the onset of a disaster and informs the recovery process.
- Recovery - activities that include short and long-term activities that help return individuals and communities to normalcy as soon as possible. Recovery actions involve clean-up efforts, temporary housing, and repair or replacement of infrastructure.

1.2 Purpose

This 2020 Plan Update is intended to enable the County and its municipalities to effectively respond to hazards as they occur and reduce the potential risks of these hazards to the health, safety, and welfare of residents. The overall goal for the Update is to continue to allow NCC municipalities to be eligible for a range of financial assistance following hazard events.

This 2026 Plan Update consists of a thorough review of the 2020 Plan and an update of relevant sections based on hazard occurrences within the past five years. The Update process included the review of data on potential hazards and reprioritized these hazards in terms of frequency and

severity, as well as exploring new hazards to incorporate. The process also involved the review of county and municipal capabilities, as well as mitigation goals and objectives, and actions.

1.3 Scope

The NCC County EMA contracted with Vision Planning and Consulting (VPC) to update the 2020 County Hazard Mitigation Plan. The Plan Update is a multi-jurisdictional plan that covers the County and its 13 municipalities.

It must be noted that future funding for projects will be contingent upon having each jurisdiction in NCC individually adopt the Plan after the County adopts its Plan. Jurisdictions that do not adopt the Plan will not be eligible for pre- and post-disaster mitigation funds.

The Hazard Mitigation Plan Update comprises 8 chapters. Chapter 1 provides an introduction to the plan update process and organization. Chapter 2 provides an overview of the geographic, socio-economic, and demographic characteristics. Chapter 3 discusses the planning process; Chapter 4 comprises the Risk Assessment, including hazard identification and profiles, historic profile of hazard types and associated losses, and a vulnerability assessment, which analyzes the potential for future damages due to the hazards identified. Chapter 5 contains a capability assessment, including a review of existing plans and ordinances from the counties and municipalities. Chapter 6 discusses the mitigation strategy, including updated mitigation goals and objectives, mitigation actions, and the method for prioritization and implementation of mitigation actions. Chapter 7 outlines how NCC and its municipalities will implement the Plan once it is adopted and ways to monitor progress and ensure continued public involvement. Chapter 8 addresses the adoption of the Plan Update by the County and municipalities.

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;
- Code of Federal Regulations (CFR), Title 44, Parts 201 and 206; and
- Disaster Mitigation Act of 2000, Public Law 106-390, as amended.

Authority for this Plan originates from the following Delaware sources:

- State of Delaware All-Hazard Mitigation Plan, revised August 2023.

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

- FEMA. Local Mitigation Planning Tool and Guide. March 2012.
- FEMA. Local Mitigation Planning Handbook. March 2013.
- Local Mitigation Planning Policy Guide, April 2023

2.0 CHAPTER 2 - COMMUNITY PROFILE

2.1 History

New Castle County was first settled in March 1638 with the establishment of Fort Christina by Swedish colonists along the banks of the Christina River, near present-day Wilmington. Control of the territory shifted several times in the seventeenth century—first to the Dutch in 1655 and then to the English in 1664—introducing English common law and proprietary governance under the Penn family. These early patterns of settlement concentrated activity along navigable rivers and estuaries, a factor that continues to influence the county’s exposure to flooding today.¹

During the eighteenth century, the county’s location on the Delaware River spurred growth in shipbuilding, gristmills, and agricultural trade. According to the Delaware Public Archives, towns such as New Castle and Odessa prospered as regional trade centers. The completion of the Chesapeake and Delaware Canal in 1829 provided a vital connection between the Chesapeake Bay and the Delaware River, further encouraging development along the waterway.²

As maritime trade gave way to rail transport in the nineteenth century, Wilmington emerged as an industrial hub. The arrival of railroads accelerated the growth of iron foundries, textile mills, and manufacturing facilities. Census records from this period document rapid population growth as workers migrated into the county, creating dense residential neighborhoods that remain important but vulnerable communities today.³

In the twentieth century, New Castle County’s economy diversified. The DuPont Company’s chemical works on the Brandywine Creek became a global center for materials research. At the same time, the University of Delaware and a growing financial services sector supported urban development and employment growth. Post-World War II suburban expansion converted farmland into planned residential communities such as Newark, Elsmere, and Claymont, reflecting the broader trend toward automobile-dependent development. This outward growth also increased the amount of housing and infrastructure located within areas susceptible to flooding and severe storms.

Throughout its history, the county has confronted natural hazards including tidal flooding, severe storms, and winter ice events. Historic storms such as Hurricane Floyd in 1999 and Superstorm Sandy in 2012 caused significant flooding, transportation disruptions, and property damage across the region. Early adaptation measures—such as raised embankments and rudimentary levees—have since evolved into modern floodplain regulations, stormwater management requirements, and watershed restoration initiatives overseen by the Delaware Department of Natural Resources and Environmental Control (DNREC).

¹ Delaware Public Archives, “Colonial Delaware Timeline,” item 3, https://archives.delaware.gov/wp-content/uploads/sites/43/2022/01/Colonial_Delaware_Timeline.pdf.

² U.S. Army Corps of Engineers, History of the C&D Canal, chap. 1, https://www.nap.usace.army.mil/Portals/39/docs/CandD/history_CH1.pdf.

³ Delaware Historical Society, Railroad Expansion in Wilmington (pp. 45–47), https://dehistory.org/assets/railroads_wilmington.pdf.

Today, New Castle County continues to strengthen resilience through dam safety programs, hazard mapping, and community education efforts. These measures aim to reduce vulnerability in low-lying areas, safeguard critical infrastructure, and protect the health and safety of county residents.

2.2 Geography

New Castle County occupies the northern tip of Delaware, encompassing 494 square miles—426 square miles of land and 68 square miles of water—along the Delmarva Peninsula. Its north boundary adjoins Pennsylvania’s Chester and Delaware counties, while Cecil County, Maryland, lies to the west. To the south, the Chesapeake and Delaware Canal separate New Castle from Kent County; the eastern edge follows approximately 40 miles of Delaware Bay shoreline. This strategic position provides direct access to Philadelphia (30 miles), Baltimore (75 miles), New York City (130 miles), and Washington, D.C. (125 miles) via Interstate 95 and U.S. Route 13.⁴

Topography transitions from tidal flats at sea level along the Delaware Bay to 448 feet above mean sea level at Ebright Azimuth on the northern Piedmont plateau. The northern third of the county is characterized by rolling hills and fractured bedrock of the Piedmont Province. In contrast, the southern two-thirds lie within the Coastal Plain, comprised of unconsolidated clays, silts, sands, and gravels. The Fall Line—where harder Piedmont rocks meet softer Coastal sediments—traverses the county just north of Wilmington, shaping historic waterpower sites and today’s variable floodplain extents.⁵

Hydrologic networks drain almost the entire county into the Delaware River Basin, a 13,539 square-mile watershed shared with four states. Major tributaries include Brandywine Creek, White Clay Creek, Red Clay Creek, the Appoquinimink River, and the Christina River, whose combined valleys support critical transport corridors and dense settlements. The Chesapeake and Delaware Canal bisect the county at its midpoint, creating an artificial waterway that links the Delaware River to the Chesapeake Bay. The Hoopes Dam, located near the Claymont landfill, impounds approximately two billion gallons of freshwater for industrial and municipal use.^{6,7}

New Castle County’s land-to-water ratio and varied terrain directly affect flood risk. Coastal plain lowlands and stream valleys are subject to tidal, fluvial, and storm-surge inundation, while upland slopes and plateau edges offer relative refuge. This geographic complexity underpins the county’s hazard mitigation strategies and informs land-use decisions across jurisdictions.

Figure 2.1 illustrates Delaware’s statewide elevation gradient as rendered by the Delaware Geological Survey. Gentle shades of pale yellow along the Atlantic coast transition through ochre tones at the Fall Line, culminating in deep reds and browns across the Piedmont uplands. This continuous swath of color delineates physiographic provinces, defines watershed divides, and

⁴U.S. Census Bureau, “New Castle County, Delaware—Census Bureau Profile” (accessed September 11, 2025), https://data.census.gov/profile/New_Castle_County,_Delaware?g=0500000US10003.

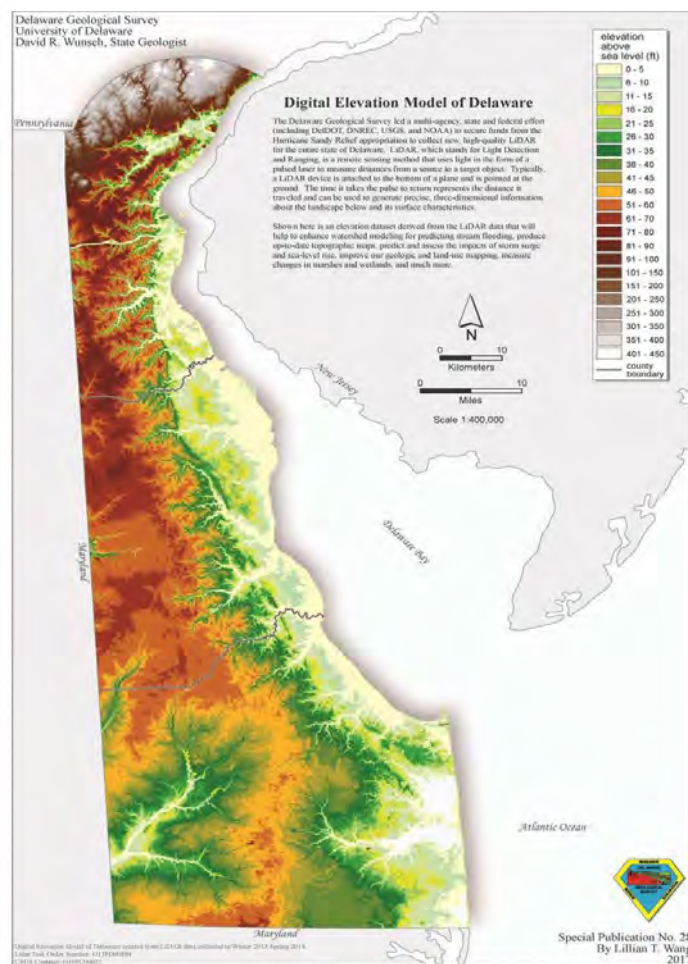
⁵Wilmington Area Planning Council, 2050 Regional Transportation Plan (WILMAPCO, 2023), 23–24, https://wilmapco.org/Rtp/2050_RTP_2023_update_4_6_2023.pdf.

⁶“New Castle County Topographic Map,” en-gb.topographic-map.com, accessed September 11, 2025, <https://en-gb.topographic-map.com/map-nphmt/New-Castle-County/>.

⁷Delaware Department of Natural Resources and Environmental Control, Delaware River Basin Commission, “Delaware River Basin Overview” (DNREC, 2022), 5, <https://dnrec.delaware.gov/climate-plan/>.

indicates primary surface-water flow paths across the state's 2,489 square miles.⁸ The map's legend clearly identifies elevation increments in feet, providing essential context for interpreting New Castle County's more detailed terrain.

Figure 2.1 Elevation Map of Delaware



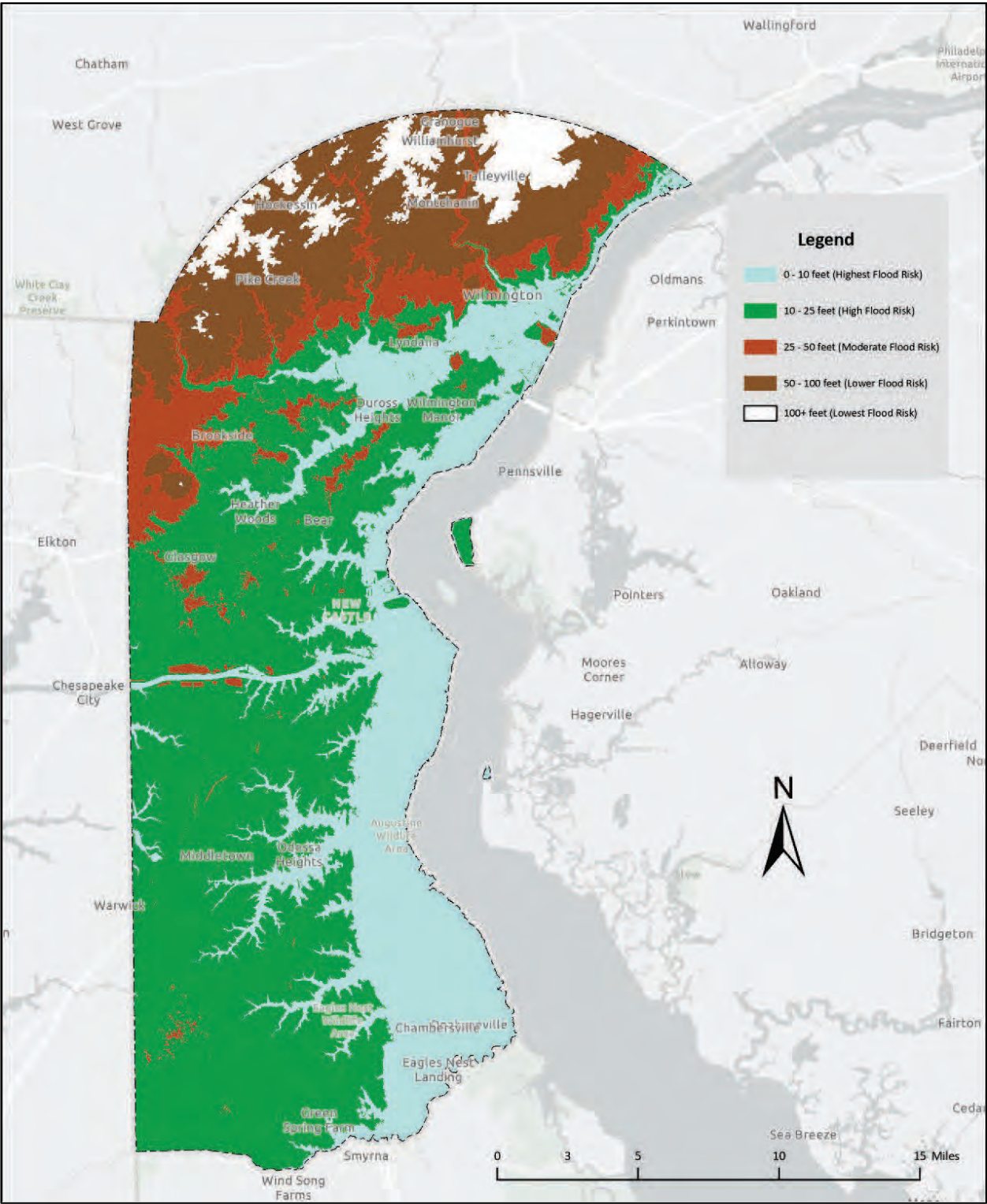
Source: Delaware Geological Survey

Figure 2.2 presents a classified elevation model for New Castle County, dividing the landscape into five FEMA-aligned risk categories: 0–10 ft (Highest Flood Risk, light blue), 10–25 ft (High Flood Risk, green), 25–50 ft (Moderate Flood Risk, burnt orange), 50–100 ft (Lower Flood Risk, dark brown), and above 100 ft (Lowest Flood Risk, white). Low-lying areas concentrated along the Delaware River, Christina River, and Bay shoreline are immediately evident as the light blue and green zones that host key transport corridors and intense urbanization.⁹ In contrast, the elevated Piedmont plateau appears in the brown and white bands, signifying natural refuges from inundation.

⁸ Delaware Geological Survey, Special Publication No. 28, Digital Elevation Model of Delaware, by Lillian T. Wang (Newark: University of Delaware, 2017), https://www.dgs.udel.edu/sites/default/files/publications/sp28_2017.pdf.

⁹ New Castle County Department of Land Use, "Refined NCC Elevation Raster" (ArcGIS Online layer, 2025), <https://de-firstmap-delaware.hub.arcgis.com/datasets/delaware::refined-ncc-elevation/explore>.

Figure 2.2 Elevation Map of New Castle County



Sources: Delaware Office of State Planning Coordination, Esri, National Aeronautics and Space Administration, US Geological Survey, US Environmental Protection Agency, US Department of Agriculture, US Fish and Wildlife Services, New Jersey Office of GIS

The spatial distribution of these classes holds direct implications for hazard mitigation planning. First, floodplain management efforts recommend focus on the light blue and green bands to safeguard critical utilities and densely populated communities. Second, land-use policies recommend new residential or commercial development within the Highest and High Flood Risk zones, instead promoting open-space buffers or flood-resilient infrastructure. Third, evacuation routes and emergency access roads are best suited within the Moderate and Lower Flood Risk bands to ensure reliable connectivity during extreme high-water events. Fourth, targeted structural mitigation—such as floodproofing, stormwater detention, and levee reinforcement—should concentrate on the transitional edges between High and Moderate Risk zones, thereby smoothing the risk gradient where urban expansion abuts floodplain fringe areas. Fifth, integrating this elevation framework with demographic and social vulnerability data will enable prioritizing outreach, early-warning systems, and resource allocation in communities where low elevation coincides with high population density for current and future mitigation actions.

2.2.1 Climate

New Castle County experiences a temperate, humid climate characterized by four distinct seasons and moderated by proximity to the Atlantic coast and Delaware Bay. According to the most recent 30-year normals (1991–2020) published by the National Oceanic and Atmospheric Administration, the county’s mean annual temperature is 54.3 °F, with mean monthly temperatures ranging from 31.2 °F in January to 77.3 °F in July.¹⁰

Precipitation totals average 43.2 inches per year, distributed relatively evenly throughout the year. Monthly rainfall peaks in May (4.6 inches) and July (4.4 inches), while February is the driest month (3.1 inches). Seasonal snowfall averages 19.8 inches, with January and February together accounting for over half of the annual total.

Storm patterns combine both convective and frontal systems. Thunderstorms occur most frequently in late spring and summer, sometimes producing localized flooding and hail. Nor’easters and strong coastal storms in winter and early spring can deliver heavy snow, ice accumulations, and powerful coastal surges along the Delaware Bay shoreline. Annual variability in precipitation and temperature underscores the need for adaptive stormwater management and floodplain regulation.

These climatic conditions directly influence hazard profiles: summer convective storms drive intense runoff events in urban watersheds, whereas winter ice and snow can paralyze transportation and impede emergency response. Likewise, prolonged wet spells heighten soil saturation, increasing landslide and debris-flow risk on the county’s upland slopes. Understanding these seasonal dynamics is essential for aligning mitigation measures—such as detention basins, snow-removal planning, and coastal surge barriers—with the county’s meteorological regime.

2.2.2 Physical Features

New Castle County’s landscape is defined by the juxtaposition of the Piedmont Plateau and the Atlantic Coastal Plain, separated by the geologic Fall Line that runs just north of Wilmington. The Piedmont region in the county’s northern tier consists of weathered crystalline bedrock—primarily schist, gneiss, and quartzite—forming rolling hills and narrow stream valleys. Soils here are generally

¹⁰ NOAA National Centers for Environmental Information, “U.S. Climate Normals 1991–2020,” Wilmington Station ID GHCND:USW00013752 (accessed September 12, 2025), <https://www.ncei.noaa.gov/products/us-climate-normals>.

well-drained loams with moderate to steep slopes, lending natural stability yet presenting erosion concerns along cutbanks and road embankments.¹¹

South of the Fall Line, unconsolidated sediments of the Coastal Plain dominate. Layered deposits of clay, silt, sand, and gravel extend to the Delaware Bay shoreline, underlain at depth by confining clay layers that influence groundwater flow. These sediments create broad floodplains along major waterways such as the Christina River, Brandywine Creek, and Red Clay Creek. Floodplain soils—classified as Hydrologic Soil Group C and D—exhibit low infiltration rates, increasing surface runoff, and elevating flood peaks during heavy precipitation events.¹²

Karst features are absent in New Castle County; however, shallow groundwater near the Fall Line contributes to natural springs and seeps, notably along perennial streams that served historic mill operations. The county's bedrock aquifers yield high-quality water. Still, they are sensitive to contamination from surface activities. At the same time, the overlying Coastal Plain aquifers provide the primary source for municipal and industrial supply, regulated through the Delaware Department of Natural Resources and Environmental Control's Source Water Assessment Program.¹³

Flood hazard extents, as delineated by FEMA's Flood Insurance Rate Maps, reveal that over 20% of the county's land area lies within the 1-% annual chance floodplain. These floodplains coincide with the low-lying Coastal Plain and river valley margins, underscoring their significance for hazard mitigation. Artificial features—such as the Chesapeake and Delaware Canal and the Hoopes Dam reservoir—alter natural hydrology, necessitating careful integration of levees, detention basins, and stormwater networks into the county's resilience planning.¹⁴

2.2.3 Watersheds

New Castle County's hydrologic framework comprises a network of eight principal watershed units that drain northward into the Delaware River and eastward into Delaware Bay and the Chesapeake Bay, as illustrated in Figure 2.3. The Piedmont watersheds—White Clay Creek, Red Clay Creek, Brandywine Creek, and Shellpot Creek—originate in the rolling uplands north of the Fall Line and converge near Wilmington, supplying both drinking water and industrial process flow. These streams traverse fractured bedrock channels, where steep gradients accelerate runoff and heighten the potential for flash flooding during intense storm events.¹⁵

South of the Fall Line, the Coastal Plain watersheds—Appoquinimink River, Blackbird Creek, Bohemia Creek, and the Sassafras River drainage—occupy broad floodplains underlain by fine-grained sediments. The Appoquinimink watershed, covering approximately 150 square miles,

¹¹ Delaware Geological Survey, GM13 Geologic Map of New Castle County, Delaware (Newark: University of Delaware, 2005), <https://www.dgs.udel.edu/sites/default/files/publications/GIS/data/gm13.pdf>.

¹² U.S. Department of Agriculture, Natural Resources Conservation Service, Soil Survey of New Castle County, Delaware (Washington, DC: USDA, 2014), https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/delaware/DE011/0/DE011.pdf.

¹³ Delaware Department of Natural Resources and Environmental Control, "Source Water Assessment Report: New Castle County," Delaware DNREC Water Supply Section, 2023, <https://dnrec.delaware.gov/water/Pages/SWAP.aspx>.

¹⁴ Federal Emergency Management Agency, Digital Flood Insurance Rate Map Panel 10003C, New Castle County, Delaware (FEMA, 2019), <https://msc.fema.gov/portal>.

¹⁵ U.S. Geological Survey, National Hydrography Dataset, "New Castle County Hydrologic Units" (accessed September 12, 2025), <https://nhd.usgs.gov>.

conveys the bulk of surface runoff from interior farmlands and suburban developments to Delaware Bay, where tidal backwater complicates upstream flood peaks.¹⁶ Bohemia and Sassafras watersheds, shared with Cecil County, Maryland, exhibit similar tidal influences and require coordinated interstate flood mitigation strategies.

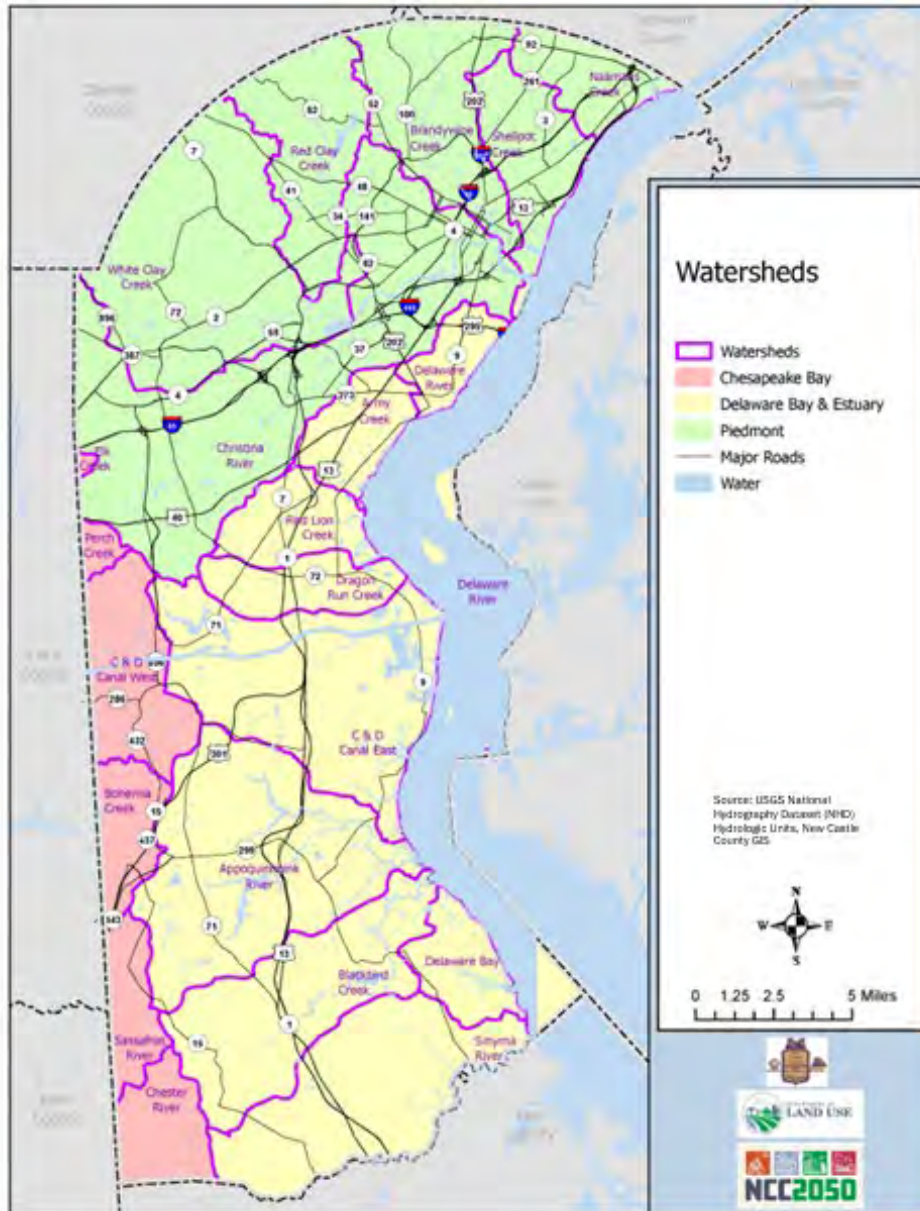
The Chesapeake and Delaware Canal bisect the county's central zone, creating artificial watershed divides that alter historic flow patterns. East of the canal, the Drawyers Creek and Dragon Run sub watersheds contribute to the Delaware Bay estuary system; west of the canal, headwaters of the Chester River watershed lie just beyond the county line. Hydraulic control structures at C&D Canal locks modulate both maritime traffic and local groundwater levels, affecting floodplain recharge and saltwater intrusion risks.¹⁷

Watershed delineation underpins hazard mitigation planning by identifying nodes of vulnerability and guiding the placement of structural controls. In upland sub catchments, detention basins and riparian buffers can attenuate stormwater peaks, reducing downstream inundation in urbanized corridors. In tidal estuary zones, restoration of marshlands and living shorelines buffers surge impacts and stabilizes eroding banks. Moreover, interjurisdictional coordination—particularly for watersheds shared with Maryland and Pennsylvania—ensures that upstream land-use changes do not exacerbate flood hazards in New Castle County.

¹⁶ New Castle County Department of Land Use, GIS Division, “Watersheds of New Castle County” (ArcGIS Online layer, 2024), <https://de-firstmap-delaware.hub.arcgis.com/datasets/delaware::ncc-watersheds/explore>.

¹⁷ U.S. Army Corps of Engineers, “Chesapeake & Delaware Canal Hydraulics Report” (Philadelphia District, 2020), https://www.nap.usace.army.mil/Portals/39/docs/CandD/2020_Hydraulics_Report.pdf.

Figure 2.3 New Castle County Watersheds



Source: New Castle County 2050 Comprehensive Plan

2.2.4 Municipalities/Jurisdictions

New Castle County comprises thirteen incorporated municipalities: four cities, six towns, and three villages. As of July 1, 2024, the City of Wilmington encompasses 10.85 square miles and has a population of 71,365, representing approximately 12.2% of the county's total population.

Table 2.1 shows each of the municipalities/jurisdictions participating in New Castle County's Hazard Mitigation Plan Update.

Table 2.1 Jurisdictions of NCC

Cities	
Delaware City	Newark
New Castle	Wilmington
Towns	
Bellefonte	Elsmere
Middletown	Newport
Odessa	Townsend
Villages	
Arden	Ardencroft
Ardentown	

2.3 Demographics and Socio-Economic Profile

New Castle County's resident population reached an estimated 571,719 as of July 1, 2024. Growth patterns varied markedly among municipalities. Middletown expanded by 36.1% between 2010 and 2024 to 25,686 residents, while Townsend recorded a 44.1% rise to 2,941. In contrast, Newark's population declined slightly by 0.4% to 30,506, and Wilmington grew by 3.2% to 73,176.

Incorporated places collectively housed 149,644 persons in 2024, a 7% increase over 2010, whereas unincorporated areas grew by 10% to 438,449—now accounting for 76.7% of the county total. Such suburban and rural expansion reflects continued housing development outside historic urban cores.

Household composition trends indicate that 32.5% of households include children under 18, and 25.7% contain at least one member aged 65 or older. The county's median age of 35 years aligns with the national figure, although projections suggest that by 2030, more than 27% of residents will be aged 60 and above. Racial and ethnic diversity has increased steadily: non-Hispanic white residents comprised 56.5% of the population in 2023, down from 63.8% in 2010, while Hispanic or Latino residents grew to 12.5%.

Table 2.2 Population of NCC Jurisdictions^{18 19}

Cities	2010 Census	2020 Census	2024 Population Estimate	Percentage change 2010-2024
Delaware City	1,780	1,882	1,933	+8.6%
Newark	31,776	30,621	30,506	-2.7%
New Castle	5,117	5,552	5,715	+11.7%
Wilmington	70,941	70,889	73,176	+3.2%
Towns	2010 Census	2020 Census	2024 Population Estimate	Percentage change 2010-2024
Bellefonte	1,193	1,226	1,249	+4.7%
Elsmere	5,975	6,233	6,234	+4.3%

¹⁸ <https://www2.census.gov/library/publications/decennial/2010/cph-2/cph-2-9.pdf>

¹⁹ U.S. Census Bureau. (2025). *Annual Estimates of the Resident Population for Incorporated Places in Delaware: April 1, 2020 to July 1, 2024* (SUB-IP-EST2024-POP-10).

Middletown	18,871	23,201	25,686	+36.1%
Newport	907	909	909	+0.2%
Odessa	359	365	366	+1.9%
Townsend	2,041	2,718	2,941	+44.1%
Villages	2010 Census	2020 Census	2024 Population Estimate	Percentage change 2010-2024
Arden	427	430	437	+2.3%
Ardencroft	211	228	234	+10.9%
Ardentown	271	254	258	-4.8%
County	2010 Census	2020 Census	2024 Population Estimate	Percentage change 2010-2024
NCC	538,479	570,719	149,644	+9.2%
Total Incorporated Areas	139,869	144,508	149,644	+7.0%
Unincorporated Areas	398,610	426,211	438,449	+10.0%

Table 2.3 NCC Population Age Breakdown²⁰

Population Group	Percentage of Total Population
Persons under 5 years	5.6%
Persons under 18 years	20.2%
Persons 65 years and over	17.3%
Persons under 65 with a disability	9.1%

Table 2.4 NCC County Racial Breakdown^{21 22}

Race	Percentage of Total Population
White alone	56.5%
Black or African American alone	25.3%
American Indian and Alaska Native alone	0.2%
Asian alone	5.9%
Native Hawaiian and Other Pacific Islander alone	0.04%
Some Other Race alone	4.7%
Two or More Races	7.4%
Hispanic or Latino (of any race)*	12.5%

* Note: Race and Hispanic/Latino ethnicity are collected as separate questions in the Census, so the total populations differ slightly between tables due to different universe definitions.

Table 2.5 indicates that New Castle County contained 235,057 housing units in 2023, of which 222,943 (94.9%) were occupied. Among occupied units, owner-occupied dwellings comprised 68.5% (152,742 units), while renter-occupied units represented 31.5% (70,201 units). The high occupancy rate reflects sustained demand for housing across suburban and urban jurisdictions. Owner-occupancy predominates in established residential neighborhoods and newer master-

²⁰ <https://data.census.gov/table/ACSST5Y2023.S0101?g=050XX00US10003&tid=ACSST5Y2023.S0101>

²¹ <https://data.census.gov/table/ACSDT5Y2023.B02001?g=050XX00US10003&tid=ACSDT5Y2023.B02001>

²² <https://data.census.gov/table?q=B03003&g=050XX00US10003>

planned communities, whereas rental tenure is more common in Wilmington, Newark, and near major employment centers.

Table 2.5 NCC Housing Statistics²³

Subject	Estimate
Total Households	222,943
Total housing units	235,057
Occupied housing units	222,943
Owner occupied	152,742
Renter occupied	70,201

Table 2.6 reveals considerable income diversity among New Castle County households. At the lower end of the spectrum, 4.1% of households earn less than \$10,000 annually, underscoring pockets of economic vulnerability. Approximately 16.2% of households fall within the \$10,000–\$24,999 range, reflecting modest wages among service and entry-level occupations. Middle-income brackets (\$50,000–\$99,999) account for 30.0% of households, indicative of a substantial professional and managerial workforce. The largest single cohort (20.1%) resides in the \$100,000–\$149,999 bracket, while 17.4% of households report incomes of \$150,000 or more, illustrating the presence of high-earning professionals and executives.

These housing and income patterns inform hazard mitigation priorities by identifying communities with limited financial resilience and housing tenure constraints. Rental households may face heightened risk due to constrained resources for property-level mitigation, and lower-income areas often coincide with flood-prone neighborhoods. Targeted outreach, grant assistance, and resilient building programs should therefore prioritize these vulnerable segments to enhance overall community resilience.

Table 2.6 NCC Household Income²⁴

Income Bracket (2023 Dollars)	Occupied Housing Units	Percentage of Occupied Housing Units
Less than \$5,000*	4,066	1.8%
\$5,000 to \$9,999*	5,083	2.3%
\$10,000 to \$14,999	8,471	3.8%
\$15,000 to \$19,999	7,794	3.5%
\$20,000 to \$24,999	8,473	3.8%
\$25,000 to \$34,999	20,055	9.0%
\$35,000 to \$49,999	18,514	8.3%
\$50,000 to \$74,999	35,447	15.9%
\$75,000 to \$99,999	31,434	14.1%
\$100,000 to \$149,999	44,811	20.1%
\$150,000 or more	38,792	17.4%

** Note: The specific dollar brackets are based on the latest available ACS categories, and the household counts are derived by applying proportions from detailed tables in the ACS 2023 5-year estimates. Exact*

²³ <https://data.census.gov/table/ACSDP5Y2023.DP04?q=DP04&g=050XX00US10003>

²⁴ <https://data.census.gov/table/ACSST5Y2023.S1901?g=050XX00US10003&tid=ACSST5Y2023.S1901>

counts for some income ranges are not directly published publicly, so estimates, such as "~33,000" for less than \$25,000, have been refined based on the detailed percentages.

New Castle County exhibits a broad spectrum of household incomes, as shown in Table 2.6. At the lower end, 1.8% of households report annual earnings below \$5,000, and an additional 2.3% fall within the \$5,000–\$9,999 bracket. Combined, these lowest two cohorts—totaling 9,149 households—may face acute financial hardship and have limited capacity to invest in property-level mitigation measures.

Modest-income groups (\$10,000–\$24,999) comprise 11.1% of households, reflecting wages typical of entry-level service, retail, and seasonal occupations. The lower-middle segment (\$25,000–\$49,999) accounts for 17.3%, indicating a significant portion of the population earning near or just above the poverty threshold.

The middle-income range (\$50,000–\$99,999) encompasses 30.0% of households, suggesting a sizable professional and technical workforce with moderate resilience to hazard-related expenses. The largest concentration (20.1%) resides in the \$100,000–\$149,999 bracket, while the highest-income cohort (\$150,000 or more) represents 17.4% of households. These upper segments likely possess greater financial capacity for proactive mitigation actions such as floodproofing, elevation, or backup power installations.

Understanding this income distribution is essential for targeting hazard mitigation assistance. Lower-income and renter-occupied households—particularly those in flood-prone zones—should be prioritized for grant programs, technical support, and community outreach to reduce vulnerability and ensure equitable resilience across income strata.

2.4 Employment and Industry Profile

New Castle County's civilian workforce numbered 306,800 in 2023, reflecting a diverse economic base that shapes both daily life and regional resilience. The educational services, health care, and social assistance sector employs the largest share—70,667 workers or 23.0 % of the total—underscoring the county's role as a medical and academic hub. Retail trade follows with 32,593 employees (10.6 %), serving both local consumers and cross-state commuters along major highways.

Manufacturing remains a significant contributor, with 16,925 positions (5.5 %) centered in chemicals, pharmaceuticals, and precision products—industries that depend on reliable power, transportation, and water infrastructure. The professional, scientific, management, administrative, and waste management services sector employs 29,750 residents (9.7 %), reflecting growth in corporate headquarters, research facilities, and environmental services. Financial activities, including banking, insurance, real estate, rental, and leasing—account for 17,246 workers (5.6 %), anchored by regional offices of national institutions.

Construction (13,862 jobs; 4.5 %) and transportation, warehousing, and utilities (12,003 jobs; 3.9 %) highlight the county's ongoing growth in residential development and distribution networks. Public administration employs 21,983 individuals (7.2 %), illustrating the government's substantial role in education, emergency management, and social services. Smaller sectors—information (1.9 %), wholesale trade (2.6 %), arts and recreation (8.6 %), and agriculture and mining (0.4 %)—round out the employment landscape.

Table 2.7 NCC Employment by Industry Breakdown ²⁵

Industry	Number of Employees	Percentage
Civilian employed population, 16 years and older	306,800	100%
Agriculture, forestry, fishing, hunting, and mining	1,138	0.4%
Construction	13,862	4.5%
Manufacturing	16,925	5.5%
Wholesale trade	8,075	2.6%
Retail trade	32,593	10.6%
Transportation, warehousing, and utilities	12,003	3.9%
Information	5,700	1.9%
Finance and insurance, and real estate, rental, and leasing	17,246	5.6%
Professional, scientific, management, and administrative, and waste management services	29,750	9.7%
Educational services, health care, and social assistance	70,667	23.0%
Arts, entertainment, recreation, accommodation and food services	26,512	8.6%
Other services, except public administration	8,606	2.8%
Public administration	21,983	7.2%

Table 2.8 lists New Castle County's top ten private- and public-sector employers, many of which are critical to post-disaster recovery and continuity of operations. These include:

AstraZeneca; JPMorgan Chase & Co.; Bank of America; M&T Bank (formerly Wilmington Trust); ChristianaCare Health System; State of Delaware; Comcast Corporation; University of Delaware; DuPont; and Wilmington University.

Table 2.8 Top Major Employers in NCC ²⁶

Major Employers	
AstraZeneca	JPMorgan Chase & Co
Bank of America	M&T Bank (formerly, Wilmington Trust)
ChristianaCare Health System	State of Delaware
Comcast Corporation	University of Delaware
DuPont	Wilmington University

2.5 Education/Institutional

New Castle County's public education infrastructure comprises a network of 128 institutions serving students from early childhood through secondary levels. Sixty-seven elementary schools anchor neighborhood learning, offering foundational instruction to children in grades K–5. Thirty middle schools bridge the transition to adolescence, while twenty-three high schools prepare older students for postsecondary pathways or the workforce. In addition, eight dedicated pre-kindergarten and kindergarten centers support early literacy and developmental readiness.

Complementing the traditional system are twenty-one specialized public choice schools. Ten vocational-technical (vo-tech) institutions deliver career and technical education in fields such as

²⁵ https://www.bls.gov/regions/mid-atlantic/news-release/countyemploymentandwages_delaware.htm

²⁶ Top Major Employers data compiled from Delaware state and county economic development publications and the BLS' QCEW summaries.

health sciences, engineering, and information technology. Eleven charter schools provide alternative pedagogical models, emphasizing themes ranging from STEM immersion to classical liberal arts. Combined and special-needs schools, though not disaggregated by grade level in the 2023–2024 dataset, further enhance options for Delaware students.

Table 2.9 NCC Public Schools²⁷

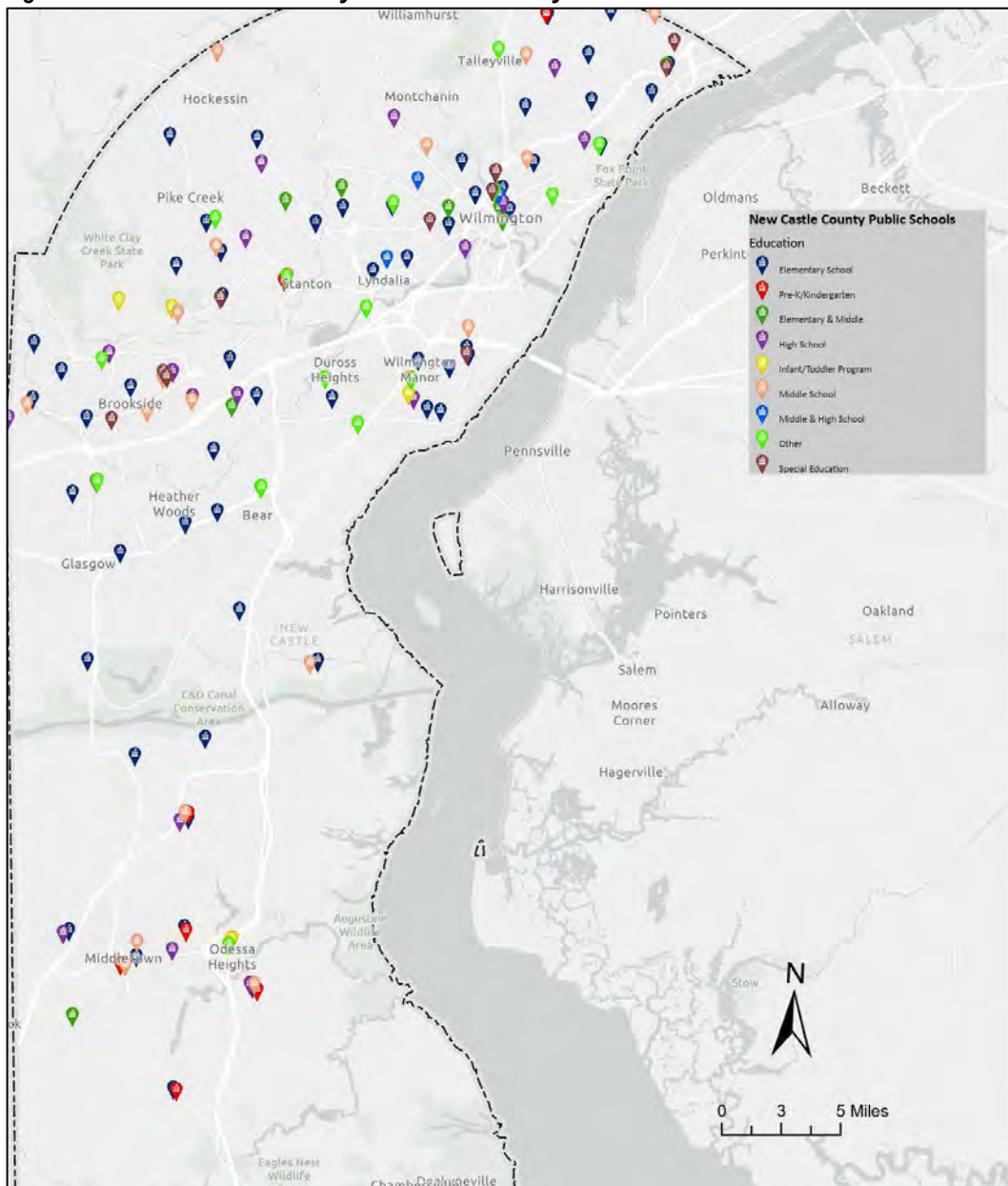
Public Schools*	Number in NCC
Elementary schools	67
Middle schools	30
High schools	23
Pre-kindergarten/kindergarten	8
Public Choice Schools	Number in NCC
Vocational technical (Vo-tech) schools	10
Public charter schools	11

**For the 2023-2024 school year, “Special, alternative, and other” Delaware public schools were not separately counted by age group. Additionally, combined schools are counted in each applicable category.*

The geographic distribution of these facilities highlights their crucial role in enhancing hazard resilience. Schools frequently serve as community shelters during emergencies and as staging areas for disaster response. Consequently, as depicted in Figure 2.4, schools concentrated within low-lying flood zones—particularly along the Christina River corridor—require robust mitigation measures, such as elevated electrical systems, floodproofed gymnasiums, and redundant power supplies. In upland areas, school campuses can integrate stormwater retention features and serve as neighborhood hubs for community education on preparedness.

²⁷ <https://de-firstmap-delaware.hub.arcgis.com/datasets/delaware::delaware-schools/explore?layer=0&location=39.579544%2C-75.480141%2C9.74&showTable=true>

Figure 2.4 New Castle County Public Schools by Education Level



Source: Delaware FirstMap Program, US Census Bureau

New Castle County is home to a robust higher education sector comprising public, private, and specialized institutions. The University of Delaware maintains two main campuses: the historic Newark site, serving approximately 24,000 undergraduates and 5,000 graduate students, and the Wilmington campus, which focuses on professional and continuing studies. Delaware Technical Community College operates its largest center in Wilmington, enrolling over 15,000 students in workforce training, technical certificates, and associate-degree programs.

Within the private sector, Wilmington University offers comprehensive undergraduate and graduate curricula at its New Castle and Brandywine/Wilmington locations, supporting roughly 20,000

learners with flexible evening and online options. Goldey–Beacom College, situated in Pike Creek, specializes in business and finance programs for about 1,500 students. The Widener University Delaware Law School, located in Wilmington, educates future legal professionals through its Juris Doctor and LL.M. offerings.

Additional niche institutions expand the county’s educational portfolio. Strayer University–Delaware delivers career-oriented bachelor’s and master’s degrees in business and information technology. The Relay Graduate School of Education offers teachers and administrators advanced pedagogical training and leadership certification, attracting candidates from across the state.

Table 2.10 Public and Private Universities in NCC

Public Universities	Private Universities
University of Delaware, Newark	Wilmington University, New Castle
University of Delaware, Wilmington	Wilmington University, Brandywine/Wilmington
Delaware Technical Community College, Wilmington (Orlando J. George Jr. Campus)	Goldey-Beacon College
Delaware Technical Community College, Newark (Stanton Campus)	Widener University Delaware Law School
	Strayer University – Delaware
	Relay Graduate School of Education

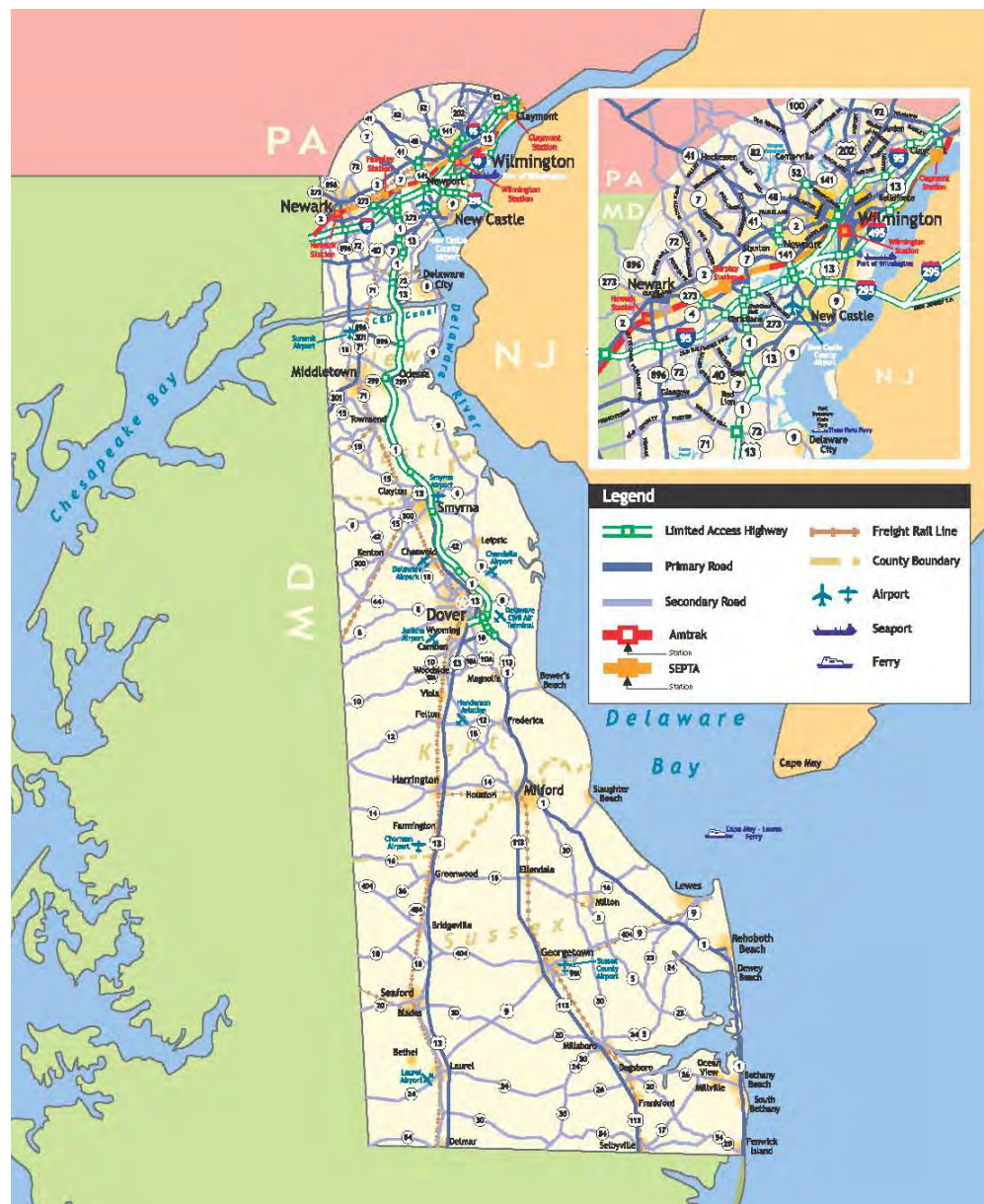
2.6 Transportation

Figure 2.5 depicts New Castle County’s multimodal transportation network, which underpins both economic vitality and emergency response capabilities. Limited-access highways, notably Interstate 95 and Interstate 295, traverse the county in a north–south direction, facilitating regional commuter flows between Philadelphia, Baltimore, and Washington, D.C. U.S. Routes 13, 40, and 202 provide primary arterial links to Newark, Wilmington, and the Chesapeake and Delaware Canal corridor. Secondary roads, including high-capacity county routes such as DE 1 and DE 7, distribute traffic into suburban and rural communities.

Freight rail lines operated by CSX and Norfolk Southern parallel the primary highway corridors, enabling bulk movement of chemicals, bulk commodities, and manufactured goods to and from the Port of Wilmington, one of the East Coast’s deepest natural harbors. Amtrak and SEPTA passenger services connect Wilmington and Newark to Philadelphia and New York City, with stations situated centrally within flood-prone river valleys yet elevated above the 1 % annual chance floodplain. The Wilmington Airport (ILG) and Delaware River and Bay Authority’s Cape May–Lewes Ferry terminal further diversify mobility options, offering air and marine access for passengers and critical supplies.

This integrated network has direct implications for hazard mitigation planning. Highways and rail lines situated within low-elevation corridors require redundancy analyses and floodproofing of bridges and culverts to ensure continuity of evacuation routes. Passenger rail stations and airport terminals serve as potential shelter-in-place locations but recommend be assessed for flood risk and retrofitted with flood barriers where necessary. The ferry terminal and port facilities demand surge-resilient wharves and reinforced access roads to maintain maritime lifelines during coastal storm events. Coordination among DelDOT, rail operators, and maritime authorities is essential to preposition equipment, stage response personnel, and implement rapid repairs when infrastructure is impaired.

Figure 2.5 Map of Delaware Transportation

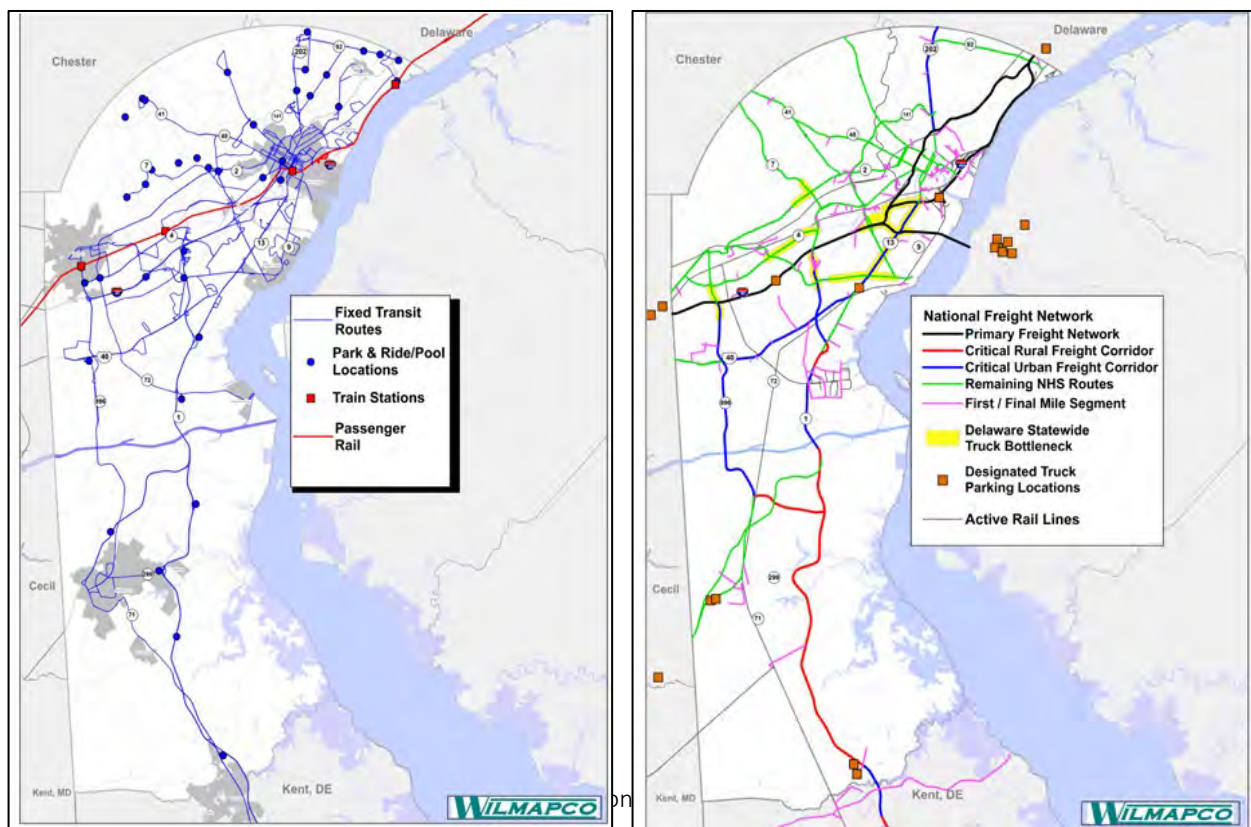


Source: DelDOT 2018 Fact Book

Figure 2.6a illustrates New Castle County's fixed-route transit and regional rail connections. Suburban and urban bus lines (blue) converge on Wilmington and Newark, providing lifeline service to park-and-ride lots (blue circles) and Amtrak/SEPTA stations (red squares). The radial pattern of routes extending into northern and southern municipalities ensures access to critical services, yet many corridors traverse low-lying flood-prone areas along the Christina River and adjacent tributaries. Consequently, flood-resilient design of bus depots and elevated boarding platforms is essential to maintain continuity of service during high-water events. Coordination with rail operators to implement co-located shelters at combined bus–rail transfer points further strengthen evacuation options for transit-dependent populations.

Figure 2.6b depicts the county's role in the National Freight Network, with primary freight corridors (black) following Interstate 95 and key arterial highways. Critical urban (red) and rural (blue) freight routes feed into these backbone lines, while first-/final-mile segments (purple) connect industrial parks and the Port of Wilmington. Designated truck parking sites (orange squares) and identified statewide bottlenecks (yellow) highlight areas where congestion and infrastructure vulnerability intersect. Mitigation strategies should include elevating critical overpasses, reinforcing bridges against scour, and pre-positioning portable barriers at identified flood-vulnerable nodes. Ensuring redundant east–west linkages across the Chesapeake and Delaware Canal will preserve supply-chain resilience during major storm events.

Figures 2.6 New Castle County Transportation (Right) and Freight Network (Left)



Source: Wilmington Area Planning Council

2.7 Utilities

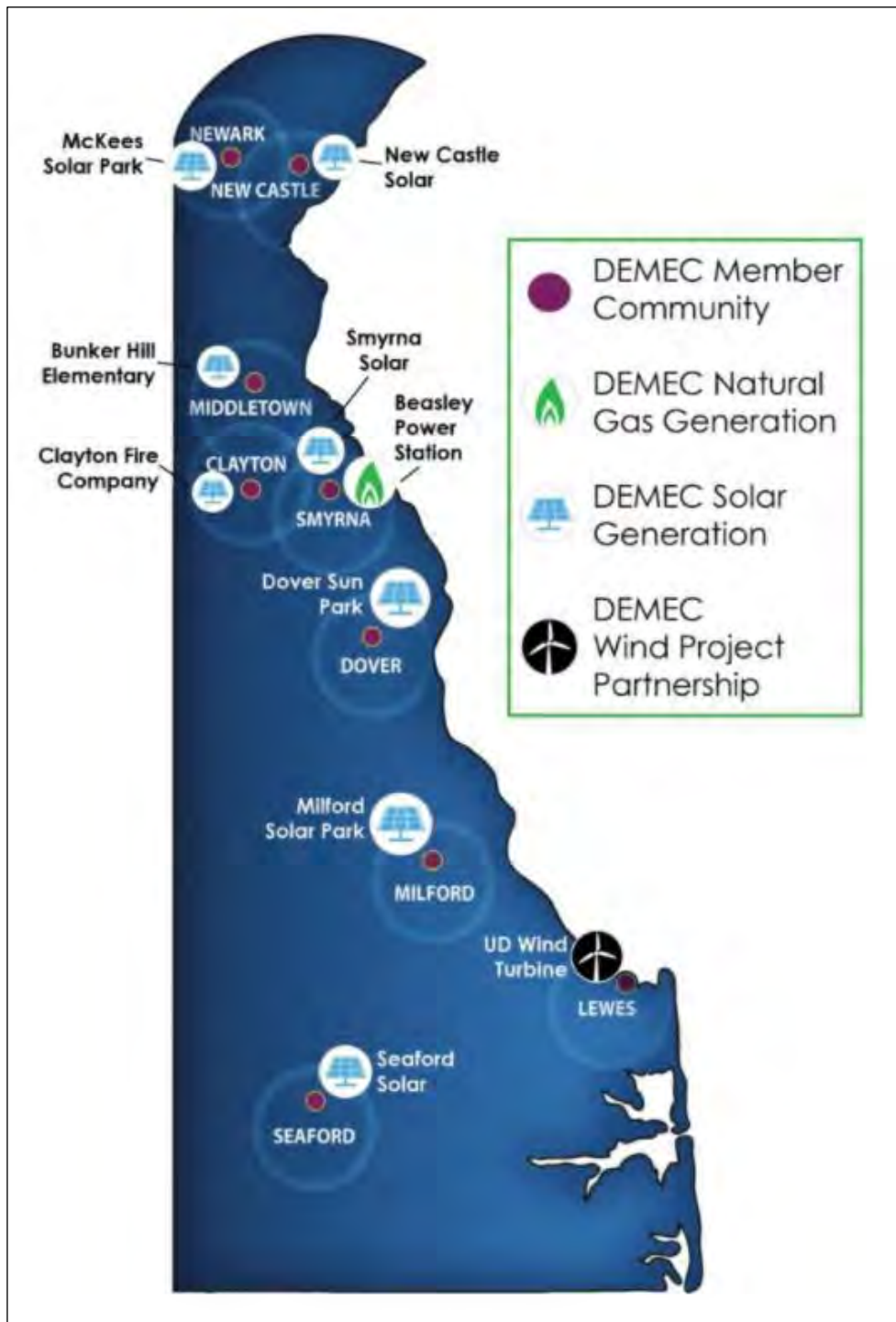
The Water Supply Section of the Delaware Department of Natural Resources and Environmental Control (DNREC) issues well and water allocation permits and licenses water well contractors. The section also oversees statewide drought management, groundwater quality monitoring, and wellhead and source water protection programs. The section works with the Delaware River Basin Commission (DRBC) to manage water withdrawal from the Delaware River.

The Water Supply Coordinating Council, established by the Delaware General Assembly, works to develop and publish water supply plans for NCC. The Well Permits Branch manages and issues well construction and use permits for wells that withdraw 50,000 gallons of water or less daily. The Water Well Licensing Board oversees the licensing of well drilling professionals, developing forms and examinations, reviewing applications, examining candidates, and making recommendations for actions by the DNREC.

While residents of NCC get their water supply from drilling wells, many individual homeowners in small towns and rural areas do not have the protections offered by municipal systems. In addition, there is a threat of water contamination caused by fertilizers, insecticides, or other substances leaching into the ground.

The Delaware Municipal Electric Corporation (DEMEC) is a public utility and a Joint Action Agency that represents nine municipal electric departments in the State, including the electric departments of Dover, Milford, Clayton, and Smyrna. DEMEC invests in a range of electricity generation sources, including natural gas, solar, and wind energy, as illustrated in Figure 2.7.

Figure 2.7 DEMEC Power Generation Stations



Source: Delaware Municipal Electric Corporation

2.8 Land Use

Figure 2.8 reproduces the Future Land Use Map adopted in the New Castle County 2050 Comprehensive Plan, which delineates ten land-use categories to guide development through mid-century. Predominant among these is the Resource Preservation district (shaded dark green), encompassing nearly one-third of the county's area. These lands include protected woodlands, agricultural tracts, and environmentally sensitive corridors, where future development is discouraged to safeguard water quality, wildlife habitat, and open-space continuity.

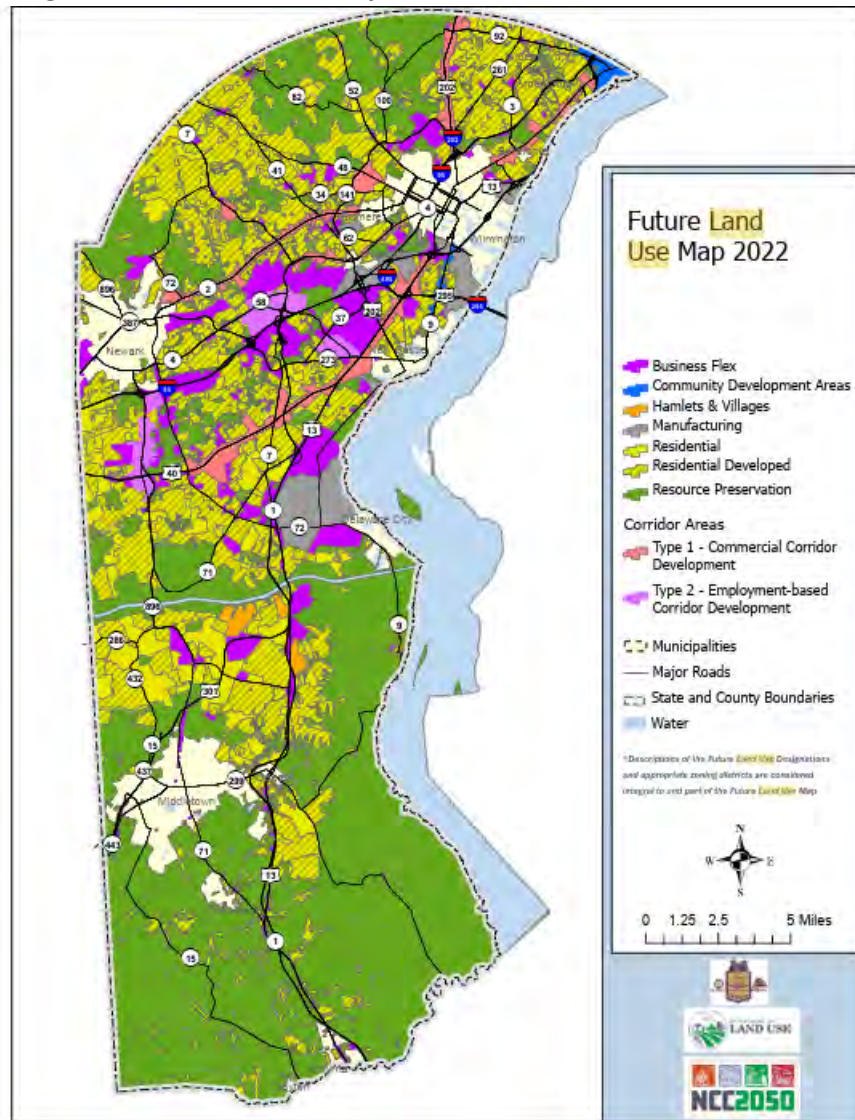
Adjacent to preservation zones lie the Residential (Developed) areas (yellow crosshatch), which account for roughly 25 % of land cover. These districts reflect existing neighborhoods and are targeted for infill housing, streetscape enhancements, and stormwater retrofits to mitigate flooding in aging subdivisions. In contrast, Residential districts (solid yellow) represent undeveloped or underutilized parcels earmarked for carefully planned growth, with infrastructure capacity and hazard considerations—such as proximity to floodplains—shaping allowable densities.

The map identifies Business Flex districts (magenta) along major corridors—primarily DE 1, DE 7, and US 13—where mixed commercial, light industrial, and office uses may co-locate. These flexible zones accommodate evolving economic sectors while buffering adjacent residential neighborhoods. Within these corridors, Type 1 Commercial Corridor Development (red overlay) and Type 2 Employment-Based Corridor Development (purple overlay) refine design standards for retail, service, and manufacturing uses, respectively.

Community Development Areas (blue) encompass historic downtowns—such as New Castle and Odessa—and emerging mixed-use centers. These compact districts promote walkability, placemaking, and multimodal access, with special emphasis on higher-ground locations to reduce flood risk. Hamlets & Villages (tan) preserve small-town character in places like Arden and Ardentown, where land-use regulations reinforce traditional lot patterns and green-space buffers.

Finally, Manufacturing districts (gray) remain concentrated along the Christina and Delaware River valleys, reflecting legacy industrial sites that require ongoing site remediation and stormwater management to prevent contaminant runoff. The Future Land Use Map directs that any redevelopment within these zones incorporate resilient design—such as reinforced building pads and on-site detention—to protect both workers and downstream communities from flood hazards.

Figure 2.8 New Castle County Future Land Use



Source: New Castle County 2050 Comprehensive Plan

2.8.1 Growth and Development

Since the turn of the twenty-first century, New Castle County has experienced a dispersed pattern of growth, driven by suburban expansion, strategic infill, and targeted redevelopment. Between 2000 and 2020, the county's population increased by over 15 %, with most new housing constructed in outlying municipalities such as Middletown and Townsend. This outward growth has been facilitated by highway access improvements, particularly along Delaware Route 1 and Interstate 95—and by the availability of affordable land in former agricultural zones.

The NCC 2050 Comprehensive Plan projects continued expansion through 2050, estimating an additional 75,000 residents countywide. To accommodate this growth while mitigating hazard exposure, the plan designates Residential and Residential (Developed) districts in locations with adequate drainage infrastructure and outside the 1-% annual chance floodplain. Simultaneously, the

plan curtails sprawl into Resource Preservation areas, preserving natural buffers that attenuate runoff and maintain groundwater recharge.

Infill development within Community Development Areas, Hamlets, and Villages is prioritized to concentrate population density in already urbanized or formerly platted neighborhoods. Such compact growth reduces impervious surface expansion, lessens stormwater management demands, and leverages existing utilities. Mixed-use redevelopment in nodes like Wilmington's Riverfront and Newark's Main Street enables walkable access to services, decreasing reliance on evacuation-constrained roadways during emergencies.

Commercial and industrial growth is channeled into Business Flex, Manufacturing, and Corridor Areas along major transport arteries. The plan mandates that new development in these zones incorporate on-site stormwater detention, elevated floor slabs where flood risk exists, and setbacks from stream corridors.

Vulnerability to and impacts from all hazards can also be impacted by population change, as seen in Table 2.2 – Population of NCC Jurisdictions, the county has increased in population, twelve (12) of the county's thirteen (13) municipalities have experienced population growth between the 2010 decennial census and the 2024 ACS Population Estimate. These include Delaware City, New Castle, Wilmington, Bellefonte, Elsmere, Middletown, Newport, Odessa, Townsend, Arden, Ardencroft, and Ardentown. With this information, it can be speculated that the twelve (12) municipalities have had an increased vulnerability and impacts from all hazards included in this HMP, since 2010. This increased vulnerability is due to more potential development and that development encroaching on high vulnerability areas for Bradford County, including near the Special Flood Hazard Area and areas in close proximity to hazardous materials locations.

2.9 Data Sources and Limitations

This Community Profile draws on multiple authoritative datasets, each subject to specific constraints:

- **U.S. Census Bureau:** Population, housing, demographic, income, and employment data derive from the 2020 Decennial Census and the 2019–2023 American Community Survey 5-Year Estimates, as well as the 2024 Annual Estimates of the Resident Population for Incorporated Places (SUB-IP-EST2024-POP-10). Small-area survey estimates (ACS) carry margins of error that may affect precision in jurisdictions with low populations and narrow income brackets.
- **Delaware Department of Natural Resources and Environmental Control (DNREC):** Geology, soils, watersheds, and source-water assessments are based on state-sponsored surveys (2005–2023) conducted at varying scales. Soil survey mapping units may not capture recent land-cover changes, and watershed delineations may differ slightly from federal hydrography datasets.
- **Federal agencies:** Elevation and floodplain extents utilize Delaware Geological Survey Special Publication No. 28 (2017) and FEMA Digital Flood Insurance Rate Map panels (2019). Elevation rasters have a vertical accuracy of ± 1 foot, while FIRMs represent regulatory floodplains that may omit unmapped local drainage features or future conditions under climate change.

- **Bureau of Labor Statistics and state economic reports:** Employment by industry and major-employer data combine QCEW summaries and mid-Atlantic regional releases (2023). Quarterly wage data exclude self-employed and informal sectors, potentially underestimating total employment in small business and gig-economy activities.
- **New Castle County GIS and Comprehensive Plan:** Municipal boundaries, land-use designations, transportation networks, schools, and higher-education campus locations are derived from county GIS layers (2022–2025). These layers reflect the county's planning vision but may lag behind recent annexations, roadway realignments, or institutional expansions.
- **Wilmington Area Planning Council (WILMAPCO):** Transit routes, freight corridors, and bottleneck analyses are drawn from the 2023 2050 Regional Transportation Plan and associated GIS datasets. Park-and-ride locations and multimodal facilities may have changed in response to post-pandemic travel patterns.

Limitations include potential temporal mismatches exist among sources.²⁸ Infrastructure layers may not capture post-2022 projects. Floodplain maps reflect existing regulatory standards and may not incorporate planned levee upgrades or future sea-level rise.

²⁸ For example, 2020 Census vs. 2023 ACS vs. 2025 GIS updates.

3.0 CHAPTER 3 – PLANNING PROCESS

3.1 Update Process and Participation Summary

The NCC Hazard Mitigation Plan Update process comprised four main phases: 1) organizing the work group and process; 2) assessing natural hazards, vulnerability, and mitigation capabilities; 3) developing a mitigation plan; and 4) implementing the plan.

Phase 1 – Organize Work Group and Process - The first phase involved educating the County, municipalities, and stakeholders on the planning update process via: 1) Steering Committee; 2) Municipality Questionnaires; and 3) a Public Meeting. Each of these avenues for stakeholder involvement served a specific purpose and involved a different tier of participation to ensure involvement from local, county, and state levels. Each of these will be discussed in detail in the next section of this chapter.

Phase 2 – Assess Hazards, Risks, Vulnerability, and Mitigation Capability - In this step, information on recent past hazard events that affected NCC and its municipalities was gathered, and specific hazard areas were identified. The hazard identification included summaries on past occurrences and the probability of future events. Relevant GIS layers and other data were used to conduct the risk assessment. The vulnerability analysis identified specific areas, including critical facilities that were vulnerable to hazards, and included estimates of potential losses. Past and future development trends were also analyzed as part of this step. The Plan provides a general description of land uses and development trends in the County and identifies high-hazard areas that are not suitable for future development.

The Capability Assessment was conducted to document the roles of various departments/agencies in the County and municipalities, which would develop and implement mitigation actions. The purpose of this assessment was to identify areas for coordination and/or improvement, and to provide a platform to integrate plans and other documents, so that recommendations and strategies are not in contradiction with one another. The Assessment also involved a review of select plans and ordinances from the County, and identified sections in these documents that addressed, or had the potential to address, hazard mitigation issues.

Phase 3 – Develop a Mitigation Plan - Based on data from the hazard, vulnerability, and capability assessments, mitigation goals and objectives were developed that were aimed at protecting the County and municipalities from long-term vulnerability to the identified hazards. A comprehensive range of specific mitigation actions and projects to reduce the effects of each hazard, with emphasis on new and existing buildings and infrastructure, was developed in this step. While some mitigation actions were ‘broader’ in nature and covered the entire County, others were specific to each municipality.

Phase 4 – Implement the Plan - In the final phase, an action plan describing how the mitigation strategies and activities identified would be prioritized, implemented, funded, and administered by the County and its municipalities was developed. Cost estimates and possible funding sources to implement recommended projects were identified. In this phase, the methods to monitor, evaluate, and update the mitigation plan within a five-year cycle were discussed, along with recommendations on how to incorporate community participation into the plan maintenance process.

The planning process was developed around the requirements laid out in the Federal Emergency Management Agency (FEMA) Local Hazard Mitigation Crosswalk.

3.2 The Planning Team

The 2025 NCC Hazard Mitigation Plan update was led by the NCC Department of Public Safety and the Hazard Mitigation Planning Steering Committee. The NCC Steering Committee provided guidance and leadership for the overall project. The steering committee assisted VPC with dissemination of information and administrative tasks. Table 3.1 – Steering Committee outlines the individuals who comprised this team. Those with an asterisk (*) next to their name participated in the planning process and provided input either via meeting attendance, completion of worksheets/questionnaires, and/or working phone calls.

Table 3.1 Plan Update Steering Committee Members and Invitees

Agency/Affiliation/Municipality	Representative	Position
New Castle County	Christopher Hodgden*	Coordinator of Emergency Management
New Castle County	Michael Edwards*	Emergency Management Planner
New Castle County	Trevor Matthews	Emergency Management Planner
New Castle County	Marcus Henry	County Executive
New Castle County	Mona Parikh	Chief Administrative Officer
New Castle County	Elmer Setting	Director of Public Safety
New Castle County	Jane Rattenni	Policy Director
New Castle County	Carrie Casey	Community Service GM
New Castle County	Cleon Cauley*	Public Works GM
New Castle County	Jason Zern	Public Works Manager
New Castle County	Rob Roff*	Public Works Manager
New Castle County	Michael Harris*	Stormwater & Env Program Manager
New Castle County	James Leonard	Chief of Police
New Castle County	Ben Feldmann	Police Major
New Castle County	Don Holden	Chief of Emergency Communications
New Castle County	Chris Williams	Emergency Communications Asst Chief
New Castle County	Mark Logemann*	Chief of EMS
New Castle County	Chris Johnson*	EMS Asst Chief
New Castle County	Andy Bero*	Community Services Admin
New Castle County	John Gysling*	Civil Engineer III
New Castle County	Stephen (Doug) Hokuf*	Chief of Site Management
DEMA	Phil Cane*	Recovery Planner IV
DEMA	Jen Walls*	Manager of Planning
DEMA	Brian Pollock	Principal Planner
DNREC	Michael Powell	Environmental Scientist IV
DNREC	Greg Williams	Solid and Hazardous Waste Management

Agency/Affiliation/Municipality	Representative	Position
DNREC	Janice Shute*	Dam Safety Engineer
DNREC	Katherine Potter*	State NFIP Coordinator
DHSS	Muriel Allaband*	Unknown
	Lori Wall*	Unknown
DelDOT	Dwayne Day	DelDOT Homeland Security Planner
FEMA, DE FIT	William Ethridge*	Community Planner
Christiana Care	Chris Murtha*	Emergency Management Program Manager
Nemours	Michael Jackson*	Emergency Preparedness Coordinator
University of Delaware	Josh Kelly*	Emergency Management Coordinator
	Adam Anderson*	Unknown
Disaster Research Center	James Kendra	Director
New Castle Conservation District	Kevin Donnelly	Coordinator
New Castle Conservation District	Andy Bowman	Manager
Wilmapco	Tigist Zegeye	Executive Director
Chester County, PA	Chris Christensen*	Deputy Director of Emergency Services
Delaware County, PA	Steven Shulz*	Deputy Emergency Management Coordinator
	Larry Bak*	
Kent County, DE	Brandon Olenik	OEM Coordinator
Salem County, NJ	Jeffery Pompper	Deputy Emergency Management Coordinator
Sussex County, DE	Tim Cooper	Deputy Director – EM
Cecil County, MD	Michael Berth*	EM Planner
Arden	Jeffrey Politis	Chair
	Sachin Puranik	Advisory Chair
	Skip Baley	Treasurer
	Simon Hamermesh*	Town Assembly Chair
Ardencroft	Ben Gruswitz	Chair
	Jennifer Abernethy	Secretary
	Don Lipari*	Treasurer
Ardentown	Don Lipari*	Treasurer
	Lisa Wilson Riblett	Trustee
	Melissa Parsonson*	Secretary
Bellefonte	Scott MacKenzie*	Secretary
	Curt Nass	Treasurer

Agency/Affiliation/Municipality	Representative	Position
Delaware City	Paul Johnson*	Mayor
	Britney Loveland	Town Manager
Elsmere	Steve Martin*	Town Manager
	Eric Thompson	Mayor
Middletown	Kenneth L. Branner	Mayor
	Morris Deputy*	Town Manager
New Castle City	Valarie Leary	Mayor
	Antonina Tantillo*	City Manager
Newark	Tom Coleman	City Manager
	Jerry Clifton	Mayor
	Jeff Martindale*	City Manager
Newport	Wendy King*	Town Manager
	Stephanie Banks	Mayor
Odessa	Harvey C. Smith, Jr.	Mayor
	David Wilson*	Fire Chief
Townsend	Julie Goodyear*	Manager
	Scott Lobdell	Mayor
Wilmington	Willie Patrick*	Director of Emergency Management

Each of the neighboring counties were invited to participate in the Steering Committee. Academic Institutions were also provided with an opportunity to participate in the planning process and be a representative on the County Steering Committee.

3.3 Meetings and Documentation

3.3.1 Steering Committee Meetings

A kick-off meeting was held between the Consultant team and County DPS officials on July 25, 2024. This meeting officially began the planning process, which covered the tasks involved and the project schedule, as well as suggestions for Steering Committee members. Steering Committee and municipal representatives were requested via email to attend all scheduled meetings. Additionally, information gathering worksheets and questionnaires were also sent to the County and municipality via email.

The first Steering Committee Meeting was held on 13 November 2024 at the New Castle County Gilliam Building Multipurpose Room in New Castle, DE. The following agenda items were covered at this meeting:

- Present data on the hazard identification;
- Solicit input on risks from various hazards;

- Discuss data from the hazard vulnerability and risk assessment;
- Discuss mitigation questionnaire responses; and
- Draft updated Goals and Objectives.

The second Committee meeting was held virtually on 10 February 2025. The Consultant facilitated and covered the following items at this meeting:

- Review updated goals and objectives;
- Examine a range of new mitigation actions that address goals;
- Develop an implementation strategy for each county mitigation action.

The third Committee meeting was held virtually on 6 August 2025. The Consultant facilitated and covered the following items at this meeting:

- Provide an overview of progress to date;
- Review newly developed mitigation actions;
- Prioritize mitigation actions.

Face-to-face meetings were held with a representative from each jurisdiction during the Municipal workshop. Finally, follow-up emails were sent to encourage municipalities to complete their feedback forms. Two municipality meetings were also held during the process, on November 13, 2024, and February 10, 2025. A further breakdown of municipal participation is provided in the section below.

3.4 Public and Stakeholder Participation

3.4.1 Public Participation

A hazard mitigation-specific public survey was also conducted. The survey asked questions about potential high-risk areas in the County, specific hazards, outreach and education efforts, and ideas to mitigate the impacts of different hazards. The survey was open for eight (8) weeks and received 13 responses. Outreach steps included sharing the online survey via the County website as well as County social media accounts. To reach underserved populations, flyers with QR codes to the online survey were posted in County community center and libraries, as shown in the photo below.

Public meeting invitations were sent via public notice in the newspaper in advance of the meeting. The purpose of the meeting was to provide residents with an opportunity to become educated on the hazard mitigation planning process. A Public Meeting was held/offered on August 6, 2025. The meeting was advertised in local newspapers. One person attended the public meeting. Language for the meeting advertisement is provided in Appendix B.

The public was provided with an opportunity to:

- Review of the results of the updated HIRA;



- Review updated goals and objectives;
- Review of new mitigation actions and associated implementation strategies; and
- Review draft plan; and
- Provide comments and/or recommended edits.

The public was also provided with an opportunity to comment on the Draft HMP Update. The Plan Update was posted for public review on the County DPS website for one month, from 10/23/2025-11/22/2025, allowing the public an opportunity to comment on the Plan, and/or specific components of the Plan Update. No public comments were received during this stage.

3.5 Multi-Jurisdictional Planning

Table 3.2 provides a synopsis of municipal participation through the planning process.

Table 3.2 Jurisdictional Participation Summary

City/Town	Communication Established	Attended Municipal Meeting 1	Attended Municipal Meeting 2/3	Working Call	Municipal Capability Survey	NFIP Questionnaire	Local Hazard Areas	Mitigation Actions
Arden	✓	✓	✓					✓
Ardencroft	✓						✓	✓
Ardentown	✓						✓	✓
Belleville	✓				✓	✓	✓	✓
Delaware City	✓						✓	✓
Elsmere	✓		✓				✓	✓
Middletown	✓		✓				✓	✓
New Castle	✓	✓			✓	✓	✓	✓
Newark	✓	✓	✓		✓	✓	✓	✓
Newport	✓	✓	✓	✓	✓	✓	✓	✓
Odessa	✓			✓	✓	✓	✓	✓
Townsend	✓						✓	✓
Wilmington	✓	✓	✓	✓			✓	✓

Of the 13 municipalities in NCC, all 13 have met participation thresholds as required by FEMA.

4.0 CHAPTER 4 - RISK ASSESSMENT

4.1 Update Process Summary

Multiple sources were referenced to obtain a comprehensive identification of all potential hazards affecting the County. These include the NCEI, United States Geological Survey (USGS), DE Department of Natural Resources and Environmental Control (DNREC), and the *Delaware 2023 Hazard Mitigation Plan (2023)*. For all hazards without readily and freely accessible data, information from the *Delaware 2023 Hazard Mitigation Plan (2023)* was referred to and included.

A risk assessment evaluates threats associated with a specific hazard and is defined by probability and frequency of occurrence, magnitude, severity, exposure, and consequences. The New Castle County risk assessment provides in-depth knowledge of the hazards and vulnerabilities that affect New Castle County and its municipalities. This document uses an all-hazards approach when evaluating the hazards that affect the county and the associated risks and impacts each hazard presents.

4.2 Hazard Identification

As a first step in identifying hazards, a review of the 2020 HMP was conducted, as well as updating the list of Presidential and Gubernatorial declarations of emergencies issued for New Castle County since the last HMP was developed. This is presented in Table 4.1.

Table 4.1 Presidential Disaster Declarations in New Castle County

Presidential Disaster Declarations in New Castle County	
Date	Event Type
03/20/2003	Severe Snowstorm
09/20/2003	Hurricane Isabel
09/23/2003	Tropical Storm Henri
11/15/2004	Hurricane Jeane
09/30/2005	Hurricane Katrina
03/31/2010	Severe Winter Storm
08/28/2011	Hurricane Irene
04/05/2020	COVID-19 Pandemic
10/02/2020	Tropical Storm Isaias
10/24/2021	Remnants of Hurricane Ida

4.2.1 Summary of Hazards

Multiple sources were referenced to obtain hazard information and identify potential hazards affecting the County. These include the National Climatic Data Center (NCDC), United States Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA), the previous *New Castle County Hazard Mitigation Plan (2020)*, and the *Delaware All-Hazard Mitigation Plan (2023)*.

The Consultants facilitated a meeting to offer Steering Committee representatives the opportunity to review the hazard rankings from the 2020 HMP.

1. Flooding	10. Drought/Extreme Heat
2. Winter Storms, Nor'easters, and Freezes	11. Energy Pipeline Failures
3. Hurricanes and Coastal Storms	12. Public Health Incident
4. Severe Thunderstorms and Tornadoes	13. Wildfire
5. Transportation and Infrastructure Incidents	14. Earthquakes
6. Hazardous Materials (HazMat)	15. Hail
7. Dam/Levee Failure	16. Geomagnetic Storms (Solar Flares)
8. Terrorism	17. Sinkholes/Debris Pits
9. Erosion	18. Landslides
	19. Volcano
	20. Tsunami

All hazards that were included in the 2020 County HMP are included in this Update, and no additional hazards have been added. As some hazards are most commonly found co-occurring with other hazards, these hazards have been combined or incorporated by reference, such as hail and lightning (thunderstorms and tornado events). Any hazards deemed not possible or not having occurred within the County historically have also been omitted from this update.

Table 4.2 below identifies the critical facilities in New Castle County, their locations, and their corresponding hazard area overlap. Hazard-specific impacted critical facilities are included within the maps/figures included in specific hazard profiles.

Critical Facilities

Table 4.2 Critical Facilities List

Exposure of Critical Facilities to Location-Specific Hazards								
Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
Aetna Hose - Hook and Ladder Company Station 7	Fire Station	7 Thorn Lane	Newark	No	No	No	No	No
Aetna Hose Hook and Ladder Company Fire Station 8	Fire Station	410 Ogletown Road	Newark	No	No	No	No	No
Aetna Hose Hook and Ladder Company Station 9	Fire Station	31 Academy Street	Newark	No	No	No	No	No
Aetna Hose Hook and Ladder Fire Station 10	Fire Station	2501 Old County Road	Newark	No	No	No	No	No
Belvedere Volunteer Fire Company	Fire Station	1000 Liberty Road	Wilmington	No	No	No	No	No
Brandywine Hundred Fire Company Number 1	Fire Station	1006 Brandywine Boulevard	Wilmington	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
Christiana Fire Company Station 12	Fire Station	2 East Main Street	Christiana	No	No	Yes	No	No
Christiana Fire Company Station 3	Fire Station	600 Salem Church Road	Newark	No	Yes	No	No	No
Christiana Fire Company Station 6	Fire Station	1714 Porter Road	Bear	No	No	Yes	No	No
Claymont Fire Company	Fire Station	1610 Naamans Road	Wilmington	No	No	No	No	No
Claymont Fire Company Station 13	Fire Station	3223 Philadelphia Pike	Claymont	No	No	No	No	No
Cranston Heights Fire Company	Fire Station	3306 Kirkwood Highway	Wilmington	No	No	No	No	No
Delaware City Fire Company Station 15	Fire Station	815 5th Street	Delaware City	No	Yes	No	No	No
Elsmere Fire Company Number 1	Fire Station	1107 Kirkwood Highway	Elsmere	No	No	No	No	No
Five Points Fire Company	Fire Station	209 South Maryland Avenue	Wilmington	No	No	No	No	No
Good Will Fire Company	Fire Station	401 South Street	New Castle	No	No	No	No	No
Hockessin Fire Company	Fire Station	1225 Old Lancaster Pike	Hockessin	No	No	No	No	No
Holloway Terrace Volunteer Fire Company	Fire Station	700 West Avenue	New Castle	No	No	No	No	No
Mill Creek Fire Company Ambulance Station 2	Fire Station	4021 Skyline Drive	Wilmington	No	No	No	No	No
Mill Creek Fire Company Station 21	Fire Station	3900 Kirkwood Highway	Wilmington	No	No	No	No	No
Minquedale Fire Company	Fire Station	129 East Hazeldell Avenue	New Castle	No	No	No	No	No
Minquas Fire Company Station 23	Fire Station	21 North James Street	Newport	No	No	No	No	Yes
Odessa Fire Company Station 24	Fire Station	304 Main Street	Odessa	No	No	Yes	No	No
Odessa Fire Company Station 4	Fire Station	1324 Pole Bridge Road	Middletown	No	No	Yes	No	No
Port Penn Volunteer Fire Company	Fire Station	26 West Market Street	Port Penn	No	No	Yes	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
Talleyville Fire Company	Fire Station	3919 Concord Pike	Wilmington	No	No	No	No	No
Townsend Fire Company Station 26	Fire Station	107 Main Street	Townsend	No	No	No	No	No
Volunteer Hose Company of Middletown Station 1	Fire Station	711 Churchtown Road	Middletown	No	No	No	No	No
Volunteer Hose Company of Middletown Station 27	Fire Station	27 West Green Street	Middletown	No	No	No	No	Yes
Wilmington Fire Department Station 1	Fire Station	400 West 2nd Street	Wilmington	No	No	No	No	Yes
Wilmington Fire Department Station 2	Fire Station	400 New Castle Avenue	Wilmington	No	Yes	No	No	No
Wilmington Fire Department Station 3	Fire Station	333 East 30th Street	Wilmington	No	No	No	No	Yes
Wilmington Fire Department Station 4	Fire Station	2200 North Tatnall Street	Wilmington	No	No	No	No	Yes
Wilmington Fire Department Station 5	Fire Station	1814 Gilpin Avenue	Wilmington	No	No	No	No	Yes
Wilmington Fire Department Station 6	Fire Station	224 North Union Street	Wilmington	No	No	No	No	No
Wilmington Manor Volunteer Fire Company - Station 28	Fire Station	301 North Dupont Highway	New Castle	No	No	No	No	No
Wilmington Manor Volunteer Fire Company - Station 32	Fire Station	223 South Dupont Highway	New Castle	No	No	No	No	No
BRANDYWINE CREEK STATE PARK RANGERS OFFICE	Police Station	41 ADAMS DAM ROAD	WILMINGTON	No	No	Yes	No	No
DELAWARE ALCOHOLIC BEVERAGE CONTROL ENFORCEMENT	Police Station	820 NORTH FRENCH STREET, 3RD FLOOR	WILMINGTON	No	No	No	No	Yes
DELAWARE CITY POLICE DEPARTMENT	Police Station	407 CLINTON STREET	DELAWARE CITY	No	No	No	No	No
DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL	Police Station	108 SOUTH REEDY POINT ROAD	DELAWARE CITY	Yes	Yes	Yes	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
CONTROL - FORT DELAWARE STATE PARK RANGER STATION								
DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL - WHITE CLAY CREEK STATE PARK RANGER STATION	Police Station	750 THOMPSON STATION ROAD	NEWARK	No	No	No	Yes	No
DELAWARE RIVER AND BAY AUTHORITY POLICE DEPARTMENT TROOP 1	Police Station	INTERSTATE HIGHWAY 295 AND NEW CASTLE AVENUE	NEW CASTLE	No	No	No	No	No
DELAWARE STATE POLICE TROOP 1 – WILMINGTON	Police Station	603 PHILADELPHIA PIKE	WILMINGTON	No	No	No	No	No
DELAWARE STATE POLICE TROOP 2 – NEWARK	Police Station	100 LAGRANGE AVENUE	NEWARK	No	No	No	No	No
DELAWARE STATE POLICE TROOP 6 – WILMINGTON	Police Station	3301 KIRKWOOD HIGHWAY	WILMINGTON	No	No	No	No	No
DELAWARE STATE POLICE TROOP 9 – ODESSA	Police Station	414 MAIN STREET	ODESSA	No	No	Yes	No	No
ELSMERE POLICE DEPARTMENT	Police Station	11 POPLAR AVENUE	ELSMERE	No	No	No	No	No
JAMES T VAUGHN CORRECTIONAL CENTER	Police Station	1181 PADDOCK ROAD	SMYRNA	No	No	No	No	No
LUMS POND STATE PARK RANGERS OFFICE	Police Station	1068 HOWELL SCHOOL ROAD	BEAR	No	No	No	No	No
MIDDLETOWN POLICE DEPARTMENT	Police Station	19 WEST GREEN STREET	MIDDLETOWN	No	No	No	No	No
NEW CASTLE CITY POLICE DEPARTMENT	Police Station	1 MUNICIPAL BOULEVARD	NEW CASTLE	No	Yes	No	No	No
NEW CASTLE COUNTY POLICE DEPARTMENT	Police Station	87 READS WAY	NEW CASTLE	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
NEWARK POLICE DEPARTMENT	Police Station	220 ELKTON ROAD	NEWARK	No	No	No	No	No
NEWPORT POLICE DEPARTMENT	Police Station	226 NORTH JAMES STREET	NEWPORT	No	No	No	No	No
UNIVERSITY OF DELAWARE DEPARTMENT OF PUBLIC SAFETY	Police Station	413 ACADEMY STREET	NEWARK	No	No	No	No	No
WILMINGTON FIRE MARSHALS OFFICE	Police Station	800 NORTH FRENCH STREET, LOUIS L REDDING BUILDING 3RD FLOOR	WILMINGTON	No	No	No	No	Yes
WILMINGTON POLICE DEPARTMENT	Police Station	300 NORTH WALNUT STREET	WILMINGTON	No	No	No	No	Yes
ACADEMIA ANTONIA ALONSO	Public School	300 NORTH WAKEFIELD DRIVE	NEWARK	No	No	No	No	No
APPOQUINIMINK HIGH SCHOOL	Public School	1080 BUNKER HILL ROAD	MIDDLETOWN	No	No	No	No	No
APPOQUINIMINK PRESCHOOL CENTER	Public School	502 SOUTH BROAD STREET	MIDDLETOWN	No	No	No	No	Yes
BALTZ (AUSTIN D.) ELEMENTARY SCHOOL	Public School	1500 SPRUCE AVENUE	WILMINGTON	No	No	No	No	No
BEDFORD (GUNNING) MIDDLE SCHOOL	Public School	801 COX NECK ROAD	NEW CASTLE	No	No	Yes	No	No
BRADER (HENRY M.) ELEMENTARY SCHOOL	Public School	350 FOUR SEASONS PARKWAY	NEWARK	No	No	No	No	No
BRANDYWINE HIGH SCHOOL	Public School	1400 FOULK ROAD	WILMINGTON	No	No	No	No	No
BRANDYWINE SITE	Public School	3301 GREEN ST	CLAYMONT	No	No	No	No	No
BRANDYWINE SPRINGS SCHOOL	Public School	2916 DUNCAN ROAD	WILMINGTON	No	No	No	No	No
BRENNEN SCHOOL (THE)	Public School	144 BRENNEN DRIVE	NEWARK	No	No	No	No	No
BRICK MILL EARLY CHILDHOOD CENTER	Public School	378 BRICK MILL ROAD	MIDDLETOWN	No	No	No	No	No
BRICK MILL ELEMENTARY SCHOOL	Public School	378 BRICK MILL ROAD	MIDDLETOWN	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
BROOKSIDE ELEMENTARY SCHOOL	Public School	800 MARROWS ROAD	NEWARK	No	No	No	No	No
BUNKER HILL ELEMENTARY SCHOOL	Public School	1070 BUNKER HILL ROAD	MIDDLETOWN	No	No	No	No	No
BUSH (CHARLES W.) PRE-SCHOOL	Public School	2523 BERWYN ROAD	WILMINGTON	No	No	No	No	No
CALLOWAY (CAB) SCHOOL OF THE ARTS	Public School	100 NORTH DUPONT ROAD	WILMINGTON	No	No	No	No	No
CANTWELLS BRIDGE MIDDLE SCHOOL	Public School	550 TONY MARCHIO DRIVE	TOWNSEND	No	No	Yes	No	No
CARRCROFT ELEMENTARY SCHOOL	Public School	503 CREST ROAD	WILMINGTON	No	No	No	No	No
CASTLE HILLS ELEMENTARY SCHOOL	Public School	502 MOORES LANE	NEW CASTLE	No	No	No	No	No
CEDAR LANE EARLY CHILDHOOD CENTER	Public School	1221 CEDAR LANE ROAD	MIDDLETOWN	No	No	No	No	No
CEDAR LANE ELEMENTARY SCHOOL	Public School	1259 CEDAR LANE ROAD	MIDDLETOWN	No	No	No	No	No
CHARTER SCHOOL OF NEW CASTLE	Public School	170 LUKENS DRIVE	NEW CASTLE	No	No	No	No	No
CHARTER SCHOOL OF WILMINGTON	Public School	100 NORTH DUPONT ROAD	WILMINGTON	No	No	No	No	No
CHRISTIANA HIGH SCHOOL	Public School	190 SALEM CHURCH ROAD	NEWARK	No	No	No	No	No
CHRISTINA EARLY EDUCATION CENTER	Public School	620 EAST CHESTNUT HILL RD	NEWARK	No	No	No	No	No
CLAYMONT ELEMENTARY SCHOOL	Public School	3401 GREEN STREET	CLAYMONT	No	No	No	No	No
CONCORD HIGH SCHOOL	Public School	2501 EBRIGHT ROAD	WILMINGTON	No	No	No	No	No
CONRAD SCHOOLS OF SCIENCE	Public School	201 JACKSON AVENUE	WILMINGTON	No	No	No	No	No
CRYSTAL RUN ELEMENTARY SCHOOL	Public School	313 SOUTH FIFTH	ODESSA	No	No	Yes	Yes	No
DELAWARE MILITARY ACADEMY	Public School	112 MIDDLEBORO ROAD	WILMINGTON	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
DELAWARE SCHOOL FOR THE DEAF	Public School	630 EAST CHESTNUT HILL ROAD	NEWARK	No	No	No	No	No
DELCASTLE TECHNICAL HIGH SCHOOL	Public School	1417 NEWPORT ROAD	WILMINGTON	No	No	No	No	No
DICKINSON (JOHN) SCHOOL	Public School	1801 MILLTOWN ROAD	WILMINGTON	No	No	No	No	No
DOUGLASS SCHOOL	Public School	1800 PROSPECT ROAD	WILMINGTON	No	No	No	No	No
DOWNES (JOHN R.) ELEMENTARY SCHOOL	Public School	220 CASHO MILL ROAD	NEWARK	No	No	No	No	No
DOWNIE (CARRIE) ELEMENTARY SCHOOL	Public School	1201 DELAWARE STREET	NEW CASTLE	No	No	No	No	No
DUPONT (ALEXIS I.) HIGH SCHOOL	Public School	50 HILLSIDE ROAD	WILMINGTON	No	No	No	No	No
DUPONT (ALEXIS I.) MIDDLE SCHOOL	Public School	3130 KENNETT PIKE	GREENVILLE	No	No	No	No	No
DUPONT (H.B.) MIDDLE SCHOOL	Public School	735 MEETING HOUSE ROAD	HOCKESSIN	No	No	No	No	No
DUPONT (PIERRE S.) MIDDLE SCHOOL	Public School	701 WEST 34TH STREET	WILMINGTON	No	No	No	No	No
EAST SIDE CHARTER SCHOOL	Public School	3000 NORTH CLAYMONT STREET	WILMINGTON	No	No	No	No	Yes
EDISON (THOMAS A.) CHARTER SCHOOL	Public School	2200 NORTH LOCUST STREET	WILMINGTON	No	No	No	No	No
EISENBERG (HARRY O.) ELEMENTARY SCHOOL	Public School	27 LANDERS LANE	NEW CASTLE	No	No	No	No	No
FIRST STATE MONTESSORI ACADEMY	Public School		WILMINGTON	No	No	No	No	Yes
FIRST STATE SCHOOL	Public School	501 WEST 14TH STREET	WILMINGTON	No	No	No	No	No
FOREST OAK ELEMENTARY SCHOOL	Public School	55 SOUTH MEADOWOOD DRIVE	NEWARK	No	No	No	No	No
FORWOOD ELEMENTARY SCHOOL	Public School	1900 WESTMINSTER DRIVE	WILMINGTON	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
FREIRE CHARTER SCHOOL	Public School	201 WEST 14TH STREET	WILMINGTON	No	No	No	No	Yes
GALLAHER (ROBERT S.) ELEMENTARY SCHOOL	Public School	800 NORTH BROWNLEAF ROAD	NEWARK	No	No	No	No	No
GATEWAY CHARTER SCHOOL	Public School	2501 CENTERVILLE ROAD	WILMINGTON	No	No	No	No	No
GAUGER-COBBS MIDDLE SCHOOL	Public School	50 GENDER ROAD	NEWARK	No	No	No	No	No
GLASGOW HIGH SCHOOL	Public School	1901 SOUTH COLLEGE AVENUE	NEWARK	No	No	No	No	No
GREAT OAKS CHARTER SCHOOL	Public School	1200 NORTH FRENCH ST	WILMINGTON	No	No	No	No	Yes
HANBY ELEMENTARY SCHOOL	Public School	2523 BERWYN ROAD	WILMINGTON	No	No	No	No	No
HARLAN (DAVID W.) ELEMENTARY SCHOOL	Public School	3601 JEFFERSON STREET	WILMINGTON	No	No	No	No	No
HERITAGE ELEMENTARY SCHOOL	Public School	2815 HIGHLANDS LANE	WILMINGTON	No	No	No	No	No
HODGSON (PAUL M.) VOCATIONAL TECHNICAL HIGH SCHOOL	Public School	2575 GLASGOW AVENUE	NEWARK	No	No	No	No	No
HOWARD HIGH SCHOOL OF TECHNOLOGY	Public School	401 EAST 12TH STREET	WILMINGTON	No	No	No	No	Yes
JOHNSON (JOSEPH E. JR) ELEMENTARY SCHOOL	Public School	2100 GILPIN AVENUE	WILMINGTON	No	No	No	No	No
JONES (ALBERT H.) ELEMENTARY SCHOOL	Public School	35 WEST MAIN STREET	NEWARK	No	No	Yes	No	No
KEENE (WILLIAM B.) ELEMENTARY SCHOOL	Public School	200 LAGRANGE AVENUE	NEWARK	No	No	No	No	No
KIRK (GEORGE V.) MIDDLE SCHOOL	Public School	140 BRENNEN DRIVE	NEWARK	No	No	No	No	No
KUUMBA ACADEMY CHARTER SCHOOL	Public School	1200 NORTH FRENCH STREET	WILMINGTON	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
LANCASHIRE ELEMENTARY SCHOOL	Public School	2000 NAAMANS ROAD	WILMINGTON	No	No	No	No	No
LAS AMERICAS ASPIRA ACADEMY	Public School	326 RUTHAR DRIVE	NEWARK	No	No	No	No	Yes
LEACH (JOHN G.) SCHOOL	Public School	10 LANDERS LANE	NEW CASTLE	No	No	No	No	No
LEASURE (MAY B.) ELEMENTARY SCHOOL	Public School	1015 CHURCH ROAD	NEWARK	No	No	No	No	No
LEWIS (WILLIAM C.) DUAL LANGUAGE ELEMENTARY SCHOOL	Public School	920 NORTH VAN BUREN STREET	WILMINGTON	No	No	No	No	No
LINDEN HILL ELEMENTARY SCHOOL	Public School	3415 SKYLINE DRIVE	WILMINGTON	No	No	No	No	No
LOMBARDY ELEMENTARY SCHOOL	Public School	412 FOULK ROAD	WILMINGTON	No	No	No	No	No
LOREWOOD GROVE ELEMENTARY SCHOOL	Public School	820 MAPLETON AVE.	MIDDLETOWN	No	No	Yes	No	No
LOSS (OLIVE B.) ELEMENTARY SCHOOL	Public School	200 BRENNAN BOULEVARD	BEAR	No	No	No	No	No
MACLARY (R. ELISABETH) ELEMENTARY SCHOOL	Public School	300 ST. REGIS DRIVE	NEWARK	No	No	No	No	No
MAPLE LANE ELEMENTARY SCHOOL	Public School	100 MAPLE LANE	CLAYMONT	No	No	No	No	No
MARBROOK ELEMENTARY SCHOOL	Public School	2101 CENTERVILLE ROAD	WILMINGTON	No	No	No	No	No
MARSHALL (THURGOOD) ELEMENTARY SCHOOL	Public School	101 BARRETT RUN ROAD	NEWARK	No	No	No	No	No
MCCULLOUGH (CALVIN R.) MIDDLE SCHOOL	Public School	20 CHASE AVENUE	NEW CASTLE	No	No	No	No	No
MCKEAN (THOMAS) HIGH SCHOOL	Public School	301 MCKENNAN'S CHURCH ROAD	WILMINGTON	No	No	No	No	No
MCVEY (JOSEPH M.) ELEMENTARY SCHOOL	Public School	908 JANICE DRIVE	NEWARK	No	No	No	No	No
MEADOWOOD PROGRAM	Public School	55A SOUTH MEADOWOOD DRIVE	NEWARK	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
MEREDITH (EVERETT) MIDDLE SCHOOL	Public School	504 SOUTH BROAD STREET	MIDDLETOWN	No	No	No	No	Yes
MIDDLETOWN HIGH SCHOOL	Public School	120 SILVER LAKE ROAD	MIDDLETOWN	No	No	No	No	No
MOT CHARTER SCHOOL	Public School	1156 LEVELS ROAD	MIDDLETOWN	No	No	No	No	No
MOTE (ANNA P.) ELEMENTARY SCHOOL	Public School	2110 EDWARDS AVENUE	WILMINGTON	No	No	No	No	Yes
MOUNT PLEASANT ELEMENTARY SCHOOL	Public School	500 DUNCAN ROAD	WILMINGTON	No	No	No	No	No
MOUNT PLEASANT HIGH SCHOOL	Public School	5201 WASHINGTON STREET EXTENSI	WILMINGTON	No	No	No	No	No
NEW CASTLE ELEMENTARY SCHOOL	Public School	903 DELAWARE STREET	NEW CASTLE	No	No	No	No	No
NEWARK CHARTER SCHOOL	Public School	200 MCINTIRE DRIVE	NEWARK	No	No	No	No	Yes
NEWARK HIGH SCHOOL	Public School	750 EAST DELAWARE AVENUE	NEWARK	No	No	No	No	Yes
NORTH STAR ELEMENTARY SCHOOL	Public School	1340 LITTLE BALTIMORE ROAD	HOCKESSIN	No	No	No	No	No
OBERLE (WILLIAM) ELEMENTARY SCHOOL	Public School	500 SOUTH CALEDONIA WAY	BEAR	No	No	No	No	No
ODESSA HIGH SCHOOL	Public School	570 TONY MARCHIO DRIVE	TOWNSEND	No	No	Yes	No	No
ODYSSEY CHARTER SCHOOL	Public School	4409 LANCASTER PIKE	WILMINGTON	No	No	No	No	No
OLD STATE ELEMENTARY SCHOOL	Public School	580 TONY MARCHIO DRIVE	TOWNSEND	No	No	Yes	No	No
PENN (WILLIAM) HIGH SCHOOL	Public School	713 EAST BASIN ROAD	NEW CASTLE	No	No	No	No	No
PLEASANTVILLE ELEMENTARY SCHOOL	Public School	16 PLEASANT STREET	NEW CASTLE	No	No	No	No	No
PYLE (SARAH) ACADEMY	Public School	501 NORTH LOMBARD STREET	WILMINGTON	No	No	No	No	Yes
READ (GEORGE) MIDDLE SCHOOL	Public School	314 EAST BASIN ROAD	NEW CASTLE	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
RED CLAY EARLY YEARS PROGRAM	Public School	1621 TELEGRAPH ROAD	WILMINGTON	No	No	Yes	No	No
REDDING (LOUIS L.) MIDDLE SCHOOL	Public School	201 NEW STREET	MIDDLETOWN	No	No	No	No	No
RICHARDSON PARK ELEMENTARY SCHOOL	Public School	16 IDELLA AVENUE	WILMINGTON	No	No	No	No	No
RICHARDSON PARK LEARNING CENTER	Public School	99 MIDDLEBORO ROAD	WILMINGTON	No	No	No	No	No
RICHEY ELEMENTARY SCHOOL	Public School	105 EAST HIGHLAND AVENUE	WILMINGTON	No	No	No	No	No
SHORTLIDGE (EVAN G.) ACADEMY	Public School	100 WEST 18TH STREET	WILMINGTON	No	No	No	No	Yes
SHUE-MEDILL MIDDLE SCHOOL	Public School	1500 CAPITOL TRAIL	NEWARK	No	No	No	No	No
SILVER LAKE ELEMENTARY SCHOOL	Public School	200 EAST COCHRAN STREET	MIDDLETOWN	No	No	No	No	No
SKYLINE MIDDLE SCHOOL	Public School	2900 SKYLINE DRIVE	WILMINGTON	No	No	No	No	No
SMITH (JENNIE E.) ELEMENTARY SCHOOL	Public School	142 BRENNEN DRIVE	NEWARK	No	No	No	No	No
SOUTHERN ELEMENTARY SCHOOL	Public School	795 COX NECK ROAD	NEW CASTLE	No	No	No	No	No
SPRING MEADOW EARLY CHILDHOOD CENTER	Public School	611 CAMPUS DRIVE	TOWNSEND	No	No	Yes	No	No
SPRINGER MIDDLE SCHOOL	Public School	2220 SHIPLEY ROAD	WILMINGTON	No	No	No	No	No
ST. GEORGES TECHNICAL HIGH SCHOOL	Public School	555 HYETTS CORNER RD.	MIDDLETOWN	No	No	No	No	No
STANTON MIDDLE SCHOOL	Public School	1800 LIMESTONE ROAD	WILMINGTON	No	No	No	No	No
STUBBS EARLY EDUCATION CENTER	Public School	1100 NORTH PINE STREET	WILMINGTON	No	No	No	No	Yes
SUSSEX MONTESSORI SCHOOL	Public School	24970 DAIRY LANE	SEAFORD	No	No	No	No	No
TALLEY MIDDLE SCHOOL	Public School	1110 CYPRESS ROAD	WILMINGTON	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
THE BANCROFT SCHOOL	Public School	700 NORTH LOMBARD STREET	WILMINGTON	No	No	No	No	Yes
THE BAYARD SCHOOL	Public School	200 SOUTH DUPONT STREET	WILMINGTON	No	No	No	No	No
THE COLWYCK CENTER	Public School	12 LANDERS LANE	NEW CASTLE	No	No	No	No	No
THE WALLACE WALLIN SCHOOL	Public School	701 EAST BASIN ROAD	NEW CASTLE	No	No	No	No	No
TOWNSEND EARLY CHILDHOOD CENTER	Public School	10 BROOK RAMBLE LANE	TOWNSEND	No	No	No	No	No
TOWNSEND ELEMENTARY SCHOOL	Public School	126 MAIN STREET, 126 MAIN STREET	TOWNSEND	No	No	No	No	No
WARNER ELEMENTARY SCHOOL	Public School	801 WEST 18TH STREET	WILMINGTON	No	No	No	No	No
WATERS (ALFRED G.) MIDDLE SCHOOL	Public School	1235 CEDAR LANE ROAD	MIDDLETOWN	No	No	No	No	No
WEST PARK PLACE ELEMENTARY SCHOOL	Public School	193 WEST PARK PLACE	NEWARK	No	No	No	No	No
WILBUR (KATHLEEN H.) ELEMENTARY	Public School	4050 WRANGLE HILL ROAD	BEAR	No	No	No	No	No
WILLIAM F. COOKE JR. ELEMENTARY	Public School	2025 GRAVES ROAD	HOCKESSIN	No	No	No	No	No
WILMINGTON MANOR ELEMENTARY SCHOOL	Public School	200 EAST ROOSEVELT AVENUE	NEW CASTLE	No	No	No	No	No
WILSON (ETTA J.) ELEMENTARY SCHOOL	Public School	14 FORGE ROAD	NEWARK	No	No	No	No	No
CHRISTIANA CARE HEALTH SERVICES - CHRISTIANA HOSPITAL	Hospital	4755 OGLETOWN-STANTON RD, PO BOX 6001	NEWARK	No	No	No	No	No
CHRISTIANA CARE HEALTH SERVICES - WILMINGTON HOSPITAL	Hospital	501 WEST 14TH ST, PO BOX 1668	WILMINGTON	No	No	No	No	No
CHRISTIANACARE (NEWARK)	Hospital	4755 OGLETOWN-STANTON ROAD, MANAGEMENT	NEWARK	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
		SUITE 1270, POB 6001						
CHRISTIANACARE (WILMINGTON)	Hospital	501 WEST 14TH STREET, POB 1668	WILMINGTON	No	No	No	No	No
DELAWARE PSYCHIATRIC CENTER	Hospital	1901 NORTH DUPONT HWY	NEW CASTLE	No	No	No	No	No
ENCOMPASS HEALTH REHABILITATION HOSPITAL OF MIDDLETOWN	Hospital	250 EAST HAMPDEN RD	MIDDLETOWN	No	No	Yes	No	No
MEADOWWOOD BEHAVIORAL HEALTH SYSTEM	Hospital	575 SOUTH DUPONT HWY	NEW CASTLE	No	No	No	No	No
NEMOURS CHILDREN'S HOSPITAL DELAWARE	Hospital	1600 ROCKLAND RD	WILMINGTON	No	No	No	No	No
ROCKFORD CENTER	Hospital	100 ROCKFORD DR	NEWARK	No	No	No	No	No
SELECT SPECIALTY HOSPITAL OF WILMINGTON	Hospital	701 N CLAYTON ST, FIFTH FLOOR	WILMINGTON	No	No	No	No	No
ST FRANCIS HEALTHCARE	Hospital	701 N CLAYTON ST	WILMINGTON	No	No	No	No	No
WILMINGTON VA MEDICAL CENTER	Hospital	1601 KIRKWOOD HIGHWAY	WILMINGTON	No	No	No	No	No
AGT001 CENTERVILLE FUEL CELL	Power Plant	2850 CENTERVILLE ROAD	WILMINGTON	No	No	No	No	Yes
BROOKSIDE NEWARK	Power Plant	512 E. CHESTNUT HILL ROAD	NEWARK	No	No	No	No	No
CEDAR CREEK SOLAR	Power Plant	674 FLEMING LANDING ROAD (DE R	SMYRNA	No	No	No	No	No
CHRISTIANA	Power Plant	CHRISTIANA AVE & LOBDELL ST	WILMINGTON	Yes	Yes	No	No	No
CRODA ATLAS POINT CHP	Power Plant	315 CHERRY LANE	NEW CASTLE	No	No	No	No	Yes
DD HAY ROAD SOLAR 23 LLC	Power Plant	4503 HAY ROAD	NEW CASTLE	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
DELAWARE CITY 10	Power Plant	RT 9 & RIVER ROAD	DELAWARE CITY	No	No	No	No	No
DELAWARE CITY PLANT	Power Plant	2000 WRANGLE HILL ROAD	DELAWARE CITY	No	No	No	No	Yes
EDGE MOOR	Power Plant	200 HAY ROAD	WILMINGTON	Yes	Yes	No	No	Yes
HAY ROAD	Power Plant	198 HAY ROAD	WILMINGTON	No	Yes	No	No	No
RED LION ENERGY CENTER	Power Plant	1493 RIVER ROAD	NEW CASTLE	No	No	No	No	No
SOUTH CAMPUS SOLAR	Power Plant	880 POWDER MILL ROAD	WILMINGTON	No	No	No	No	No
WEST STATION (DE)	Power Plant	ROUTE 41	WILMINGTON	No	No	No	No	No
WHA SOUTHBRIDGE SOLAR PARK	Power Plant	900 SOUTH CLAYMONT ST	WILMINGTON	No	No	No	No	Yes
MOT WASTEWATER TREATMENT PLANT – NCC	WWTP	810 OLD CORBIT ROAD (COUNTY ROAD 424)	NEW CASTLE	Yes	Yes	Yes	No	No
ARDEN COURTS OF WILMINGTON	Nursing Home	700 1/2 FOULK RD.	WILMINGTON	No	No	No	No	No
BRACKENVILLE CENTER	Nursing Home	100 SAINT CLAIRE DR.	HOCKESSIN	No	No	No	No	No
BRANDYWINE NURSING AND REHABILITATION CENTER	Nursing Home	505 GREENBANK RD.	WILMINGTON	No	No	No	No	No
BROOKDALE HOCKESSIN	Nursing Home	6677 LANCASTER PIKE	HOCKESSIN	No	No	No	No	No
CADIA REHABILITATION BROADMEADOW	Nursing Home	500 SOUTH BROAD STREET	MIDDLETOWN	No	No	No	No	Yes
CADIA REHABILITATION PIKE CREEK	Nursing Home	3540 THREE LITTLE BAKERS BLVD.	WILMINGTON	No	No	No	No	No
CADIA REHABILITATION SILVERSIDE	Nursing Home	3322 SILVERSIDE ROAD	WILMINGTON	No	No	No	No	No
CHURCHMAN VILLAGE	Nursing Home	4949 OGLETOWN-STANTON RD.	NEWARK	No	No	Yes	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
EXCEPTIONAL CARE FOR CHILDREN	Nursing Home	11 INDEPENDENCE WAY	NEWARK	No	No	No	No	No
FIVE STAR FOULK MANOR NORTH LLC, ASSISTED LIVING	Nursing Home	1212 FOULK ROAD	WILMINGTON	No	No	No	No	No
FIVE STAR FOULK MANOR NORTH LLC, NURSING HOME	Nursing Home	1212 FOULK ROAD	WILMINGTON	No	No	No	No	No
FORWOOD MANOR ASSISTED LIVING	Nursing Home	1912 MARSH ROAD	WILMINGTON	No	No	No	No	No
FORWOOD MANOR NURSING HOME	Nursing Home	1912 MARSH ROAD	WILMINGTON	No	No	No	No	No
FOULK MANOR SOUTH ASSISTED LIVING	Nursing Home	407 FOULK ROAD	WILMINGTON	No	No	No	No	No
FOULK MANOR SOUTH NURSING HOME	Nursing Home	407 FOULK ROAD	WILMINGTON	No	No	No	No	No
GILPIN HALL NURSING HOME	Nursing Home	1101 GILPIN AVE.	WILMINGTON	No	No	No	No	No
GOVERNOR BACON HEALTH CENTER	Nursing Home	2546 COLTER ROAD	DELAWARE CITY	Yes	Yes	No	No	No
HARBOR CHASE OF WILMINGTON	Nursing Home	2004 SHIPLEY ROAD	WILMINGTON	No	No	Yes	No	No
HILLSIDE CENTER	Nursing Home	810 S. BROOM ST.	WILMINGTON	No	No	No	No	Yes
INGLESIDE ASSISTED LIVING, LLC	Nursing Home	1605 NORTH BROOM STREET	WILMINGTON	No	No	No	No	No
IVY GABLES LTD, LLC.	Nursing Home	2210 SWISS LANE	WILMINGTON	No	No	Yes	No	No
JEANNE JUGAN RESIDENCE NURSING HOME	Nursing Home	185 SALEM CHURCH RD.	NEWARK	No	No	No	No	No
KENTMERE REHABILITATION AND HEALTHCARE CENTER	Nursing Home	1900 LOVERING AVE.	WILMINGTON	No	No	No	No	Yes
KUTZ REHABILITATION AND NURSING	Nursing Home	704 RIVER ROAD	WILMINGTON	No	No	No	No	No
LODGE LANE ASSISTED LIVING	Nursing Home	1221 LODGE LANE	WILMINGTON	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
LUTHER TOWERS I	Nursing Home	1201 NORTH HARRISON STREET	WILMINGTON	No	No	No	No	No
LUTHER TOWERS II	Nursing Home	1420 NORTH FRANKLIN STREET	WILMINGTON	No	No	No	No	No
MANORCARE HEALTH SERVICES - WILMINGTON	Nursing Home	700 FOULK ROAD	WILMINGTON	No	No	No	No	No
MEADOWCREST AT MIDDLETOWN SENIOR LIVING	Nursing Home	820 MIDDLETOWN ODESSA RD	MIDDLETOWN	No	No	Yes	No	No
MILLCROFT ASSISTED LIVING	Nursing Home	255 POSSUM PARK RD.	NEWARK	No	No	No	No	No
MILLCROFT NURSING HOME	Nursing Home	255 POSSUM PARK RD.	NEWARK	No	No	No	No	No
NEW CASTLE HEALTH AND REHABILITATION CENTER	Nursing Home	32 BUENA VISTA DR.	NEW CASTLE	No	No	No	No	No
NEWARK MANOR NURSING HOME	Nursing Home	254 W. MAIN ST.	NEWARK	No	No	No	No	No
OAKBRIDGE TERRACE AT COKESBURY VILLAGE	Nursing Home	726 LOVEVILLE ROAD	HOCKESSIN	No	No	No	Yes	No
OAKBRIDGE TERRACE AT COUNTRY HOUSE	Nursing Home	4830 KENNETT PIKE	WILMINGTON	No	No	No	No	No
PARAMOUNT SENIOR LIVING AT NEWARK	Nursing Home	200 E. VILLAGE ROAD	NEWARK	No	No	No	No	No
PARKVIEW NURSING & REHAB CENTER	Nursing Home	2801 W. 6TH ST.	WILMINGTON	No	No	No	No	No
PROMEDICA SKILLED NURSING AND REHABILITATION (PIKE CREEK)	Nursing Home	5651 LIMESTONE RD.	WILMINGTON	No	No	No	No	No
REGAL HEIGHTS HEALTHCARE & REHAB CENTER, LLC	Nursing Home	6525 LANCASTER PIKE	HOCKESSIN	No	No	No	No	No
REGENCY HEALTHCARE AND REHAB CENTER	Nursing Home	801 N. BROOM STREET	WILMINGTON	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
ROCKLAND PLACE	Nursing Home	1519 ROCKLAND ROAD	WILMINGTON	No	No	No	No	No
SERENITY GARDENS ASSISTED LIVING	Nursing Home	207 RUTH DRIVE	MIDDLETOWN	No	No	Yes	No	No
SHIPLEY MANOR ASSISTED LIVING	Nursing Home	2723 SHIPLEY ROAD	WILMINGTON	No	No	No	No	No
SHIPLEY MANOR HEALTH CARE NURSING HOME	Nursing Home	2723 SHIPLEY ROAD	WILMINGTON	No	No	No	No	No
SOMERFORD HOUSE	Nursing Home	501 SOUTH HARMONY ROAD	NEWARK	No	No	No	No	No
SOMERFORD PLACE	Nursing Home	4175 OGLETOWN-STANTON ROAD	NEWARK	No	No	No	No	No
STONEGATES	Nursing Home	4031 KENNETT PIKE	GREENVILLE	No	No	No	No	No
SUNRISE ASSISTED LIVING OF WILMINGTON	Nursing Home	2215 SHIPLEY ROAD	WILMINGTON	No	No	No	No	No
THE LORELTON	Nursing Home	2200 WEST 4TH ST.	WILMINGTON	No	No	No	No	No
THE MARY CAMPBELL CENTER	Nursing Home	4641 WELDIN RD.	WILMINGTON	No	No	No	No	No
THE SUMMIT ASSISTED LIVING	Nursing Home	5850 LIMESTONE ROAD	HOCKESSIN	No	No	Yes	No	No
THE VERO AT NEWARK ASSISTED LIVING	Nursing Home	924 BARKSDALE ROAD	NEWARK	No	No	No	No	No
WESTON SENIOR LIVING CENTER AT HIGHFIELD	Nursing Home	4800 LANCASTER PIKE	WILMINGTON	No	No	No	No	No
WILLOWBROOKE COURT AT COKEBURY VILLAGE	Nursing Home	726 LOVEVILLE ROAD	HOCKESSIN	No	No	No	No	No
WILLOWBROOKE COURT AT COUNTRY HOUSE	Nursing Home	4830 KENNETT PIKE	WILMINGTON	No	No	No	No	No
ACADEMY OF MASSAGE AND BODYWORK	College/University	1218 PULASKI HWY STE 324	BEAR	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

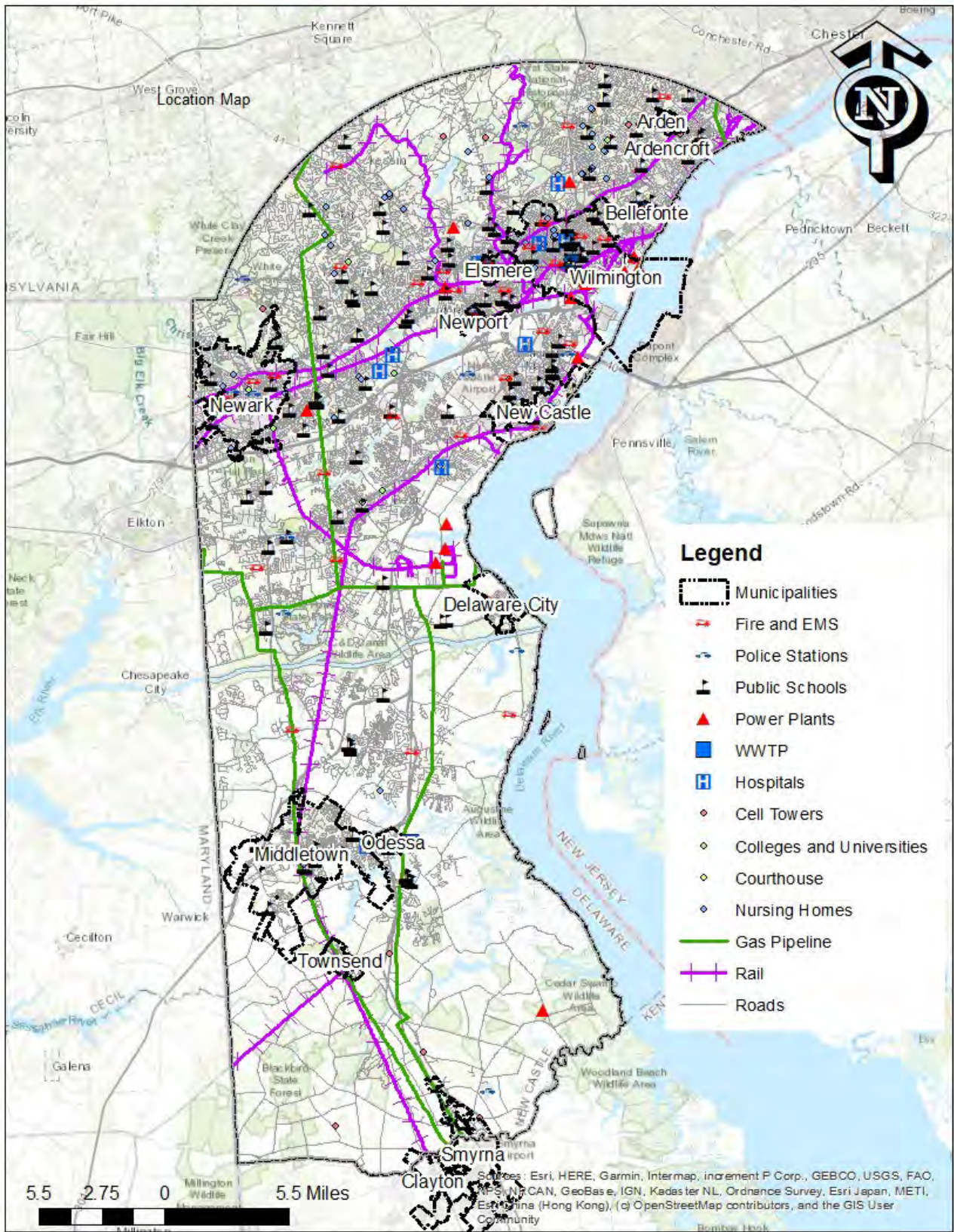
Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
DAWN CAREER INSTITUTE LLC	College/University	252 CHAPMAN ROAD, SUITE 100	NEWARK	No	No	No	No	No
DELAWARE COLLEGE OF ART AND DESIGN	College/University	600 N MARKET ST	WILMINGTON	No	No	No	No	Yes
GOLDEY-BEACOM COLLEGE	College/University	4701 LIMESTONE RD	WILMINGTON	No	No	No	No	No
HAIR ACADEMY SCHOOL OF BARBERING & BEAUTY	College/University	160 PENCADER PLAZA	NEWARK	No	No	No	No	No
HARRIS SCHOOL OF BUSINESS- WILMINGTON CAMPUS	College/University	1413 FOULK ROAD, SUITE 100	WILMINGTON	No	No	No	No	No
PAUL MITCHELL THE SCHOOL-DELAWARE	College/University	1420 PULASKI HWY	NEWARK	No	No	No	No	No
SCHILLING-DOUGLAS SCHOOL OF HAIR DESIGN LLC	College/University	211 LOUVIERS DRIVE	NEWARK	No	No	No	No	Yes
STRAYER UNIVERSITY-DELAWARE	College/University	800 NORTH KING STREET SUITE 101	WILMINGTON	No	No	No	No	No
UNIVERSITY OF DELAWARE	College/University	104 HULLIHEN HALL	NEWARK	No	No	No	No	No
WILMINGTON UNIVERSITY	College/University	320 DUPONT HWY	NEW CASTLE	No	No	No	No	No
Leonard L Williams Justice Center	Courthouse	500 North King Street	Wilmington	No	No	No	No	No
Cellco Partnership	Cell Tower	(Blackbird site) 3931 DUPONT PARKWAY	TOWNSEND	No	No	No	No	No
Cellco Partnership	Cell Tower	159 BRICK STORE LANDING RD	SMYRNA	No	No	No	Yes	No
Cellco Partnership	Cell Tower	(Winterthur) 4825 Kennett Pike	WILMINGTON	No	No	No	No	No
Cellco Partnership	Cell Tower	Thompson Station Rd.	Newark	No	No	No	Yes	No
NEW CINGULAR WIRELESS PCS, LLC	Cell Tower	5013 Kennett Pike (61916)	Wilmington	No	No	No	No	No
NEW CINGULAR WIRELESS PCS, LLC	Cell Tower	573 BLACK STALLION ROAD (78787)	CLAYTON	No	No	No	No	No

Exposure of Critical Facilities to Location-Specific Hazards

Critical Facility Name	Type	Address	Jurisdiction	100-year Flood	500-year Flood	Wildfire	Landslide	Hazmat
NEW CINGULAR WIRELESS PCS, LLC	Cell Tower	4860 South Dupont Hwy (43802)	Townsend	No	No	No	No	No
NEW CINGULAR WIRELESS PCS, LLC	Cell Tower	1000 PENNSYLVANIA AVENUE (3329)	CLAYMONT	No	No	No	No	No
NEW CINGULAR WIRELESS PCS, LLC	Cell Tower	142 Owensby Drive (13588)	Wilmington	No	No	No	No	No
NEW CINGULAR WIRELESS PCS, LLC	Cell Tower	2318 Knowles & Dorset Roads (78952)	Wilmington	No	No	No	No	No

Locations of Critical Facilities in New Castle County are provided in Figure 4.1.

Figure 4.1 Critical Facilities Map



4.3 Hazard Profiles

4.3.1 Flooding

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 Delaware. A large amount of rainfall over a short time span, like a cloudburst, can result in flash flood conditions. Small amounts of rain can result in floods in locations where the soil is frozen or saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces such as large parking lots, paved roadways, or other impervious developed areas (MRCC, 2022). Winter flooding can include ice jams, which occur when warm temperatures and heavy rain cause snow to melt rapidly.

Flooding occurs when stream capacities are exceeded due to large volumes of water from precipitation or from winter snow melt, which enters streams as surface run-off. Flooding can also occur from undersized culverts, bridges, or storm pipes that cannot accept the increased flow of water during storm events. This causes water to back up behind the structures and overtop the natural stream channel banks in what is referred to as the “backwater effect.” Another form of flooding, flash flooding, occurs during a short but intense rainfall event. Although the total amount of precipitation is often much less than the standard 24-hour design storm (1-year, 2-year, 5-year, 10-year, 25-year, 50-year, or 100-year) precipitation depths, the precipitation falls in a short period. This leads to intense surface runoff, and stream levels rise quickly in response to the runoff. The effects of flash flooding are exacerbated by increases in impervious surfaces from new developments.

Location and Extent

Flooding is the temporary condition of partial or complete inundation on normally dry land, and it is the most frequent and costly of all hazards in Delaware. Flooding events are generally the result of excessive precipitation. General flooding is typically experienced when precipitation occurs over a given river basin for an extended period. 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. The severity of a flood event is dependent upon a combination of creek, stream, and river basin topography and physiography, hydrology, precipitation and weather patterns, present soil moisture conditions, the degree of vegetative clearing, as well as the presence of impervious surfaces in and around flood-prone areas.

Winter flooding can include ice jams, which occur when warm temperatures and heavy rain cause snow to melt rapidly. Snow melt combined with heavy rain can cause frozen rivers to swell, which breaks the ice layer on top of a river. The ice layer often then breaks into large chunks, which float downstream, piling up in narrow passages and near other obstructions such as bridges and dams. All forms of flooding can damage infrastructure.

Severe flooding is generally restricted to the 100-year floodplain boundary (2012 FEMA Digital Flood Insurance Rate Map (DFIRM), which is identified on the Flood Hazard Map. Floodplains are lowlands adjacent to rivers, streams, and creeks that are subject to recurring floods. In assessing the potential spatial extent of flooding, it is important to know that a floodplain associated with a flood that has a

10% chance of occurring in a given year is smaller than the floodplain associated with a flood that has a 0.2% annual chance of occurring.

The National Flood Insurance Program (NFIP) publishes digital flood insurance rate maps (DFIRMs). These maps identify the 1% annual chance of flood area. Special flood hazard area (SFHA) and base flood elevations (BFE) are developed from the 1% annual chance flood event. The SFHA serves as the primary regulatory boundary used by FEMA, the State of Delaware, and New Castle County local governments. Federal floodplain management regulations and mandatory flood insurance purchase requirements apply to high-risk special flood hazard areas.

Figure 4.2 Special Flood Hazard Area

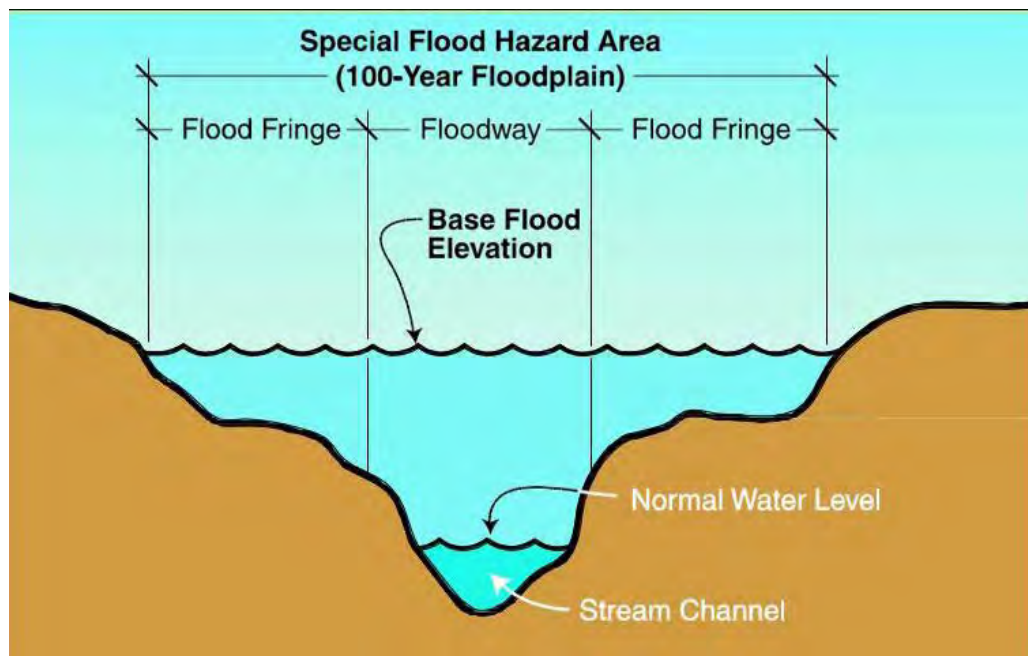


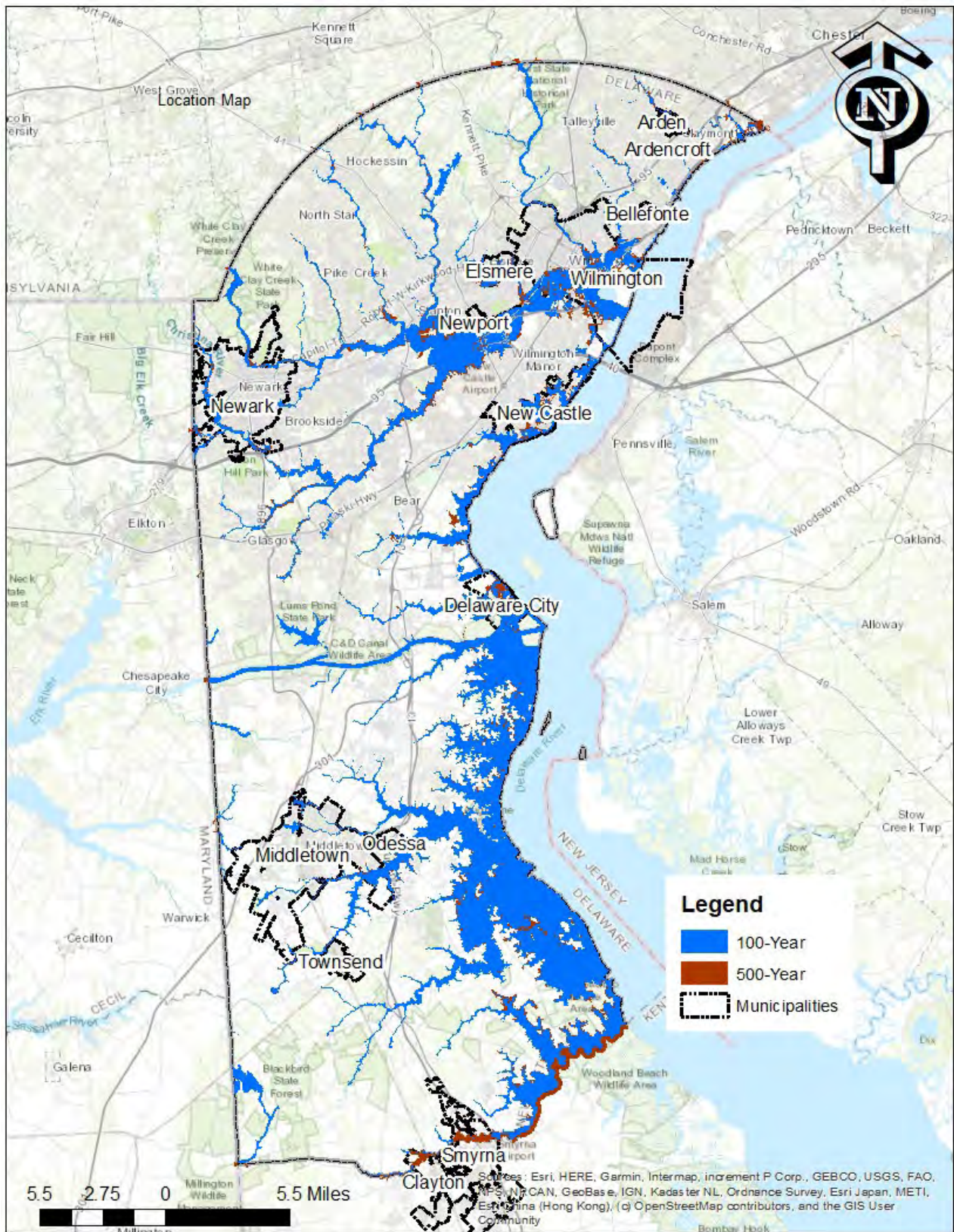
Table 4.3 Flood Hazard High Risk Zones

Flood Hazard High Risk Zones (<i>FEMA, 2017</i>)	
Zone	Description
A	Areas subject to inundation by the 1% annual chance flood event. Because detailed hydraulic analysis has not been performed, no base flood elevations or flood depths are shown
AE	Areas subject to inundation by the 1% annual chance flood event determined by detailed methods. BFEs are shown within these zones.
AH	Areas subject to inundation by the 1% annual chance shallow flooding (usually areas of ponding) where average depths are 1-3 feet. BFEs derived from detailed hydraulic analysis are shown in this zone.

Flood Hazard High Risk Zones <i>(FEMA, 2017)</i>	
Zone	Description
AO	Areas subject to inundation by the 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are 1-3 feet. Average flood depths derived from detailed hydraulic analysis are shown within this zone.
AR	Areas that result from the decertification of a previously accredited flood protection system that is determined to be in the process of being restored to provide base flood protection.

Flooding poses a threat to functional needs, facilities, agricultural areas, and those who reside or conduct business in the floodplain. The most significant hazard exists for facilities in the floodplain that process, use, and/or store hazardous materials. A flood could potentially release and transport hazardous materials out of these areas. As the water recedes, it would spread the hazardous materials throughout the area. Most flood damage to property and structures located in the floodplain is caused by water exposure to the interior, high-velocity water, and debris flow.

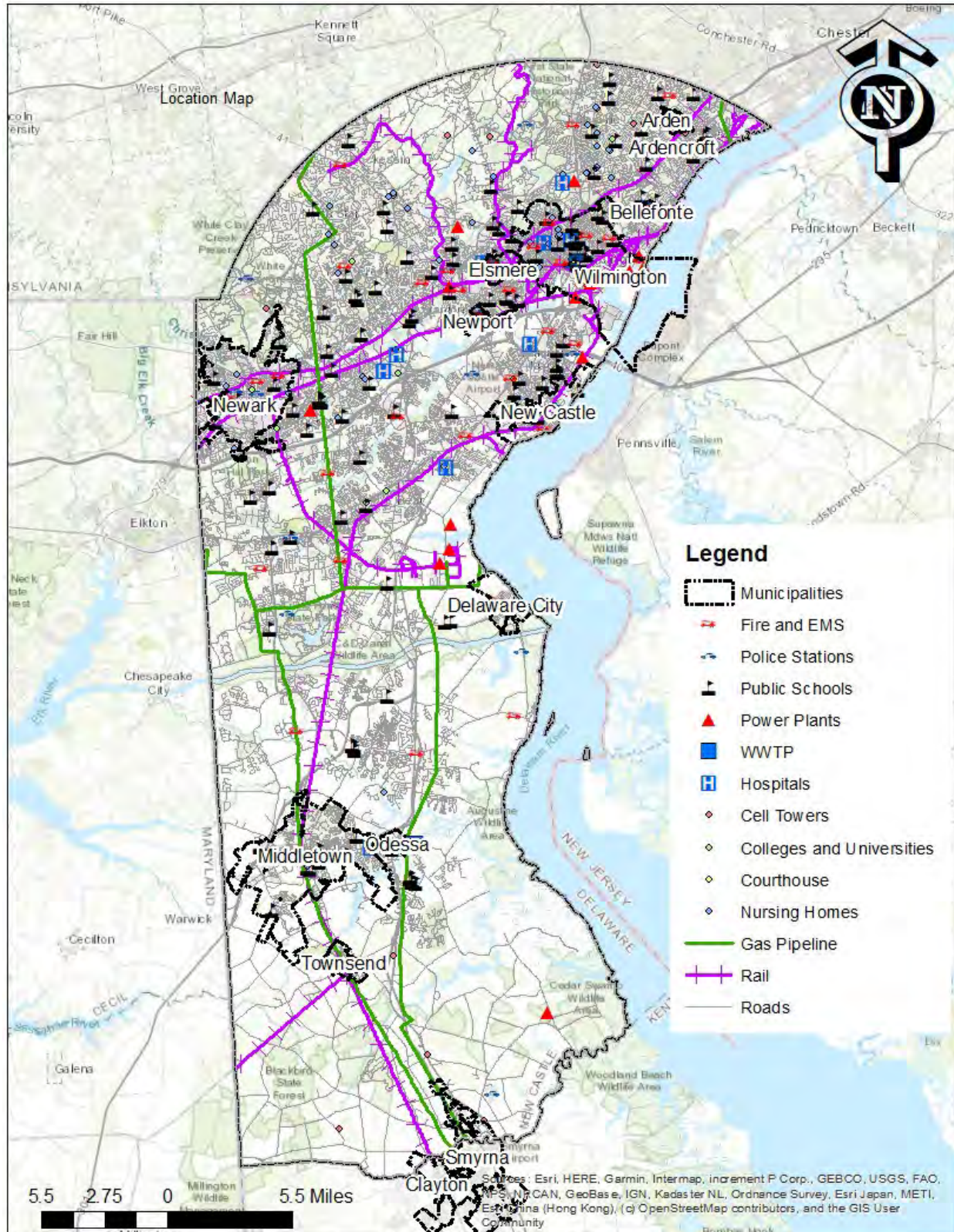
Figure 4.3 NCC Floodplains/Coastal Inundation Map





There are nine (9) critical facilities exposed and at risk to a 100-year flood event. These nine (9) facilities and their locations are shown in Figure 4.4.

Figure 4.4 Critical Facilities in 100-year Floodplain



Range of Magnitude

The Delaware River is the largest waterway that passes along the eastern shoreline of New Castle County. Other notable waterways include the Christina River and White Clay Creek, among others.

Several factors determine the severity of floods, including rainfall intensity and duration, topography, ground cover, tidal factors, and rate of snowmelt. Water runoff is greater in areas with steep slopes and little to no vegetative ground cover. Urbanization typically results in the replacement of vegetative ground cover with impermeable surfaces like asphalt and concrete, increasing the volume of surface runoff and stormwater, particularly in areas with poorly planned stormwater drainage systems. A large amount of rainfall over a short period can cause flash floods. Additionally, small amounts of rain can cause floods in locations where the soil is frozen, saturated from a previous wet period, or if the area is rife with impermeable surfaces such as large parking lots, paved roadways, and other developed areas. The county occasionally experiences intense rainfall from tropical storms in late summer and early fall, which can potentially cause flooding as well.

Although floods can cause deaths, injuries, and damage to property, they are naturally occurring events that benefit riparian systems, which have not been disrupted by human actions. Such benefits include groundwater recharge and the introduction of nutrient-rich sediments, which improve soil fertility. However, human development often disrupts natural riparian buffers by changing land use and land cover, and the introduction of chemical or biological contaminants that often accompany human presence can contaminate habitats after flood events.

Table 4.4 summarizes the range of magnitude for flood hazards.

Table 4.4 Flood Hazards Range of Magnitude

Severity	Causes	Frequency	Damage Extents
Minimum	Local Storms – Flash Floods	Annual	Minor road washouts; storm pipe failure
Moderate	Regional Storms – Heavy Rainfall	5 to 10 years	Bridge and culvert damage; some properties flooded
Maximum	Large Multi-Day Storms – Hurricanes	10 to 100 years	Major rivers and large streams experience overbank flooding; properties flooded; bridge and culvert failure

Past Occurrence

According to the NCEI Storm Events Database, there have only been 191 recorded flood or flash flood events in New Castle County, resulting in 4 deaths, 6 injuries, and causing over \$28 million in property damage. Those incidents which resulted in damage to life and/or property have been listed in the table below.

Table 4.5 Past Flood Occurrences²⁹

LOCATION	DATE	TYPE	DEATHS	INJURIES	Prop. Damage	Crop Damage
North Portion	01/18/1999	Flash Flood	0	1	0.00k	0.00k
Countywide	09/16/1999	Flash Flood	2	1	8.000M	0.00k

²⁹ [Storm Events Database - Search Results | National Centers for Environmental Information \(noaa.gov\)](#)

North Portion	09/15/2003	Flash Flood	0	1	16.100M	0.00k
Countywide	07/12/2004	Flash Flood	0	1	0.00k	0.00k
Coochs Bridge	12/09/2009	Flood	0	1	0.00k	0.00k
Duross Heights	07/13/2010	Flash Flood	0	0	5.00k	0.00k
Holly Oak	07/14/2010	Flash Flood	0	1	50.00k	0.00k
Milford Crossroads	10/01/2010	Flood	0	0	600.00k	0.00k
Milford Crossroads	08/27/2011	Flash Flood	2	0	0.00k	0.00k
Coochs Bridge	09/01/2021	Flash Flood	0	0	3.600M	0.00k
Totals:			4	6	28.355M	0.00K

Future Occurrence

Based on historical occurrence, with 191 flood events occurring over 35 years, it is expected that five (5) flood events will take place within the County on an annual basis.

Flooding is a frequent problem throughout Delaware. New Castle County will certainly be impacted by flooding events in the future. New Castle County experiences some degree of flooding annually. The threat of flooding is compounded in the late winter and early spring months, as melting snow can overflow streams, creeks, and tributaries, increasing the amount of groundwater, clogging stormwater, culverts, and bridge openings. Properties along the banks of a waterway are the most vulnerable. The property within the floodplain is broken into sections depending on its distance from the waterway. The ten-year flood zone is the area that has a ten percent chance of being flooded every year. However, this label does not mean that this area cannot flood more than once every ten years. It just designates the probability of a flood of this magnitude every year. Further away from this area is the fifty-year flood plain. This area includes all of the ten-year floodplain plus additional property. The probability of a flood of this magnitude occurring during a one-year period is two percent. A summary of flood probability is shown in Table 4.6 - Flood Probability Summary.

Table 4.6 Flood Probability Summary

Flood Probability Summary (<i>FEMA</i>)	
Flood Recurrence Intervals	Annual Chance of Occurrence
10-year	10.00%
50-year	2.00%
100-year	1.00%
500-year	0.20%

The New Castle County Hazard Mitigation Team will continue to work with municipalities to identify vulnerable locations to all types of flooding and identify vulnerable special needs populations and functional needs facilities. This will be a continuous process during the 2025-2030 mitigation plan period. As new data is developed and new special needs facilities appear, the interface between flooding locations and the new data will be analyzed to identify new vulnerabilities.

Vulnerability Assessment

Inventory and summary of vulnerable assets

Table 4.7 identifies the Flood exposure by building count and by occupancy for each New Castle County jurisdiction. There is a total of 3,598 buildings exposed to a potential 100-year flood event.

Table 4.7 Flood Exposure by Building Count and Jurisdiction

Flood Exposure by Building Count										
Jurisdiction	Agriculture	Single-Family Home	Manufactured Housing	Multi-Family Home	Commercial	Industrial	Government	Education	Religious	TOTAL
Arden	0	0	0	0	0	0	0	0	0	0
Ardencroft	0	0	0	0	0	0	0	0	0	0
Ardentown	0	0	0	0	0	0	0	0	0	0
Bellefonte	0	0	0	0	0	0	0	0	0	0
Clayton	0	0	0	0	0	0	0	0	0	0
Delaware City	20	211	53	2	32	44	4	2	0	368
Elsmere	8	111	0	9	10	15	0	0	0	153
Middletown	0	8	0	0	0	0	0	0	0	8
New Castle	19	244	0	19	33	7	6	3	1	332
Newark	4	77	0	5	5	21	1	0	0	113
Newport	3	1	0	0	4	0	0	0	0	8
Odessa	3	1	0	0	0	0	0	0	0	4
Smyrna	0	0	2	0	0	0	0	0	0	2
Townsend	0	1	0	0	0	0	0	0	0	1
Wilmington	84	276	33	0	150	254	42	1	9	849
Unincorporated	161	1037	65	47	210	208	25	4	3	1760
TOTAL	302	1967	153	82	444	549	78	10	13	3,598

Table 4.8 identifies the Flood exposure by structure value and by occupancy for each New Castle County jurisdiction. Throughout New Castle County, the structure value exposed to a flood event is \$1,843,239,996.

Table 4.8 Flood Exposure by Jurisdiction and Building Type

Jurisdiction	Agriculture	Single-Family Home	Manufactured Housing	Multi-Family Home	Commercial	Industrial	Government	Education	Religious	TOTAL
Arden	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ardencroft	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ardentown	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bellefonte	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Clayton	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Delaware City	\$3,374,520	\$35,982,304	\$3,528,899	\$7,517,727	\$10,317,164	\$24,677,193	\$4,798,234	\$575,253	\$0	\$90,771,294
Elsmere	\$351,029	\$14,328,751	\$0	\$15,038,004	\$7,287,588	\$6,909,623	\$0	\$0	\$0	\$43,914,995
Middletown	\$0	\$223,249	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$223,249
New Castle	\$7,484,632	\$43,604,977	\$0	\$45,487,492	\$18,979,677	\$9,728,360	\$1,497,244	\$13,746,312	\$387,142	\$140,915,836
Newark	\$585,954	\$14,356,413	\$0	\$29,402,250	\$14,369,023	\$24,855,792	\$50,970	\$0	\$0	\$83,620,401
Newport	\$2,017,561	\$58,149	\$0	\$0	\$2,219,494	\$0	\$0	\$0	\$0	\$4,295,204
Odessa	\$263,808	\$112,216	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$376,023
Smyrna	\$0	\$0	\$102,155	\$0	\$0	\$0	\$0	\$0	\$0	\$102,155
Townsend	\$0	\$108,771	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$108,771
Wilmington	\$95,097,357	\$36,864,495	\$0	\$100,474,517	\$181,651,030	\$415,772,537	\$39,205,937	\$1,348,913	\$13,665,226	\$884,080,012
Unincorporated	\$25,798,183	\$145,149,906	\$3,747,424	\$62,587,314	\$141,746,091	\$204,208,265	\$5,020,752	\$5,246,012	\$1,328,109	\$594,832,056
TOTAL	\$134,973,044	\$290,789,230	\$7,378,478	\$260,507,304	\$376,570,065	\$686,151,771	\$50,573,138	\$20,916,490	\$15,380,477	\$1,843,239,996

Estimation of Losses

Tables 4.9 through 4.14 show the estimated losses for a flood event in New Castle County, including building exposure and damage count, potential damage in a 100-year flood (by damage category), 100-year flood estimated property losses, and estimated business interruptions.

Table 4.9 Flood Estimated Building Exposure and Damage Count

100-year Estimated Building Exposure and Damage Count			
Study Area	Exposed Structures	At Least Moderate Damage	Buildings Destroyed
New Castle County	1,035	122	11

Table 4.10 Potential Damage in a 100-year Flood Event, by Damage Category

Potential Damage in a 100-Year Flood, by Damage Category	
Degree of Damage	100-Year Count
1-10%	709
11-20%	204
21-30%	56
31-40%	44
41-50%	11
Greater than 50%	11

Table 4.11 Estimated Property Losses

100-year Estimated Property Losses (in Millions of Dollars)							
Study Area	Residential Building Loss	Residential Content Loss	Commercial Building Loss	Commercial Content Loss	Total Building Loss	Total Content Loss	Estimated Total Loss
New Castle County	84.45	48.84	127.36	220.84	231.28	330.16	203.5

Table 4.12 100-Yr Estimated Business Interruption Losses

100-year Estimated Business Interruption Losses (in Millions of Dollars)					
Business Interruption	Residential	Commercial	Industrial	Others	Total
Income	5.74	1409.14	1.98	38.38	1455.24
Relocation	46.57	363.79	1.64	19.67	431.67
Rental Income	27.34	273.1	0.35	2.1	302.89
Wage	13.56	614.14	2.38	155.21	785.29
Total	93.21	2660.17	6.35	215.36	2975.09

Table 4.13 100-Yr Debris Estimates

100-Year Debris Estimates				
Study Area	Finish Debris (tons)	Structure Debris (tons)	Foundation Debris (tons)	Debris (Total Tons)
New Castle County	4,549	1,294	942	6,785

Table 4.14 100-Yr Social Impacts

100-Year Social Impacts		
Study Area	Displaced Population	Persons Seeking Public Shelter
New Castle County	9,834	2,382

NFIP-Insured Structures/RL/SRL Properties

A repetitive loss property is an NFIP-insured property that has had at least four paid flood losses of more than \$1,000 or has had two paid flood losses within 10 years that, in aggregate, equal or exceed the value of the property, or has had three or more paid losses that, in aggregate, equal or exceed the value of the property. Addressing repetitive loss properties through the implementation of specific mitigation projects represents one of the most effective ways to reduce future flood losses. A severe repetitive loss property is a property that has had at least four claim payments greater than \$5,000, or the cumulative amount of the four payments exceeds \$20,000 or has had two cumulative claim payments that exceed the value of the property.

A total of 148 repetitive loss and severe repetitive loss properties structures have been identified in New Castle County, according to FEMA's Repetitive Loss Records. Table 4.15 presents a summary of these structures by building occupancy and by jurisdiction.

Table 4.15 Repetitive Loss and Severe Repetitive Loss Properties by Jurisdiction and Building Occupancy

Repetitive Loss Properties AND Severe Repetitive Loss	2-4 Family	Business-NonRes	Other-NonRes	Single Family	Total RL/SRL Properties	Total Claims	Total Paid
Arden	0	0	0	0	0	0	\$0.00
Ardencroft	0	0	0	0	0	0	\$0.00
Ardentown	0	0	0	0	0	0	\$0.00
Bellefonte	0	0	0	0	0	0	\$0.00
Delaware City	0	0	0	2	2	4	\$42,778.55
Elsmere	0	0	1	1	2	5	\$176,752.43
Middletown	0	0	0	9	9	26	\$265,411.05
New Castle	0	0	8	7	15	35	\$1,216,097.50
Newark	0	7	4	13	24	86	\$8,884,505.88

Repetitive Loss Properties AND Severe Repetitive Loss	2-4 Family	Business-NonRes	Other-NonRes	Single Family	Total RL/SRL Properties	Total Claims	Total Paid
Newport	0	0	0	0	0	0	\$0.00
Odessa	0	0	0	0	0	0	\$0.00
Townsend	0	0	0	1	1	2	\$91,934.19
Wilmington	1	4	26	39	70	210	\$7,306,419.16
New Castle County (Christiana)	1	2	0	3	6	42	\$1,058,051.24
New Castle County (Hockessin)	0	0	0	3	3	13	\$221,754.77
New Castle County (Marshallton)	1	0	3	0	4	11	\$2,741,983.89
New Castle County (Port Penn)	0	0	0	1	1	3	\$12,506.71
New Castle County (Stanton)	0	1	4	1	6	24	\$3,823,762.99
New Castle County (Yorklyn)	0	0	4	1	5	26	\$4,829,372.76
Total	3	14	50	81	148	487	\$30,671,331.12

Potential Impacts

Restrictions on future development in the floodplain will continue to be in place in New Castle County. Additionally, flood events may have a greater impact on vulnerable and underserved populations due to a lack of health and medical access to clean water following a flood event, and evacuation access. Flooding disproportionately impacts underserved communities, causing greater economic hardship, displacement, and health risks due to factors like inadequate housing, limited access to resources, and often being located in high-risk floodplains, stemming from historical discriminatory practices like redlining, leaving them more vulnerable to the damaging effects of floods compared to wealthier communities; this can further exacerbate existing inequalities and hinder their recovery process.

Severe flooding can cause injuries and deaths and can have long-term impacts on the health and safety of the citizens. Severe flooding can also result in significant property damage, potentially disrupting the regular function of functional needs facilities and having long-term negative impacts on local economies. Industrial, commercial, and public infrastructure facilities can become inundated with flood waters, threatening the continuity of government and business. The special needs population must be identified and located in flooding situations, as they are often homebound. Mobile homes are especially vulnerable to high water levels. Flooding can have significant environmental impacts when flood waters release and/or transport hazardous materials and can also result in the spread of diseases.

Severe flooding also comes with many secondary effects that could have long-lasting impacts on the population, economy, and infrastructure of New Castle County. Power failures are the most common secondary effect associated with flooding. Coupled with a shortage of critical services and supplies, power failures could cause a public health emergency. Critical infrastructure, such as sewage and water treatment facilities, can be severely damaged, having a significant effect on public health. High flood water can cause sewage systems to fail and overflow, contaminating groundwater

and drinking water. Flooding also has the potential to trigger other hazards, such as landslides, hazardous material spills, and dam failures.

The FEMA Community Lifelines most likely to be impacted include:

- Safety and Security
- Food, Water, Shelter
- Transportation
- Hazardous Materials

4.3.2 Winter Storms, Nor'easters, and Freezes

Winter storms are regional events and most often impact a large portion or all of Delaware. Winter storms consist of cold temperatures, heavy snow or ice, and sometimes strong winds. They begin as low-pressure systems that move through Delaware, usually following the jet stream (NOAA NSSL, 2022c). A winter storm can adversely affect roadways, utilities, business activities, and cause loss of life, frostbite, and freezing conditions. They can result in the closing of secondary roads, particularly in rural locations, loss of utility services, and depletion of oil heating supplies (FEMA, 2022d).

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 last 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.

Winter weather poses threats to the safety of people and infrastructure in the following ways:

- Medical conditions such as frostbite, hypothermia, and serious injury or loss of life.
- Disruptions in electrical/utility systems, transportation systems, and business activities.
- Failure of power lines due to the weight or force of snow, wintry mix, etc., or indirectly because of the higher demand for electricity during these types of events.
- Prevention of the delivery of fuel sources such as oil and propane for heating purposes when roads close or become too dangerous to traverse.
- Increase in traffic accidents and blocking of evacuation routes.

Winter weather leaves the County vulnerable not only during the winter months, but also during the upcoming spring months. After a season of snow and ice, ice melt brings with it a flood threat.

Location and Extent

In New Castle County, the risk to people and property from winter storms cannot be distinguished by area, as the hazard is not spatially constrained and can occur anywhere within the County. Although different parts of the County may be impacted in different ways when a severe winter weather event strikes, generally, all people and assets are considered to have the same degree of exposure. Types of Winter Storms and Precipitation are shown in Table 4.16.

Table 4.16 Types of Winter Storms and Precipitation (NOAA NSSL, 2022f)

Type	Description
Blizzards	Storms consisting of snow, winds of at least 35mph, and visibility frequently reduced to less than a ¼ mile. These conditions must last for at least 3 hours
Ice Storms	Storms where at least ¼" of ice accumulates on exposed surfaces.

Type	Description
Lake Effect Storms	Storms that are created by cold, dry air moving through warm, moist air over lakes, adding moisture that is then deposited in the form of snow. They affect areas to the south and east of lakes.
Snow Squalls	Brief, intense snow events where strong and gusty winds can lead to large snow deposits and low visibility conditions.
Snow	Ice crystals that form in wintertime clouds that cling to each other as they fall forming snowflakes; they will remain in this form if the temperature from cloud to ground is at or below 0°C/32°F. Accumulation can range from none to significant. Wind conditions will impact visibility.
Sleet	Partially melted snowflakes that have passed through a small layer of warm air on their descent, only to refreeze as they approach the ground and from frozen rain drops.
Freezing Rain	Completely melted snowflakes that have passed through a large layer of warm air on their descent; they are then supercooled but not frozen by a small layer of cold air directly above the ground. The water drops will refreeze when contacting with anything that is 0°C/32°F or below, creating a layer of ice on exposed surfaces.

Range of Magnitude

Table 4.17 summarizes the range of magnitude for winter storms.

Table 4.17 Range of Magnitude - Winter Storms

Severity	Causes	Frequency	Damage Extents
Minimum	Light Snowfall	Annual	Minor traffic disruptions
Moderate	Heavy Snowfall; Freezing Rain	1 to 2 years	Road closures; some downed trees and power lines
Maximum	Excess Heavy Snowfall; Severe Icing	2 to 5 years	Substantial road closures; extensive power outages

Past Occurrence

According to the NCEI Storm Events Database, since 1996, there have been 169 recorded winter storms, blizzards, and/or winter weather events in New Castle County, resulting in 4 deaths and 46 injuries, and causing over \$5M in property damage. All events that caused damage or resulted in death or injury have been included in Table 4.18.

Table 4.18 Past Winter Storm Occurrences

Location	DATE	TYPE	DEATHS	INJURIES	Prop Damage	Crop Damage
NEW CASTLE (ZONE)	1/7/1996	Blizzard	0	0	\$1,000,000	\$0
NEW CASTLE (ZONE)	1/25/2000	Winter Storm	0	20	\$0	\$0
NEW CASTLE (ZONE)	2/16/2003	Winter Storm	0	0	\$1,300,000	\$0
NEW CASTLE (ZONE)	2/13/2007	Winter Storm	1	0	\$0	\$0
NEW CASTLE (ZONE)	2/25/2007	Winter Storm	2	0	\$0	\$0
NEW CASTLE (ZONE)	2/12/2008	Winter Weather	0	6	\$0	\$0
NEW CASTLE (ZONE)	1/18/2009	Winter Weather	0	10	\$0	\$0
NEW CASTLE (ZONE)	1/27/2009	Winter Storm	0	10	\$50,000	\$0
NEW CASTLE (ZONE)	2/9/2010	Winter Storm	1	0	\$3,000,000	\$0
Totals			4	46	\$5.350M	\$0

Future Occurrence

Based on New Castle County's geography and location, winter storm occurrences are highly likely to occur annually. Although these will vary in intensity and type of winter storm, winter storms will continue to occur in New Castle County and all of Delaware. The frequency and intensity of winter storm events are expected to be impacted by climate change.

Vulnerability Assessment

Inventory and summary of vulnerable assets

All structures and critical facilities are considered to be vulnerable to winter storms. The DE 2023 State HMP identifies that the impact of severe winter weather can be catastrophic to both life and property.

Estimation of Losses

According to NCEI, the total estimated economic damage associated with the 169 winter storms/winter weather or freeze events in the period from 1996 to 2025 is over \$5M. According to the DE 2023 State HMP, between 2000 and 2022, there has been just over \$4M in property damage.

Potential Impacts

Winter storm events are not expected to impact future development in the County. Additionally, winter storms may have a greater impact on vulnerable and underserved populations due to a lack of access to transportation. Winter storms disproportionately affect underserved communities by exacerbating existing inequalities, making it harder for them to access essential services, increasing the risk of health complications due to cold exposure, causing significant financial strain due to potential power outages, transportation disruptions, and the added cost of heating their homes, often poorly insulated, during extreme cold weather. Winter storms can have different impacts on

different age groups, including direct impacts to the elderly, which must be accounted for in the County, especially in municipalities with the most elderly residents who may require more immediate assistance.

The FEMA Community Lifelines most likely to be impacted include:

- Safety and Security
- Food, Water, Shelter
- Energy
- Transportation

4.3.3 Hurricanes and Coastal Storms

Hurricanes, Coastal Storms, 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. The Atlantic hurricane season runs from June 1 to November 30.

Tropical storm systems (i.e., hurricanes, tropical storms, tropical depressions) impacting Delaware develop in tropical or sub-tropical waters of the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea (NOAA NOS, 2021). Nor'easters are extra-tropical storms that typically develop from low-pressure centers off the Atlantic Coast between Georgia and New Jersey during the winter months (NOAA NWS, n.d.b). Potential threats from these storms include powerful winds, heavy rainfall, storm surges, coastal and inland flooding, rip currents, tornadoes, and landslides.

Location and Extent

Owing to the county's proximity to the Atlantic and its shoreline along the Delaware Bay and River, New Castle County is highly susceptible to hurricane landfall and the storm surges associated with it. This can and has resulted in county-wide flooding and damage from high winds.

Range of Magnitude

Hurricanes are classified according to the Saffir-Simpson scale, ranging from Category 1 (weakest) to Category 5 (strongest). Table 4.19 provides a description of these categories.

Table 4.19 Saffir Simpson Hurricane Wind Scale³⁰

Category	Sustained Winds (mph)	Type of Damage Done
1	74-95	Well-constructed frame homes could have damage to the 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	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	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.

³⁰ National Oceanic and Atmospheric Administration, National Weather Service, National Hurricane Center.

4	130-156	Well-built framed homes can sustain severe damage with the 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 uninhabitable for weeks or months.
5	>157	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.

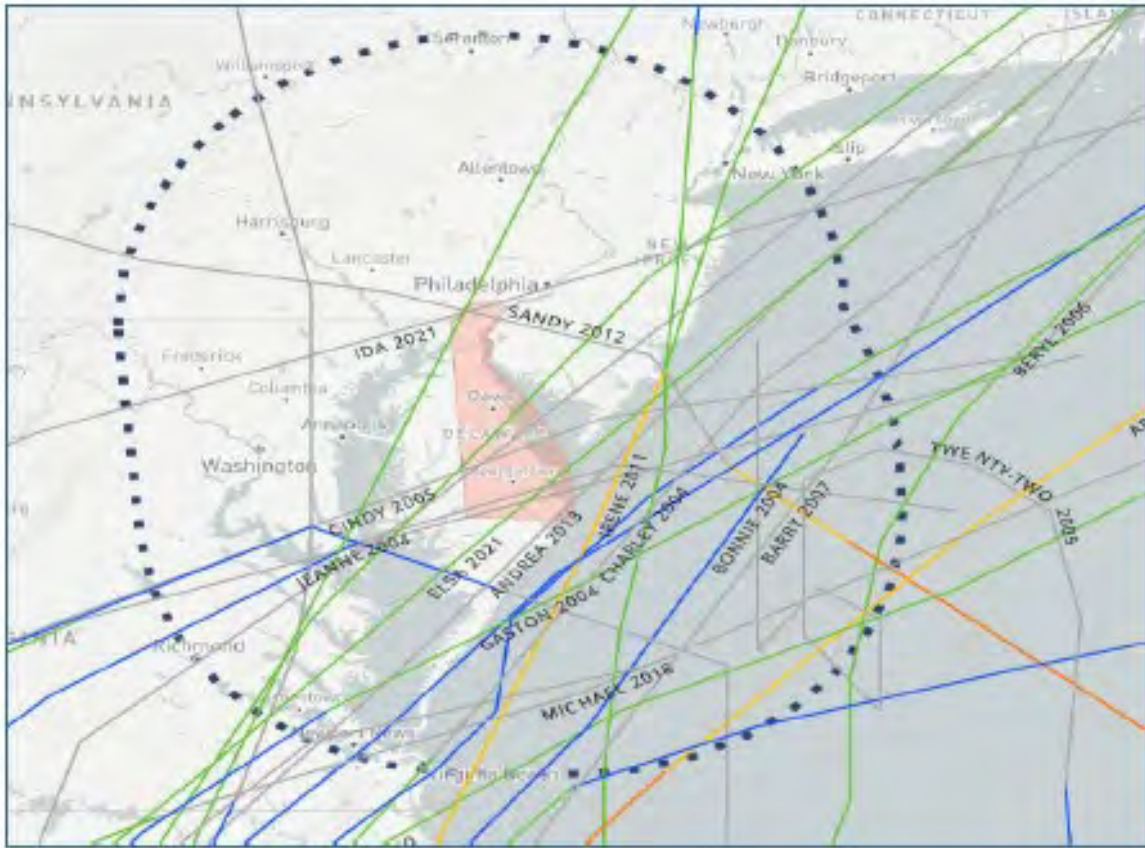
Past Occurrence

NCEI lists zero hurricane/tropical storm events to directly impact New Castle County from 1950 to 2023. However, the county has experienced the effects of as many as twenty-two hurricanes and at least one significant tropical storm since the 1920s. Those of most significant impact to New Castle County can be found in Table 4.20.

Table 4.20 Storm Impacts to Delaware and New Castle County

Storms to Impact Delaware and New Castle County	
1969	Hurricane Camille
1972	Hurricane Agnes
1996	Tropical Storm Bertha
1996	Hurricane Eduardo
1999	Hurricane Dennis
1999	Hurricane Floyd
2000	Hurricane Gordon (Remnants)
2001	Tropical Storm Allison (Remnants)
2003	Tropical Storm Henri (Remnants)
2003	Hurricane Isabel
2008	Tropical Storm Hanna
2011	Hurricane Irene
2012	Hurricane Sandy

Figure 4.5 Historical Hurricane Paths



Future Occurrence

In the future, it is likely that a hurricane will impact New Castle County in the future, causing flooding and damage due to wind. Climate change is likely to negatively impact the frequency and intensity of future hurricane/tropical storm events.

Vulnerability Assessment

Inventory and summary of vulnerable assets and Estimation of Losses

FEMA's Hazus software version 6.0 was used to estimate the relative vulnerability to hurricanes across the state. The methodology uses Hazus default data on hurricane wind hazards and building stock, user-defined essential facilities data, and the software's standard algorithms. Hazus was used to calculate two kinds of economic losses: 1) direct building losses, and 2) business interruption losses. Direct building losses consist of the damage to structures, contents, and inventory; while business interruption losses consist of the relocation expenses, employee wage loss, business income loss, and rental income loss that accrue during the time that businesses remain inoperable. Table 4.21 through Table 4.24 provide the results from the Hurricane/Tropical Storm risk and estimation of loss assessment.

Table 4.21 100-year Probabilistic Hurricane Event with 62mph peak gust wind speed

100-year Probabilistic Hurricane Event with 62mph peak gust wind speed		
Debris (total tons)	Eligible Tree Debris (tons)	Brick/Wood Debris (tons)

63,263	46,709	16,554

Table 4.22 500-year Probabilistic Hurricane Event with 76mph peak gust wind speed

500-year Probabilistic Hurricane Event with 76mph peak gust wind speed		
Debris (total tons)	Eligible Tree Debris (tons)	Brick/Wood Debris (tons)
318,604	191,369	127,235

Table 4.23 1000-year Hurricane Building Damage County by General Occupancy

1000-year Hurricane Building Damage County by General Occupancy		
Occupancy	Minor Damage	Moderate Damage
Agriculture	45	21
Commercial	2,175	1,155
Education	60	38
Government	37	21
Industrial	493	297
Religion	124	44
Residential	42,533	8,885
Total Count	45,467	10,461

Table 4.24 Total Estimated Loss for 1000-year Hurricane (\$k)

Total Estimated Loss for 1000-year Hurricane (\$k)					
Loss Type	Residential	Commercial	Industrial	Others	Total
Property Damage	2,459,586.44	373,509.77	106,970.47	155,048.23	3,095,114.91
Business Interruption	200,968.44	124,700.38	9,616.79	68,997.08	404,282.69
Total	2,660,554.88	498,210.15	116,587.26	224,045.31	3,499,397.60

Potential Impacts

Hurricane/Tropical Storm events will likely have an impact on future development in the County, and it will continue to be recommended to have no new development in floodplain areas, and in areas with high levels of coastal erosion. Additionally, these events may have a greater impact on vulnerable and underserved populations due to a lesser ability to evacuate and/or have access to transportation and/or medical services. Hurricanes and tropical storms disproportionately affect underserved communities, particularly low-income and minority populations, due to factors like pre-existing economic inequalities, limited access to resources, poorer infrastructure in their neighborhoods, and evacuating difficulties, leaving them more vulnerable to the devastating impacts of a storm, including longer power outages, greater property damage, and slower recovery times compared to wealthier areas.

The FEMA Community Lifelines most likely to be impacted include:

- Safety and Security
- Food, Water, Shelter
- Transportation

4.3.4 Severe Thunderstorms and Tornadoes

A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. A tornado is a narrow, violently rotating column of air that extends from a thunderstorm to the ground (NOAA NSSL, 2022b). The impact of tornado or windstorm hazards is ultimately dependent on the population or amount of property (i.e., buildings, infrastructure, agricultural land, etc.) present in the area in which they occur. Tornado events are often so severe that property loss or human fatality is typically inevitable if evacuation or proper construction standards are not implemented.

About 1,250 tornadoes hit the U.S. each year. 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.

Straight-line winds and windstorms are different from tornadoes in that they do not involve any rotation. They may accompany tornadoes and thunderstorms as straight-lined winds are caused by the movement of air from areas of higher pressure to areas of lower pressure (NOAA NSSL, 2022e). Stronger winds are the result of greater differences in pressure

Location and Extent

Tornado events are usually localized events. However, severe thunderstorms may result in conditions favorable to the formation of numerous or long-lived tornadoes. While tornadoes nationally can occur at any time during the day or night or any month of the year but are most frequent during late afternoon into early evening, the warmest hours of the day, and most likely to occur during the spring and early summer months of March through June (NOAA NSSL, 2022b), they are most frequent (and most violent) in May, June, and July for Delaware.

Wind events are typically experienced on a region-wide scale and can vary in spatial size from small microscale events to large-scale synoptic wind events often associated with warm or cold fronts (NOAA NSSL, 2022e).

Range of Magnitude

Tornadoes and “microbursts” can occur during thunderstorms and other weather systems where relatively high winds prevail. Tornadoes are classified according to the Enhanced Fujita (EF) scale, which is based on wind speed and degrees of damage applied to various structure types. There are six categories of tornadoes, with the weakest labeled as EF0 and the most intense, as EF5. Table 4.25 provides a description of each category.

Table 4.25 Enhanced Fujita Scale

Category	Wind Speed (mph)	Damage Level	Type of Damage Done
EF0	65-85	Light	Light Damage: Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.

Category	Wind Speed (mph)	Damage Level	Type of Damage Done
EF1	86-110	Moderate	Moderate Damage: Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	Considerable	Considerable Damage: Roofs torn off well-constructed houses; mobile homes demolished; large trees snapped or uprooted; light object missiles generated; cars lifted off ground.
EF3	136-165	Severe	Severe Damage: Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	Devastating	Devastating Damage: Whole frame houses, well-constructed houses and whole frame houses completely leveled; cars thrown, and small missiles generated.
EF5	>200	Incredible	Incredible Damage: Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100m (109 yd.); high-rise buildings have significant structural deformation; incredible phenomena will occur.

Past Occurrence

According to the NCEI Storm Events Database, since 1950, there have been 466 recorded high wind, and/or thunderstorm wind events in New Castle County resulting in over \$12,719,000 in property damage. One death and nine injuries were reported as a result of these events. All events which resulted in death, injury, or damage can be found in Table 4.26. There have been two tornados reported since 1950. Both were an EF1 Tornado, and caused no damage. No deaths or injuries were reported as a result of the tornados.

Table 4.26 Past Thunderstorm/High Wind and Tornado Occurrences (1975-2023)³¹

Location	Date	Type	Magnitude	Deaths	Injuries	Prop Damage	Crop Damage
NEW CASTLE CO.	11/16/1989	Thunderstorm Wind	0 kts.	0	1	\$0	\$0
St. George	9/27/1993	Thunderstorm Wind	0 kts.	0	0	\$500	\$0
NEW CASTLE CO.	9/27/1993	Thunderstorm Wind	0 kts.	0	0	\$5,000	\$0
NEW CASTLE CO.	9/27/1993	Thunderstorm Wind	0 kts.	0	0	\$500	\$0
NEW CASTLE CO.	07/16/1995	Thunderstorm Wind	0 kts.	1	0	\$0	\$0
NEW CASTLE (ZONE)	9/18/2003	High Wind	50 kts.	0	0	\$9,500,000	\$0
NEW CASTLE (ZONE)	11/13/2003	High Wind	51 kts.	0	1	\$430,000	\$0

³¹ [Storm Events Database - Search Results | National Centers for Environmental Information \(noaa.gov\)](#)

Location	Date	Type	Magnitude	Deaths	Injuries	Prop Damage	Crop Damage
MIDDLETOWN	6/14/2004	Thunderstorm Wind	50 kts.	0	0	\$75,000	\$0
NEW CASTLE (ZONE)	11/24/2005	High Wind	53 kts.	0	0	\$10,000	\$0
NEW CASTLE (ZONE)	1/14/2006	High Wind	54 kts.	0	0	\$5,000	\$0
GLASGOW	6/1/2006	Thunderstorm Wind	50 kts.	0	0	\$6,000	\$0
NEW CASTLE (ZONE)	4/16/2007	High Wind	52 kts.	0	0	\$5,000	\$0
KENTMERE	8/10/2008	Thunderstorm Wind	52 kts.	0	0	\$100,000	\$0
NEW CASTLE (ZONE)	12/31/2008	High Wind	51 kts.	0	0	\$10,000	\$0
NEW CASTLE (ZONE)	2/12/2009	High Wind	52 kts.	0	0	\$25,000	\$0
(ILG)WILMINGTON ARPT	6/2/2009	Thunderstorm Wind	66 kts.	0	0	\$250,000	\$0
NEWARK	8/9/2009	Thunderstorm Wind	56 kts.	0	0	\$500,000	\$0
HOCKESSIN	7/25/2010	Thunderstorm Wind	52 kts.	0	0	\$25,000	\$0
DUROSS HGTS	9/28/2010	Thunderstorm Wind	60 kts.	0	0	\$10,000	\$0
NEW CASTLE (ZONE)	12/27/2010	High Wind	54 kts.	0	0	\$25,000	\$0
NEW CASTLE (ZONE)	2/19/2011	High Wind	50 kts.	0	0	\$50,000	\$0
NEW CASTLE (ZONE)	2/25/2011	High Wind	50 kts.	0	0	\$125,000	\$0
HOCKESSIN	8/9/2011	Thunderstorm Wind	52 kts.	0	0	\$250,000	\$0
ELSMERE JCT	8/9/2011	Thunderstorm Wind	52 kts.	0	0	\$25,000	\$0
CHALFONTE	8/9/2011	Thunderstorm Wind	52 kts.	0	0	\$50,000	\$0
LANCASTER VLG	8/9/2011	Thunderstorm Wind	52 kts.	0	0	\$100,000	\$0
GLASGOW	6/22/2012	Thunderstorm Wind	54 kts.	0	0	\$100,000	\$0
NEWARK	6/29/2012	Thunderstorm Wind	65 kts.	0	0	\$100,000	\$0
TOWNSEND	7/18/2012	Thunderstorm Wind	52 kts.	0	0	\$1,000	\$0
LANCASTER VLG	7/28/2012	Thunderstorm Wind	56 kts.	0	0	\$10,000	\$0
NEW CASTLE (ZONE)	10/29/2012	High Wind	58 kts.	0	0	\$500,000	\$0
NEW CASTLE (ZONE)	12/21/2012	High Wind	52 kts.	0	0	\$10,000	\$0

Location	Date	Type	Magnitude	Deaths	Injuries	Prop Damage	Crop Damage
NEW CASTLE (ZONE)	3/6/2013	High Wind	56 kts.	0	0	\$30,000	\$0
HOCKESSIN	6/13/2013	Thunderstorm Wind	50 kts.	0	0	\$5,000	\$0
TALLEYVILLE	6/24/2013	Thunderstorm Wind	52 kts.	0	0	\$5,000	\$0
BRANDYWINE	6/24/2013	Thunderstorm Wind	52 kts.	0	0	\$50,000	\$0
WILMINGTON	6/24/2013	Thunderstorm Wind	50 kts.	0	0	\$25,000	\$0
NEWARK	8/13/2013	Thunderstorm Wind	65 kts.	0	0	\$25,000	\$0
ASHLAND	7/8/2014	Thunderstorm Wind	52 kts.	0	0	\$20,000	\$0
HARMONY HILLS	7/8/2014	Thunderstorm Wind	52 kts.	0	0	\$10,000	\$0
WINTERTHUR	7/8/2014	Thunderstorm Wind	52 kts.	0	0	\$20,000	\$0
AFTON	7/8/2014	Thunderstorm Wind	50 kts.	0	0	\$20,000	\$0
HAGLEY	7/8/2014	Thunderstorm Wind	52 kts.	0	0	\$20,000	\$0
NEW CASTLE (ZONE)	2/15/2015	High Wind	53 kts.	0	0	\$25,000	\$0
HARMONY	6/1/2015	Thunderstorm Wind	56 kts.	0	0	\$10,000	\$0
LANCASTER VLG	6/23/2015	Thunderstorm Wind	56 kts.	0	0	\$100,000	\$0
HOLLY OAK	6/23/2015	Thunderstorm Wind	52 kts.	0	0	\$30,000	\$0
MEADOWOOD	6/5/2016	Thunderstorm Wind	43 kts.	0	0	\$1,000	\$0
DUNLEITH	6/8/2016	Thunderstorm Wind	52 kts.	0	1	\$0	\$0
GREENVILLE	4/6/2017	Thunderstorm Wind	52 kts.	0	2	\$0	\$0
CLAYMONT	5/28/2019	Thunderstorm Wind	50 kts.	0	1	\$0	\$0
SILVERBROOK	6/26/2023	Thunderstorm Wind	50 kts.	0	0	\$20,000	\$0
HOCKESSIN	6/23/2024	Thunderstorm Wind	50 kts.	0	1	\$0	\$0
MONROE PARK	7/16/2024	Thunderstorm Wind	50 kts.	0	2	\$0	\$0
Totals				1	9	\$12,719,000	

Figure 4.6 Delaware High Wind Paths



Figure 4.7 Delaware Historic Tornado Paths



Future Occurrence

With 466 events occurring in a 75-year timeframe, it can be expected that high wind and/or thunderstorm wind events will affect New Castle County several times a year, similar to others, with tornadoes occurring infrequently. It is likely that climate change will continue to impact the frequency and intensity of winter storm events from year to year.

Vulnerability Assessment

Inventory and Summary of Vulnerable Assets

Wind impacts and associated damages from severe thunderstorms are generally greatest on utility transmission lines, specifically overhead electric power lines and communication lines, and older structures that were built before uniform code standards for wind loadings. Because it cannot be predicted where a tornado may touch down, all buildings and facilities are considered to be exposed to this hazard and could potentially be impacted. It is also not possible to estimate the number of residential, commercial, and other buildings or facilities that may experience losses.

Severe thunderstorms can also impact important county and local assets, such as damage or disruption to transportation and utility systems in New Castle County. Lightning and high winds associated with severe thunderstorms and tornadoes can knock out the electrical power grid in parts of the County, and in major events, throughout the entire county. This can result in loss of power for businesses and residences for potentially up to several days, depending on the severity of the event.

Estimation of Losses

Estimated losses due to severe thunderstorms and tornadoes will be explored further in the subsequent Plan Update.

Potential Impacts

Tornadoes and windstorms are not expected to impact future development in the County. Additionally, these hazard events may have a greater impact on vulnerable and underserved populations due to a lack of mitigation measures and access to financial resources following an event. Severe thunderstorms disproportionately impact underserved communities by exacerbating existing vulnerabilities due to factors like substandard housing, limited access to resources, and poorer infrastructure, leading to longer recovery times, increased health risks, and greater economic hardship after a storm hit compared to more affluent areas.

The most likely community lifelines to be impacted by a tornado or windstorm event include:

- Safety and Security
- Food, Water, Shelter
- Energy
- Hazardous Materials

4.3.5 Transportation Issues

Transportation accidents are technological 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, environmental damage, and economic consequences.

Location and Extent

There are a number of major transportation arteries that run through New Castle County, including I-95, I-295, and I-495, US Routes 13, 40, 202, 301, and DE Routes 1, 2, 9, 141, 273, and 896. Additionally, several passenger and freight rail lines, including the Amtrak Northeast Corridor, which has stations in Wilmington and Newark, the SEPTA Regional Rail, and the Norfolk Southern and CSX

Transportation railways. In the air, the county is home to the Wilmington Airport, Summit Airport, and a number of smaller heliports and private airstrips. On the water, the Port of Wilmington is a major transportation nexus on the Delaware River.

Range of Magnitude

Transportation accidents can result in death or serious injury and extensive property loss or damage. In the United States, over 37,000 people die in road crashes annually (ASIRT, 2017). Inclement weather, higher traffic volume, and higher traffic speed increase the risk of automobile accidents.

Road and railway accidents, in particular, have the potential to result in hazardous material releases. Accidents involving hazardous materials can pose an environmental hazard and potentially contaminate the air, water, and/or soil.

Aviation incidents most often occur near landing or takeoff sites; the five-mile radius around the Wilmington Airport is considered a high-risk area for aircraft incidents.

Table 4.27 summarizes the range of magnitude for transportation issues related to the local industry.

Table 4.27 Transportation Hazards Range of Magnitude

Severity	Causes	Damage Extents
Minimum	Single vehicle accidents	Minor traffic disruptions; no loss of life
Moderate	Multiple vehicle accidents and/or moderate material spills	Temporary road closures; potential injuries; moderate release of hazardous chemicals restricted to a confined area
Maximum	Multiple vehicle accidents and major material spills	Road closures; injuries and fatalities; release of hazardous chemicals into streams and groundwater systems

Past Occurrence

Over the years, New Castle County has experienced a wide range of transportation accidents, from minor accidents to major crashes affecting public safety and infrastructure.

Delaware's 2024 State Annual Traffic Statistical Report identified a total of 16,070 crashes in 2024, with 67 fatalities.

The most recent recorded aviation accident in the county was the Beechcraft 55 Baron Crash in August of 2019. This crash resulted in two fatalities (pilot and passenger)

Future Occurrence

With the volume of goods and people moving through Delaware, transportation incidents will continue to occur routinely, especially passenger vehicle incidents. Changes to Delaware's climate will also have an impact on future occurrences of transportation incidents. 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.

The likelihood of an aviation incident in New Castle County is considered low; however, past events show that they are possible. While they are also infrequent, railroad accidents are considered more likely to affect larger areas of population and/or the environment.

The probability of transportation accidents is characterized as highly likely, as defined by the risk factor methodology probability criteria.

Vulnerability Assessment

Inventory and summary of vulnerable assets

Transportation incidents can occur along any roadway, and at any time, especially in locations with increased transport of goods, and at transportation nexuses, like major intersections, or where roadways cross railways.

Potential Impacts

It is unlikely that transportation incidents will impact future development in New Castle County. Additionally, these events may have a greater impact on vulnerable and underserved populations due to the lack of harmful impacts from hazardous materials and proximity to vulnerable areas. Transportation accidents disproportionately affect underserved communities by causing higher rates of injuries and fatalities due to factors like inadequate infrastructure, limited access to healthcare, higher reliance on walking and cycling, and often being located near high-traffic areas, leading to further economic hardship and exacerbating existing health disparities within these communities.

The FEMA Community Lifelines most likely to be impacted include:

- Safety and Security
- Health and Medical
- Hazardous Material

4.3.6 Hazardous Materials (HazMat)

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 as a result of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary events.

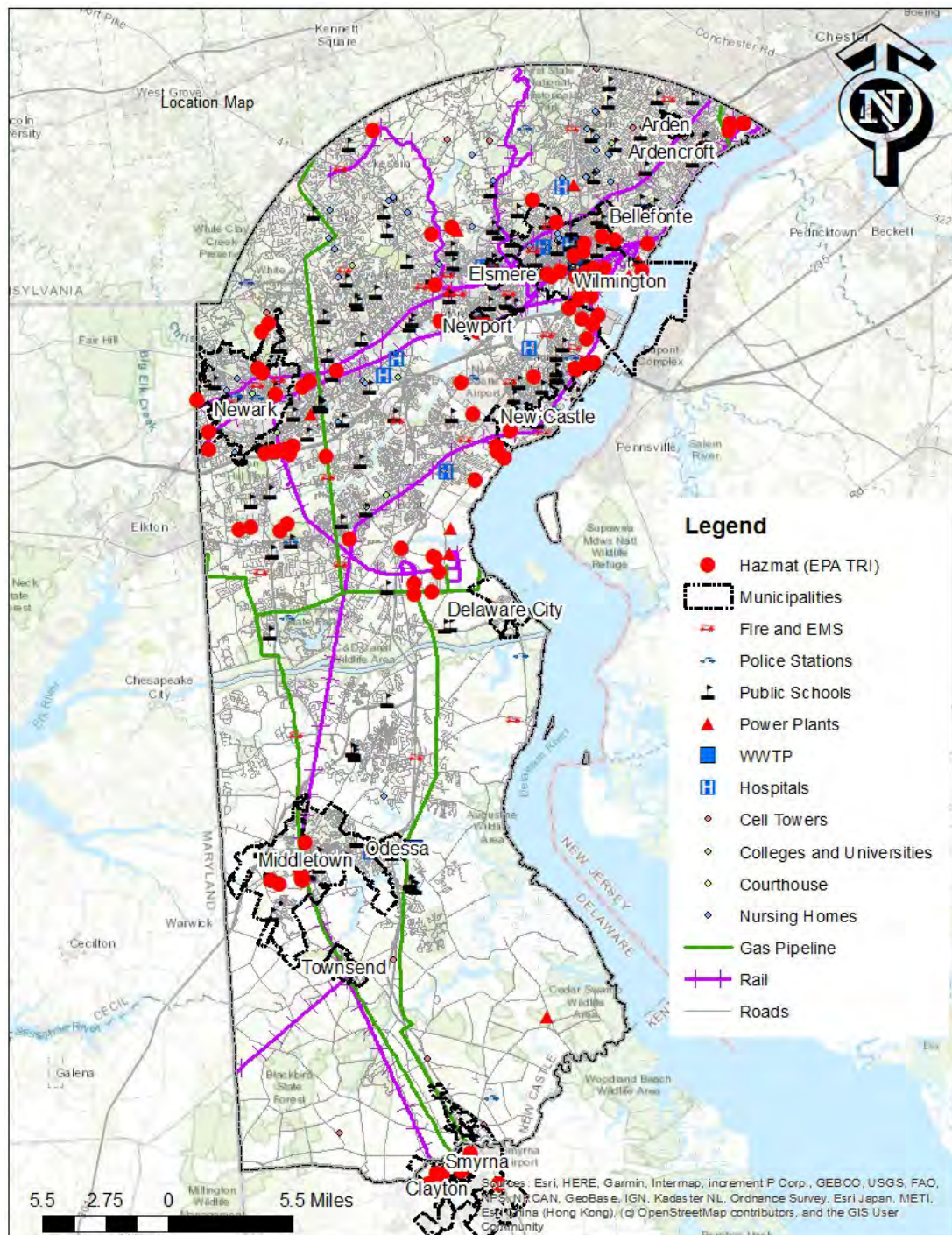
Location and Extent

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. Transportation of hazardous materials on highways involves tanker trucks or trailers, which are responsible for the greatest number of hazardous material release incidents (FEMA, 1997).

Potential also exists for hazardous material releases to occur along rail lines as collisions and derailments of train cars can result in large spills. Pipelines also transport hazardous liquids and flammable substances such as natural gas, as incidents can occur when pipes corrode, are damaged during excavation, incorrectly operated, or damaged by other forces. Fixed-site facilities that use, manufacture, or store hazardous materials in Delaware pose significant risk to public health and the environment and must comply with both Title III of the federal Superfund Amendments and Reauthorization Act (SARA). 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, as established by EPA, report to the county where the facility is located and the State.

The list of SARA Title III facilities is not an exhaustive, fully comprehensive inventory of all hazardous material locations within the State. The EPA also tracks key information about chemicals handled by industrial facilities through its Toxics Release Inventory (TRI) database.

Figure 4.8 Potential Hazardous Materials Release Locations



Range of Magnitude

Hazardous material releases can contaminate air, water, and soils, possibly resulting in death and/or injuries, and 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, and when caused by natural hazards, these incidents are known as secondary events

Hazardous materials fall under nine (9) hazard classes:

Class 1: Explosives

Class 2: Gases (flammable, non-flammable, non-toxic, and toxic)

Class 3: Flammable and combustible liquids

Class 4: Flammable solids (spontaneously combustible materials and dangerous when wet materials/water reactive substances)

Class 5: Oxidizing substances and organic peroxides

Class 6: Toxic substances and infectious substances

Class 7: Radioactive materials

Class 8: Corrosive substances

Class 9: Miscellaneous hazardous materials/products, substances, or organisms

As previously mentioned, materials can include toxic chemicals, radioactive materials, infectious substances, and hazardous wastes. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas. Exacerbating conditions, characteristics that can enhance or magnify the effects of a hazardous material release include:

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

The severity of the incident is dependent not only on the circumstances described above, but also on the type of material released and the distance and related response time for emergency response teams (FEMA, 2019). 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

Past Occurrence

There have been several previous and ongoing hazardous materials incidents in New Castle County.

The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) maintain information on highway-related hazardous material release incidents, rail incidents, air-related incidents, and pipeline-related incidents. Pipeline releases can also result in fatality, injury, damage, the release highly volatile liquids, or liquid releases that result in unintentional fire or explosion.

Future Occurrence

While hazardous materials release incidents have occurred in New Castle 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. Risk associated with hazardous materials release is

expected to remain moderate. The incidence rate and impacts from a HazMat Release are not expected to be impacted by future climate change.

Vulnerability Assessment

Inventory and summary of vulnerable assets

Assessing vulnerability to a hazardous materials (HazMat) release on a countywide scale can consist of several factors, such as the type(s) of hazardous materials present, the potential for mass casualties, potential consequences for the surrounding area, accessibility, public awareness, and the likelihood of being a terrorist target. The assessment conducted for New Castle County focuses on identifying the buildings around (1) Hazmat sites, (2) rail, and (3) highways. For the analysis, a 500-foot buffer was created around these elements to determine what was at risk.

Table 4.28 identified the HazMat exposure by building count and by occupancy for each New Castle County jurisdiction. There is a total of 15,935 buildings exposed to a potential HazMat release.

Table 4.28 HazMat Exposure by Building Count

HazMat Exposure by Building Count										
Jurisdiction	Agriculture	Single-Family Home	Manufactured Housing	Multi-Family Home	Commercial	Industrial	Government	Education	Religious	TOTAL
Arden	0	0	0	0	0	0	0	0	0	0
Ardencroft	0	0	0	0	0	0	0	0	0	0
Ardentown	0	0	0	0	0	0	0	0	0	0
Bellefonte	0	0	0	0	0	0	0	0	0	0
Clayton	0	0	0	0	0	0	0	0	0	0
Delaware City	1	0	0	0	0	0	0	0	0	1
Elsmere	0	0	0	0	0	0	0	0	0	0
Middletown	24	488	0	21	75	88	6	14	1	717
New Castle	16	102	0	0	4	12	3	0	0	137
Newark	17	778	6	165	71	126	9	42	2	1216
Newport	72	156	4	31	55	74	2	0	4	398
Odessa	0	0	0	0	0	0	0	0	0	0
Smyrna	0	0	0	0	0	0	0	0	0	0
Townsend	0	0	0	0	0	0	0	0	0	0
Wilmington	179	5243	15	554	740	294	54	35	68	7182
Unincorporated	211	3994	159	132	661	1095	13	3	16	6284
TOTAL	520	10761	184	903	1606	1689	87	94	91	15,935

Table 4.29 identifies the HazMat exposure by structure value and by occupancy for each New Castle County jurisdiction. Throughout New Castle County, the structure value exposed to a HazMat Release is \$9,624,383,264.

Table 4.29 HazMat Exposure by Structure Value

Jurisdiction	Agriculture	Single-Family Home	Manufactured Housing	Multi-Family Home	Commercial	Industrial	Government	Education	Religious	TOTAL
Arden	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ardencroft	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ardentown	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bellefonte	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Clayton	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Delaware City	\$46,407	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$46,407
Elsmere	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Middletown	\$9,946,228	\$91,703,191	\$0	\$70,655,805	\$129,053,777	\$430,718,671	\$9,153,243	\$14,088,133	\$619,429	\$755,938,476
New Castle	\$1,684,472	\$15,728,663	\$0	\$0	\$6,032,384	\$169,471,406	\$5,877,780	\$0	\$0	\$198,794,705
Newark	\$4,847,979	\$183,883,618	\$620,661	\$303,840,762	\$121,615,522	\$298,861,491	\$1,922,400	\$128,339,401	\$1,508,943	\$1,045,440,777
Newport	\$34,711,998	\$27,810,985	\$471,403	\$27,695,608	\$35,460,525	\$85,477,358	\$3,477,920	\$4,606,984	\$0	\$219,712,781
Odessa	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Smyrna	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Townsend	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Wilmington	\$128,867,051	\$668,323,425	\$1,484,000	\$659,706,537	\$792,275,492	\$639,356,937	\$66,551,263	\$180,804,743	\$96,188,424	\$3,233,557,871
Unincorporated	\$156,381,085	\$756,481,060	\$8,783,950	\$265,883,251	\$798,696,739	\$2,152,016,804	\$1,630,460	\$15,437,705	\$15,581,193	\$4,170,892,247
TOTAL	\$336,485,220	\$1,743,930,942	\$11,360,014	\$1,327,781,963	\$1,883,134,438	\$3,775,902,668	\$88,613,066	\$343,276,965	\$113,897,988	\$9,624,383,264

Estimation of Losses

Estimation of losses for hazardous materials incidents can vary based on the scale and makeup of the incident. Likely, most buildings will not be impacted during a hazardous materials spill, while most losses would come in the form of loss of life due to inhalation/ingestion of a hazardous material. Due to a lack of data, loss estimations for New Castle County were not determined for this hazard, although exposure estimates are provided in the Table above.

Potential Impacts

A hazardous materials release would likely have an impact on future development in the County, as development may be directed away from pipelines, unconventional wells, and hazardous materials storage sites. Additionally, these events may have a greater impact on vulnerable and underserved populations back to limited evacuation access and limited healthcare access. The placement of hazardous waste sites across the United States has disproportionately affected minority and low-income communities for several decades. The majority of these facilities have been deliberately constructed in communities that lack an effective local government, allowing them to operate with little to no impunity for the damage caused to the local communities.

During a hazardous material release, the community lifelines that are most likely to be impacted include:

- Safety and Security
- Food, Water, and Shelter
- Health and Medical
- Transportation

4.3.7 Dam/Levee Failure

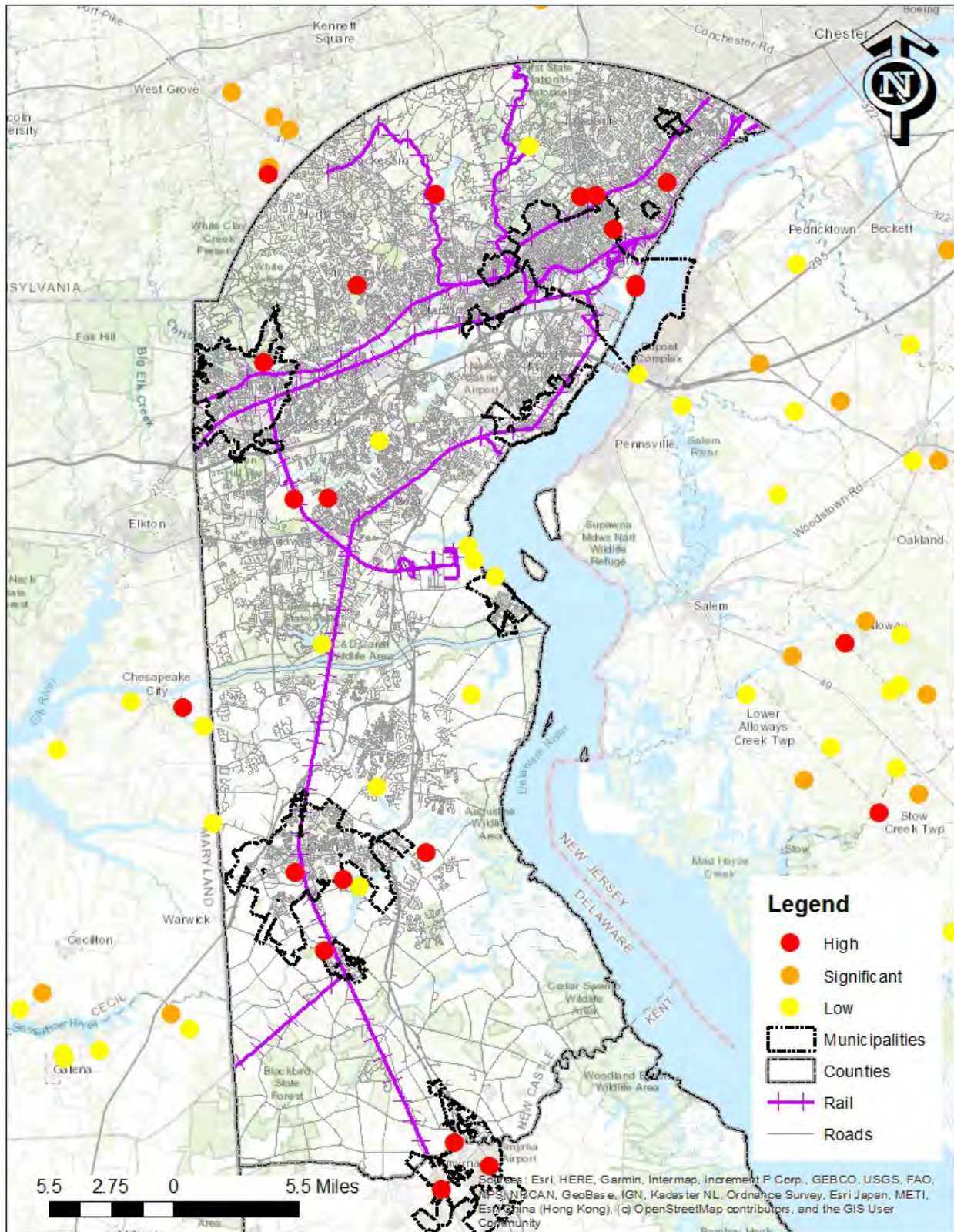
Dam failure is the uncontrolled release of water (and any associated waste) from a dam. This hazard often results from a combination of natural and human causes, and can follow other hazards such as hurricanes, earthquakes, and landslides. The consequences of dam failures can include property and environmental damage and loss of life.

A levee is a human-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water to provide protection from temporary flooding (FEMA, 2016). A levee failure or breach occurs when a levee fails to prevent flooding on the landside of the levee. The consequences of a sudden levee failure can be catastrophic, with the resulting flooding causing loss of life, emergency evacuations, and significant property damage.

Location and Extent

The location of all dams is provided in Figure 4.9, and all dam failure analysis, data, and information are included in Appendix A – New Castle County High Hazard Potential Dam Analysis.

Figure 4.9 Dam Locations in New Castle County and Surrounding Region (all dams)



The New Castle–Army Creek levee is an earthen embankment stretching roughly 3,100 feet with a minimum crest elevation of 8.75 feet NAVD88 and a 17-foot-wide top. The levee includes a paved pedestrian trail and maintenance drive. A floodgate at the confluence of Army Creek and the Delaware River consists of five 48-inch corrugated metal pipes with flap gates to prevent backflow, secured by concrete headwalls. Upgraded in 2013 by the State of Delaware and sponsored by the City of New Castle, the levee has functioned as intended. The protected area includes businesses, wetlands, parkland, and a section of Delaware Route 9.

The Broad Dyke levee system extends approximately 2,350 feet and consists of northern and southern sections. The northern section, about 1,350 feet long, includes a 16-foot-wide crest with gravel maintenance access and riverside rock riprap, along with a floodgate system of concrete vaults and pipes at the Broad Dyke Canal–Delaware River confluence. The southern section, roughly 1,000 feet, features a 13-foot-wide earthen embankment, partially riprapped and partially vegetated, with a drainage swale leading to a piped outlet with flap gates. Upgraded in 2013 by the State and sponsored by the City, the levee has performed as designed. The leveed area encompasses businesses, residences, wetlands, a rail line, parkland, and Delaware Route 9.

The Buttonwood levee is an earthen embankment approximately 1,850 feet in length with a 17-foot-wide crest at 8.5 feet NAVD88. A gravel maintenance drive spans the top, and a floodgate structure near the northern third includes reinforced concrete pipes on both marsh and river sides. Upgraded in 2013 under the State’s guidance and City sponsorship, the levee continues to function effectively. Protected areas include businesses, wetlands, and an active rail line.

The Gambacorta levee stretches about 2,300 feet with a 17-foot crest at a minimum elevation of 8.5 feet NAVD88, including a paved trail and maintenance drive. A floodgate near West 3rd Street consists of a concrete outlet structure with a 42-inch HDPE drainage pipe and flap gate to manage marsh runoff. This levee, upgraded in 2013 and sponsored by the City, has performed as intended. The leveed area contains businesses, wetlands, and parkland.

The Red Lion Creek levee extends roughly 1,900 feet along the Delaware River, with crest widths of 10–15 feet and typical 9-foot height. Both riverside and most landside slopes are armored with riprap, with some northern areas vegetated. A flood gate at the confluence with the Delaware River includes five 48-inch pipes with flap gates and 500 feet of steel sheet pile wing walls. Upgraded in 2013 by the State of Delaware, the levee has largely performed as designed, with prior drainage issues corrected. The protected area includes businesses and wetlands.

The locations of the levee systems in New Castle County are shown in Table 4.30.

Table 4.30 New Castle County Levee Details

New Castle County Levee Details (NLD, 2019)						
Levee Name	Muni.	Leveed Waterway	Accredited	People at Risk	Structures at Risk	Property Value at Risk
New Castle-Army Creek Levee	New Castle City	Delaware River	NO	2	1	\$240,000
New Castle-Broad Dyke Levee	New Castle City	Delaware River	NO	195	95	\$52 Million
New Castle-Buttonwood Levee	New Castle City	Delaware River	NO	152	65	\$22 Million
New Castle-Gambacorta Levee	New Castle City	Delaware	NO	34	18	\$48 Million
Red Lion Levee	Delaware City	Delaware River	NO	2	1	\$400,000

Range of Magnitude

Levee failures can pose a serious threat to communities located in flat or low-lying areas near bodies of water that are protected by levees. The impact of a levee failure is dependent on the volume of water behind the levee, the size of the failure, and the number of people or assets located in the protected area.

Levees require maintenance to continue to provide the level of protection they were designed and built for. Maintenance responsibility belongs to a variety of entities, including local, state, and federal government, as well as private landowners. Levee owners need to both maintain levees and pay for an independent inspection to have the levee certified as providing flood protection. The impacts of an uncertified levee include levee failure and insurance rate increases because FEMA identifies that the structures are not designed to protect the 1% annual-chance flood height on Flood Insurance Rate Maps. Regardless of whether a levee is accredited, there is concern that property in these areas lacks flood insurance.

Past Occurrence

Information and records of past levee failures in Delaware are not comprehensive. There is no documented history of levee failures in New Castle County.

Future Occurrence

Similar to dam failures, given certain circumstances, a levee failure can occur at any time. However, the probability of future occurrences can be reduced through proper design, construction, and maintenance measures. Most levees are designed to operate safely at specified levels of flooding. The age of the levee system, if not maintained, should also be considered regarding the potential for failures.

A levee failure can occur at any time, especially during times of the year when there are traditionally heavy rains, especially during hurricane season, and snowmelt.

Vulnerability Assessment

The U.S Army Corps of Engineers uses three (3) questions to help to identify the potential impacts of a levee failure.

What event could occur? (flood, storm, earthquake, other)

How will the levee perform during these events?

What are the consequences if the levee does not perform well, in particular, will loss of life occur?

These three questions help to form a basic understanding of the potential damage that is expected from a levee failure and can provide valuable insight into where to prepare in the future.

There are three inspection levee rating classifications, which are shown in Table 4.31 - Levee System Inspection Ratings.

Table 4.31 Levee System Inspection Ratings

Levee System Inspection Ratings	
Rating	Description
Acceptable	All inspection items are rated as Acceptable.
Minimally Acceptable	One or more inspection items are rated as Minimally Acceptable or one or more items are rated as Unacceptable and an engineering determination concludes that the Unacceptable inspection items would not prevent the segment/system from performing as intended during the next flood event.
Unacceptable	One or more inspection items are rated as Unacceptable and would prevent the segment/system from performing as intended, or a serious deficiency noted in past inspections (previous Unacceptable items in a Minimally Acceptable overall rating) has not been corrected within the established timeframe, not to exceed two years.

Inventory and summary of vulnerable assets

Inventory and summary of assets vulnerable to levee failure will be explored further in the subsequent Plan Update.

Estimation of Losses

Due to the lack of data and information regarding addition significantly impacting the County, a risk factor was determined, although no loss analysis will be conducted for this hazard at this time.

Potential Impacts

With respect to critical facilities, the types of facilities most vulnerable to levee failure include fire departments, public schools, police departments, and water facilities. The environmental impacts of a levee failure result in significant water quality and debris disposal issues. Floodwaters will back up sanitary sewer systems and inundate wastewater treatment plants, causing raw sewage to contaminate residential and commercial buildings, as well as the flooding waterway. The contents of unsecured containers of oil, fertilizers, pesticides, and other chemicals get added to flood water. Water supplies and wastewater treatment could be offline for weeks. After the flood waters subside, contaminated and flood-damaged building materials and contents must be properly disposed. Contaminated sediment must be removed from buildings, yards, and properties.

The FEMA Community Lifelines most likely to be impacted include:

- Safety and Security
- Food, Water, Shelter
- Hazardous Materials

4.3.8 Terrorism

Terrorism is the use of force or violence against persons or property with the intent to intimidate or coerce. Acts of terrorism include threats of terrorism; assassinations; kidnappings; hijackings; bomb scares and bombings; cyber-attacks (computer-based); and the use of chemical, biological, nuclear, and radiological weapons. Cyber-attacks have become an increasingly pressing concern.

Location and Extent

Critical facilities like police stations, hospitals, military installations, fire stations, schools, water treatment plants, and nuclear generation stations, and critical infrastructure like bridges, tunnels, electric generation and distribution facilities, public water supplies, and government buildings are potential targets for a terrorist attack.

Range of Magnitude

Terrorism is divided into two (2) categories:

- **International Terrorism:** Violent acts committed by individuals and/or groups inspired by or associated with designated foreign terrorist organizations or nations (state-sponsored).

- **Domestic Terrorism:** Violent, criminal acts carried out 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.

Within those two categories, FEMA identifies the following as some of the common tactics for terrorist events and/or terrorist organizations:

- Agriterrorism – food contamination or destruction of crops via pest introduction or disease agents
- Arson/incendiary attack
- Armed attack
- Assassination
- Biological agent
- Chemical agent
- Cyberterrorism
- Conventional bomb
- Hijackings
- International hazardous material releases
- Kidnapping
- Nuclear bomb
- Radiological agent

Past Occurrence

New Castle County has not been directly impacted by any significant international terrorist incident.

Future Occurrence

The likelihood of a major terrorist attack occurring in New Castle County is low. The most common future occurrence will likely come in the form of bomb threats at schools and other facilities.

Vulnerability Assessment

Both civilian populations and more rural areas are subject to impacts from terrorism. Dense population centers like the City of Wilmington, in particular, are likely targets for adversarial or terrorist attacks. Additionally, the close proximity of the Dover base, another potential target of adversarial or terrorist attack, could result in indirect impacts to the County.

Inventory and summary of vulnerable assets

All communities in New Castle County are vulnerable at some level to a terrorist attack, whether directly or indirectly. Site specific assessments should be based on the relative importance of a particular site to the surrounding 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 main 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?
- 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 HVAC systems protected and/or backed up with redundant systems?
- Electrical Engineering – Are emergency power and telecommunications available? Are alarm systems operational? Is lightning 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?

Estimation of Losses

Due to the lack of data and information regarding terrorism significantly impacting the County, a risk factor was determined, although no loss analysis will be conducted for this hazard at this time.

Potential Impacts

The severity and scale of impacts 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.

The FEMA Community Lifelines most likely to be impacted include:

- Safety and Security

- Food, Water, Shelter
- Energy
- Hazardous Materials

4.3.9 Erosion

Erosion is the gradual wearing away of soil, rock, or sediment by wind, water, or human activity. In New Castle County, erosion is most significant along riverbanks, tidal shorelines, and areas under development. Left unmanaged, erosion can lead to land loss, property damage, and degradation of natural habitats, while also threatening infrastructure such as roads and levees.

Location and Extent

Erosion in New Castle County primarily affects riverbanks, the Delaware Bay shoreline, and areas along tributaries of the Christina and Brandywine Rivers. Soil erosion can also occur along steep slopes and construction sites.

Range of Magnitude

- Minor erosion: gradual soil loss, localized property impact.
- Moderate erosion: noticeable bank retreat, damage to landscaping or minor infrastructure.
- Severe erosion: loss of land, structural damage, or failure of flood protection measures.

Past Occurrence

Erosion has historically impacted low-lying riverfront areas and Delaware Bay shores. Notable effects have occurred during flooding and storm events, leading to loss of shoreline, property damage, and occasional road closures.

According to Delaware Coastal Management Program (DCMP) Section 309 Enhancement Program 2021-2025 Assessment and Strategy, Delaware has experienced relatively little coastal shoreline change in the past five years (2016-2020) as a result of development.

Future Occurrence

Erosion is expected to continue, particularly in areas with high development pressure and along rivers and tidal shorelines. Sea-level rise may exacerbate coastal and riverine erosion.

Vulnerability Assessment

Inventory and summary of vulnerable assets

Erosion primarily threatens riverbanks, tidal shorelines, and areas of steep terrain or development. Residential properties, infrastructure (roads, bridges, levees), and natural habitats in low-lying and shoreline areas are most vulnerable.

Potential Impacts

While erosion is unlikely to halt future development, it can increase maintenance costs and result in property and environmental loss. Vulnerable populations in waterfront or flood-prone areas may experience disproportionate impacts.

The FEMA Community Lifelines most likely to be impacted include:

- Safety and Security
- Food, Water, and Shelter
- Energy

4.3.10 Drought/Extreme Heat

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, landslides, or debris flows.

A Drought is the result of a natural reduction in precipitation expected to fall over a period of time and is generally defined by three categories:

- A *meteorological drought* occurs when there is a deficiency in atmospheric moisture. Depending on pre-drought conditions, a meteorological drought typically has little effect on crops or water resources.
- A more serious drought is an *agricultural drought*, which occurs when the lack of sufficient moisture starts to inhibit crop growth.
- Should an agricultural drought last on the order of months, it could develop into a *hydrologic drought*. The hydrologic drought is the most devastating of the three types, as water resources can become significantly depleted and crops can be greatly damaged.

Location and Extent

The current climate in Delaware, when compared to many other states across the U.S., is generally water-rich. However, like all other states, Delaware is subject to periodic droughts that impact the State's ability to meet all of its water needs. Droughts are regional climatic events that can impact large areas ranging from several counties in Delaware to the entire mid-Atlantic region. While large geographic areas can be impacted by a given drought, areas with extensive agricultural land use can experience particularly significant impacts.

Range of Magnitude

Droughts can have varying effects, depending upon what month they occur, severity, duration, and location. Some droughts may have their greatest impact on agriculture, and even short-term droughts, when coupled with extreme temperatures, can be devastating. Drought events are defined by rainfall amounts, vegetation conditions, soil-moisture conditions, water levels in reservoirs, stream flow, agricultural productivity, or economic impacts.

Wildfires are often the most severe secondary effect associated with drought. Wildfires can devastate wooded and agricultural areas, threatening natural resources, structures near high wildfire loads, and farm production facilities. Prolonged drought conditions can have a lasting impact on the economy and can cause major ecological changes, such as increases in scrub growth, flash flooding, and soil erosion.

Long-term water shortages during severe drought conditions can have a significant impact on agribusiness, public utilities, and other industries reliant on water for production services.

Table 4.32 - Palmer Drought Severity Index) - a soil moisture algorithm calibrated for relatively homogeneous regions, which measures dryness based on recent precipitation and temperature.

Table 4.32 Palmer Drought Severity Index

Palmer Drought Severity Index	
Severity Category	PDSI
Extremely wet	4.0 or more
Very wet	3.0 to 3.99
Moderately wet	2.0 to 2.99
Slightly wet	1.0 to 1.99
Incipient wet spell	0.5 to 0.99
Near normal	0.49 to -0.49
Incipient dry spell	-0.5 to -0.99
Mild drought	-1.0 to -1.99
Moderate drought	-2.0 to -2.99
Severe drought	-3.0 to -3.99
Extreme drought	-4.0 or less

U.S. Drought Monitor uses the following five stages to describe and manage droughts.

Table 4.33 Drought Intensity Scale

Category	Description	Possible Impacts	Palmer Drought Severity Index (PDSI)
D0	Abnormally Dry	Going into a drought: • Short-term dryness slowing planning, growth of crops and pastures. Coming out of a drought: • Some lingering water deficits • Pastures or crops not fully recovered	-1.0 to -1.9
D1	Moderate Drought	• Some damage to crops and pastures. • Streams, reservoirs, or wells are low, some water shortage development or imminent. • Voluntary water-used restrictions	-2. To -2.9
D2	Severe Drought	• Crop or pasture losses likely. • Water shortages common • Water restrictions imposed	-3.0 to -3.9
D3	Extreme Drought	• Major crop/pasture losses • Widespread water shortages or restrictions	-4.0 to -4.9
D4	Exceptional Drought	• Exceptional and widespread crop/pasture losses	-5.0 or less

Category	Description	Possible Impacts	Palmer Drought Severity Index (PDSI)
		Shortages of water in reservoirs, streams, and wells creating water emergencies	

Past Occurrence

According to the NCEI Storm Events Database, there have been no droughts recorded in New Castle County.

Future Occurrence

Based on past occurrences, there is a low probability of droughts occurring in New Castle County.

Vulnerability Assessment

Inventory and summary of vulnerable assets

As a hazard, droughts primarily impact water supply and agricultural land. Areas of the Delaware that rely on private wells are more impacted by water supply reductions than areas of the State that rely on public water supply; frequently, these areas reliant on groundwater wells are more rural.

Estimation of Losses

Due to a lack of data, as estimated loss information for New Castle County is not included in the DE 2023 State HMP, it is difficult to make estimations on losses resulting from a drought event, as the severity and duration of the event impact potential losses.

Potential Impacts

Drought events are not expected to impact future development in the County. Additionally, drought events may have a greater impact on vulnerable and underserved populations due to limited freshwater access for personal and farming needs. Drought disproportionately impacts underserved communities by exacerbating existing inequalities in access to clean water, leading to food insecurity, economic hardship, health problems due to poor water quality, and increased stress on already limited resources, often forcing them to travel further distances to find water, impacting their daily lives and livelihoods significantly more than those with greater access and resources.

The FEMA Community Lifelines most likely to be impacted include:

- Safety and Security
- Food, Water, Shelter
- Health and Medical

4.3.11 Energy Pipeline Failures

An energy pipeline failure occurs when a pipeline break creates the potential for an explosion or a leak of a dangerous substance like oil or gas, possibly requiring an evacuation of local residents and businesses, and rapid ecological response depending on location and proximity to water sources, and animal habitats. 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 properties.

Location and Extent

Energy pipelines cross most of the State with the Colonial Pipeline, Adelphia Gateway Pipeline, and Mariner East Pipeline being some of the more major pipelines in New Castle County. Additionally, The Delaware City Refinery and Eastern Shore Natural Gas are connected to a number of pipelines in the County.

Range of Magnitude

Energy pipeline failures in New Castle County can vary widely in severity depending on the type of fuel or material transported, the size of the pipeline, and the nature of the failure. Typical impacts include:

- Minor incidents: Small leaks or ruptures that are quickly contained, causing limited property damage and no injuries.
- Moderate incidents: Pipeline ruptures or equipment failures resulting in localized fires, injuries, temporary evacuations, and moderate property or environmental damage.
- Major incidents: Large-scale pipeline explosions, refinery equipment failures, or prolonged leaks that cause multiple injuries or fatalities, significant property damage, environmental contamination, and major disruptions to energy supply or transportation infrastructure.

Natural gas and petroleum pipelines, as well as associated refinery operations, have the potential for severe consequences if not properly managed, including fires, explosions, toxic releases, and long-term environmental harm.

Past Occurrence

Energy pipeline failures in New Castle County have historically varied in scale, ranging from localized gas leaks to major refinery incidents with significant human and environmental consequences. One of the most notable events occurred on July 2, 2003, when a contractor excavating for sidewalk and curbing improvements in Wilmington struck an unmarked natural gas line. The resulting rupture triggered a powerful explosion that leveled two rowhouses and injured fourteen people, three of them critically. This incident highlighted the vulnerability of urban infrastructure to pipeline accidents and underscored the importance of accurate mapping and communication during construction activities.

In addition to natural gas incidents, the Delaware City Refinery has been the site of multiple significant events over the past two decades. In October 2018, three contractors were severely burned during operations, prompting an immediate emergency response and reinforcing the hazards associated with high-pressure industrial processes. A similar incident occurred in March 2020, when a fire broke out at the refinery's alkylation unit during maintenance, critically injuring two workers. More recently, in May 2025, a mechanical failure compromised an emission control device, leading to prolonged releases of sulfur dioxide above permitted levels. Although no injuries

were reported, this incident demonstrated the potential for environmental impacts and the need for continuous monitoring and regulatory oversight.

Future Occurrence

The future probability of high-impact pipeline failures will be shaped by the maintenance of existing pipeline systems, the construction of new pipeline systems, and the amount of new development that occurs near pipelines. As the metal in aging pipelines reacts with the environment, it can become corroded, causing a loss of pipe strength that can lead to leakage or rupture. Corrosion is one of the most prevalent causes of pipeline incidents and was listed as the cause for 20 percent of significant pipeline incidents nationwide between 1998 and 2017. Maintenance and repair, however, can reduce the risk of corrosion. Improved technologies have led to better prevention, monitoring, detection, and mitigation of external pipeline corrosion for older as well as newer pipelines (PHMSA, 2018).

As is the case with conventional wells, it remains difficult to predict the number or frequency of unconventional well sites and pipeline incidents. New Castle County should be prepared for multiple incidents to occur annually.

Land development near a pipeline right-of-way can bring people near pipeline hazards. Land development adjacent to natural gas and liquid petroleum pipelines increases the likelihood of damage to the pipeline and also increases the exposure of people and property to pipeline failure hazards.

Vulnerability Assessment

Inventory and summary of vulnerable assets and Estimation of Losses

To evaluate the vulnerability of New Castle County to energy pipeline failures, all census blocks containing or located within 1,000 feet of major natural gas and petroleum pipelines were identified. Populations, building counts, and total assessed property values within these blocks were aggregated to the county level to assess potential exposure. The analysis shows that the majority of vulnerable assets are concentrated around Wilmington and New Castle, where pipeline density is highest and residential, commercial, and industrial development is significant. Key facilities, including refineries, storage terminals, and critical infrastructure such as bridges and utility corridors, are also located within these areas, increasing potential risk to human life, property, and essential services in the event of a pipeline failure.

Potential Impacts

If the industry continues to grow in the region, this potential hazard will likely have an impact on future development, to avoid any harmful impacts from drilling or pipeline transmission. Additionally, these events may have a greater impact on vulnerable and underserved populations due to a lack of health and medical access to clean water following an incident, etc. Gas and pipeline infrastructure disproportionately impact vulnerable and underserved communities by exposing them to higher levels of air pollution from leaks and emissions, often situated near their homes, leading to increased health risks, property devaluation, and environmental damage, while also disrupting their land use and livelihoods.

The FEMA Community Lifelines most likely to be impacted include:

- Safety and Security
- Food, Water, Shelter
- Health and Medical

- Energy

4.3.12 Public Health Incident

According to the Delaware 2023 State HMP, the five public health concerns include Animal/Crop/Plant Disease, Invasive Species, Human Health Incident & Pandemic, Opioid (substance) Addiction, and Housing Instability.

Animal/Crop/Plant Disease

Outbreaks affecting animal, crop, or plant populations can cause widespread disruption to Delaware's economy and food systems. These events may stem from contagious diseases that spread rapidly among animals or plants, or from invasive species and pest infestations that damage agricultural production and native ecosystems.

In Delaware, where poultry and agriculture are vital to the state's economy, an incident such as avian influenza could result in devastating losses. Quarantines or restrictions on the movement, processing, and sale of livestock and related products would significantly affect producers and dependent industries. Likewise, infestations involving crop or plant pests can trigger severe economic hardship for farmers, reduce yields, and cause long-term environmental damage. Invasive plant and insect species, once established, can become endemic, resulting in repeated losses across multiple growing seasons and negatively influencing soil health, biodiversity, and ecosystem services.

Each year, the Delaware Department of Agriculture conducts numerous investigations into suspected animal or crop diseases and monitors for emerging threats, including invasive species. Recovery from large-scale agricultural or ecological disease events would be prolonged, with secondary economic impacts on transportation, food processing, and export markets.

Human Health Incident & Pandemic

A human health incident includes any medical, environmental, or biological threat to public well-being, ranging from infectious disease outbreaks and vector-borne illnesses to contamination events. Delaware's disease prevention and response systems are based on modern public health surveillance and early detection, supported by the Centers for Disease Control and Prevention (CDC) and the Delaware Division of Public Health (DPH). These agencies track notifiable diseases, investigate outbreaks, and implement vaccination, education, and prevention programs.

An epidemic refers to the rapid spread of an infectious disease among a population within a defined region. Such events may occur due to shifts in population immunity, changes in the pathogen itself, or ecological conditions favoring transmission (such as vector population increases). When an epidemic expands globally, affecting populations across multiple continents, it becomes a pandemic.

Opioid (Substance) Addiction

Substance use disorder, particularly opioid addiction, has emerged as a critical public health hazard in New Castle County and across Delaware. The epidemic affects individuals, families, and communities and can magnify other hazards by increasing vulnerability during emergencies. High rates of overdose, mental health crises, and related infections strain public health systems and emergency response capacity.

Injection drug use elevates the risk for blood-borne pathogen transmission, while addiction and overdose incidents can impact workforce stability and social cohesion. Substance abuse is also linked to higher rates of homelessness, domestic instability, and behavioral health emergencies. County

and state agencies, in coordination with hospitals, law enforcement, and community organizations, are advancing prevention, harm reduction, and recovery programs to reduce fatalities and improve long-term resilience.

Housing Instability

Housing insecurity, including homelessness, overcrowding, and substandard living condition, represents a growing social vulnerability in New Castle County. Economic stressors, rising housing costs, and disasters that displace residents all contribute to instability. Individuals experiencing homelessness or unstable housing are at greater risk during emergencies, lacking safe shelter, access to healthcare, and reliable communication channels.

Housing instability also intersects with other public health concerns, including chronic illness, addiction recovery, and exposure to environmental hazards such as extreme heat, cold, or flooding. The county's mitigation planning emphasizes the need to expand affordable housing options, strengthen social service coordination, and integrate housing security into disaster recovery and resilience efforts.

Location and Extent

Public Health Incidents have the potential to occur anywhere in, and spread anywhere throughout, New Castle County. Densely populated areas are more vulnerable to communicable disease outbreaks as the speed and likelihood of disease transmission increase in these types of environments.

Vulnerability to communicable diseases also increases with population mobility and increased exposure to individuals from diverse geographic regions. Additionally, the proximity to highways and rail network increases the vulnerability to the introduction and spread of communicable diseases.

Range of Magnitude

Public Health Incidents can occur at the local level and be contained or can be spread to as large as a global pandemic. COVID-19 is an example of a global pandemic that spread throughout the world very rapidly.

Past Occurrence

New Castle County has experienced outbreaks and infestations affecting agriculture and natural ecosystems, and human populations alike. While Delaware has not experienced a statewide epidemic of animal disease, the poultry sector remains particularly vulnerable.

Pandemics, like the 2009 H1N1 influenza or the 2020 COVID-19 outbreak, have had a deep and prolonged economic and social consequences. They often overwhelmed healthcare systems, disrupted critical supply chains, and impacted every sector of society. Delaware's population includes large numbers of older adults and individuals with chronic conditions, both at higher risk for severe illness.

The CDC's Pandemic Severity Assessment Framework evaluates potential pandemic viruses, such as avian influenza A (H7N9), based on transmissibility, severity, and antiviral resistance.

The first case of COVID-19 was detected in Delaware during the first weeks of March 2020. Between March 2020, and February 2023, there were 324,137 COVID-19 cases with a total of 2,702 deaths. The following table lists COVID-19 case and death data for New Castle County between March 2020 and February 2023.

Table 4.34 COVID-19 Cases in New Castle County

County	# Cases	#Deaths
New Castle	189,681	1,667

Future Occurrence

The future likelihood of a pandemic/infectious disease outbreak in New Castle County is expected to be higher than indicated by the historical occurrence rate alone. Expected increases in likelihood can be attributed to several factors, such as rapid growth in population, an increase in interstate and international travel, and subsequent introduction and spread of infectious diseases and/or the emergence of novel diseases (such as COVID-19), and increased resistance to current treatment and mitigation strategies. Climate change may be a driving cause in any dramatic changes or shifts in viruses and other diseases by potentially creating favorable conditions for transmission through milder winters, earlier spring seasons, and warmer temperatures.

Vulnerability Assessment

Inventory and summary of vulnerable assets

In general, jurisdictions that are more densely populated are more vulnerable to disease threats when the disease is directly spread from human to human, but every jurisdiction in the State has some vulnerability to pandemic and infectious disease threats.

Estimation of Losses

Jurisdictional losses in a pandemic or infectious disease outbreak are similar to the state, stemming from the health impact of employees and residents. No losses are expected 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.

Potential Impacts

A pandemic/infectious disease outbreak would likely not have an impact on future development in the County. Additionally, these events may have a greater impact on vulnerable and underserved populations due to a lack of access to healthcare and/or personal protective equipment. A pandemic or disease outbreak can disproportionately impact underserved communities by exacerbating existing inequalities in healthcare access, economic stability, and social support systems, leading to higher rates of infection, severe illness, and mortality compared to more affluent populations; this is often due to factors like limited access to quality healthcare, higher rates of chronic health conditions, and increased exposure to risk factors like crowded housing and essential worker roles.

During a pandemic/infectious disease outbreak, the community lifelines that are most likely to be impacted include:

- Safety and Security
- Food, Water, and Shelter
- Health and Medical

4.3.13 Wildfire

Wildfire occurs throughout wooded and open vegetation areas of Delaware. Open fields, grass, dense brush, and forest-covered areas are typical sites for wildfire events. Under dry conditions or droughts, wildfires have the potential to burn forests as well as croplands. Most wildfires are caused



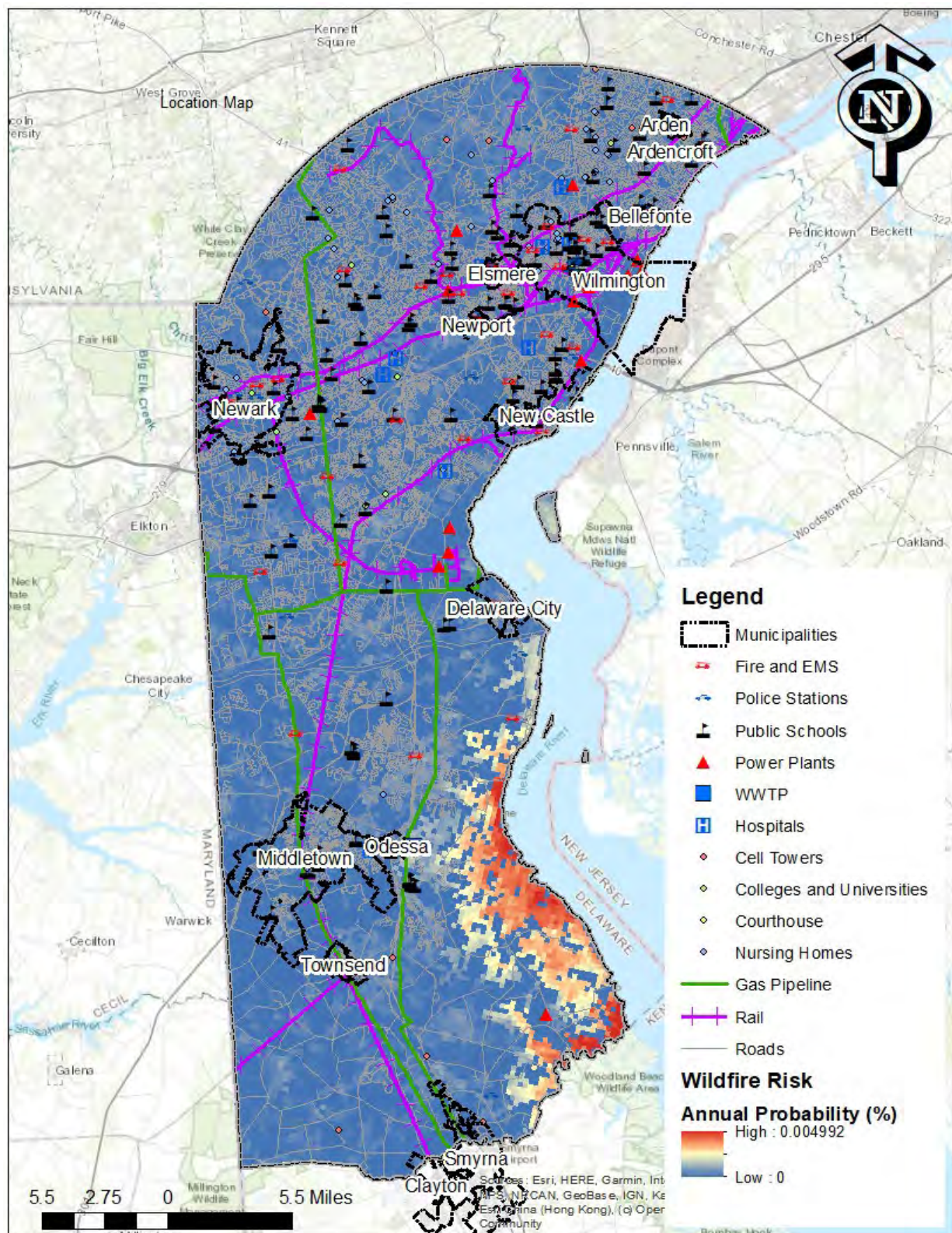
by human carelessness or negligence. However, some are precipitated by lightning strikes (DCNR, 2022c). Large events may require evacuation from one or more communities and necessitate regional or national firefighting support.

New Castle County is at a low risk for wildfire, with wildland-urban interface (WUI) fires are becoming increasingly problematic. As people continue to live and work near wildland areas, the threat to private property from wildfires increases. This phenomenon is growing as suburbanization and population growth continues in the County. Although urban interface fires have the greatest possibility to cause property damage, the potential for wildfire exists throughout the entire planning area.

Location and Extent

The southeastern region is the most wildfire-prone area of the County, with the remainder of the county being low to medium-low.

Figure 4.10 Wildfire Exposure in New Castle County



Range of Magnitude

The frequency and severity of wildfires depend on many factors. The three that control wildfire behavior the most are the availability of fuels, the weather, and the topography of the area. The speed and intensity of a fire will usually increase as the slope and wind increase, and the humidity decreases.

Table 4.35 summarizes the range of magnitude for wildfire hazards.

Table 4.35 Range of Magnitude - Wildfire

Severity	Causes	Frequency	Damage Extents
Minimum	Localized brush burning; contained naturally or by emergency response team	Annual	Minor loss of forest/vegetation; no damage to structures
Maximum	Extreme drought conditions prevent extinguishing and containing a fire	None Recorded	Major loss of forest, agricultural land; damage to structures

Past Occurrence

As provided in the DE 2023 State HMP, over the past 22 years there have been no recorded wildfire impacts in New Castle County.

Future Occurrence

Based on experience, wildfire events are unlikely to occur in New Castle County in any given year.

Vulnerability Assessment

Inventory and summary of vulnerable assets and Estimation of Losses

Exposure to wildfire by jurisdiction, building type, and building count is provided in Table 4.36 and Table 4.37.

Table 4.36 Wildfire Exposure by Building Count

Wildfire Exposure by Building Count										
Jurisdiction	Agriculture	Single-Family Home	Manufactured Housing	Multi-Family Home	Commercial	Industrial	Government	Education	Religious	TOTAL
Arden	2	162	0	1	5	0	0	1	0	171
Ardencroft	2	35	0	1	0	0	0	0	0	38
Ardentown	11	175	1	4	3	0	0	0	0	194
Bellefonte	0	0	0	0	0	0	0	0	0	0

Clayton	0	0	0	0	0	0	0	0	0	0
Delaware City	2	69	0	1	0	15	3	0	0	90
Elsmere	0	25	0	0	0	0	0	0	0	25
Middletown	20	1223	48	21	26	1	0	0	0	1339
New Castle	4	5	0	1	11	4	0	0	0	25
Newark	1	85	0	0	4	4	0	0	0	94
Newport	1	0	0	0	9	4	0	0	0	14
Odessa	8	174	0	4	16	1	6	1	1	211
Smyrna	0	0	0	0	0	0	0	0	0	0
Townsend	2	156	0	0	3	0	0	0	0	161
Wilmington	1	258	0	3	2	0	0	0	1	265
Unincorporated	466	20609	539	275	589	253	27	51	36	22845
TOTAL	520	22976	588	311	668	282	36	53	38	25,472

Table 4.37 Wildfire Exposure by Structure Value

Jurisdiction	Agriculture	Single-Family Home	Manufactured Housing	Multi-Family Home	Commercial	Industrial	Government	Education	Religious	TOTAL
Arden	\$222,212	\$30,948,698	\$0	\$3,418,935	\$2,187,340	\$0	\$0	\$1,396,486	\$0	\$38,173,670
Ardencroft	\$45,649	\$8,498,584	\$0	\$349,634	\$0	\$0	\$0	\$0	\$0	\$8,893,868
Ardentown	\$892,558	\$32,405,619	\$68,235	\$21,039,279	\$2,026,266	\$0	\$0	\$0	\$0	\$56,431,958
Bellefonte	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Clayton	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Delaware City	\$320,932	\$13,694,106	\$0	\$520,903	\$0	\$5,888,182	\$4,227,289	\$0	\$0	\$24,651,413
Elsmere	\$0	\$4,971,070	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,971,070
Middletown	\$15,022,094	\$399,360,144	\$3,054,101	\$103,107,222	\$28,963,934	\$438,773	\$0	\$0	\$0	\$549,946,268
New Castle	\$2,199,189	\$1,332,816	\$0	\$1,501,859	\$9,621,598	\$12,812,095	\$0	\$0	\$0	\$27,467,556
Newark	\$20,680	\$21,749,309	\$0	\$0	\$2,170,205	\$7,407,559	\$0	\$0	\$0	\$31,347,752
Newport	\$320,430	\$0	\$0	\$0	\$4,755,789	\$7,728,170	\$0	\$0	\$0	\$12,804,389
Odessa	\$495,702	\$32,913,519	\$1,560,356	\$0	\$5,648,805	\$158,891	\$8,836,139	\$4,751,989	\$39,053	\$54,404,453
Smyrna	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Townsend	\$5,903,164	\$42,876,068	\$0	\$0	\$1,150,707	\$0	\$0	\$0	\$0	\$49,929,939
Wilmington	\$661,614	\$72,922,005	\$0	\$4,352,459	\$190,546	\$0	\$0	\$0	\$6,381,690	\$84,508,315
Unincorporated	\$92,154,337	\$5,309,883,333	\$36,462,060	\$748,381,633	\$531,298,048	\$307,393,068	\$11,871,865	\$208,458,625	\$32,265,595	\$7,278,168,563
TOTAL	\$118,258,561	\$5,971,555,270	\$41,144,753	\$882,671,925	\$588,013,238	\$341,826,738	\$24,935,293	\$214,607,099	\$38,686,337	\$8,221,699,214

Potential Impacts

Wildfire events would likely not have an impact on future development in the County, although it will continue to be recommended to protect and conserve the County's forested areas. Additionally, these events may have a greater impact on vulnerable and underserved populations due to a lesser ability to evacuate and/or have access to transportation and/or medical services. Wildfires disproportionately affect underserved communities by causing greater exposure to harmful smoke due to factors like limited access to resources for evacuation, inadequate housing, language barriers, and a higher prevalence of pre-existing health conditions, making them more vulnerable to the health impacts of wildfire smoke and significantly hindering their ability to recover from fire damage compared to wealthier communities.

The FEMA Community Lifelines most likely to be impacted include:

- Safety and Security
- Food, Water, Shelter
- Health and Medical

4.3.14 Earthquake, Sinkholes, and Landslides

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 people, and disrupt the social and economic functioning of the affected area.

In a landslide, masses of rock, earth, or debris move down a slope. Landslides can be caused by a variety of factors, including earthquakes, storms, fire, and human modification of land. Areas that are prone to landslide hazards include previous landslide areas, areas on or at the base of slopes, areas in or at the base of drainage hollows, developed hillsides with leach field septic systems, and areas recently burned by forest or brush fires.

Location and Extent

According to the DE 2023 State HMP, earthquake events in Delaware are unlikely. Since 2000, there have been three recorded earthquakes with epicenters inside the State. The strongest of these earthquakes occurred near Dover in November 2017, and was a level IV intensity on the Mercalli Intensity Scale. Earthquakes originating from outside Delaware can also impact the State.

Areas that are generally prone to landslide hazards include previous landslide areas; the bases of steep slopes; the bases of drainage channels; and developed hillsides where leach-field septic systems are used. Areas that are typically considered safe from landslides include areas that have not moved in the past; relatively flat-lying areas away from sudden changes in slope; and areas at the top or along ridges, set back from the tops of slopes.

In New Castle County, the northern part of the County is identified as a low-medium risk of landslide, while the remainder of the County is only low risk.

Figure 4.11 shows the landslide risk throughout the County.

Figure 4.11 Landslide Risk Areas

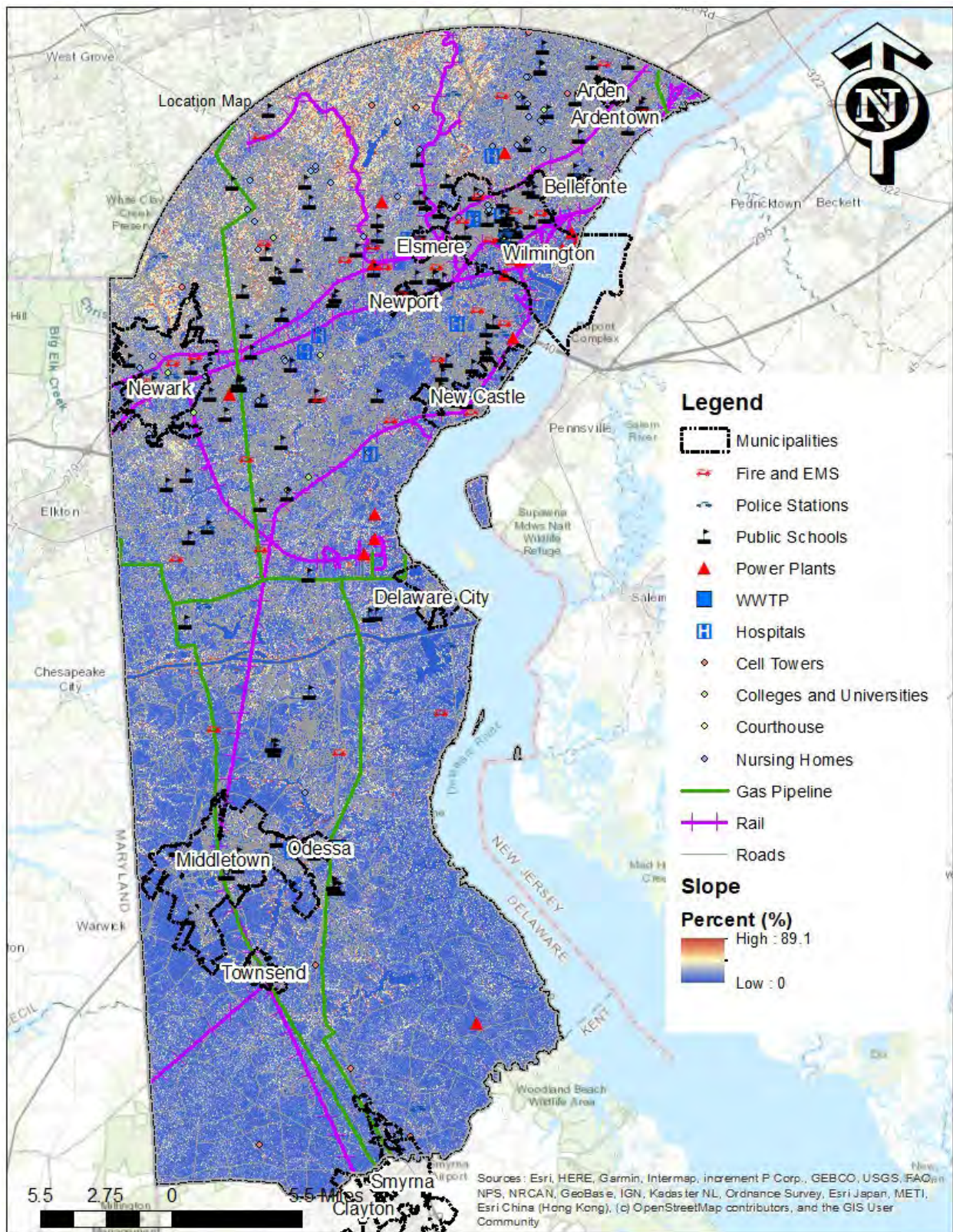


Table 4.38 summarizes the range of magnitude for landslide hazards.

Table 4.38 Range of Magnitude - Landslides

Severity	Causes	Frequency	Damage Extents
Minimum	Rock falls from steep roadway cuts	Annual	Minor traffic disruptions; damage to vehicles
Maximum	Heavy rainfall resulting in slope failure	>10 years	Substantial road closures

Range of Magnitude

Earthquake magnitude is often measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake, shown in Table 4.44. The impact an earthquake event has on an area is typically measured in terms of earthquake intensity, as intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. A detailed description of the Modified Mercalli Intensity Scale is provided in Table 4.39.

Table 4.39 Richter Scale

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 up to about 100 kilometers across where people live.
7.0-7.9	Major earthquake. Can cause serious damage over larger areas.
8 or greater	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

Table 4.40 Modified Mercalli Intensity Scale and Impacts

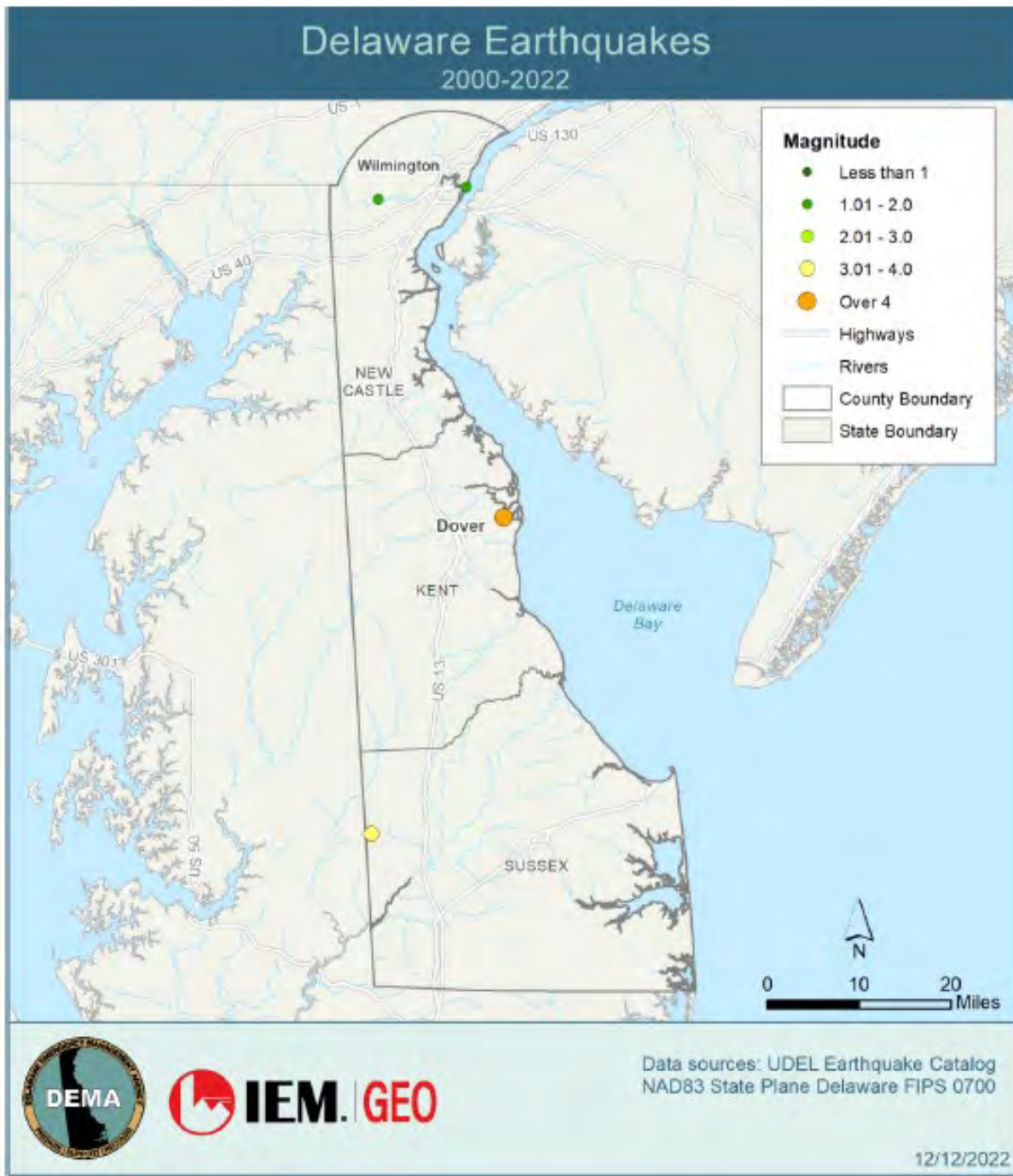
Scale	Intensity	Description of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Usually detected only on seismographs.	<4.2
II	Feeble	Felt only by a few persons at rest, especially on upper floors of buildings.	
III	Slight	Felt quite noticeably indoors, especially on upper floors. Most people do not recognize it as an earthquake (i.e., a truck rumbling).	
IV	Moderate	Can be felt by people walking; dishes, windows, and doors are disturbed.	
V	Slightly Strong	Sleepers are awoken; unstable objects are overturned.	<4.8
VI	Strong	Trees sway; suspended objects swing; objects fall off shelves; damage is slight.	<5.4
VII	Very Strong	Damage is negligible in buildings of good design and construction, slight to moderate in well-built ordinary	<6.1

		structures, and considerable in poorly built or badly designed structures; some chimneys are broken.	
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged	<6.9
IX	Ruinous	Some houses collapse; ground cracks; pipes break open	
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

Past Occurrence

Three earthquakes have been recorded with epicenters in Delaware. Figure 4.12 shows the location of these epicenters. One of the three earthquakes was recorded with an epicenter in New Castle County, along with one in both Kent and Sussex Counties.

Figure 4.12 DE Earthquake History (2000-2022)



Earthquakes whose epicenters fall outside of Delaware can impact the State as well. A cluster of historical epicenters in southeastern Pennsylvania is spatially associated with a seismic trend along the lower Delaware River, which continues in a northeasterly direction through New Jersey.

According to the DE 2023 State HMP, there have been no local earth movements (landslides, sinkholes, etc.) since 2000.

Future Occurrence

The likelihood of significant earthquake damage in New Castle County is low since the probability of the area being stricken by an earthquake with an epicenter in New Castle County is relatively low compared to other parts of the country. Even though earthquakes do occur occasionally, the County is located in an area of very low seismic activity. Because of the very low risk associated with this hazard, a simple loss estimation based on default Hazus data was completed for earthquakes and is covered in the next chapter. The frequency and intensity of earthquakes is not expected to be impacted as a result of climate change.

The likelihood of a landslide or sinkhole occurring in New Castle County is low as there have been no instances recorded in the past 25 years.

Vulnerability Assessment

Inventory and summary of vulnerable assets and Estimation of Losses

Table 4.41 shows the estimated losses in New Castle County for a 1000-year earthquake event. Income losses and building stock losses are identified for different building occupancies. The total estimated loss for an earthquake in New Castle County is \$307,998,900.

Table 4.41 1000-Year Earthquake Loss

1000-Year Earthquake Loss						
Loss Type	Single Family	Other Residential	Commercial	Industrial	Other	Total
Income Losses	\$18,902,900	\$3,047,800	\$34,418,300	\$1,610,400	\$6,264,600	\$64,244,000
Building Stock Losses	\$120,804,800	\$14,752,500	\$67,620,800	\$15,467,300	\$25,109,500	\$243,754,900
Total	\$139,707,700	\$17,800,300	\$102,039,100	\$17,077,700	\$31,374,100	\$307,998,900

Potential Impacts

There are essential and critical facilities that may be impacted by an earthquake event. These facilities are those specifically noted in the HAZUS identified essential facilities and critical facility results for Earthquake in Appendix E and the list of critical facilities provided in Appendix F.

An earthquake event may have an impact on future development in the County. Additionally, these events may have a greater impact on vulnerable and underserved populations. Earthquakes disproportionately affect underserved communities by causing greater damage to their often poorly constructed housing, limited access to emergency services, increased vulnerability to displacement and economic hardship, and a harder time recovering due to pre-existing social and economic disadvantages, making them more susceptible to the devastating impacts of a seismic event compared to more affluent areas.

During an Earthquake, the community lifelines that are most likely to be impacted include:

- Food, Water, and Shelter
- Health and Medical
- Hazardous Materials
- Transportation Systems

4.3.15 Hail

Hail is a form of solid precipitation that occurs during thunderstorms when updrafts in the storm carry raindrops into extremely cold areas of the atmosphere. In New Castle County, hailstorms are typically associated with severe summer thunderstorms and can vary from small, pea-sized stones to larger hail capable of damaging property, vehicles, and crops. While usually localized, severe hail events have the potential to cause economic and structural impacts.

Location and Extent

Hail events in New Castle County can occur anywhere in the county, typically associated with severe thunderstorms during the spring and summer months. Hail size is highly variable, ranging from pea-sized to larger hailstones capable of causing property or vehicle damage.

Range of Magnitude

Depending on meteorological factors, hail can range in size from small to large, and have varying impacts based on size and intensity.

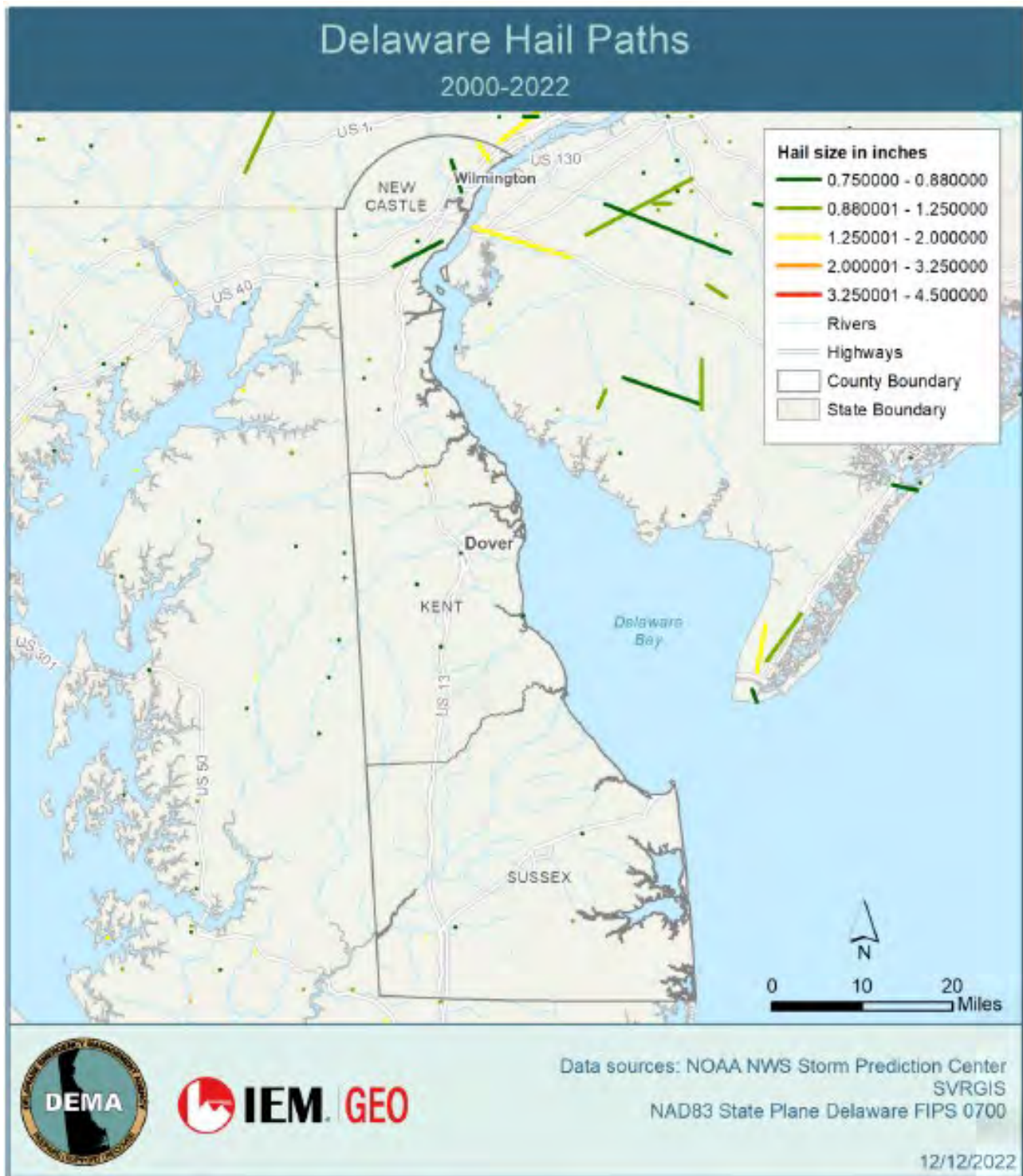
- Small Hail (<1 inch): minor property and vehicle damage.
- Moderate Hail (1–2 inches): roof, siding, and vehicle damage.
- Large Hail (>2 inches): significant structural damage, potential injury to persons and livestock.

Past Occurrence

Hailstorms are relatively common in New Castle County, often accompanying severe thunderstorms or squall lines. Most events produce small hail, causing minimal damage; however, larger sporadic events have damaged roofs, vehicles, and crops. For example, hail up to 1.75 inches in diameter was recorded during storms in the summer of 2019. Since 1970 there have been 73 recorded events in the County. No deaths or injuries were reported and only one event resulted in reportable damage, which being in \$5,000 in Smyrna in 1993.

Figure 4.13 identifies Hail Paths through Delaware between the years of 2000 to 2022.

Figure 4.13 Delaware Hail Paths (2000-2022)



Future Occurrence

Hail events are expected to continue annually, with intensity varying based on storm systems. Climate change may slightly alter the frequency or intensity of severe hail events.

Vulnerability Assessment

Inventory and summary of vulnerable assets

Hail can occur throughout New Castle County, particularly during severe summer thunderstorms. Populations, residential and commercial buildings, vehicles, and crops in areas with dense development or agricultural activity are most exposed to damage.

Potential Impacts

Hail events are unlikely to influence future development patterns but can cause localized property and crop damage. Vulnerable populations, including those with limited financial resources, may face disproportionate impacts due to damage to vehicles, roofs, and small farms.

The FEMA Community Lifelines most likely to be impacted include:

- Safety and Security
- Food, Water, and Shelter
- Health and Medical

4.3.16 Geomagnetic Storm (Solar Flares)

Geomagnetic storms, caused by solar activity, can disrupt the Earth's magnetic field and affect electrical and communication systems. In New Castle County, impacts would primarily involve power grid disturbances, satellite and radio communication interruptions, and potential disruption to critical infrastructure. While severe storms are uncommon, their effects could be widespread if they occur.

Location and Extent

Geomagnetic storms could affect New Castle County along with the entire U.S. East Coast. Effects are primarily on electrical grids, communications, and satellite-dependent systems.

Range of Magnitude

Minor storms: temporary disruptions to communications and navigation systems.

Moderate storms: short-term power fluctuations, minor grid disturbances.

Severe storms: widespread power outages, damage to transformers, disruption to critical services.

Past Occurrence

New Castle County has experienced geomagnetic storm effects indirectly, primarily minor electrical and communication disruptions. No major power failures have been directly attributed to solar activity.

Future Occurrence

Geomagnetic storms are likely to occur periodically in line with the 11-year solar cycle. Severe events remain low probability but could cause widespread disruption.

Vulnerability Assessment

Inventory and summary of vulnerable assets

Electrical substations, critical infrastructure, communication networks, hospitals, and transportation systems. Power grid infrastructure is the primary exposed asset, along with hospitals, emergency services, and telecommunications systems. Short- or long-term power outages, communication failures, and disruption of critical services. Losses could be moderate to high for prolonged events.

Potential Impacts

Geomagnetic storms could disrupt power, communication, and transportation systems. Vulnerable populations relying on medical devices, emergency services, or digital communications may experience disproportionate impacts.

The FEMA Community Lifelines most likely to be impacted include:

- Safety and Security
- Health and Medical
- Energy
- Transportation

4.3.17 Volcano

Volcanic hazards result from eruptions, which can include lava flows, ashfall, and gas emissions. Delaware has no active or dormant volcanoes, so the risk to New Castle County is limited to the potential for minor ashfall from distant eruptions, which could temporarily affect air quality and transportation. The likelihood of direct impacts is extremely low.

Location and Extent

Delaware has no active or dormant volcanoes. Any volcanic hazard would be from distant eruptions (ashfall) affecting air quality.

Range of Magnitude

Minor ashfall: temporary air quality reduction.

Major distant ashfall: disruption of transportation (air travel), minor property and health impacts.

Past Occurrence

No volcanic events have affected New Castle County.

Future Occurrence

The likelihood is extremely low; impacts would be minor and largely limited to air quality or transport disruptions.

Vulnerability Assessment

Inventory and summary of vulnerable assets

Ashfall from distant volcanic eruptions could affect air quality and aviation operations. Populations with respiratory conditions and facilities reliant on-air travel are most susceptible.

Potential Impacts

The likelihood of volcanic impact is extremely low. Effects would primarily be short-term disruptions to transportation and minor health impacts, with limited influence on development. The FEMA Community Lifelines most likely to be impacted include:

- Health and Medical
- Transportation
- Safety and Security

4.3.18 Tsunami

A tsunami is a series of ocean waves generated by sudden disturbances such as underwater earthquakes, landslides, or volcanic eruptions. Although extremely rare along the mid-Atlantic coast, low-lying areas of New Castle County along the Delaware Bay could theoretically experience minor flooding if a distant tsunami were to occur. The probability of a significant event impacting the county is very low.

Location and Extent

Tsunamis are extremely unlikely in Delaware due to its geographic location on the mid-Atlantic coast. Any potential inundation would be confined to low-lying tidal areas along the Delaware Bay.

Range of Magnitude

A theoretical tsunami would likely produce only minor coastal flooding, given the lack of nearby subduction zones or major offshore earthquake sources.

Past Occurrence

There are no recorded tsunami events in Delaware's history.

Future Occurrence

Future tsunamis are considered highly unlikely but could theoretically result from distant undersea earthquakes or landslides.

Vulnerability Assessment

Inventory and summary of vulnerable assets

Low-lying tidal areas along the Delaware Bay are the most exposed, including waterfront homes, marinas, and critical infrastructure near the shore.

Potential Impacts

Although the probability of a tsunami is extremely low, even minor inundation could temporarily disrupt transportation and utilities. Vulnerable populations in these coastal areas could experience temporary displacement.

The FEMA Community Lifelines most likely to be impacted include:

- Safety and Security
- Food, Water, and Shelter
- Energy

4.4 Hazard Vulnerability Summary

4.4.1 Methodology

To prepare for the Vulnerability Assessment, a variety of sources and analyses were completed. Historic data for each event (where available) were tabulated to determine current probabilities and estimate future occurrences. For spatially specific hazards, such as flooding and wildfires, those hazard areas were obtained from the best available data sources (e.g., FEMA DFIRM GIS shapefiles and National Land Cover Dataset). Building footprint and parcel data were obtained from the county and were overlain with the hazard areas in GIS to determine the number of structures potentially exposed to these hazards and to better characterize those structures. Critical facilities data was obtained from the county and State database sources and was also overlain with the hazard areas in GIS to determine which critical facilities are potentially exposed to each hazard.

FEMA's risk assessment software, Hazus, was used to calculate probabilistic losses for the flood, earthquake, hurricane wind, and hurricane surge hazards. Inventory and vulnerable assets (including exposure estimates), and loss estimates were discussed with the Steering Committee and communities. For specific hazards, loss estimates were prepared based on historic annualized loss data (where available). Inventory and vulnerable assets (including exposure estimates) and loss estimates were incorporated into this Vulnerability Assessment.

Finally, a "risk factor" calculation was also prepared based on the characteristics of each hazard, to quantitatively weigh and rank each hazard as part of the hazard prioritization effort. Risk factors from the 2020 HMP were reviewed with the Steering Committee, and it was agreed that no changes are desired regarding specific risk factors for the 2025 Update.

To aid in prioritization efforts in terms of planning needs and mitigation strategy, each of the hazards was assigned a "risk factor." The risk factor is essentially a weighted calculation based on five variables associated with each hazard: 1) probability; 2) impact; 3) spatial extent; 4) warning time; and 5) duration. An index was then assigned to each variable depending on level: "1" – low to "4" – high. These variables, levels, and indices associated with each are summarized in Table 4.59. For probability specifically, highly likely indicates a 100% chance to occurring in a given year; likely probability indicates a 75% chance top occurring in a given year; possible probability indicates at least a 50% percent of occurring in a given year; and unlikely probability indicates less than a 25% chance of occurring in a given year. The risk factor calculation matrix is provided in Table 4.59.

Table 4.59 Risk Factor Calculation Matrix

Probability		Impact		Spatial Extent		Warning Time		Duration	
Weight – 30%		Weight – 30%		Weight – 20%		Weight – 10%		Weight – 10%	
Level	Index	Level	Index	Level	Index	Level	Index	Level	Index
Unlikely	1	Minor	1	Negligible	1	>24 Hrs	1	<6 Hours	1
Possible	2	Limited	2	Small	2	12-24 Hrs	2	<24 Hours	2
Likely	3	Critical	3	Moderate	3	6-12 Hrs	3	<1 Week	3
Highly Likely	4	Catastrophic	4	Large	4	<6 Hrs	4	>1 Week	4

The risk factor for each hazard was then calculated using the following equation:

- Risk Factor = (0.3) (Probability Index) + (0.3) (Impact Index) + (0.2) (Spatial Extent Index) + (0.1) (Warning Time Index) + (0.1) (Duration Index)

4.4.2 Ranking Results

Table 4.60 presents the updated hazard ranking results based on applying the risk factor calculation to each hazard.

Hazard Ranking	Probability	Impact	Spatial Extent	Warning Time	Duration	Total Cumulative	Risk Score	Risk Level
Flooding (Storm Surge/Tide and Coastal Flooding)	4	3	4	2	3	16	3.4	High
Winter Storms, Nor'easters and Freezes	4	3	4	1	3	15	3.3	High
Hurricanes and Coastal Storms	4	3	4	1	3	15	3.3	High
Severe T-Storms and Tornadoes	4	3	3	3	1	14	3.1	High
Transportation and Infra. Incidents	4	3	2	4	2	15	3.1	High
Hazardous Materials	4	2	2	4	2	14	2.8	High
Dam/Levee Failure	2	3	3	4	2	14	2.7	High
Terrorism	2	3	3	4	2	14	2.7	High
Erosion	3	2	2	1	4	12	2.4	Moderate
Drought/Extreme Heat	2	2	4	1	3	12	2.4	Moderate
Energy Pipeline Failures	2	2	3	4	2	13	2.4	Moderate
Public Health Incidents	2	2	3	2	3	12	2.3	Moderate
Wildfire	2	2	2	4	2	12	2.2	Moderate
Earthquakes	1	2	4	3	1	11	2.1	Moderate
Hail	2	2	2	3	1	10	2	Moderate
Geomagnetic Storms	1	1	3	1	2	8	1.5	Low

Sinkholes/Debris Pits	2	1	2	1	1	7	1.5	Low
Landslides	1	1	1	4	1	8	1.3	Low
Volcano	1	1	1	3	1	7	1.2	Low
Tsunami	1	1	1	3	1	7	1.2	Low

Based on the results of the risk factor analysis, it was determined that the top five hazards that impact NCC are: 1) Flooding (Storm Surge/Tide and Coastal Flooding; 2) Winter Storms, Nor'easters and Freezes; 3) Hurricanes and Coastal Storms; 4) Severe Thunderstorms and Tornadoes; 5) Transportation and Infrastructure Incidents.

It is important to understand how any hazards included in this plan may impact municipalities differently than the County as a whole. Table 4.61 provides a matrix and breakdown of how hazard risks differ between the participating jurisdictions.

Table 4.61 Jurisdictional Risk Comparison Matrix

IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR																
JURISDICTION	Flooding (Storm Surge/Tide and Coastal Flooding)	Winter Storms, Nor'easters and	Hurricanes and Coastal Storms	Severe T-Storms and Tornadoes	Transportation and Infra. Incidents	Hazardous Materials	Dam/Levee Failure	Terrorism	Erosion	Drought/Extreme Heat	Energy Pipeline Failures	Public Health Incidents	Wildfire	Earthquakes	Hail	Geomagnetic Storms
Arden	<	=	=	=	<	<	<	=	<	=	=	=	>	=	=	=
Ardencroft	<	=	=	=	<	<	<	=	<	=	>	=	>	=	=	=
Ardentown	<	=	=	=	<	<	<	=	<	=	>	=	>	=	=	=
Bellefonte	<	=	=	=	=	=	=	=	<	=	>	=	=	=	=	=
Delaware City	>	=	>	=	<	<	=	=	>	=	>	=	>	=	=	=
Elsmere	=	=	=	=	>	=	>	=	<	=	>	=	=	=	=	=
Middletown	<	=	<	=	<	>	>	=	<	=	>	=	=	=	=	=
New Castle	>	=	>	=	>	=	<	=	>	=	>	=	=	=	=	=
Newark	>	=	>	=	=	>	=	>	<	=	>	>	=	=	=	=

IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR

JURISDICTION	Flooding (Storm Surge/Tide and Coastal Flooding)	Winter Storms, Nor'easters and	Hurricanes and Coastal Storms	Severe T-Storms and Tornadoes	Transportation and Infra. Incidents	Hazardous Materials	Dam/Levee Failure	Terrorism	Erosion	Drought/Extreme Heat	Energy Pipeline Failures	Public Health Incidents	Wildfire	Earthquakes	Hail	Geomagnetic Storms
Newport	"	"	"	"	"	"	<	"	<	"	<	"	"	"	"	"
Odessa	<	"	<	"	"	<	"	"	<	"	>	"	>	"	"	"
Townsend	<	"	<	"	"	<	"	"	<	"	>	"	"	"	"	"
Wilmington	>	"	>	>	>	>	>	>	>	"	>	>	"	"	"	"

IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR (CONTINUED)

JURISDICTION	Sinkholes/Debris Pits	Landslides	Volcano	Tsunami
Arden	"	"	"	"
Ardencroft	"	"	"	"
Ardentown	"	"	"	"
Bellefonte	"	"	"	"
Delaware City	"	"	"	"
Elsmere	"	"	"	"
Middletown	"	"	"	"
New Castle	"	"	"	"

IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR (CONTINUED)				
JURISDICTION	Sinkholes/Debris Pits	Landslides	Volcano	Tsunami
Newark	=	=	=	=
Newport	=	=	=	=
Odessa	=	=	=	=
Townsend	=	=	=	=
Wilmington	=	=	=	=

4.4.3 Potential Loss Estimates

Table 4.62 presents the results of a summary table of potential loss estimates for each hazard based on the analyses conducted in the hazard profiling.

Summary of New Castle County Average Annual Loss Estimations		
Hazard	Asset	Annual Losses (\$)
Floods	Residential (using NFIP claims projection)	\$1,123,640
Floods	Residential (using Hazus annual loss)	\$226,500
Floods	All properties (using Hazus annual loss)	\$3,554,580
Hurricane Wind	All properties (Hazus annual loss estimate)	\$20,577,314
Winter Storm	All properties (based on NCDC reported losses)	
Storm/Tornado/Wind Event	All properties	--
Earthquake	All properties (Hazus annual loss estimate)	\$1,265,993
Transportation	All properties	--
Gas Wells/Pipelines	All properties	--

4.4.4 Future Development and Vulnerability

As part of this Plan Update, the Steering Committee repeatedly expressed concern that new development should be focused on where infrastructure already exists and regulate development in hazard areas such as the floodplain or forested and steeply sloped areas, to mitigate the increased potential for hazard impacts. These hazards will not cause problems countywide, although the vulnerability for those areas at risk may continue to increase.



Risk and vulnerability to natural and human-caused hazard events are not static. Risks will increase or decrease as counties and municipalities see changes in land use and development, as well as changes in population. New Castle County is expected to experience a variety of factors that will, in some areas, increase vulnerability to hazards, while in other areas, vulnerability may stay static or even be reduced.

5.0 CHAPTER 5 – CAPABILITY ASSESSMENT

5.1 Update Process Summary

The Capability Assessment is an evaluation of New Castle County’s governmental structure, political framework, legal jurisdiction, fiscal status, policies and programs, regulations and ordinances and resource availability. Each category is evaluated for its strengths and weaknesses in responding to, preparing for and mitigating the effects of the profiled hazards.

The Capability Assessment is critical to developing a comprehensive and implementable mitigation strategy. The Capability Assessment serves to identify existing gaps, conflicts and/or shortcomings that may need to be addressed through future mitigation actions. The capability assessment also helps to ensure that proposed mitigation actions are practical considering the local ability to implement them.

The Capability Assessment comprises three components:

1. Plan Integration and Document Review - an inventory of select County planning and regulatory tools and a review and incorporation of existing plans and other technical information as appropriate.
2. County Roles and Emergency Response Capabilities and Responsibilities; and
3. Municipal Capability Assessment - an analysis of municipal capacity from a planning, policy, staffing, response, and training standpoint.

This update process included disseminating county and municipal Capability Assessment surveys to all jurisdictions. Information returned was utilized to inform this Capability Assessment Update. Throughout the planning process, the mitigation local planning team considered the county’s 13 municipalities. Delaware municipalities have their own governing bodies, pass and enforce their own ordinances and regulations, purchase equipment and manage their own resources, including critical infrastructure. These capability assessments, therefore, consider the various characteristics and capabilities of municipalities under study.

NCC has a number of resources it can access to implement hazard mitigation initiatives including emergency response measures, 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 actions taken before, during and after a hazardous event. 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. The 2020 Plan’s Capability Assessment was used as a baseline, and sections of this Capability Assessment have been derived from the 2020 plan and updated where applicable.

5.2 Capability Assessment Findings

5.2.1 Planning and Regulatory Capability

Municipalities have the authority to govern more restrictively than state and county minimum requirements. Municipalities can develop their own policies and programs and implement their own rules and regulations to protect and serve their local residents. Local policies and programs are typically identified in a comprehensive plan, implemented through a local ordinance and enforced

by the governmental body or its appointee.

Municipalities regulate land use via the adoption and enforcement of zoning, subdivision and land development, building codes, building permits, floodplain management and/or storm water management ordinances. When effectively prepared and administered, these regulations can lead to an opportunity for hazard mitigation. For example, the National Flood Insurance Program (NFIP) established minimum floodplain management criteria. Municipalities have the option of adopting a single-purpose ordinance or incorporating these provisions into their zoning, subdivision and land development, or building codes; thereby mitigating the potential impacts of local flooding. This capability assessment details the existing NCC and municipal legal capabilities to mitigate the profiled hazards. It identifies the counties and the municipalities' existing planning documents and their hazard mitigation potential. Hazard mitigation recommendations are, in part, based on the information contained in the assessment.

All jurisdictions participate in some form of regional planning decisions, most notably through the Wilmington Area Planning Council (WILMAPCO). WILMAPCO is the designated Metropolitan Planning Organization (MPO) for the region that includes New Castle County, Delaware, and Cecil County, Maryland. The organization is primarily responsible for coordinating transportation plans of local governments within the region, including towns and cities, counties, and states.

Table 5.1 provides a summary of the local plans and programs in place for New Castle County's participating local governments. An "X" indicates that the given plan or program is currently in place and being implemented by the local jurisdiction. An asterisk in front of the "X" for indicates that these capabilities are handled by New Castle County under the Local Service Agreements, or by reliance on the County's capability.

Table 5.1 Jurisdictional Plan Matrix

Jurisdiction	HMP	DRP	CLUP	FMP	SMP	EOP	COOP	REP	SARA	TRANS	CIP	REG-PL	HPP	ZO	SO	FDPO	NFIP	CRS	BC
New Castle County	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Arden, Village of	X		*X	X	*X			*X	*X	*X	X	X	*X	*X	*X	*X	X		*X
Ardencroft, Village of	X		*X	X	*X			*X	*X	*X		X	*X	*X	*X	*X			*X
Ardentown, Village of	X		*X	X	*X			*X	*X	*X		X	*X	*X	*X	*X	X		*X
Bellefonte, Town of	X		X	X	*X			*X	*X	*X		X	*X	X	*X	*X			*X
Delaware City, City of	X		X	X	X	X	X	*X	*X	*X	X	X	X	X	X	X	X	X	X
Elsmere, Town of	X		X	X	X	X	X	*X	*X	*X	X	X		X	X	X	X		X
Middletown, Town of	X	X	X	X	X	*X	X	*X	*X	*X	X	X	X	X	X	X	X		X
New Castle, City of	X		X	X	X	X	X	*X	*X	*X	X	X	X	X	X	X	X	X	X
Newark, City of	X	X	X	X	X	X	X	*X	*X	X	X	X	X	X	X	X	X	X	X
Newport, City of	X		X	X	X	*X	X	*X	*X	*X	X	X	*X	X	X	X			X
Odessa, Town of	X		X	X	*X		X	*X	*X	*X		X	X	X	X	X	X		X
Townsend, Town of	X	X	X	X	X	X	X	*X	*X	*X	X	X		X	X	X			X
Wilmington, City of	X	X	X	X	X	X	X	*X	X	X	X	X	X	X	X	X	X		X

Key to Table 5.1

HMP – Hazard Mitigation Plan
 DRP – Disaster Recovery Plan
 CLUP – Comprehensive Land Use Plan
 FMP – Floodplain Management Plan / Flood Mitigation Plan

SMP – Stormwater Management Plan
 EOP – Emergency Operations Plan
 COOP – Continuity of Operations Plan
 REP – Radiological Emergency Plan
 SARA – SARA Title III Emergency Response Plan

TRANS – Transportation Plan
 CIP – Capital Improvements Plan (that regulates infrastructure in hazard areas)
 REG-PL – Regional Planning
 HPP – Historic Preservation Plan
 ZO – Zoning Ordinance

SO – Subdivision Ordinance
 FDPO – Flood Damage Prevention Ordinance
 NFIP – National Flood Insurance Program
 CRS – Community Rating System
 BC – Building Codes

Building Codes

Building Codes regulate construction standards. In many communities, permits are issued for, and inspections of work take place on, new construction. Decisions regarding the adoption of building codes (that account for hazard risk), the type of permitting process required both before and after a disaster, and the enforcement of inspection protocols all affect the level of hazard risk faced by a community.

Building codes are important in mitigation because they are developed for a region of the country in respect to the hazards existing in that area. Consequently, structures that are built according to applicable codes are inherently resistant to many hazards, such as strong winds, floods and earthquakes; and can help mitigate regional hazards, such as wildfires. NCC, Middletown, Wilmington, and Newark all have adopted the most recent 2018 Standard of IBC/ICC Building Code, while others have either 2012 standard or at least 2000 standard, as in Elsmere's case which switched to IBC/ICC in 2015.

The adoption and enforcement of building codes by local jurisdictions was assessed using the Building Code Effectiveness Grading Schedule (BCEGS) program developed by the Insurance Services Office, Inc. (ISO). This program is voluntary, and the jurisdiction is not required to have their building codes and personnel evaluated. Under the BCEGS program, ISO assesses the building codes in effect in a community and how the community enforces its building codes, with special emphasis on mitigation of losses from natural hazards.

In conducting the assessment, ISO collects information related to personnel qualification and continuing education as well as number of inspections performed per day. This type of information, combined with local building codes, is used to determine a grade for that jurisdiction. The grades range from 1 to 10, with the lower grade being more ideal. A BCEGS grade of 1 represents exemplary commitment to building code enforcement, and a grade of 10 indicates less than minimum recognized protection. A rating of 99 means that the entity does not meet the minimum requirements for a 1-10 class rating. BCEGS grades for each of New Castle County's local jurisdictions are listed in Table 5.2.

Table 5.2 BCEGS grades for each of New Castle County's Local Jurisdictions

Jurisdiction	BCEGS Grade	BCEGS Grade
Residential Properties	Residential Properties	Commercial Properties
New Castle County	3	3
Arden, Village of	3	3
Ardencroft, Village of	3	3

Jurisdiction	BCEGS Grade	BCEGS Grade
Residential Properties	Residential Properties	Commercial Properties
Ardentown, Village of	3	3
Bellefonte, Town of	3	3
Delaware City, City of	4	4
Elsmere, Town of	10	10
Middletown, Town of	99	99
New Castle, City of	3	3
Newark, City of	4	4
Newport, City of	99	99
Odessa, Town of	3	3
Townsend, Town of	3	3
Wilmington, City of	5	4

Zoning Ordinance

Zoning represents the means by which land use is controlled by local governments. As part of a community's police power, zoning is used to protect the public health, safety and welfare of those in each jurisdiction that maintains zoning authority. A zoning ordinance is the mechanism through which zoning is typically implemented. Since zoning regulations enable municipal governments to limit the type and density of development, it can serve as a powerful tool when applied in identified hazard areas.

Stormwater Management

The proper management of storm water runoff can improve conditions and decrease the chance of flooding. A stormwater management plan is designed to address flooding associated with stormwater runoff. The stormwater management plan is typically focused on design and construction measures that are intended to reduce the impact of minor urban flooding more frequently occurring.

Many of the municipalities in New Castle County coordinate their stormwater management efforts with the New Castle County Conservation District and the Delaware Department of Natural Resources and Environmental Control. Section 5101 of the Sediment and Stormwater Regulation identifies ways to reduce effects of stormwater runoff on the water and lands of the State of Delaware. It is administered by the Division of Watershed Stewardship, Department of Natural Resources and Environmental Control (DNREC). The City of Newark created a Stormwater Utility and associated fee to fund stormwater improvements, as did the City of Wilmington since 2007. Middletown does not have a drainage ordinance but adopted the State SWM Regs for code.

Subdivision Ordinance

Subdivision and land development ordinances include regulations to control the layout of streets, the planning of lots and the provision of utilities and other site improvements. The objectives of a subdivision and land development ordinance are to: coordinate street patterns; ensure adequate utilities and other improvements are provided in a manner that will not pollute streams, wells and/or soil; reduce traffic congestion; and provide sound design standards as a guide to developers, the elected officials, planning commissions and other municipal officials.

A subdivision ordinance is intended to regulate the development of housing, commercial, industrial or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Subdivision design that accounts for natural hazards can dramatically reduce the exposure of future development.

Comprehensive Plan

A comprehensive plan establishes an overall vision for what a community wants to be and a guide to future governmental decision-making. Typically, a comprehensive plan is comprised of demographic conditions, land use, transportation elements and community facilities. Given the broad nature of the plan and its regulatory standing in many communities, the integration of hazard mitigation measures into the comprehensive plan can enhance the likelihood of achieving risk reduction goals, objectives and actions.

The State of Delaware requires its counties to adopt and regularly update comprehensive plans in conformity with the Quality-of-Life Act of 1988 codified under Title 22, Chapter 7, and for the Counties under Title 9 of the Delaware State Code. This law requires the plans to include the following elements: Public Participation, Population Data and Analysis, Future Land Use Plan, Mobility, Water and Sewer, Conservation, Recreation and Open Space, Housing, Intergovernmental Coordination, Community Design, Historic Preservation, Economic Development, Capital Improvements, and Implementation Strategies. The plans are to be on a 10-year cycle with 5-year updates provided, and an Annual Report submitted to the State Office of Planning. Currently, the Villages of Arden, Ardencroft, and Ardentown fall under county comprehensive planning jurisdiction while all other municipalities have their own certified comprehensive plans.

Capital Improvements Plan

The capital improvements plan is a multi-year policy guide that identifies needed capital projects and is used to coordinate the financing and timing of public improvements. Capital improvements relate to streets, storm water systems, water distribution, sewage treatment and other major public facilities. A capital improvements plan should be prepared by the respective county's planning department and should include a capital budget. This budget identifies the highest priority projects recommended for funding in the next annual budget. The capital improvements plan is dynamic and can be tailored to specific circumstances.

Most of the jurisdictions have a Capital Improvement Plan that is part of their Capital Budget process. Some of the smaller municipals have funds within their operating budgets for small projects based upon their services and needs. Ardencroft and Ardentown do not have any capital infrastructure or needs, and all capital infrastructure in Bellefonte and Odessa is under the responsibility of other entities.

Transportation Plan:

A transportation plan identifies the means to gauge transportation demands and the options to meet those needs, while considering the social, economic and environmental characteristics of the area. The development of transportation networks can significantly impact the amount, type and location

of future growth. As a result, transportation planning can have a dramatic effect on future hazard vulnerability.

Transportation planning (including emergency evacuation planning) is commonly addressed as an element to the local comprehensive plans and in coordination with the Delaware Department of Transportation and WILMAPCO. Primarily, WILMAPCO's Regional Transportation Plan focused on the I-95 corridor through Northern NCC and into Cecil County, MD. Over the past several years, WILMAPCO has developed area focused plans for municipals, areas of specific transit problems, and assisted in the plans for the Southern portion of NCC. Newport and Newark both have separate Transportation Plans that address specifics for their municipals.

DELDOT manages the transportation network and projects, including railroad crossings, and coordinates with the County and City OEMs on the Evacuation Routes and Evacuation Plans.

Historic Preservation Plan

A historic preservation plan is intended to preserve historic structures or districts within a community. An aspect of the historic preservation plan that is often overlooked is the assessment of buildings and sites located in areas subject to natural hazards to include the identification of the most effective way to reduce future damages.³² This may involve retrofitting or relocation techniques that account for the need to protect buildings that do not meet current building standards or are within a historic district that cannot easily be relocated out of harm's way.

Historic Preservation Planning is broadly handled at the State level through the State Historic Preservation Office (SHPO), or as its proper name, the Division of Historical and Cultural Affairs under the Department of State. SHPO has developed an overall State Historic Preservation Plan, and each jurisdiction has individually addressed Historic Preservation within the CLUP's. All of the jurisdictions have their own Historic Preservation Plan or are part of the State/County's Plan except Elsmere and Townsend. In addition, several towns are designated as Historic District Overlay areas.

Participation in the National Flood Insurance Program (NFIP)

Flooding represents the greatest natural hazard facing the nation. At the same time, the tools available to reduce the impacts associated with flooding are among the most developed when compared to other hazard-specific mitigation techniques. In addition to approaches that cut across hazards, such as education, outreach, and the training of local officials, the National Flood Insurance Program (NFIP) contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments, but the program is promoted by FEMA and DEMA as a first basic step for implementing and sustaining an effective hazard mitigation program. It is therefore used as a key indicator for measuring local capability as part of this assessment.

In order for a county or municipality to join the NFIP, they must adopt a local flood damage prevention ordinance that requires jurisdictions to follow established minimum building standards in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by the 100-year flood, and that new floodplain development will not aggregate existing flood problems or increase damage to other properties.

³² See *Protecting the Past from Natural Disasters*. 1989. Nelson, Carl. National Trust for Historic Preservation: Washington, D.C.

Another key service provided by the NFIP is the mapping of identified flood hazard areas. Once prepared, the Flood Insurance Rate Maps (FIRMs) are used to assess flood hazard risk, regulate construction practices, and set flood insurance rates. FIRMs are an important source of information to educate residents, government officials and the private sector about the likelihood of flooding in their community. As of August 10, 2020, FEMA Region 3 is the first in the country to have wall-to-wall coverage in digital maps – a big step forward in ensuring the safety of local communities from flooding. FEMA Region 3, which includes Delaware, Maryland, Pennsylvania, Virginia, West Virginia, and Washington, D.C. leads the country in providing up-to-date flood hazard information to local communities. Table 5.3 summarizes NFIP participation for each of New Castle County's municipalities below.

Table 5.3 NFIP Map Dates

Jurisdiction	NFIP Entry Date	Current Effective Map
New Castle County	12/03/71	01/22/2020
Arden, Village of	03/11/2016	01/22/2020
Ardencroft, Village of	Not in NFIP	01/22/2020
Ardentown, Village of	1/28/97	01/22/2020
Bellefonte, Town of	Not in NFIP	01/22/2020
Delaware City, City of	2/16/77	02/04/2015
Elsmere, Town of	12/31/76	01/22/2020
Middletown, Town of	1/07/77	01/22/2020
New Castle, City of	12/26/75	01/22/2020
Newark, City of	3/29/74	01/22/2020
Newport, City of	Not in NFIP	01/22/2020
Odessa, Town of	04/27/2012	02/04/2015
Townsend, Town of	Not in NFIP	01/22/2020
Wilmington, City of	5/02/1977	01/22/2020

An additional indicator of floodplain management capability is the number of participants in the *Community Rating System* (CRS). The CRS is administered by FEMA's National Flood Insurance Program (NFIP). The CRS is an incentive-based program that encourages counties and municipalities to undertake defined flood mitigation activities as extra measures, which provide protection from flooding that goes beyond the minimum requirements of the NFIP, adding extra local measures to provide protection from flooding. The incentives are in the form of premium discounts. There are 18 creditable CRS mitigation activities available to communities. These activities are assigned a range of point values. A community receives a CRS classification based upon the credit points it receives for its activities. It can take on a wide range of activities that reduce flood losses. These activities include but are not limited to better mapping, regulations, public information, flood damage reduction and/or flood warning and preparedness programs. As points are accumulated and reach identified thresholds, communities can apply for an improved CRS class. Class ratings, which run from 10 to 1, are tied to flood insurance premium reductions shown in Table 5.4. Under the CRS, flood insurance premiums for properties in participating communities are reduced to reflect the flood protection activities that are being implemented. As class ratings improve (decrease), the percent reduction in flood insurance premiums for NFIP policy holders in that community increases.

Table 5.4 CRS Classes and Premium Reductions

CRS Class	Premium Reduction	CRS Class	Premium Reduction
1	45%	6	20%
2	40%	7	15%
3	35%	8	10%
4	30%	9	5%
5	25%	10	0

Community participation in the CRS is voluntary. Any community that is in full compliance with the rules and regulations of the NFIP may apply to FEMA for a CRS classification better than Class 10. The CRS application process has been greatly simplified over the past several years based on community comments to make the CRS more user friendly as possible, and extensive technical assistance is also available for communities who request it.

Table 5.5 lists the current CRS communities in New Castle County.

Table 5.5 CRS Communities in New Castle County

Jurisdiction	CRS Entry Date	Current CRS Class
New Castle, City of	10/1/94	8
Newark, City of	10/1/92	7
Delaware City, City of	10/1/12	9
Unincorporated areas of County	05/01/13	5

Source: FEMA

After discussions with the Steering Committee, and a survey sent to County and Local Floodplain Coordinators, GIS Specialists, and County Planning, the following information is included (Table 5.1) to document how the County and municipalities currently address and will continue to address NFIP compliance and requirements in the future. This was also sent to all municipal representative/floodplain coordinators to identify the responsibilities at the municipal level, which vary from jurisdiction to jurisdiction. Individual municipalities are responsible for fulfilling NFIP requirements and can request county assistance, while the county is responsible at the county level and for the municipalities' areas. All completed municipal NFIP Questionnaires are included in Appendix C, effectively providing a reflection of NFIP activities for each participating community. The designee responsible for implementing the NFIP locally for each jurisdiction are the municipal representatives identified in in Table 5.6, and/or the local floodplain coordinator/administrator.

Table 5.6 Involvement in NFIP Compliance

Flood Identification and Mapping	County

Does the County make the Flood Insurance Rate Map and Flood Insurance Studies available to the public? Where are these documents housed within the County?	YES
Will the recently developed Digital Flood Insurance Rate Maps be made available to the public as well? How?	YES, via a link (to the FEMA website) on the County website
A) Are Letters of Map Revisions (LOMRs) reviewed and signed by County officials. B) If during the subdivision review process a new development determines a reduction in the floodplain delineation of the FIRM floodplain, is the developer required to submit a LOMR submission to FEMA?	A) NO B) YES, the local Flood Plain administrators must enforce this as per their regulations.
Does the County provide advice to community residents regarding elevation certificates and Letter of Map Amendment (LOMA) applications?	YES
Does the County maintain records of approved letters of map change?	NO, this is available on the FEMA website
Does the County assist residents in interpreting the FIRM and County flood studies to determine the property's status in the floodplain? If yes, which department?	YES
Are any restrictions on floodplain use enforced through the subdivision and building permit process?	YES, for those municipalities which enforce such permits.
Do all proposed developments require plans to go through the County's subdivision approval process or to acquire a building permit for new structures?	YES, depending on type of development and size of building
Are all new structures required to be at least 1.5 feet above the 100-year base flood elevation?	YES
Is the County committed to educating residents about the value and availability of flood insurance? Is an annual letter sent to residents in the floodplain explaining the importance of flood insurance and where it may be obtained?	Municipalities educate their own residents.
Does the County assist residents in interpreting the FIRM and County flood studies to determine the resident's property's flood plain status, and offer advice regarding elevation certificates and LOMA applications?	YES
When was the last Community Assistance Visit conducted and, as of that date, NCC County was found to meet the requirements for continued participation in the NFIP?	New Castle County was found to meet the requirements.

5.2.2 Administrative and Technical Capability

There are 13 municipalities within New Castle County. Each of these municipalities conducts its daily operations and provides various community services according to local needs and limitations. Some of these municipalities have formed cooperative agreements and work jointly with their neighboring municipalities to provide services such as police protection, fire and emergency response, infrastructure maintenance and water supply management. Others choose to operate on their own. Municipalities vary in staff size, resource availability, fiscal status, service provision, constituent population, overall size and vulnerability to the profiled hazards.

Administrative Capability

Administrative capability was evaluated by reviewing county and municipal staffing and the existing organizational structure for local governments to implement mitigation strategies. The ability of a local government to develop and implement mitigation projects, policies and programs is directly tied to its ability to direct staff time and resources for that purpose.

The analysis of the responses to the *Capability Assessment* findings indicated that there is generally a *limited to moderate* administrative capability of New Castle County's jurisdictions to implement mitigation strategies, and one jurisdiction rated as High. Eight (8) jurisdictions indicated they had limited administrative capability, while six (4) indicated they had moderate administrative capability, and one (1), New Castle, indicated they had a High capability. Local municipal jurisdictions in New Castle County indicated that they work cooperatively with the county and State on many activities, and utilize contractors, helping to offset their administrative and staff limitations. Most municipal police and fire departments have mutual aid agreements in place with the county covering response and recovery operations, but not mitigation activities. The villages of Arden, Ardencroft and Ardentown work cooperatively with each other and the county on many local activities. Some municipalities in fact credit their small staff size to facilitating close intergovernmental cooperation.

The implementation of mitigation actions is assigned to special services and/or contractors. Municipal actions are completed by the municipality. Both county and municipal actions are often completed in coordination with the Conservation District. Other mitigation actions are identified within the departments and handled by specific departments. Town of Townsend ranked their Admin Capability as a High Low, almost Moderate due to staffing and improvements within the Town on management of administrative components. In addition, the City of New Castle ranked their Administrative Capability as High, given the experience of their staff and the use of three separate engineering firms to evaluate and manage projects.

The results of the administrative capability assessment demonstrate that each jurisdiction has a wide range of experience, internal and external capability, and possess some capability to conduct projects, but the available time of commitment to dedicate to these projects is the challenge for all of them. The development of contractual project management firms through a dedicated effort would assist all levels of government in developing and administering mitigation grants and projects. In preparing local mitigation strategies, local governments should look to integrate hazard mitigation activities into routine governmental functions whenever possible.

Technical Capability

Technical capability can be defined as possessing the skills and tools needed to improve decision making, including the development and implementation of sound mitigation actions. For purposes of gauging the technical capability of New Castle County's local jurisdictions for mitigation planning purposes, the Capability Assessment meetings focused on the local availability and application of Geographic Information Systems (GIS) and having engineering capability within the jurisdiction.

The analysis of the responses to the Capability Assessment feedback indicated that there is generally a limited technical capability of New Castle County's jurisdictions to implement mitigation strategies. Nine (9) of the 15 jurisdictions indicated they had limited technical capability, while only four (4) indicated they had high technical capability. Most of the cities and towns do not employ GIS staff or have direct access to GIS systems due to financial limitations, and many indicated that they rely on New Castle County for GIS data and management services. Many local officials indicated that

they are interested in gaining better access to GIS and related technical resources for their jurisdiction.

The development of GIS capability and availability of those resources remains strong at the State, County, Private, and Academia levels, however, the municipal level depends on those levels for support. As understanding grows amongst them of the available capabilities, this effort will continue to grow in a coordinated effort. NCC GIS now has the ability internally to handle HAZUS and other vulnerability analysis, in conjunction with the State, Sussex and Kent Counties, City of Wilmington, and University of Delaware. The evaluation of projects has always been a challenge for entities, in order to determine the best solution and grant program.

Emergency Management Coordinator

Emergency Management is a comprehensive, integrated program of mitigation, preparedness, response and recovery for emergencies/disasters of any kind. No public or private entity is immune to disasters, and no single segment of society can meet the complex needs of a major emergency or disaster on its own. A County and municipal emergency management coordinator is responsible for emergency management – preparedness, response, recovery and mitigation within his/her respective jurisdiction.

The New Castle County Department of Public Safety coordinates countywide emergency management efforts. Each municipality has a designated local emergency management coordinator who possesses a unique knowledge of the impact hazard events have on their community.

Political Capability

One of the most difficult capabilities to evaluate involves the political will of a jurisdiction to enact meaningful policies and projects designed to mitigate hazard events. The adoption of hazard mitigation measures may be seen as an impediment to growth and economic development. In many cases, mitigation may not generate interest among local officials when compared with competing priorities. Therefore, the local political climate must be considered when designing mitigation strategies, as it could be the most difficult hurdle to overcome in accomplishing the adoption or implementation of specific actions.

The capability assessment survey was used to capture information on each jurisdiction's political capability. Survey respondents were asked to identify examples of political capability, such as guiding development away from hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum state or federal requirements (i.e., building codes, floodplain management ordinances, etc.). These examples were used to guide respondents in scoring their community on a scale of "unwilling" (0) to "very willing" (5) to adopt policies and programs that reduce hazard vulnerabilities. Of the municipalities that responded, none of the municipalities completed this section with a numerical response.

New Castle County Emergency Operations Center

The New Castle County Emergency Operations Center (EOC) serves as a central hub for coordinating emergency response efforts during natural or human-caused disasters. It acts as a command-and-control center, managing resources, information, and communication to support first responders and citizens. The EOC does not manage incidents directly but rather coordinates the overall response. The New Castle County EOC acts as the "brain" of the county's emergency response system, ensuring a coordinated and effective approach to managing and mitigating the impacts of any emergency. The EOC is located at the Department of Public Safety (DPS) building, located at 3601 N Dupont Hwy, New Castle, DE 19720.

Local Fire and EMS Organizations

New Castle County has numerous fire and EMS facilities serving its communities. These include local fire departments, often volunteer-based, and EMS services that may be integrated with the fire departments or operate independently. These facilities provide a range of services, including fire suppression, rescue operations, and emergency medical care, often with cross-trained firefighter/paramedic.

Self-Assessment

In addition to the inventory and analysis of specific local capabilities, the *Capability Assessment Survey* required each local jurisdiction 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 “L = limited” “M = moderate” or “H = high.” *Table 5.7 – Capability Self-Assessment Matrix* summarizes the results of the self-assessment survey. All municipalities returned this section of the assessment completed.

Table 5.7 Capability Self-Assessment Matrix

Jurisdiction	Technical Capability	Fiscal Capability	Administrative Capability
New Castle County	H	M	M
Arden, Village of	L	L	L
Ardencroft, Village of	L	L	L
Ardentown, Village of	L	L	L
Bellefonte, Town of	L	L	L
Delaware City, City of	L	L	M
Elsmere, Town of	M	L	L
Middletown, Town of	H	M	M
New Castle, City of	H	M	H
Newark, City of	M	M	M
Newport, City of	L	L	L
Odessa, Town of	L	L	L
Townsend, Town of	L	M	L
Wilmington, City of	H	M	H

Existing Limitations

Funding has been identified as the largest limitation for a municipality to complete mitigation activities. The acquisition of grants is the best way to augment this process for the municipalities. The county and municipalities representatives will need to rely on regional, state and federal partnerships for future financial assistance. Development of intra-county regional partnerships and intra-municipality regional partnerships will bolster this process.

5.2.3 Financial Capability

The ability to act is often closely associated with the amount of money available to implement policies and projects. This may take the form of grants received or state and locally based revenue. The costs associated with policy and project implementation vary widely. In some cases, policies are tied primarily to staff costs associated with the creation and monitoring of a given program. In other cases, money is linked to an actual project, like the acquisition of flood-prone homes, which can require a substantial commitment from local, state and federal funding sources.

The analysis of the responses to the Capability Assessment feedback indicated that there is a limited to moderate fiscal capability of New Castle County's jurisdictions to implement mitigation strategies. Nine (9) jurisdictions indicated they had limited fiscal capability, while six (6) indicated they had moderate fiscal capability. Some jurisdictions can generate revenue for mitigation purposes, such as charging stormwater utility fees for clearing drainage systems and completing flood mitigation projects (in fact, most communities in New Castle County do pay for drainage system maintenance through their own internal funding sources). However, most jurisdictions in New Castle County do not have access to such dedicated revenue streams and rely heavily upon monies available through state and federal grant programs.

Under the NCC Capital Budget for FY 2020-2025, the County Council is required to approve a capital program and adopt a capital budget before it ordains the annual operating budget. The program is required to detail each capital improvement project. Each project indicates the amount of appropriations that have been expended or are to be expended and the funding sources. This ranking is then related to the County's ability to pay for the projects over time. There are several capital projects related to stormwater, drainage, and infrastructure improvements.

The results of the local capability assessment should be used as a general guide to help craft mitigation actions that are achievable. When considering the effect of fiscal capability on the implementation of mitigation policies and projects, jurisdictions should consider whether the actions require monetary commitment or staff resources. If so, consideration should be given to available grant funding sources, or perhaps combining resources with the county or other municipalities to offset costs of implementation. Consideration should also be made as to whether the jurisdiction is willing to commit local revenue on a sustained or one-time basis.

In most cases, in order to implement mitigation projects and policies, some monetary commitment or staff resources will be required. This may take the form of a non-federal match requirement or the costs associated with staff time devoted to policy development, implementation and monitoring. The identification of eligible Pre-Disaster Mitigation projects, as well as other federal funding sources identified in the New Castle County Mitigation Plan, enables communities to compete nationally for available funding. The county and municipal governments should consider, whenever possible, combining financial and staff resources to address hazards, most of which tend to impact regions rather than individual jurisdictions. The State Hazard Mitigation Council has discussed this effort recently. There have also been discussions on the establishment of a Mitigation Fund at the State and Local levels with a dedicated revenue stream to assist in the match funding of projects.

Fiscal capability is significant to the implementation of hazard mitigation activities. Every jurisdiction must operate within the constraints of limited financial resources. The following information pertains to various financial assistance programs relevant to hazard mitigation.

FEMA Hazard Mitigation Assistance Program

FEMA administers three hazard mitigation grant programs, known collectively as the Hazard Mitigation Assistance (HMA) programs. FEMA's Hazard Mitigation Assistance Program and Policy Guide (April 2023) provide specific guidance for these different programs. The HMA guidance replaces previous guidance and more efficiently manages hazard mitigation grants under one umbrella. Three FEMA hazard mitigation grants of the HMA program include:

Financial sources are a critical aspect to implementing projects within a community. In the past, the municipalities, as well as the County, have taken an active role in seeking funds for these planning efforts. The following funding sources provide grants for hazard mitigation planning and project related activities:

- **Hazard Mitigation Grant Program (HMGP)** – HMGP is administered by FEMA and provides grants to states, tribes and local governments to implement hazard mitigation actions after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to natural disasters and to enable mitigation activities to be implemented as a community recovers from a disaster. Eligible projects include elevating flood-prone homes or businesses; acquisition of flood-prone homes from willing owners and returning the property to open space; retrofitting buildings; and construction of floodwall systems to protect critical facilities.
- **Flood Mitigation Assistance (FMA) Program** – FMA provides funding to assist communities and states in implementing actions that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, or other National Flood Insurance Program (NFIP) insurable structures with a focus on repetitive loss properties. The NFIP enables property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages. Three types of FMA grants are available to States and communities: 1) planning grants to prepare Flood Mitigation Plans; 2) project grants to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures; and 3) technical assistance grants for the State to help administer the FMA program and activities.

Other FEMA and Federal Programs

- **National Flood Insurance Program (NFIP)** – As discussed in other sections, the NFIP offers flood insurance to homeowners, renters, and business owners if their community participates in the NFIP. Flood insurance protects two types of insurable property – building and contents. The program is administered in Delaware by DNREC. There is language in the NFIP pertaining to substantial damage, wherein if the insured structure in the floodplain is more than 50% damaged (or modified) the structure must be brought into compliance with the NFIP. Structures in the floodplain that are substantially damaged may be eligible for the Increased Cost of Compliance (ICC) coverage, and new and renewed Standard Flood Insurance Policies. Substantial Damage Determinations and ICC coverage have been found to be effective in communities working to mitigate RL and SRL properties and may be considered in combination with other funding streams.³³

³³ PA 2023 State Hazard Mitigation Plan

- **The Community Rating System (CRS)** -The goal of the Community Rating System (CRS) program is to provide incentives for communities to go beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding. The incentives are in the form of premium discounts. The CRS is administered by FEMA's National Flood Insurance Program (NFIP). Under the CRS, flood insurance premiums for properties in participating communities are reduced to reflect the flood protection activities that are being implemented. A community receives a CRS classification based upon the credit points it receives for its activities. It can take on a wide range of activities that reduce flood losses. These activities include but are not limited to better mapping, regulations, public information, flood damage reduction and/or flood warning and preparedness programs. Currently, four jurisdictions in New Castle County belong to the CRS: City of New Castle; City of Newark; Delaware City; and unincorporated areas of NCC.
- **Public Assistance (PA) Program** – According to the FEMA website, “Through the PA Program, FEMA provides assistance for the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain PNP organizations. Section 406 of the Stafford Act provides a funding source for cost-effective hazard mitigation measures that would reduce or eliminate the threat of future damage to a facility damaged during the disaster. The measures must apply only to the damaged elements of a facility rather than to other, undamaged parts of the facility or to the entire system. Section 406 mitigation measures are considered part of the total eligible cost of repair, restoration, reconstruction, or replacement of a facility. They are limited to measures of permanent work, and the Applicant may not apply mitigation funding to alternate projects or improved projects if a new replacement facility is involved. Upgrades required to meet applicable codes and standards are not ‘mitigation measures’ because these measures are part of eligible restoration work.”
- **FEMA Regional Catastrophic Preparedness Grant Program (RCPGP)** – The RCPGP is intended to support coordination of regional all-hazard planning for catastrophic events, including the development of integrated planning communities, plans, protocols, and procedures to manage a catastrophic event in high-risk urban areas and their surrounding regions.³⁴
- **Community Assistance Program** – State Support Services Element (CAP-SSSE) According to the FEMA website, “[the CAP-SSSE] program provides funding to States to provide technical assistance to communities in the National Flood Insurance Program (NFIP) and to evaluate community performance in implementing NFIP floodplain management activities. In this way, CAP-SSSE helps to:
 - o Ensure that the flood loss reduction goals of the NFIP are met.
 - o Build State and community floodplain management expertise and capability.
 - o Leverage State knowledge and expertise in working with their communities.”³⁵
- **Public Health Emergency Preparedness (PHEP)** – The PHEP program provides funds for health departments to build and strengthen their abilities to effectively respond to a range of public health threats, including infectious diseases, natural disasters, and biological, chemical, nuclear, and radiological events. Preparedness activities funded by the PHEP cooperative agreement are targeted specifically for the development of emergency-ready public health departments that are flexible and adaptable.
- **Urban Areas Security Initiative (UASI)**– The UASI program assists high-threat, high-density urban areas in efforts to build and sustain the capabilities necessary to prevent, protect against,

³⁴ Ibid

³⁵ Ibid.

mitigate, respond to, and recover from acts of terrorism. The UASI program is intended to provide financial assistance to address the unique multi-discipline planning, organization, equipment, training, and exercise needs of high-threat, high-density Urban Areas, and to assist these areas in building and sustaining capabilities.

- **Repetitive Flood Claims** – The program provides funding to States and communities to reduce or eliminate the long-term risk of flood damage to structures insured under the NFIP that have had one or more claims for flood damages, and that cannot meet the requirements of the Flood Mitigation Assistance (FMA) program for either cost share or capacity to manage the activities. Eligible activities include: 1) acquisition of properties and either demolition or relocation of flood-prone structures, where the property is deed restricted for open space uses in perpetuity; 2) elevations; 3) dry flood-proofing of non-residential structures; and 4) minor localized flood control projects.
- **Severe Repetitive Loss (SRL)** – A SRL property is defined as a **residential property** that is covered under a NFIP flood insurance policy and: 1) that has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or 2) for which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building. Eligible flood mitigation project activities under the SRL program include: 1) acquisition and demolition or relocation of at-risk structures and conversion of the property to open space; 2) elevation of existing structures to at least the base flood elevation; 3) minor physical localized flood reduction projects; and 4) dry flood-proofing for historic properties.
- **Emergency Management Performance Grants (EMPG)** – The EMPG program provides resources to state and local governments to develop an all-hazards planning approach to emergency management and to sustain and enhance all-hazards emergency management capabilities. Every State is eligible for a percentage of the available funds and is intended to sustain the core capabilities of the five (Prevention, Protection, Mitigation, Response, and Recovery) mission areas.
- Additional Federal Programs are provided below.
 - Community Disaster Loan Program
 - Individuals and Households Program
 - Environmental Planning and Historic Preservation Program
 - Fire Management Assistance Grant
 - RiskMAP
 - Individuals and Households Program
 - Safeguarding Tomorrow Revolving Loan Fund (RLF)
 - Community Development Block Grant (CDBG)
 - Department of Homeland Security Grant Program (HSGP)
 - Small Business Administration Disaster Loan Programs
 - Natural Resources Conservation Service (NRCS)

In addition to Federal funding sources, the State of Delaware utilizes funding sources to meet the match requirements of FEMA programs, and a variety of technical assistance programs available to aid communities with hazard mitigation. State Programs are listed below, and for additional information regarding these programs, as well as potential additional State programs, please refer to the DE 2023 State HMP's Capability Assessment chapter.

Delaware Emergency Management Agency (DEMA)

- DEMA is the lead state agency coordinating mitigation, response, and recovery.
- It manages key FEMA-related mitigation grant programs: Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance, Pre-Disaster Mitigation, etc.
- Provides training and education (all-hazards training, workshops, seminars) for local governments and other stakeholders to improve preparedness and mitigation capacity.

DNREC – Division of Watershed Stewardship; Coastal Programs; Floodplain Management

- Floodplain Management Program: offers technical assistance to municipalities related to floodplain ordinance compliance, mapping, NFIP (National Flood Insurance Program) administration, and monitoring local ordinances.
- Resilient Community Partnership: helps communities prepare for coastal hazards, sea level rise, coastal storms, etc. This includes planning support, staff support, outreach, training.

Delaware State Housing Authority (DSHA)

- Two pilot programs offering **free technical assistance to local governments**:
 - Zoning and Land Use Reform Pilot Program: helps jurisdictions modernize zoning / land use codes to encourage more resilient, mixed use, compact development.
 - Disaster Housing Pilot Program: helps municipalities adopt *pre-disaster recovery ordinances*, assess risk & capacity, streamline housing recovery after disasters, establish best practices.

Delaware Forest Service / Wildland Fire Program

- Offers cost-share grants and technical assistance to communities for wildland fire risk reduction (fuel management, fire suppression tools, etc.).
- Prescribed fire program to reduce fuel loads, plus education and support for fire companies.

Community Conservation Assistance Program (DeCAP) – DNREC

- Though more water quality / environmental, this program offers technical & financial assistance for implementing best management practices (BMPs) that can help with stormwater, erosion control, drainage – all relevant to flood or water hazard mitigation.

Several of the programs under the HMA program as well as several of the other state programs that require a local match component. If funding is not obtained through other state or federal grant programs, often local municipalities use their own funds to provide the match. Mitigation resources from the local level are limited to funds generated from local taxes permitted by state enabling legislation and/or proceeds from the issuance or floating of local municipal bonds. While the percentage of local contribution varies from program to program, Local communities need to assess their financial capability and resources to implement their hazard mitigation action plans.

5.2.4 Education and Outreach

DEMA conducts outreach to county and local officials, universities, and other agencies as applicable to engage them in applying for both annual HMA funding and post-disaster HMGP funding. Annual notice of funding availability is publicized through county contacts, and post-disaster briefings are held for disaster-impacted areas to engage county and local officials in opportunities for mitigation funding. DEMA uses the Letter of Intent for HMGP projects and the Letter of Interest for other

HMA projects to identify leads on hazard mitigation projects. If the projects described in the letters fit the eligibility guidelines, the HMPO form is completed. In addition, DEMA supports local HMA application development by providing technical assistance and trainings.

DEMA also uses its website to provide guidance on mitigation grant programs and supply forms and documents. DEMA is consistently working to track progress on mitigation as the agency maintains and updates lists on mitigation projects that are in progress and complete.

Table 5.8 shows Education and outreach programs and methods at the State level that can be used to implement mitigation activities and communicate hazard-related information.

Table 5.8 Education and Outreach Programs and Methods at the State Level

Capability	Lead Organization	Description of Capability
Fire Prevention and Protection Program	Department of Agriculture Delaware Forest Service	This program operates directly through the DFS Urban and Community Forestry Program and provides technical and financial assistance to homeowners' associations, municipalities, counties, and state government agencies on tree care and hazard mitigation
Delaware Accidental Release Prevention Program	DNREC	The program led to the creation of a system that allows citizens to promptly learn of releases or discharges of contaminants or pollutants that meet or exceed certain thresholds. Following the receipt of a discharge or release report, DNREC notifies the public within 12 hours. The program was developed in response to Senate Bill 33 that was passed in July 2001. The program's mission is "protecting the lives and health of persons living and working in the vicinity of facilities handling extremely hazardous substances." The program, based on the Clean Air Act, Section 112r, requires that owners and operators of stationary sources that maintain regulated substances on site must develop and implement a risk management program that anticipates and minimizes the chances of catastrophic events.
Citizen Corps	DEMA	The mission of Citizen Corps is to harness the power of every individual through education, training, and volunteer service to make communities safer, stronger, and better prepared to respond to the threats of terrorism, crime, public health issues, and disasters of all kinds
Community Rating System	DNREC	The primary goals of the CRS are to reduce flood losses, facilitate accurate insurance ratings, and to promote the awareness of flood insurance. These goals are achieved through the administration of a program that goes beyond the requirements of NFIP participation. The CRS is an incentive-based program that encourages counties and municipalities to undertake defined actions designed to reduce the impacts of future flooding.
DC CAER (Delaware City Community Awareness and Emergency Response) group	DSHS	DC-CAER is an informal organization made up of representatives of all the chemical facilities in the Delaware City Refinery complex, NCC OEM, DEMA, DNREC, and DSP. Formed voluntarily in 1985, DC-CAER strives to meet three goals: to enhance emergency response capabilities, to test and evaluate these capabilities, and to foster knowledge about chemical-related hazards and protective measures. DC-CAER maintains a comprehensive emergency response plan, known as the DCCAER Plan, to deal with chemical emergencies at the plant; conducts training programs for emergency responders; coordinates annual field emergency response exercises and tabletop drills; conducts community outreach programs to disseminate emergency information; makes presentations about its

		programs to community, government, and professional organizations throughout Delaware and in other States.
Annual Summit and Coffee Hours	RASCL	An annual summit and quarterly coffee hours to promote information sharing, networking, and disseminate best practices.
"News Digest" newsletter	RASCL	RASCL issues a newsletter periodically with links to resources, program announcements, and information on best practices for resilience, sustainability, and hazard mitigation.
Coast Day	UDEL College of Earth Ocean and Environment	Annual outreach event, which features lectures and exhibits that relate to earth sciences and hazard information.
Cape Community Coalition	Delaware Sea Grant	Local resilience network in eastern Sussex County that activates when there is a crisis. CCC leverages help and resources within the network to address gaps related to food, housing, equipment, or other needs during a crisis.
Preparedness Workshops	Delaware Sea Grant	Emergency preparedness workshops for vulnerable populations (including the deaf and older adults).
Weather Awareness Weeks: www.climate.udel.edu	CEMA	Work with DEMA and Delaware Sea Grant severe weather awareness week, and hurricane awareness, winter weather awareness. State climate office and National weather service. Presentations around the state on severe weather and hazards Monthly summary weather reports and climate updates for the state and maintain the state's database for the state's climate.
Delaware Environmental Monitoring Coordination Council (DEMCC) Annual Symposium	DEMCC	A gathering of environmental partners from around the state to promote best practices in environmental monitoring and coordinate monitoring around the state of Delaware. These gatherings offer an opportunity to learn about the current state of environmental monitoring activities in Delaware, discuss upcoming challenges, and explore opportunities to collaborate on future monitoring campaigns.
Delaware Weather Hazard Index	CEMA	Reflects 48-hour potential threats & weather conditions.
All Ready Delaware	University of Delaware Center for Disability Studies	This website will help the disabled population think through personal needs in an emergency, and how to plan ahead for various situations. It will suggest action steps to develop a personal preparedness plan.
University of Delaware's Citizen Monitoring Program	University of Delaware Sea Grant Marine Advisory Service	Established in 1991, the University of Delaware's Citizen Monitoring Program collects verifiable water quality data to support public policy decisions and to increase public participation and support for the management and protection of the Inland Bays. Today, the program includes the original Inland Bays Citizen Monitoring Program, the Broadkill River Monitoring Program, the Harmful Algae Monitoring Program, and the Bacteria Monitoring Program. The program is managed by the University of Delaware Sea Grant Marine Advisory Service at the College of Earth, Ocean, and Environment in Lewes. Support for the program comes from many sources including Sea Grant; DNREC; the Center for the Inland Bays; U.S.

		Environmental Protection Agency; the Delaware Estuary Program; the National Fish and Wildlife Foundation and local communities.
Delaware Housing Search (DHS)	DSHA	Housing search that all counties and state agencies contribute funds to. Updated in 2019, DHS is an online housing locator service supported by a partnership of nonprofit and government organizations. DHS maintains over a quarter of Delaware's entire rental housing stock and is accessible online and via a toll-free bi-lingual call-center.

NCC DPS also provides education and outreach resources related to hazard mitigation and disaster planning information. The NCC DPS works to mitigate, plan, and prepare for all natural & man-made emergencies; educate the public about preparedness; coordinate emergency response and recovery efforts; and develop tools and identify resources to support the overall preparedness of NCC. The DPS also provides disaster preparedness education programs to community groups, schools, businesses, and municipalities to promote community resilience.

The County EMD also designs, develops, and implements a variety of training and exercise programs to test the capabilities of emergency responders and Municipalities Officials in NCC County. The Agency also works closely with the response community to schedule and implement the training required for all levels of emergency management certification. The Division also administers and provides outreach and training regarding the New Castle County Local Emergency Planning Committee (LEPC). The EMD also promotes and provides outreach materials for the National Flood Insurance Program.

5.2.5 Plan Integration

The purpose of a plan/ordinance review as part of this planning process was trifold:

- To identify existing County-level initiatives.
- To provide an inventory and review of sample plans and ordinances and identify sections in these documents that address hazard mitigation related issues; and
- To provide a platform to integrate plans and other documents so recommendations and strategies are not contradictory to one another.

Plans and ordinances that assist with minimizing impacts of hazards on New Castle County's residents through preventative measures include zoning ordinances, subdivision and land development ordinances, floodplain management ordinances, comprehensive plans, etc. Preventative measures are important for local communities to focus on for hazard mitigation efforts, as one of the most cost-effective means of reducing the probability of future losses to residents.

Plan Integration

The New Castle County Comprehensive Plan and 2023 State of Delaware Hazard Mitigation Plan were utilized for various sections of the 2025 New Castle County HMP Update. Existing conditions – profile and trends provided useful information on demographics, economics, housing, land use, physical features, and infrastructure. The county overview section was utilized in the development of the community profile section, including the land use profile, population trends, infrastructure profile, healthcare profile, and more.

The New Castle County Comprehensive Plan, Goals, Recommendations and Actions identified an implementation plan for various projects and actions that supported updates and growth for programs identified in the comprehensive plan. Although specific portions of the comprehensive

plan outlined projects, actions or specific planning items that would support hazard mitigation, the information will be more comprehensive with the integration of new hazard mitigation principals and data from the 2020 New Castle County HMP Update.

During discussions with county planning personnel as part of this hazard mitigation plan update, discussions about the importance of hazard mitigation integration during the next comprehensive plan update were expressed. Specifically, the risk assessment section and mitigation strategy section hold vital information that requires integration into the next plan update. Identification of hazard areas, vulnerable structures and developments and future risk is critical in the determination of and management of economic growth and development areas in the county.

New Castle County Comprehensive Plan

The NCC Department of Community Planning and Mapping Services is responsible for maintaining and updating the New Castle County Comprehensive Plan and many other regulatory tools. Technical assistance on community planning matters is provided to the New Castle County Board of Commissioners through the New Castle County Planning Commission and Planning Department. The New Castle County Planning Department administers the New Castle County Comprehensive Plan. The department also performs technical reviews of municipal subdivision and land development plans, municipal floodplain ordinances and other community planning and development matters.

New Castle County Emergency Operations Plan (EOP)

New Castle County DPS is responsible for preparing and maintaining the county's EOP, which applies to both the county and municipal emergency management operations and procedures.

The EOP is reviewed at least annually. Whenever portions of the plan are implemented in an emergency event or training exercise, a review is performed, and changes are made where necessary. These changes are then distributed to the county's municipalities.

The complete risk assessment section, mitigation actions and mitigation project opportunities identified in the New Castle County Hazard Mitigation Plan will assist with decreasing hazard specific risk and vulnerability. Understanding the risks and vulnerability in the county and municipalities will allow for emergency management and other response agencies to better direct planning, response and recovery aspects. New Castle County DPS will consider the New Castle County Hazard Mitigation Plan during its annual review of the county EOP. Recommended changes to the HMP will then be coordinated with the hazard mitigation local planning team.

University of Delaware Hazard Mitigation Plan

The Capability Assessment from the 2024 University of Delaware Hazard Mitigation Plan included a questionnaire to help document community agencies/departments/organizations and their missions, functions, programs, plans, policies, regulations, funding, etc. of each group, in order to create an inventory of resources that can be brought to bear on mitigation efforts. The questions were intended to help departments identify the regulatory, administrative, technical, and fiscal capacities and capabilities and were based on FEMA's capability assessment questionnaire. The Capability Assessment content was revisited for 2024 Plan Update by the following departments and updated, as necessary.

- Campus and Public Safety, Emergency Management
- College of Earth, Ocean, and Environment
- Delaware Geological Survey

- Employee Labor Relations
- Facilities Custodial and University Services
- Facilities Maintenance and Operations
- Facilities Planning and Construction
- Facilities/Science, Technology, and Advanced Research (STAR) Campus
- Finance and Risk Management
- Human Resources
- Information Technology
- Office of Communications and Marketing
- Office of Residence Life
- Department of Public Safety, University Police
- Office of the Provost
- Office of Student Conduct
- Student Health Services
- Office of Student Life

Plan Interrelationships

Ensuring consistency between these planning mechanisms is critical. To that end, New Castle County and its municipalities must ensure that the components of the hazard mitigation plan are integrated into existing community planning mechanisms and are generally consistent with goals, policies and recommended actions. New Castle County and the hazard mitigation planning team will utilize the existing maintenance schedule of each plan to incorporate the goals, policies and recommended actions as each plan is updated.

Conclusion

New Castle County has the initiative and drives to implement mitigation actions for a variety of hazards affecting the County, however there are still challenges to hazard mitigation at both the County and local levels. These challenges come in the form of insufficient funds available for action implementation; lack of training or education on various hazards, technologies, policies, or laws; limited emergency response staffing; insufficient or limited data and information available for various analyses; and the absence of meaningful and productive partnerships with both public and private stakeholders.

Municipalities have the opportunity to integrate these hazard mitigation actions into already existing planning mechanisms. The municipalities that have comprehensive plans can integrate these actions into different aspects of the plans. Growth management techniques, such as buffering, can be integrated into the future land use strategy, while different housing programs can be created to retrofit publicly subsidized affordable housing to reduce damage after a disaster occurs. These actions can also be integrated through municipal floodplain or zoning ordinances, which can be utilized to limit the density of development in high hazard areas, and/or through a municipal SALDO, for example, by reviewing the placement of roads, residential lots, public facilities within subdivisions that can increase natural hazard risks and evacuation/emergency access points.

6.0 CHAPTER 6 – MITIGATION STRATEGY

6.1 Update Summary Process

The mitigation strategy serves as the long-term road map to reduce the potential losses, vulnerabilities, and shortcomings identified in the Risk Assessment chapter. A typical mitigation strategy includes a list of goals and objectives, and mitigation actions to address the goals and objectives, which are then prioritized based on the community's priorities, assets, requirements, and necessities. Specific mitigation actions are developed through consultation and information exchange with the County and municipalities, and by taking into account municipal assets, such as infrastructure, transportation, businesses, as well as impacts to the environment and traditionally vulnerable and underserved or under-represented populations. The actions and implementations that are developed are a representation of the entire engagement process, as each point of engagement leads to developing an effective, appropriate, and cost-effective mitigation strategy.

The mitigation strategy in this Plan comprises the following five subsections:

- Goals and Objectives
- Identification and Analysis of Mitigation Actions (including NFIP compliance)
- Mitigation Action Plan (including implementation plan and prioritization for all County and municipal actions, as well as completed actions from the previous plan).
 - County Mitigation Actions
 - Municipal Mitigation Actions
 - 2020 County and municipal actions not being carried forward (Completed, Cancelled, N/A, Combined)

By updating the mitigation strategy (both county and municipal) and other plan components in this fashion. It shows that this plan is being revised to:

- Reflect changes in development.
- Reflect progress in local mitigation efforts.
- Reflect changes in priorities – major priorities included addressing hazard mitigation actions that have been carried forward between the last three HMP Updates. A major focus was to develop more recent and applicable county mitigation actions to reflect the current times and hazard risk and vulnerabilities.

6.2 Goals and Objectives

For this Plan, goals are defined as general policy guidelines or broad statements that represent a vision for a community. Objectives define strategies or implementation steps to attain the identified goals. Compared to goals, objectives are more specific and measurable. Using the 2020 Plan's Goals and Objectives as the basis for update, the goals for this planning process have been updated in close coordination with the Steering Committee, based on the findings of the hazard identification and risk assessment, the mitigation capability assessment, the 2023 PA State HMP, as well as the 2020 plan. The goals and objectives are also designed to serve as the basis for the mitigation actions at the county and municipal levels.

For this Plan Update, there was no major change in community priorities compared to the 2020 Update. Additionally, stakeholders and municipalities identified the continued need to mitigate

potential impacts of gas well and/or pipeline leak, explosion, or other type of emergency. Flooding is still a major concern within the County. Those in the higher elevation and/or steeper slope areas of the county expressed more concern for ensuring wind events, landslides, and wildfire events were also considered a priority. Ultimately, the County's priorities have not drastically changed since the previous plan update, although the priorities address a wide range of different community elements as assets, depending on where in the County one may be located.

Vision – "Protect the residents, their property, and reduce related costs of disaster response, recovery, and minimize the disruption that any disaster will cause to the community."

Goal 1: New Castle County and its municipalities will continue to maximize the use of technology (GIS, remote sensing, etc.) to develop sound mitigation policies and projects based upon risk and an enhanced risk assessment.

Goal 2: New Castle County and its municipalities will continue to emphasize the use of sound planning practices to reduce the impacts of natural, technological, and human-caused hazards.

Goal 3: New Castle County and its municipalities will continue to acquire or upgrade existing equipment to improve disaster readiness and implement hazard mitigation measures.

Goal 4: New Castle County and its municipalities will continue to improve communication and warning systems to better protect lives and property from the potential impacts of all hazards.

Goal 5: New Castle County and its municipalities will continue to enhance and implement local codes and ordinances at higher standards to reduce the impacts of all hazards while considering a holistic approach at the project level.

Goal 6: New Castle County and its municipalities, and the State (DELDOT) will continue to enhance measures to improve evacuation flow and operations, sheltering and security concerns.

Goal 7: New Castle County and its municipalities will continue to enhance education and outreach strategies to improve the dissemination of information to the public regarding hazards, including the steps that can be taken to reduce hazard impacts.

Goal 8: New Castle County and its municipalities will continue to adopt mitigation measures that better protect critical facilities and technology infrastructure from the impacts of all hazards.

Goal 9: New Castle County and its municipalities will continue to identify and implement sound hazard mitigation projects.

Goal 10: New Castle County and its municipalities will ensure that sound stormwater and drainage management principles are implemented throughout the County.

Goal 11: New Castle County and its municipalities will continue to identify potential funding sources and partnerships for projects.

HHPD Goal #1 (Appendix A) - Participate in FEMA's High-Hazard Potential Dam Program (HHPD).

6.3 Identification and Analysis of Mitigation Techniques

In formulating the Mitigation Strategy, the Steering Committee explored four mitigation categories for attaining the plan's goal and objectives. They include local plans and regulations, structure and infrastructure projects, natural systems protection, and education and awareness. Emergency response or operational preparedness actions are also included in this plan where relevant. This includes the four categories recognized by FEMA, as well as one additional category for ease of organization. These categories formed the basis of the mitigation actions in the Plan Update. Descriptions of these categories and examples for each category are included below:

1. Local Plans and Regulations

These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built. Examples include comprehensive plans, land use ordinances, subdivision regulations, development review, building codes and enforcement, NFIP community rating system, capital improvement programs, open space preservation plans, stormwater management regulations, and master plans, and other local plans and regulations.³⁶

2. Structure and Infrastructure Projects

These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards. Many of these types of actions are projects eligible for funding through the FEMA HMA program. Examples include acquisitions and elevations of structures in flood prone areas, utility undergrounding, structural retrofits, floodwalls and retaining walls, detention and retention structures, culverts, and safe rooms.³⁷

3. Natural Systems Protection

These are actions that minimize damage and losses and also preserve or restore the functions of natural systems. Examples include sediment and erosion control, stream corridor restoration, forest management, conservation easements, wetland restoration and preservation.

4. Education and Awareness Programs

These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs. Although this type of mitigation reduces risk less directly than structural projects or regulation, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions. Examples include radio or television spots, websites with maps and information, real estate disclosure, presentations to school groups or neighborhood

³⁶ Federal Emergency Management Agency. Local Mitigation Planning Handbook https://www.fema.gov/media-librarydata/1590070172371-48e87ca446838ba81afc2aca995940bc/FEMA_Local_Mitigation_Planning_Handbook_508.pdf

³⁷ Ibid.

organizations, mailings to residents in hazard-prone areas, StormReady, and Firewise communities.

Mitigation actions have been developed for the entire County as well as for each municipality. While some actions may apply to more than one jurisdiction, most actions are specific to each jurisdiction.

The mitigation actions that were developed were based on results from the risk assessment, the mitigation capability analysis, input from the Steering Committee, actions that have been completed in the past, recent past hazard occurrences, and feedback from the municipal workshop, worksheets, and questionnaires. The mitigation actions that have been developed can be implemented through a variety of local tools such as changes in ordinances and policies, capital improvements budgets, and applying for grant funding.

6.4 Mitigation Action Plan

Once the mitigation actions and implementation plan were finalized, the Steering Committee developed specific criteria to prioritize the actions. The Steering Committee agreed on three criteria which involved addressing the following questions to determine the level (high, medium, and low) for the social, administrative, and economic considerations for each action. These priorities were translated into points and facilitated the ranking and identification of high priority projects as shown in Table 6.1.

Social Considerations – Life/Safety Impact

- Will the project have minimal/direct/or significant impact on the safety of businesses, residents, and properties?
- Will the proposed action adversely affect one segment of the population?
- Will the project be a proactive measure to reducing flood risk?

Administrative Considerations – Administrative/Technical Assistance

- Is there sufficient staff currently to implement the project?
- Is training required for the staff to implement this project?

Economic Considerations – Project Cost

- What is the approximate cost of the project?

Table 6.1 Evaluation Criteria for Action Prioritization

Criteria	Points	High	Points	Medium	Points	Low
Life/Safety Impact	10	Significant impact on public safety for businesses, residents, and/or properties	6	Direct impact on businesses, residents, and/or properties	2	Minimal/negligible impact on businesses, residents, and/or properties
Administrative/ Tech. Assistance	5	No additional staff or technical support needed to implement action	3	Some administrative and technical support needed	1	Significant administrative and technical support needed to implement action

				to implement action		
Project Cost	5	Low cost (<\$25,000)	3	Moderate cost (\$25,000-\$100,000)	1	High cost to implement (>\$100,000)

It should be noted that this Plan does not include prioritization of projects within a category, i.e., there is no ranking of projects listed within the Structure and Infrastructure mitigation category. For the purposes of funding, a benefit-cost analysis will be conducted. The projects would be prioritized as individual municipalities prepare applications for specific funding agencies for particular projects.

The overall timeline for the completion of projects is dependent on available funding and involvement and commitment by the municipality. The tables that follow identify County-level and municipal-level mitigation actions. The projects are described, referring to the hazard(s) mitigated, lead agency for implementation, timeline, and possible funding sources. It is important to note that each participating jurisdiction must have at least one mitigation action for the hazards that affect their community for each hazard (some may have actions that are considered all-hazard related). Although some municipalities may not have specific actions for every hazard that may affect them, county actions will also be attributed to municipalities, allowing the municipalities to refer to and implement county-based actions within their jurisdiction. It is important to note that any revisions and updates to the county and municipal mitigation action plans were made to reflect changes in development, local mitigation efforts, and mitigation priorities in NCC.

County Mitigation Action Plan

The actions below (Table 6.2) show the updated mitigation action strategy and have been developed based on discussions at the SC meeting, discussions with municipality representatives, and based on mitigation progress reported by the county. For this plan update, there was a focus on not overdoing the number and amount of mitigation actions at the County level. Any actions from the 2020 Plan that were not given a final disposition (completed, cancelled, NA, combined, etc.) by the County, have been included in this list as not started, in progress, or ongoing.

Table 6.2 New Castle County Mitigation Action Strategy

Mitigation Actions											
Action	Action Status	Hazard Mitigated	Lead Agency for Implementation	Life/Safety Impact	Admin/Tech Assistance	Cost Ranking	Total	Possible Funding Source	Approximate Cost	Project Timeline	Action Category
Continue public education and outreach program to educate residents and business owners (who possess hazardous chemicals and compounds) about the protective actions that can be taken to eliminate or reduce property loss and injury.	Ongoing	All Hazards	NCC OEM	6	3	5	14	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Education Awareness Programs
Conduct annual training exercises based on the actions recommended in the revised New Castle County Comprehensive Emergency Management Plan (CEMP) to comply with FEMA CPG 101 version 2, and HSEEP guidelines. MAY BE A NEW VERSION OF CPG	Ongoing	All Hazards	NCC OEM	2	3	3	8	FEMA HMGP FEMA FMA & HMA County Funds	\$25,000-\$100,000	Ongoing	Local Plans and Ordinances
Develop a Countywide uniform GIS database and use County data as a baseline, including Dam Hazards and Inundation areas and a database of stormwater and drainage, and share GIS data among the levels of government and update with all agency GIS Technicians. Data should include Dam Hazards and Inundation areas.	In Progress	Dam and Levee Failure Flood	NCC GIS	6	3	3	12	FEMA HMGP FEMA FMA & HMA County Funds	\$25,000-\$100,000	1-2 years	Education Awareness Programs
Conduct a study to determine the vulnerability of the CRFM sewage along the Christiana River that stretches 10 miles from I-95 to Wilmington.	Ongoing	Hazardous Materials Flood	NCC DPW	6	3	1	10	FEMA HMGP FEMA FMA & HMA County Funds	>\$100,000	Ongoing	Education Awareness Programs

Mitigation Actions											
Action	Action Status	Hazard Mitigated	Lead Agency for Implementation	Life/Safety Impact	Admin/Tech Assistance	Cost Ranking	Total	Possible Funding Source	Approximate Cost	Project Timeline	Action Category
Reduce pollution discharges via storm water systems throughout New Castle County.	Ongoing	Flood	NCC DPW	6	3	1	10	FEMA HMGP FEMA FMA & HMA County Funds	>\$100,000	Ongoing	Natural Systems Protection
Identify critical locations for additional environmental monitoring to aid in mitigation and response.	Ongoing	All Hazards	NCC OEM NCC DPW, DGS/DEOS	2	3	3	8	FEMA HMGP FEMA FMA & HMA County Funds	\$25,000-\$100,000	Ongoing	Natural Systems Protection
Integrate Functional and Access Needs into Emergency Plans and Identify mitigation measures consistent with this population.	Ongoing	All Hazards	NCC OEM and State Agencies	10	3	5	18	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Local Plans and Ordinances
Explore acquisition/elevation for the DuRoss Heights properties. Have had construction since -- check with Chris on this action.	Not Started	Flood	NCC OEM and DPW Env. Section	2	5	3	10	FEMA HMGP FEMA FMA & HMA County Funds	\$25,000-\$100,000	2-4 years	Structure and Infrastructure Projects
Explore acquisition/elevation for properties in the Town of Christiana	Not Started	Flood	NCC OEM and DPW Env. Section	2	5	3	10	FEMA HMGP FEMA FMA & HMA County Funds	\$25,000-\$100,000	2-4 years	Structure and Infrastructure Projects
Support cost effective acquisition, elevation, and wet/dry floodproofing projects for all municipalities and unincorporated areas in the County.	Ongoing	Flood	NCC OEM and NCCD	6	5	5	16	FEMA HMGP FEMA FMA & HMA	<\$25,000	Ongoing	Structure and Infrastructure Projects

Mitigation Actions											
Action	Action Status	Hazard Mitigated	Lead Agency for Implementation	Life/Safety Impact	Admin/Tech Assistance	Cost Ranking	Total	Possible Funding Source	Approximate Cost	Project Timeline	Action Category
								County Funds			
Ensure regular training in and compliance with all safety procedures and systems related to the manufacture, storage, transport, use, and disposal of hazardous materials.	Ongoing	Hazardous Materials	NCC OEM and NCC DPW	6	3	3	12	FEMA HMGP FEMA FMA & HMA County Funds	\$25,000-\$100,000	Ongoing	Education Awareness Programs
Develop higher regulatory standards for construction and substantial improvements of critical facilities in high hazard areas.	All Hazards	In Progress	NCC DLU	6	3	1	10	FEMA HMGP FEMA FMA & HMA County Funds	>\$100,000	2-4 years	Local Plans and Ordinances
Work with USACE to plan, develop, and conduct an Emergency Action Plan (EAP) exercise for a high hazard dam breach in the County.	New	Dam Failure	NCC OEM DNREC USACE	6	5	5	16	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	1-2 years	Local Plans and Ordinances
Continue to routinely inspect and perform maintenance to the levee in Red Lion.	New	Dam/Levee Failure	NCC Conservation District	2	5	5	12	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Structure and Infrastructure Projects
Mitigate flood prone properties along Fishers Wharf. Explore mitigation projects such as floodproofing, elevation, stormwater mgmt..	New	Flood	OEM Conservation District	2	3	1	6	FEMA HMGP FEMA FMA & HMA County Funds	>\$100,000	2-4 years	Structure and Infrastructure Projects

Mitigation Actions											
Action	Action Status	Hazard Mitigated	Lead Agency for Implementation	Life/Safety Impact	Admin/Tech Assistance	Cost Ranking	Total	Possible Funding Source	Approximate Cost	Project Timeline	Action Category
Continue to work and coordinate with higher education institutions regarding emergency preparedness, response, and recovery.	New	All Hazards	NCC OEM; UDEL	6	1	3	10	FEMA HMGP FEMA FMA & HMA County Funds	\$25,000-\$100,000	Ongoing	Education Awareness Programs
Continue to utilize FEMA's Integrated Public Alert and Warning System (IPAWS) for sudden onset hazards such as tornados, thunderstorms, or flash floods. COUPLE with DENS	New	All Hazards	NCC OEM	10	5	5	20	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Education Awareness Programs
Encourage local businesses and local industry owners located in known hazardous areas to develop a business continuity plan and provide educational materials.	New	Flood All Hazards	NCC OEM; Economic Development	2	5	5	12	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Local Plans and Ordinances
Consider developing policy restricting the development of wells, pipelines, or compression stations through densely populated residential areas, commercial and historic districts, or near conservation areas such as those adjacent to the river or creeks.	New	Energy Pipeline Failures	NCC OEM; DNREC	6	3	5	14	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	1-2 years	Local Plans and Ordinances
Continue to enhance and develop mutual aid agreements with neighboring counties and state partners for response and recovery efforts.	New	All Hazards	NCC OEM	2	5	3	10	FEMA HMGP FEMA FMA & HMA County Funds	\$25,000-\$100,000	Ongoing	Local Plans and Ordinances
Utilize tracking reports during the annual review process to identify potential barriers or hindrances to implementation of hazard mitigation activities and projects.	New	All Hazards	NCC OEM	2	5	5	12	FEMA HMGP FEMA FMA & HMA	<\$25,000	Ongoing	Local Plans and Ordinances

Mitigation Actions											
Action	Action Status	Hazard Mitigated	Lead Agency for Implementation	Life/Safety Impact	Admin/Tech Assistance	Cost Ranking	Total	Possible Funding Source	Approximate Cost	Project Timeline	Action Category
								County Funds			
Continue to educate homeowners on the potential risk of earthquakes and on safety techniques to follow during and after an earthquake.	New	Earthquake	NCC OEM	2	5	5	12	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Education Awareness Programs
Continue to conduct routine inspections, regular maintenance, and annual tests on all emergency communications equipment, public address systems, and hazard alert sirens to ensure effective operation during an emergency event.	New	All Hazards	NCC OEM; NCC DPW	10	3	3	16	FEMA HMGP FEMA FMA & HMA County Funds	\$25,000-\$100,000	Ongoing	Structure and Infrastructure Projects
Work with local television and radio stations to promote public hazard awareness and disaster preparedness.	New	All Hazards	NCC OEM	6	5	5	16	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Education Awareness Programs
Continue to promote and offer Community Emergency Response Team (CERT) training/classes to increase the number of citizen responders in the municipalities.	New	All Hazards	NCC OEM	2	3	5	10	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Education Awareness Programs
Identify at-risk populations (elderly, homeless, persons with physical or mental disabilities) to various hazards and maintain records of vulnerable populations and the types of assistance needed before, during, or after a hazard.	New	Extreme Heat Winter Storms Hurricanes and Coastal Storms Tornados	NCC OEM	10	1	3	14	FEMA HMGP FEMA FMA & HMA County Funds	\$25,000-\$100,000	Ongoing	Education Awareness Programs

Mitigation Actions											
Action	Action Status	Hazard Mitigated	Lead Agency for Implementation	Life/Safety Impact	Admin/Tech Assistance	Cost Ranking	Total	Possible Funding Source	Approximate Cost	Project Timeline	Action Category
Continue to explore the purchase of substantially damaged and repetitive/severe repetitive loss structures in flood prone areas.	New	Flood	NCC OEM	6	3	1	10	FEMA HMGP FEMA FMA & HMA County Funds	>\$100,000	Ongoing	Structure and Infrastructure Projects
Continue to work with DeIDOT to educate and introduce signage to warn all traffic on road conditions/flood prone roadways.	New	Flood	NCC OEM; DeIDOT	2	5	5	12	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Education Awareness Programs
Continue to work with the local media and municipalities and develop information (for newspapers, websites, circulars, property owner's association newsletters) on topics related to the dangers and hazards of winter travel and other hazardous conditions. Already doing with Awareness week	New	Winter Storms Wind Events	NCC OEM	2	5	5	12	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Education Awareness Programs
Identify all historic properties located in the 100-year floodplain and determine appropriate mitigation that considers both preservation and mitigation.	New	Flood	NCC OEM; NCC Planning	2	5	5	12	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	2-4 years	Education Awareness Programs
Work with DeIDOT to ensure routine tree pruning/trimming along major transportation routes to avoid damages and disruptions from down limbs during winter storms/wind events. NEW CASTLE COUNTY ROADS and State ROADS	New	Storms Wind Events	DeIDOT	6	3	5	14	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Natural Systems Protection
Ensure the county has adequate stock a personal protective equipment (PPE) for use by essential personnel during a pandemic/infectious disease outbreak.	New	Public Health Incidents	NCC OEM; DE Dept of Health	6	3	1	10	FEMA HMGP FEMA FMA & HMA	>\$100,000	Ongoing	Structure and Infrastructure Projects

Mitigation Actions											
Action	Action Status	Hazard Mitigated	Lead Agency for Implementation	Life/Safety Impact	Admin/Tech Assistance	Cost Ranking	Total	Possible Funding Source	Approximate Cost	Project Timeline	Action Category
								County Funds			
Continue to educate homeowners on the potential risk of wildfire and on safety techniques to follow for areas located at an urban-forest interface.	New	Wildfire	NCC OEM	2	3	5	10	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Education Awareness Programs
Coordinate with DeIDOT to conduct stream channel and erosion inspection and maintenance on areas adjacent to all County bridges.	New	Erosion	NCC OEM; DeIDOT	6	5	5	16	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Natural Systems Protection
Identify areas of County susceptible to sinkholes and debris pits and provide residents with educational materials on the potential dangers and impacts.	New	Sinkholes	NCC OEM; DNREC	2	5	5	12	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	1-2 years	Education Awareness Programs
Continue to educate County residents on the potential different types of terroristic threats and attacks, and ensure the County has a coordinated response should a threat or attack take place.	New	Terrorism	NCC OEM	6	5	5	16	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Education Awareness Programs
Continue to work with relevant state agencies and partners to refine clear hurricane evacuation routes and designated shelters that can help people safely evacuate affected areas. CONTRAFLOW, evac that other regional states do as well.	New	Hurricanes and Coastal Storms	NCC OEM with DeIDOT and DNREC and DHHS	6	3	5	14	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Local Plans and Ordinances

Mitigation Actions											
Action	Action Status	Hazard Mitigated	Lead Agency for Implementation	Life/Safety Impact	Admin/Tech Assistance	Cost Ranking	Total	Possible Funding Source	Approximate Cost	Project Timeline	Action Category
Consider hazard mitigation and community resilience within the scoring criteria during capital projects selections.	New	All Hazards	NCC OEM; Public Works	6	5	5	16	FEMA HMGP FEMA FMA & HMA County Funds	<\$25,000	Ongoing	Local Plans and Ordinances

Table 6.3 below lists both actions from the 2015 plan that are being carried forward to this plan update for each municipality, as well as actions that are newly developed for the plan update based on responses to the municipal survey, hazard areas identified by the municipalities, and discussions during the municipal workshop. Any actions that were not given a final disposition (completed, cancelled, etc.) by the county, and all actions included in this list have been identified as new, in progress, ongoing, not started, or carried forward.

Table 6.3 Municipal Mitigation Strategy

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Timeline	Potential Funding Source	Cost	Action Category
Arden							
	All-Hazards	Work closely with the County and continue to improve public outreach within the community to include distributing informative pamphlets and other outreach materials and workshops to educate citizens about hazard awareness.	Municipal Council/ Leadership; NCC OEM	Ongoing	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Education Awareness Programs
	All-Hazards	Retrofit Gild Hall so that it can be used as a temporary shelter.	Municipal Council/ Leadership/ NCC OEM and DHHS	2-4 years	BRIC, HMGP, HHPD, CIP	>\$100,000	Structure and Infrastructure Projects
	Flood	Implement a Water Management Plan.	Municipal Council/ Leadership	2-4 years	BRIC, HMGP, HHPD, CIP	>\$100,000	Local Plans and Ordinances

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Timeline	Potential Funding Source	Cost	Action Category
	All-Hazards	Upgrade Buzz Ware Village Center for Emergency Shelter use.	Municipal Council/ Leadership; NCC OEM	2-4 years	BRIC, HMGP, HHPD, CIP	\$25,000- \$100,000	Structure and Infrastructure Projects
	All-Hazards	Perform a Village Wide Tree Risk Assessment.	Municipal Council/ Leadership	2-4 years	BRIC, HMGP, HHPD, CIP	\$25,000- \$100,000	Local Plans and Ordinances
Ardencroft							
	Flood	Investigate appropriate mitigation measures to protect 16 lease holders adjacent to the creek. Assess Perkins Run flooding potential.	Municipal Council/ Leadership; NCC OEM	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Structure and Infrastructure Projects
	All-Hazards	Develop and implement an information awareness system to include notification, mail outs, recorded messages, and email during and after an event.	Municipal Council/ Leadership; NCC OEM	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	All-Hazards	Ensure adequate training and resources for emergency organizations and personnel.	Municipal Council/ Leadership; NCC OEM	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	All-Hazards	Conduct Community Emergency Response Team (CERT) classes for emergency response personnel	Municipal Council/ Leadership; NCC OEM	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	All-Hazards	Increase the number of trained citizen emergency responders.		Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	Wind Event, Flood, Winter Weather	Conduct a vegetative vulnerability assessment to determine what plant types pose a wind, water, or snow hazard to private and public property.	Municipal Council/ Leadership; NCC OEM	2-4 years	BRIC, HMGP, HHPD, CIP	\$25,000- \$100,000	Local Plans and Ordinances

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Timeline	Potential Funding Source	Cost	Action Category
	Flood	Conduct an assessment to determine the vulnerability if Perkins Run overtops its banks (Due to increased population growth, development, and encroachment).	Municipal Council/ Leadership; NCC OEM	2-4 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Local Plans and Ordinances
Ardentown							
	All-Hazards	Prepare Candlelight Theater as needed for use as a shelter or search for another location in cooperation with the State Shelter Strategy.	Municipal Council/ Leadership; NCC OEM	2-4 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Structure and Infrastructure Projects
	All-Hazards	Develop a call out database to notify residents in the event of a disaster.	Municipal Council/ Leadership; NCC OEM	1-2 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Education Awareness Programs
	Flood	Continue to conduct the Marsh Road Property Acquisition Project.	Municipal Council/ Leadership; NCCD	1-2 years	BRIC, HMGP, HHPD, CIP	>\$100,000	Structure and Infrastructure Projects
	Flood	Survey Storm Water Issues throughout the Town.	Municipal Council/ Leadership; NCC OEM	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Local Plans and Ordinances
	All-Hazards	Scan Town Data to preserve information to prevent loss of Town Data and History.	Municipal Council/ Leadership; State Archives	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	All-Hazards	Conduct a village wide Tree Risk Assessment.	Municipal Council/ Leadership; NCC OEM	2-4 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Local Plans and Ordinances
Bellefonte					BRIC, HMGP, HHPD, CIP		

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Timeline	Potential Funding Source	Cost	Action Category
	All Hazards	Work closely with and obtain assistance from the County to implement an information awareness system to include notification, mail outs, recorded messages, and email during and after an event. Continue to send out hazard notifications via the State/County Police Alert System and through the Brandywine Hundred Fire Company.	Municipal Council/Leadership	Ongoing	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Education Awareness Programs
Delaware City							
	All Hazards	Create displays for use at public events (health fair, public awareness day, county fair, etc.). DC Main Street, DCFC, Town.	DC Main Street/DCFC/Town	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	Flood	Construct flood barrier, drainage improvements, and wetlands enhancements for Dragon Run.	Town Admin	4+ years	BRIC, HMGP, HHPD, CIP	>\$100,000	Structure and Infrastructure Projects
	Flood	Evaluate solutions for flooding of Route 9 at Dragon Run which is a major evacuation route out of Delaware City.	DELDOT/Town	1-2 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Structure and Infrastructure Projects
	All-Hazards	Provide training for Delaware City Town Council on the CRS program and encourage residents to participate.	Town Admin	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	Flood	Construct flood barrier and drainage improvements along C&D Canal and evaluate wetlands enhancements.	ACE	2-4 years	BRIC, HMGP, HHPD, CIP	>\$100,000	Structure and Infrastructure Projects
	Eco	Develop a Phragmites elimination program. ACE, Town Admin.	ACE/Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Local Plans and Ordinances
	Flood	Replace or eliminate tidal flushing pipe and valve at Old Locks.	Town Admin	2-4 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Structure and Infrastructure Projects

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Timeline	Potential Funding Source	Cost	Action Category
	Flood	Conduct the Washington Street Flood Mitigation Project	Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	>\$100,000	Structure and Infrastructure Projects
Elsmere							
	Flood	Implement stormwater study recommendations.	Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	>\$100,000	Local Plans and Ordinances
	Flood	Increase the storage capacity of the Little Mill, Chestnut Run, Silverbrook, Derrickson Run and other creeks throughout the Town.	Town Admin	4+ years	BRIC, HMGP, HHPD, CIP	>\$100,000	Structure and Infrastructure Projects
	Flood	Evaluate storm water management infrastructure.	Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	>\$100,000	Structure and Infrastructure Projects
	Flood	Study and recommend solutions to alleviate the periodic flooding threat on Chestnut Run at Kirkwood Hwy (SR-2) , added in 2020 - Chestnut Run at VA Hospital, and Little Mill by Fuel station. / DELDOT and Elsmere	DELDOT/Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Local Plans and Ordinances
	Fire	Enable Water Supply to the CSX Wilsmere Rail Yard for Fire Protection	Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	>\$100,000	Structure and Infrastructure Projects
Middletown							
	All-Hazards	Conduct a vulnerability assessment of the Town's water distribution system, to identify measures designed to reduce the potential impacts of natural hazards./ Middletown DPW	DPW	1-2 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Local Plans and Ordinances

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Timeline	Potential Funding Source	Cost	Action Category
	Drought	Develop a water restriction policy that can be implemented during drought conditions.	DPW	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	All-Hazards	Develop an Emergency Operations Plan with an integrated evacuation procedure for the Town in cooperation with DELDOT's NCC Evacuation Plan. / Town Manager, Town Planner, NCC OEM, DELDOT	Town Manager, Town Planner/NCC OEM/DELDOT	1-2 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Local Plans and Ordinances
	All-Hazards	Develop a website to notify residents of important information before, during and after emergencies, storms, etc. (include links to other major sources of information: DEMA, FEMA, DELDOT and the weather channel).	DEMA/FEMA/DELDOT	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	Flood	Perform Sharondale outfall rehabilitation to eliminate erosive velocities of stormwater runoff in the outfall.	Town Admin	2-4 years	BRIC, HMGP, HHPD, CIP	>\$100,000	Natural Systems Protection
	Flood	Develop and Establish a Drainage Code.	Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Local Plans and Ordinances
	Flood	Consider participation in the NFIP's Community Rating System (CRS).	Town Admin	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	All-Hazards	Coordinate with Emergency Services to identify available resources and increase preparedness awareness.	Town Admin	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	All-Hazards	Identify an Alternate location for Middletown Town Hall to provide continuity of operations in the event of a disaster or the building is compromised.	Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Structure and Infrastructure Projects
New Castle City							

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Timeline	Potential Funding Source	Cost	Action Category
	Transportation	Introduce railroad crossings at main highway intersections with gate and better signals (three major roadways cross the railroad near schools, businesses and residential areas).	Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	Flooding	Develop a detailed flood vulnerability study for the entire City along the Delaware River and Bay to focus on coastal/riverine flooding from severe storm events and sea level rise.	Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Local Plans and Ordinances
	HazMat	Work with railroad lines to notify citizens of hazardous shipments that run through the City of New Castle.	Town Admin	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	Flooding	Expand the flooding aspect – inland flooding that comes from dykes and roadway flooding going over bridges.	Town Admin	2-4 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Natural Systems Protection
Newark							
	All-Hazards	Assess damages sustained to city property following a disaster.	EM	Ongoing	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	
	Flooding	Retrofit storm sewer system.	DPW	2-4 years	BRIC, HMGP, HHPD, CIP	>\$100,000	Structure and Infrastructure Projects
	Flooding	Preserve riparian buffer along White Clay Creek.	DPW	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	
	Flooding	Inspect stormwater outfalls and maintain stormwater management facilities annually.	DPW		BRIC, HMGP, HHPD, CIP	<\$25,000	Structure and Infrastructure Projects

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Timeline	Potential Funding Source	Cost	Action Category
	Flooding	Conduct six inspections of creek annually.	DPW	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Structure and Infrastructure Projects
	Flooding	Continue storm drain spill response.	DPW	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Natural Systems Protection
	All-Hazards	Continue tree maintenance program.	DPW	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Structure and Infrastructure Projects
	All-Hazards	Own generation back up power at varied voltages and place at critical loads and substations.	DPW	Ongoing	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Structure and Infrastructure Projects
	All-Hazards	Manage storage area at designated parkland for debris composting.	DPW	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Structure and Infrastructure Projects
	Flooding	Keep Christina Creek clear of obstruction, including 11 bridge culverts.	DPW	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Natural Systems Protection
	Flooding	Clean catch basins and grates three times a year.	DPW	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Natural Systems Protection
	All-Hazards	Routinely inspect all construction E & S measures	DPW	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Structure and Infrastructure Projects
	Flooding	Study and recommend solutions to alleviate the periodic flooding threat on the Christina River at Nottingham Road (SR-273), Barksdale Road, near the Christina River at the Newark CSX rail line and Casho Mill Road, on the Christina River at W Chestnut Hill Road/Rittenhouse	Multiple Depts..	Ongoing	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Local Plans and Ordinances

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Timeline	Potential Funding Source	Cost	Action Category
		Park, on the Christina River at Welsh Track Road, and on White Clay Creek at Paper Mill Road, ADDED and on Julie Lane near Casho Mill Road.					
	Flooding	Support cost effective property acquisitions through Federal grants.	EM	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Structure and Infrastructure Projects
	All-Hazards	Install a Backup Generator to NW Booster Station	DPW	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Structure and Infrastructure Projects
	Flooding	Construct Stormwater Management facility at previous site of UD Rodney Dorm acquired by City, into a park.	DPW	Ongoing	BRIC, HMGP, HHPD, CIP	>\$100,000	Structure and Infrastructure Projects
	Flood	Investigate use of previously abandoned sanitary sewer force main at Silverbrook pump station for emergency bypass.	DPW	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Structure and Infrastructure Projects
Newport							
	Flooding	Work with the County to conduct a detailed flood vulnerability study for the entire Town.	Town / NCC DLU	1-2 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Local Plans and Ordinances
	Flooding	Install catch basins throughout Town.	Town Admin	Ongoing	BRIC, HMGP, HHPD, CIP	>\$100,000	Structure and Infrastructure Projects
	Flood	Install two (2) new sewer pump stations in the Industrial Park	Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Structure and Infrastructure Projects
Odessa							

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Timeline	Potential Funding Source	Cost	Action Category
	All-Hazards	Educate residents on hazards that can impact the community.	Town Admin	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	All-Hazards	Develop an evacuation policy for the Town.	Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Local Plans and Ordinances
	Flood	Study and recommend solutions to alleviate the periodic flooding threat on Appoquinimink River at Main Street (SR-299)	DELDOT	1-2 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Local Plans and Ordinances
	Flood	Address flood concerns and handicapped accessibility at Cantwell Tavern	Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	>\$100,000	Structure and Infrastructure Projects
	Flood	Develop mitigation measures to reduce the flooding occurrences and impacts on Main Street in Odessa	Town Admin	1-2 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Structure and Infrastructure Projects
Townsend							
	All-Hazards	Develop an educational and outreach program for residents, business owners and government employees to include specific actions that can be taken to reduce the impact of natural hazards.	Town Admin	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	Flood	Research and Consider adoption into the NFIP.	Townsend / DNREC & NCC OEM, NCC DLU	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	All-Hazards	Evacuation Flow Study for Town due to limited outlets	Townsend / DELDOT & NCC OEM	1-2 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Local Plans and Ordinances
Wilmington							

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Timeline	Potential Funding Source	Cost	Action Category
	Flood	Educate and encourage citizens to purchase and install backflow preventers in flood-prone homes.	Wilm. DPW	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	All-Hazards	Continue to increase public education, people should be ready to survive for three days without power.	Wilm. OEM	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	All-Hazards	Continue to increase public education for all hazards.	Town Admin	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	Severe Weather	Evaluate the adequacy of existing code to address potential wind-related damages	Wilm. L & I	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Local Plans and Ordinances
	Flood	Reduce the likelihood of sewer overflow during flood events through real-time control (RTC).	Wilm. DPW	Ongoing	BRIC, HMGP, HHPD, CIP	>\$100,000	Structure and Infrastructure Projects
	All-Hazards	Develop building construction code requiring shatter-proof glass for new city buildings.	Wilm L&I	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Local Plans and Ordinances
	All-Hazards	Establish a citywide disaster recovery/business continuity plan.	Wilm. OEM and all departments	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Local Plans and Ordinances
	All-Hazards	Coordinate with the Department of Public Works to apply traffic flow study to evacuation procedures.	Wilm. OEM and DPW	1-2 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Local Plans and Ordinances
	All-Hazards	Evaluate Comprehensive Plan to check for hazard mitigation elements.	Town Admin	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Local Plans and Ordinances

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Timeline	Potential Funding Source	Cost	Action Category
	All-Hazards	Ensure NIMS training for all appropriate City personnel and engage in tabletop exercises.	Wilm. OEM	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	Flood	On South Wilmington Wetland Park - Reestablish wetland to process stormwater from South Wilmington Area east of Walnut Street, south of A street; Partial separation of stormwater in Southbridge and from Garaches Lane	Wilm. DPW	1-2 years	BRIC, HMGP, HHPD, CIP	>\$100,000	Natural Systems Protection
	Flood	Reestablish drainage along RR property between New Castle Avenue and Christiana Avenue to relieve street flooding on New Castle Avenue and to create a drainage path for the redevelopment of the Southbridge Extension area.	Wilm. DPW	1-2 years	BRIC, HMGP, HHPD, CIP	>\$100,000	Natural Systems Protection
	All-Hazards	Develop an Emergency Management GIS training program (including hardware and software).	Wilm. OEM and DPW	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs
	Flood	Study and recommend solutions to alleviate the periodic flooding threat on Brandywine Creek at E 12 th Street/Wilmington Industrial Park and on Shellpot Creek at Governor Printz Blvd (US 13).	DPW	1-2 years	BRIC, HMGP, HHPD, CIP	\$25,000-\$100,000	Local Plans and Ordinances
	All-Hazards	Implement a Tree Maintenance Program.	Wilm. DPW	1-2 years	BRIC, HMGP, HHPD, CIP	<\$25,000	Local Plans and Ordinances
	Flood	Educate and encourage citizens to purchase and install backflow preventers in flood-prone homes.	Wilm. DPW	Ongoing	BRIC, HMGP, HHPD, CIP	<\$25,000	Education Awareness Programs

Past Actions Not Carried Forward

Action items from the 2020 HMP that have been completed, deemed infeasible, not applicable or merged/combined with another action item have been removed from this plan. Those actions are itemized, described, and justified in Table 6.5 for County actions, and in Table 6.6 for municipal actions.

The Steering Committee reviewed the actions in the 2020 Plan and each action from the original plan was discussed and categorized based on definitions given in Table 6.4. Municipalities not completing any actions since 2020 or not providing updates have been left blank.

Table 6.4 Hazard Status Definitions

Status	Definition
Completed	The lead department has completed the action since the development of the 2012 plan.
Not Applicable	Actions that were deemed by the Steering Committee to not apply to the HMP.
Cancelled	Officials have decided to terminate the project.
Infeasible	After further study this project was deemed to be infeasible based on benefit/cost analysis, engineering study, or another criterion.
Combined	The action has been merged with another existing action or new action.

Table 6.5 New Castle County 2020 Actions Completed, Cancelled, or Not Applicable

Action	Hazard Mitigated	Lead Agency for Implementation	Status	Notes
Elevate homes within the Bayview Beach community as funding allows.	Flood	NCC OEM	Complete	Was completed up to what homeowners want. 4 homes left to elevate but homeowners declined.
Study and recommend solutions to alleviate the stormwater flooding threat on Fox Run Shopping Center on Pulaski Highway near Glasgow.	Flood	NCC OEM	N/A	This is a DelDOT concern.
Evaluate solutions for flooding of Route 72 between the refinery and Route 13 which is major evacuation route out of Delaware City.	Flood	DelDOT	Cancelled	No identified project in DelDOT future, comm property dev may consider drainage improvement.
Implement the 25 specific recommendations by the Delaware Sea Level Rise Advisory	Flood; Coastal Storms	Various	Complete	Various lead agencies per Report

Action	Hazard Mitigated	Lead Agency for Implementation	Status	Notes
Committee per the 2014 Report, for all municipalities.				
Encourage all municipalities to use the LIMWA (Limited Wave Action) to adjust mitigation projects to a higher elevation level in A zones, for sea level rise and better protection. Ordinance 14-126 requires structures built within the LimWA be constructed to Coastal High Hazard or V zone standards per 40.10.320 E	Flood (Storm Surge)	NCC DLU	Complete	2022 – incorporated into NCC 2022 Comp plan – for revisions now for 2050 – also in flood ordinance. Already encouraged the Munis – NCC has developed flood ready ordinance/document with critical needs.
Evaluate and develop actions to mitigate the following areas that are vulnerable to flooding: Delmarva Power, Christina Crescent, Dupont on Powder Mill Road, Delaware Steeplechase Racetrack Property, Port of Wilmington, 350 Anchor Mill Road, 115 Christina Landing, 1237 Sussex Avenue, and 1301 E Twelfth Street.	Flood	Various Lead Agencies	N/A	This is a DelDOT/DNREC project
Encourage the adoption of building codes to require residential sprinkler systems installed in new construction.	Infrastructure Issues	DE Fire Sprinkler Coalition	Infeasible	Project is no longer feasible.

Table 6.6 2020 Municipal Actions Completed, Cancelled, or Not Applicable

Hazard Mitigated	Mitigation Action	Lead Agency	Action Status	Notes
Past Municipal Actions Completed, Cancelled, or N/A				
Arden				
HAZMAT	Establish emergency notification procedures for rail and Interstate HAZMAT incidents and chemical facilities.	Village of Arden	Complete	OEM did demonstration – will continue to find audiences for County OEM.
Flood	Create a Storm Water Management Plan / Arden & DNREC	Village of Arden	Complete	Engineering firm came out and helped with plan.
Ardencroft				
None				
Ardentown				
None				
Bellefonte				
None				
Delaware City				
None				

Hazard Mitigated	Mitigation Action	Lead Agency	Action Status	Notes
Elsmere				
None				
Middletown				
None				
New Castle City				
None				
Newark				
None				
Newport				
Flooding	Initiate wetlands protective measures along the Christina River.	Unknown	Not Applicable	Not relevant or priority
Flooding	Study and recommend solutions to alleviate the periodic flooding threat on the Christina River at Interstate 95/US 141/202.	Unknown	Cancelled	No lead agency or if this is a thing.
Odessa				
All-Hazards	Establish a comprehensive all-hazards warning system.	Town	Complete	DeIDOT installed flood warning system – signage throughout area. Flashing signs on bridge
Flood	Update the local Flood Damage Prevention Ordinance.		Complete	If requirement for updating, will be let know
Flood	Encourage citizens to purchase flood insurance.	Town Admin	Not Applicable	Action is now N/A.
All Hazards	Identify and evaluate shelters.		Not Applicable	Red Cross – Odessa does not have this
All Hazards	Develop and Improve Public Water Distribution system.	Town Admin	Complete	Now have an agreement with Artesian – have to hook up City Water, city water is available.
Townsend				
None				
Wilmington				
None				

Benefits Maximization versus Cost

A benefit-cost analysis determines the cost-effectiveness of a project to minimize damage or prevent future damage from future hazard events. By determining the benefit-cost of the proposed mitigation projects, it will provide the communities as well as project developers with additional knowledge about the feasibility of the proposed mitigation alternative. If the costs outweigh the benefits, then other alternatives that are more effective can be identified to accomplish the Plan's goals.

7.0 CHAPTER 7 – PLAN MAINTENANCE

7.1 Update Process Summary

Once this Plan has received approval from DEMA and FEMA, the Plan will be adopted by New Castle County and its participating jurisdictions. This County 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. This Chapter establishes a method to monitor how the Plan will be evaluated and maintained in the future.

7.2 Monitoring, Evaluating, and Updating the Plan

This 2025 HMP Update will be monitored by the County for several related purposes:

1. Maintain the currency of hazard and risk information.
2. Ensure mitigation projects and actions reflect the priorities of the County, the HMP Steering Committee, and the general public.
3. Comply with Federal Emergency Management Agency (FEMA) and Delaware Emergency Management Agency (DEMA) requirements for HMP maintenance, and to maintain eligibility for Federal disaster assistance and mitigation grants.

There are several criteria that should be evaluated as part of the annual review process. Annual reviews should take place every year during the same month in which the Plan was adopted, and/or within 30 days of a declared disaster. During the annual review process, the following criteria should be evaluated for any changes, and adjustments made to the Plan accordingly:

- Changes in the risk assessment (hazard rankings)
- Changes in priorities
- Hazard event occurrences and impacts
- Relevance of Plan Goals
- Status of mitigation actions (completed, ongoing, in progress, not started, not applicable)

In addition to conducting an annual review of the plan, the Steering Committee will review the Plan within 30 days after a disaster. Each goal and objective will be examined for its relevance and validity to the changing situation in each municipality and the mitigation actions will be reviewed to ensure that it addresses any recent issues that may have stemmed from disaster events. During periods without hazard events, the Plan will be updated every five years to reflect the current risk, vulnerabilities, development trends and as mitigation actions are implemented. While an annual report will be completed each year, any state and federal mandates from DEMA and FEMA respectively, will be addressed in the five-year update. The municipalities will not be responsible for making any changes to the HMP based on DEMA or FEMA requirements in between the five-year update.

The New Castle County EMA is responsible for coordinating the Steering Committee, and the Committee shall monitor and maintain the HMP Update. The EMA and Steering Committee shall continuously monitor the HMP for the purposes noted above and with respect to the update triggers discussed in the section below.

Plan integration updates should also take place as part of plan maintenance. As the HMP is updated every five years, an inventory of County plans/ordinances with relevance to hazard mitigation, resilience, and/or risk reduction should be taken, a review of the plans should be completed if there

has been an update since the previous HMP update, and any relevant information should be integrated back into the HMP Update. This requires coordination and engagement between plans and departments. As one plan is updated, other county staff tasked with developing plans should be informed so they can identify potential points of integration into their respective written plans.

On the other hand, information from the HMP should be integrated back into other County Plans, creating an ongoing cycle for integration. For guidance on integrating other planning mechanism considerations into the HMP, as integrating HMP principles into other planning mechanisms, please refer to FEMA's Plan Integration Guide, titled: Plan Integration: Linking Local Planning Efforts.

Upon adoption of this plan, the EMA will annually convene a meeting of representatives from the Steering Committee to discuss and determine implementation accomplishments and/or implementation obstacles and recommended solutions. Although the individuals filling the positions may change from year to year, future Steering Committee members will continue to be comprised of the same departments and organizations involved in this current update. The EMA will also be responsible for monitoring and preparing the annual progress reports and will utilize the data obtained from the annual meeting to note the progress made on mitigation action items in annual progress reports. Circumstances or conditions under which New Castle County will initiate HMP reviews and updates:

1. On the recommendation of the County Executive, or on its own initiative, the County may initiate an HMP review at any time.
2. At approximately the one-year anniversary of the HMP's re-adoption, and approximately at the same anniversary every year thereafter.
3. After a natural hazard event that appears to significantly change the apparent risk to County assets, operations and/or citizens, and/or after Presidentially declared disasters.
4. Upon receipt of new or updated data or information that may affect the HIRA (ex. New FEMA FIRM).
5. When activities within the County, Region, or State significantly alter the potential effects of natural hazards on County assets, operations and/or citizens. Examples include completed mitigation projects that reduce risk, actions or circumstances that increase risk.

In addition to the circumstances listed above, revisions that warrant changing the text of this HMP or incorporating new information may be prompted by a number of circumstances, including identification of specific new mitigation projects, completion of several mitigation actions, or requirements for qualifying for specific funding. Minor revisions may be handled by addenda. Major comprehensive review of and revisions to the New Castle County HMP will be conducted on a five-year cycle. This 2025 HMP Update will be posted on New Castle County's website under the Department of Emergency Services tab.

HMP Update Standard Operating Procedure (SOP)

This SOP establishes a consistent, repeatable process for updating the County HMP in accordance with FEMA requirements and applicable state hazard mitigation guidance. The SOP ensures the County maintains an approved and actionable plan to reduce risk to life, property, infrastructure, and the environment.

Update Cycle Overview

The County Hazard Mitigation Plan shall be:

- Updated every five (5) years

- Reviewed annually for relevance and progress
- Formally adopted by the County governing body prior to FEMA approval

Roles and Responsibilities

Emergency Management Department (Lead Agency)

- Serves as Plan Administrator
- Manages the overall update schedule and deliverables
- Coordinates with state and FEMA reviewers
- Maintains official plan records

Hazard Mitigation Steering Committee (HMSC)

- Provides technical input and local knowledge
- Represents key sectors and jurisdictions
- Reviews draft plan components
- Assists with public engagement

County Departments & Agencies

- Provide data, project updates, and future mitigation needs
- Identify critical facilities and infrastructure
- Participate in risk assessment and strategy development

Municipalities & Partner Jurisdictions

- Submit jurisdiction-specific data and mitigation actions
- Participate in meetings and reviews
- Adopt the final plan by resolution

Public & Stakeholders

- Provide input on local hazards, vulnerabilities, and priorities
- Participate through surveys, meetings, or public comment periods

Five-Year Update Process

Phase 1: Initiation & Scoping (Months 1–3)

- Confirm update timeline and funding sources
- Reconstitute or update the HMPC membership
- Review FEMA and state planning guidance
- Develop a public participation strategy
- Conduct a plan kick-off meeting

Phase 2: Data Collection & Risk Assessment (Months 4–9)

- Update hazard profiles using latest data
- Review disaster history since last plan update

- Assess changes in population, land use, and development
- Update vulnerability assessments for people, buildings, critical facilities, and infrastructure
- Incorporate climate and future conditions, as applicable

Phase 3: Mitigation Strategy Development (Months 10–15)

- Evaluate progress on existing mitigation actions
- Identify new mitigation actions and projects
- Prioritize actions using agreed-upon criteria
- Align mitigation actions with:
 - Comprehensive Plan
 - Capital Improvement Program (CIP)
 - Climate or resilience plans

Phase 4: Draft Plan Development & Review (Months 16–20)

- Compile full draft HMP
- Conduct internal and HMPC reviews
- Release draft for public review and comment
- Incorporate feedback and revisions

Phase 5: Adoption & Approval (Months 21–24)

- Submit plan to State Emergency Management Agency
- Address state and FEMA review comments
- Obtain local adoption resolutions
- Receive FEMA approval

Annual Plan Maintenance

Each year, the Emergency Management Department shall:

- Convene at least one HMPC meeting
- Review mitigation action status
- Identify changes in hazards or development
- Document funding opportunities pursued
- Update contact lists and appendices as needed

7.3 Continued Public Involvement

The preparation of this Plan has involved the municipalities and public throughout the process. New Castle County is dedicated to continuing to solicit municipal and public participation during the five-year update as required by FEMA. Copies of the HMP Update will be placed on the EMA website, along with a mechanism for submission for comments. Additionally, annual update meetings should be open to the public and all municipalities, and an advertising and outreach campaign should be undertaken to encourage the public to attend and provide comments. Upon adoption of the updated 2025 HMP, the public will be notified of any substantial changes to the document prior to the next scheduled update in 2030. Any changes proposed by the Steering Committee that are considered significant will be distributed to the list of stakeholders identified in the Planning Process chapter of



this Plan. Future County HMP Updates will also consider accessible formats, such as plain language summaries, translations, ADA-compliant postings. The Steering Committee will then review any and all suggested changes and make recommendations for revisions to the plan as deemed appropriate and/or necessary.

8.0 CHAPTER 8 – PLAN ADOPTION

Adoption by the County Governing Body

[Include adoption resolution from New Castle County here.](#)

Adoption by the Local Governing Bodies

[Include adoption resolution\(s\) from adopting municipalities here.](#)

Adoption Status Tracking Table

Jurisdiction	Adoption Date	Adoption Resolution Link
New Castle County		
Arden		
Ardencroft		
Ardentown		
Bellefonte		
Delaware City		
Elsmere		
Middletown		
New Castle City		
Newark		
Newport		
Odessa		
Townsend		
Wilmington		

APPENDIX A – NEW CASTLE COUNTY HIGH HAZARD POTENTIAL DAM ANALYSIS

Dam failure is a collapse or breach in a dam. In recent years, aging infrastructure and population growth in floodplain areas downstream from dams and near levees have resulted in an increased emphasis on safety, operation, and maintenance of dams. While some dams have storage volumes small enough that failures have little or no repercussions, dams with large storage volumes can cause significant downstream flooding in the event of a breach.

Several dams exist to serve mostly recreational functions within New Castle County. Other uses for dams in the County include irrigation and fish or wildlife ponds. In some cases, a single dam structure serves multiple functions.

HHPD Planning Process

For this HHPD Analysis, the County EMA and the DNREC Dam Coordinator were involved in overseeing and providing insight. Information and data developed and provided by the DNREC, as well as the National Inventory of Dams (NID), were utilized to inform this Analysis. Additionally, this Analysis utilizes products developed by other stakeholders, such as those who are responsible for county engineering tasks and overseeing the development of Emergency Action Plans for high-hazard dams. The entire steering committee, DNREC, and other county and state stakeholders were involved and informed at Steering Committee and municipality meetings and will continue to be involved to improve this Analysis with every subsequent Plan Update.

In addition to the stakeholders involved in the development of this Plan Amendment, the following resources, studies, reports, and information related to HHPDs have been used:

In addition to the stakeholders involved in the development of this Analysis, the following resources, studies, reports, and information related to HHPDs have been used:

- FEMA Rehabilitation of High Hazard Potential Dams: Grant Program Guidance, June 2020
- Emergency Action Plans for the high-hazard dams in the County (inundation maps and population at risk)
- Operations and Maintenance Inspection Reports for high-hazard dams
- FEMA Region 3 High Hazard Potential Dams: State Mitigation Planning Tips

HHPD Risk Assessment

Dam failure is a collapse or breach in a dam. In recent years, aging infrastructure and population growth in floodplain areas downstream from dams and near levees have resulted in an increased emphasis on safety, operation, and maintenance of dams. While some dams have storage volumes small enough that failures have little or no repercussions, dams with large storage volumes can cause significant downstream flooding in the event of a breach. Several dams exist to serve mostly water supply and recreation functions within New Castle County. Other uses for dams in the County include fish or wildlife ponds and flood risk reduction.

The failure or partial failure of a High-Hazard Potential Dam can have impacts that affect many different jurisdictions across New Castle County and counties adjacent to New Castle County. A failure at any of the dams in New Castle County would result in some inundation in at least those

municipalities adjacent to the dam in question. This HHPD Risk Assessment provides a comprehensive examination of risk inundation areas from the 16 High-Hazard Potential Dams in New Castle County.

However, each of the municipalities that could be affected by the failure of a High Hazard Potential Dam could result in the inundation of critical facilities such as police stations and fire departments, critical infrastructure facilities, and community lifeline locations like medical facilities, power and energy facilities, and schools, nursing homes, and senior care and long-term care facilities. It is also important to note that the high-hazard dams' flooding potential can be elevated due to cascading impacts from other hazard events, such as seismic events or wildfires. New Castle County is at risk when high-hazard potential dams are considered. There are three types of risk related to high-hazard potential dams, and they are listed below:

High Hazard Potential Dam Risk Types

High Hazard Potential Dam Risk Types	
Type of Risk	Description
Incremental Risk	The risk (likelihood and consequences) to the pool area and downstream floodplain occupants that can be attributed to the presence of the dam should the dam breach prior or subsequent to overtopping, or undergo component malfunction or mis-operation, where the consequences considered are over and above those that would occur without dam breach. The consequences typically are due to downstream inundation, but loss of the pool can result in significant consequences in the pool area upstream of the dam.
Non-breach Risk	The risk in the reservoir pool area and affected downstream floodplain due to 'normal' dam operation of the dam (e.g., large spillway flows within the design capacity that exceed channel capacity) or 'overtopping of the dam without breaching' scenarios.
Residual Risk	The risk that remains after all mitigation actions and risk reduction actions have been completed. With respect to dams, FEMA defines residual risk as "risk remaining at any time" (FEMA, 2015, p A-2). It is the risk that remains after decisions related to a specific safety issue are made and prudent actions have been taken to address the risk. It is the remote risk associated with a condition that was judged to not be a credible dam safety issue.
Source: "Rehabilitation of High Hazard Potential Dams Grant Program Guidance," June 2020	

This Analysis involved obtaining the Emergency Action Plans for each HHPD, which provide information on projected dam breach inundation areas and downstream flood zones. Upon obtaining the inundation information from dam owners and DNREC, data on building inventories were then obtained from the County GIS department and freely available data sources. Through this process, the analysis identifies the number of structures at risk, the total structure value at risk, and the total content value of those structures at risk. This analysis also provides a breakdown of the building occupancy of all structures impacted. Information from this analysis is then digitized on individual maps for the respective HHPDs.

These maps and analyses are depicted and provided within the Analysis. With digitized data, the County and municipalities can now make informed decisions on the dam breach mitigation priorities. It is a desire of the County to continue to refine the digitized HHPD data and update the data as development occurs in the future; therefore, it has been included as a mitigation action for this hazard. The current HHPD analysis was performed based on data from Emergency Action Plans from the HHPDs, as well as data provided by the DNREC Dam Safety Coordinator. The next Plan

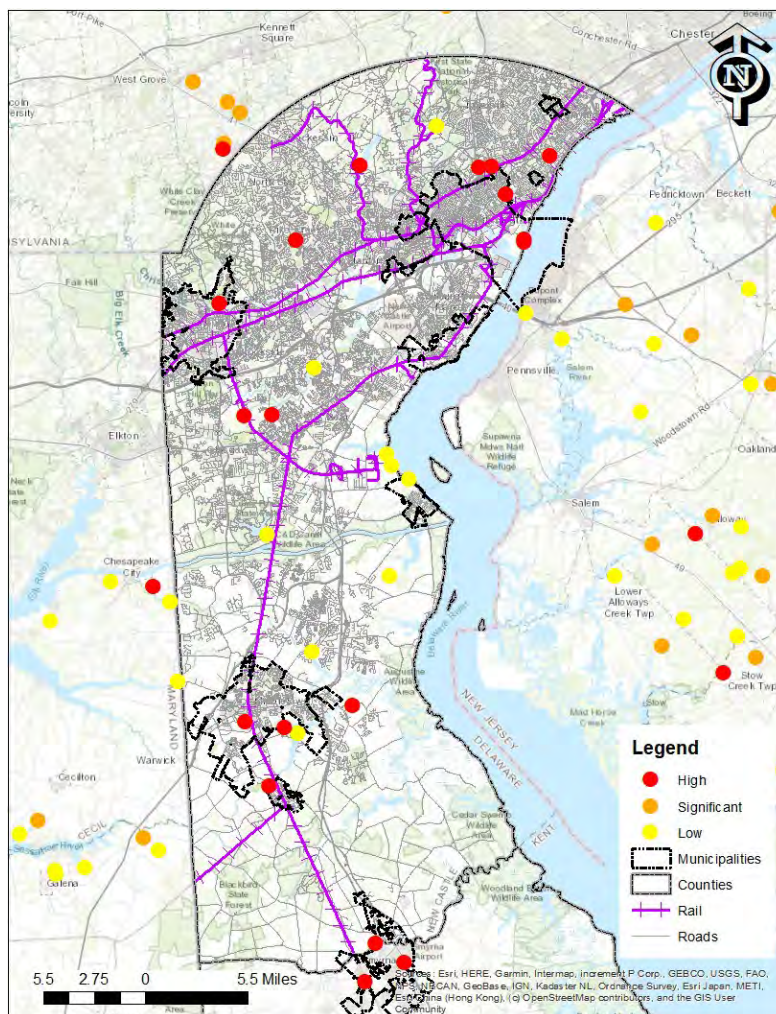
Update will provide additional analysis related to total population at risk (PAR). A specific mitigation measure has been included to pursue additional data and perform a more in-depth analysis to understand the population at risk, including any vulnerable populations, for all HHPDs.

Location and Extent

The federal and most state governments regulate certain impounding structure (dam) planning, construction, operation, maintenance, and repair. On the state level, The Dam Safety & Encroachments Act (Act 325 of 1978) and the Amendment for "High-Hazard Dam" Act 325 provides for the regulation of dams and reservoirs, water obstructions and encroachments in the Commonwealth, in order to protect the health, safety and welfare of the people and property. In Delaware, the Division of Dam Safety, under the Bureau of Waterways Engineering and Wetlands, which is part of the Department of Environmental Protection provides for the regulation and safety of dams and reservoirs throughout the Commonwealth to protect the health, safety and welfare of its citizens and their property.

This division is required to ensure proper planning, design review, construction review, maintenance monitoring and supervision of dams and reservoirs. The division directs and coordinates field investigations with regional offices on authorized projects during construction; provides program guidance and coordination to regional program staff in the periodic inspection of all existing dams to determine their condition and safety; and directs, coordinates and develops policies and technical standards in the area of dam safety for the Department.

There are twenty-seven dams in New Castle County and the locations of those dams are depicted below.



Range of Magnitude

The hazard potential classification of dams is high, significant, and low. The classification is based on a determination of the effects that a dam failure would likely have on people and property in the downstream area, or inundation zone. Hazard potential classifications descend in order from high to low, having the greatest potential for adverse downstream impacts in the event of failure.

Classification is unrelated to the physical condition of the dam or the probability of its failure. The hazard potential classifications provided in Table 1 are described by the USACE as follows:

Low Hazard Potential: Dams assigned the low hazard potential classification are those where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

Significant Hazard Potential: Dams assigned to the significant hazard potential classification are those dams where failure or mis-operation results in no probable loss of human life but can cause economic loss, environment damage, disruption of lifeline facilities, or impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be in areas with population and significant infrastructure.

High Hazard Potential: Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life.

Potential	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None expected.	Low and generally limited to owner.
Significant	None expected.	Yes.
High	Probable. One or more expected.	Yes (but not necessary for this classification).

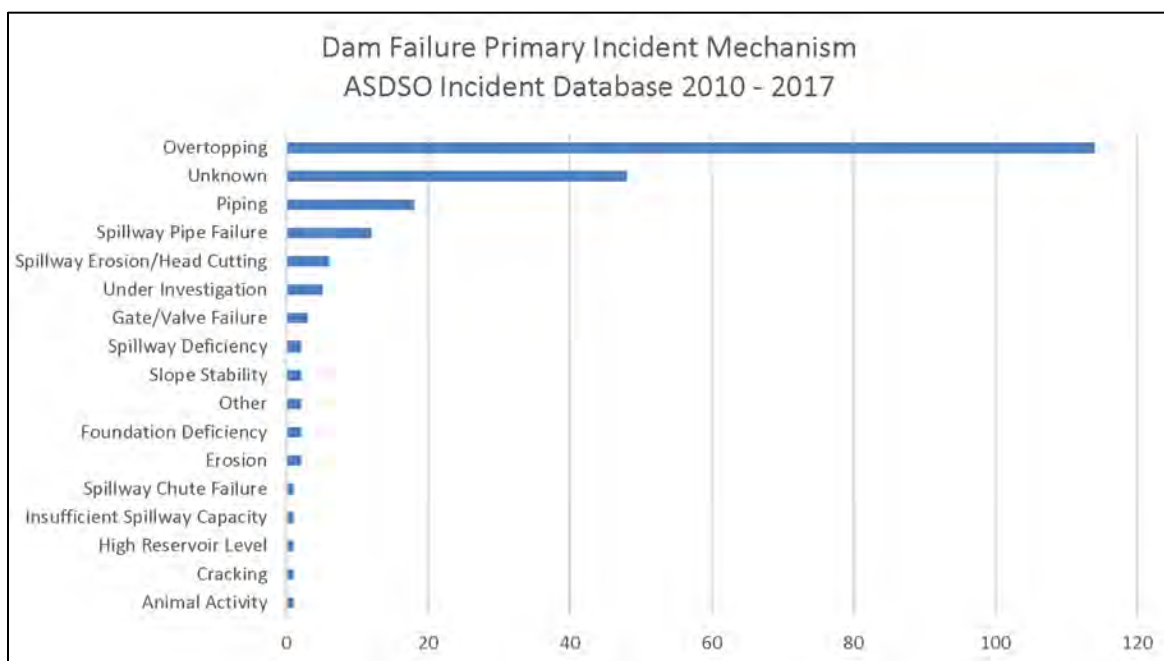
The State also classifies the hazard potential by loss of life and economic loss similar to the USACE classification. Table 3 describes the three potential hazard categories defined by the State.

Potential	Description
Class III - Low Hazard Potential	This classification includes any dam whose failure or mis operation is unlikely to cause loss of human life but may cause minor economic and/or environmental losses. This classification applies to rural or agricultural areas where failure may damage farm buildings other than residences, agricultural lands, or non-major roads. Class III dams are exempted from the requirements of these Regulations.
Class II - Significant Hazard Potential	This classification includes any dam whose failure or mis operation will cause possible loss of human life, economic loss, environmental damage, and disruption of lifeline facilities, or can impact other concerns. This classification applies to predominantly rural agricultural areas, where dam failure may damage isolated homes, major highways, or railroads or cause interruption of service of relatively important public utilities.
Class I - High Hazard Potential	This classification includes any dam whose failure or mis operation will cause probable loss of human life. The existence of normally occupied homes in the area that are susceptible to significant damage in the event of a dam failure will be assumed to mean "probable loss of life." Recreational facilities below a dam, such as a campground or recreation area, may be sufficient reason to classify a dam as having a high-hazard potential.

Past Occurrence

There are no comprehensive databases of historical dam failures or flooding following a dam failure in the area. Most failures occur due to lack of maintenance of dam facilities in combination with major precipitation events, such as hurricanes and thunderstorms.

Dam failures are most likely to happen for one of five reasons: overtopping, foundation defects, cracking, inadequate maintenance and upkeep, and piping.³⁸ Flood or overtopping is one of the most common causes of dam failure and occurs when the dam's spillway is inadequate for dealing with excess water. During flood events, too much water to be properly handled by the spillway may rush to the dam site and flow over the top of the dam. Improper building construction, including using easily eroded construction materials, also frequently leads to the slow structural failure of dams. This failure can be compounded by underlying geological factors such as porous bedrock that lose structural integrity when saturated. Figure 1 and Figure 2 summarize the most common causes of dam failure between 2010 and 2017.



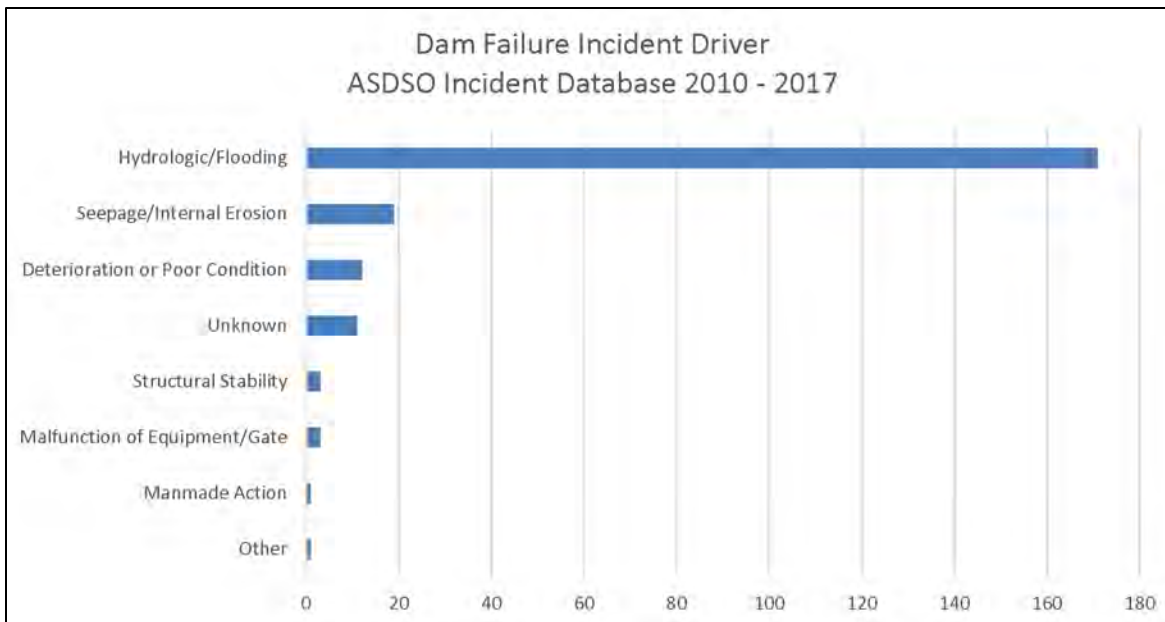
Dam failure primary incident mechanism (Source: ASDSO Incident Database, 2010 - 2017)

³⁹

³⁸ Association of State Dam Safety Officials (ASDSO). Dam Failures and Incidents.

<https://www.damsafety.org/dam-failures>

³⁹ The dam failure incident data derive from the ASDSO Dam Incident Database, dam failure incidents for the years 2010 through 2017. Incident data mostly obtained from the state dam safety programs and/or media reports. The incident data is not inclusive of all dam safety incidents.



Dam failure incident driver (Source: ASDSO Incident Database, 2010 - 2017).

Future Occurrence

Predicting the probability of flooding due to dam failure requires a detailed, site-specific engineering analysis for each dam in question. Failure may result from hydrologic and hydraulic design limitations, or from geotechnical or operational factors. The data and time necessary to perform a probabilistic failure analysis for each dam in the region are beyond the scope of this plan.

Vulnerability Assessment

Dam failure has the potential to cause direct or indirect economic impacts, significant and long-term social effects, and negative environmental impacts. Impound water upstream of a dam, when released uncontrollably, may threaten lives in the downstream flow path or cause damage to homes, roads, bridges, and any other infrastructure in its way. Direct economic impacts appear immediately following a dam failure and typically include the need to repair and rebuild structures and infrastructure and reopen businesses. Indirect economic impacts may include unemployment leading to population shifts, difficulty in attracting new business to the area, lower local property tax revenues, etc. Social impacts may include changes in quality of life in the affected community, loss of the public's confidence in public officials, difficulty delivering resources and services to the community, etc. Environmental impacts of dam failure may include the pollution of surface or groundwater, air, and soil; the release of hazardous materials; or the destruction of environmentally sensitive areas. ⁴⁰

Inventory and Summary of Vulnerable Assets

⁴⁰ <https://damsafety.org/sites/default/files/files/FEMA%20TM%20AssessingtheConsequencesofDamFailure%20March2012.pdf>

There are sixteen high hazard dams in New Castle County, no significant hazard dams, and nine low hazard dams. Information concerning the dams is provided in Table 4 and shown in Figure 3. High hazard dams have been labeled on the map.

Dam Name	Owner Types	Primary Purpose	Dam Height (Ft)	Year Completed	Hazard Potential Classification	Conditional Assessment
Becks Pond Dam	State	Fish and Wildlife Pond	21	Not Available	High	Fair
Bellevue Lake Dam	Private	Water Supply	15	1933	High	Not Rated
Carousel Pond Dam	Local Government	Recreation	36.28	Not Available	High	Satisfactory
City of Wilmington Sewage Lagoon	Local Government	Other	20.95	Not Available	High	Fair
City of Wilmington Sludge Disposal Area	Local Government	Other	20	Not Available	High	Fair
Duck Creek Pond Dam	Private	Recreation	9.33	Not Available	High	Not Rated
Edgar M. Hoopes Dam	Local Government	Water Supply	0	1932	High	Satisfactory
Edgemoor Reservoir Dam	Private	Water Supply	13.43	1908	High	Not Rated
New Castle County Water Farm Wastewater Lagoon	Local Government	Other	28.86	Not Available	High	Fair
Newark Reservoir Dam	Local Government	Water Supply	50.5	2005	High	Fair
Porter Reservoir Dam	Local Government	Water Supply	11.8	1909	High	Fair
Rock Manor Golf Course Dam	Local Government	Flood Risk Reduction	23.94	2007	High	Fair
Silver Lake Dam - Middletown	State	Recreation	18	1931	High	Poor
Sunset Lake Dam	Private	Recreation	13.29	1900	High	Not Rated
Brandywine Creek Dam No. 9	State	Recreation	9.19	1800	Low	Not Rated
Canal Farms Dam	Private	Flood Risk Reduction	13	1962	Low	Not Rated
Christiana Lake Dam	Private	Water Supply	17	1907	Low	Not Rated
Lums Pond Dam	State	Recreation	10	Not Available	Low	Not Rated
Noxontown Pond Dam	State	Recreation	14	1966	Low	Not Rated
Shallcross Lake Dam	State	Recreation	8	Not Available	Low	Not Rated
Tailings Pond No. 1 Dam Getty Oil	Private	Other	15	1960	Low	Not Rated

Dam Name	Owner Types	Primary Purpose	Dam Height (Ft)	Year Completed	Hazard Potential Classification	Conditional Assessment
Tailings Pond No. 2 Dam Getty Oil	Private	Other	15	1960	Low	Not Rated
Tailings Pond No. 3 Dam Getty Oil	Private	Other	20	1960	Low	Not Rated
Chesapeake City East Disposal Area, Bethel Road*	Federal	Recreation	42	1968	High	Not Rated
Lake Como Dam*	State	Recreation	15	1938	High	Fair
Lake Somerset*	Private	Recreation	32	1969	High	Fair
Wheatley Pond Dam*	Private	Recreation	8	Not Available	High	Fair

*Located outside the county boundary, but could impact the county.



There are 16 high-hazard dams in New Castle County. This HHPD Risk Assessment provides potential impact maps for each of the 16 high-hazard dams, depicting the location of the dam, the dam breach inundation area, and the building occupancy in the potentially impacted area. Additionally, specific tables are provided for each dam indicating the estimated types and number of buildings impacted in the event a dam breach were to occur, as well as the structure value, content value, and total value for buildings exposed to inundation impacts and within the inundation areas.

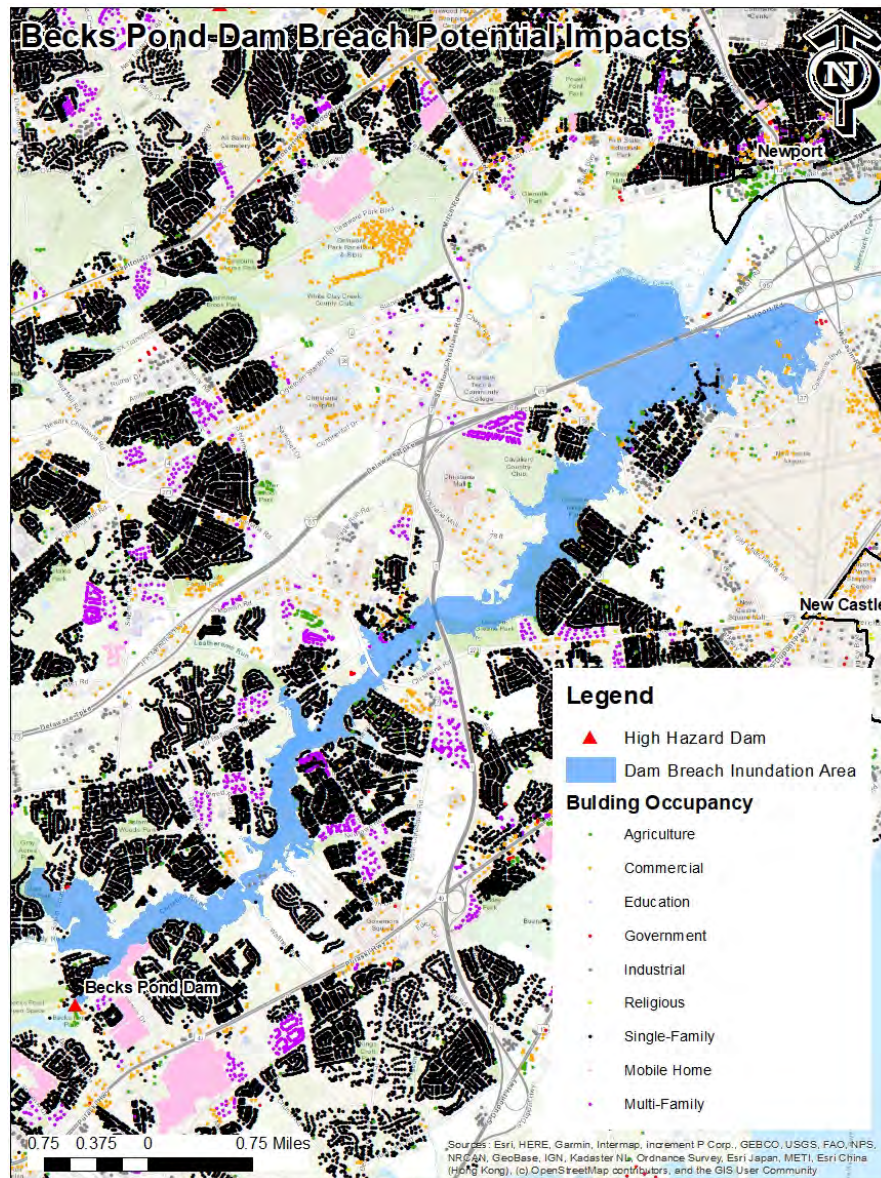
Estimation of Losses

To estimate losses, the inventory developed for the Hazus flood model using building footprints and parcel data was used along with the dam inundation areas. This was completed for each high hazard dam in the County and by each jurisdiction within the County. If a critical facility is located in the dam inundation area, they are identified in the text.

Potential Impacts

To help determine potential impacts from the high hazard dams, the dam inundation maps were digitized from the Emergency Action Plans (EAP) and overlaid with maps and inventory data. These maps and descriptions are provided below.

Becks Pond Dam Breach Impacts



Estimated population at risk from Becks Pond Dam: 307

Becks Pond Dam Losses

Municipality: Unincorporated

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	123	\$14,710,931	\$14,710,931	\$29,421,863
Multi Family	5	\$27,494,719	\$13,747,360	\$41,242,079
Agriculture	23	\$2,135,184	\$2,135,184	\$4,270,368
Commercial	31	\$3,902,439	\$3,902,439	\$7,804,878
Government	1	\$59,587	\$89,380	\$148,966

Industrial	10	\$7,589,927	\$11,384,891	\$18,974,818

Bellevue Lake Dam Breach Impacts



Estimated population at risk from Bellevue Lake Dam: 314

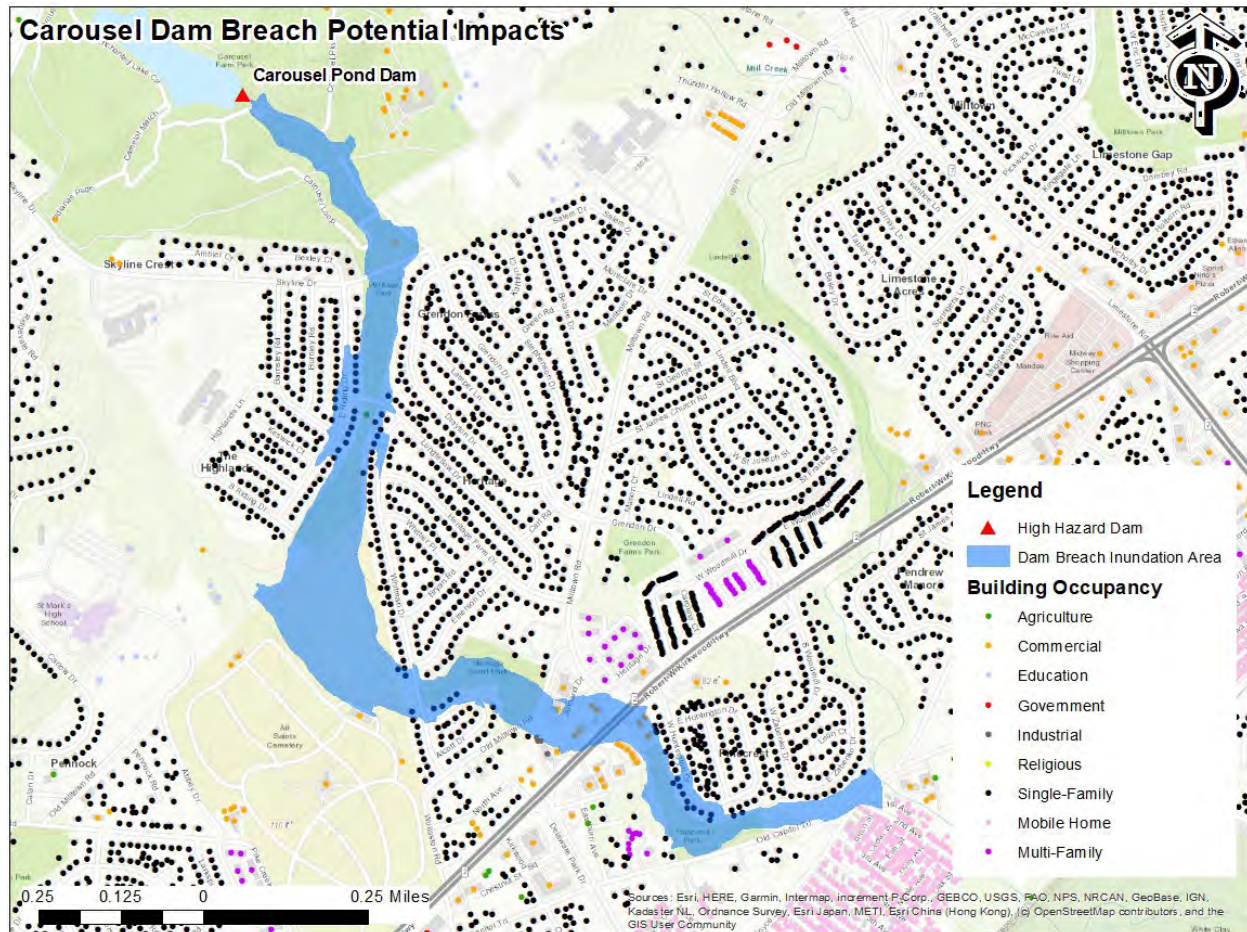
Bellevue Lake Dam Losses

Municipality: Unincorporated

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	3	\$742,938	\$742,938	\$1,485,875

Agriculture	1	\$266,131	\$266,131	\$532,261
Commercial	3	\$1,750,633	\$1,750,633	\$3,501,266
Government	3	\$843,187	\$843,187	\$1,686,374
Industrial	3	\$3,038,200	\$3,697,840	\$6,736,039

Carousel Dam Breach Impacts



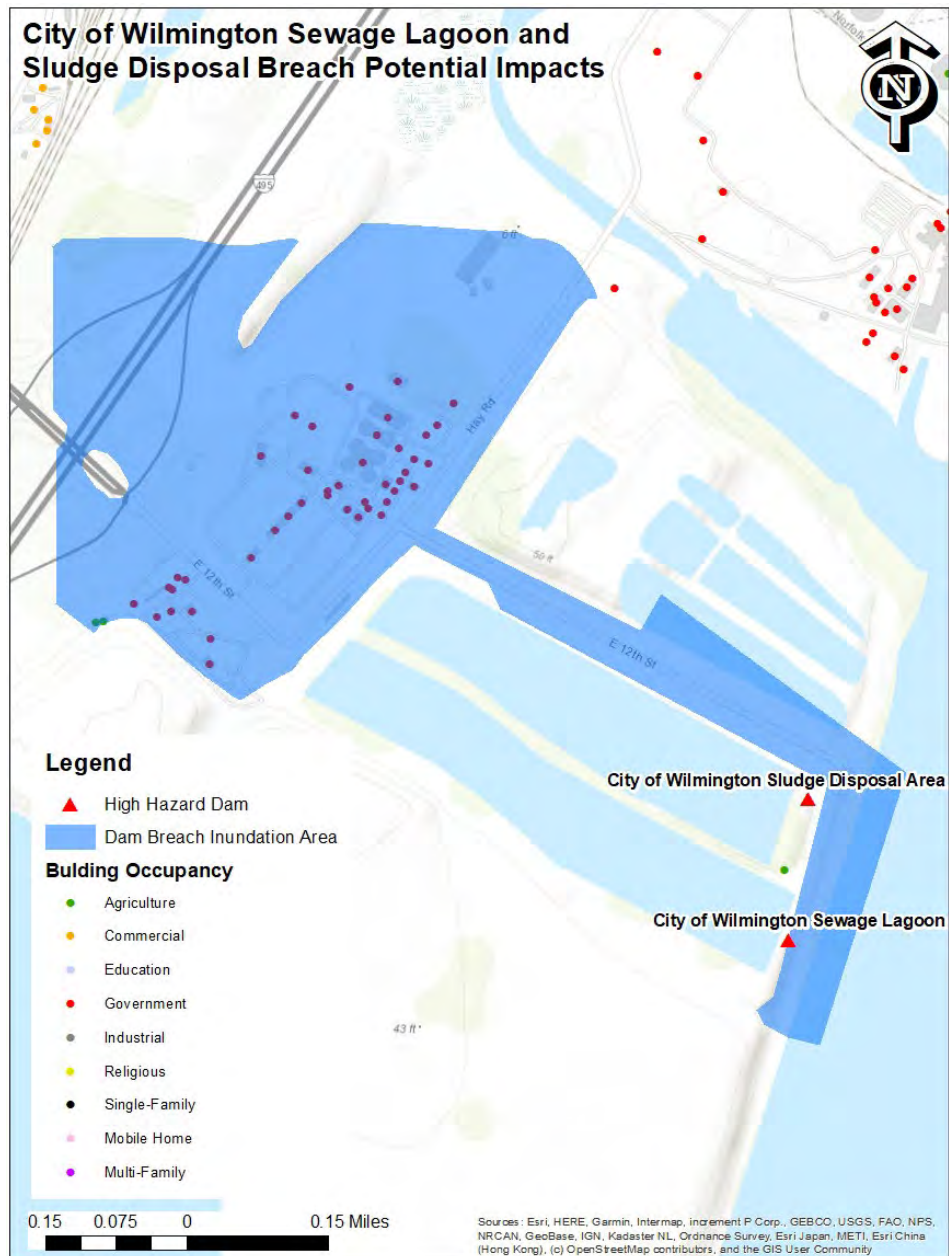
Estimated population at risk from Carousel Dam: 308

Carousel Dam Losses

Municipality: Unincorporated

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	40	\$9,177,053	\$9,177,053	\$638,276
Agriculture	1	\$56,612	\$56,612	\$210,214
Commercial	8	\$4,855,171	\$6,000,001	\$301,324

City of Wilmington Sewage Lagoon and Sludge Disposal Breach Impacts



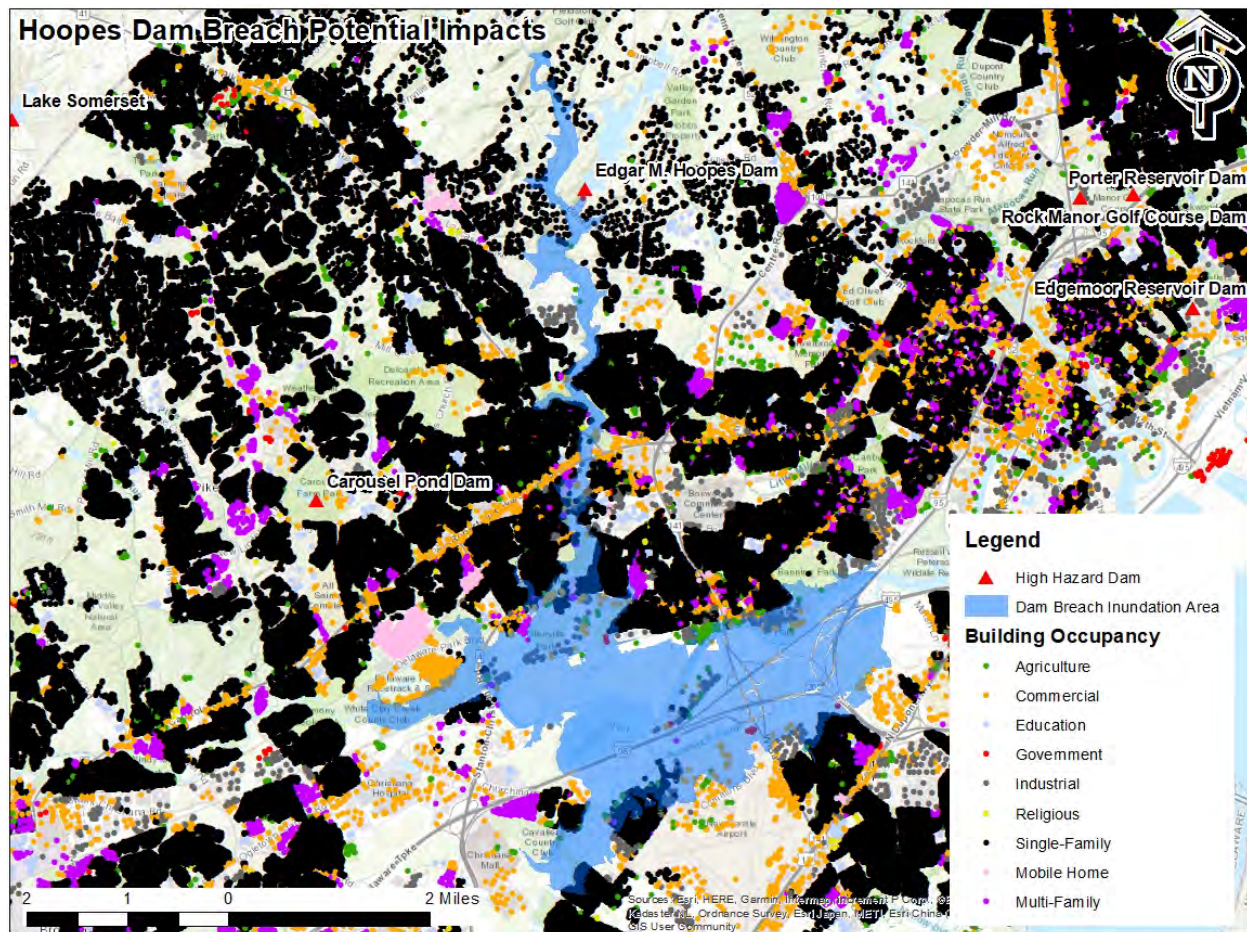
Estimated population at risk from Wilmington Sewage Lagoon and Sludge Disposal: 423

**City of Wilmington Sewage
Lagoon and Sludge Disposal**

Municipality: Wilmington

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Agriculture	2	\$234,993	\$234,993	\$469,985
Government	43	\$27,264,406	\$27,264,406	\$54,528,812

Hoopes Dam Breach Impacts



Estimated population at risk from Hoopes Dam: 7,014

Hoopes Dam Losses

Municipality: Unincorporated

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	861	\$137,246,588	\$137,246,588	\$274,493,175
Mobile Home	83	\$4,268,238	\$2,134,119	\$6,402,357

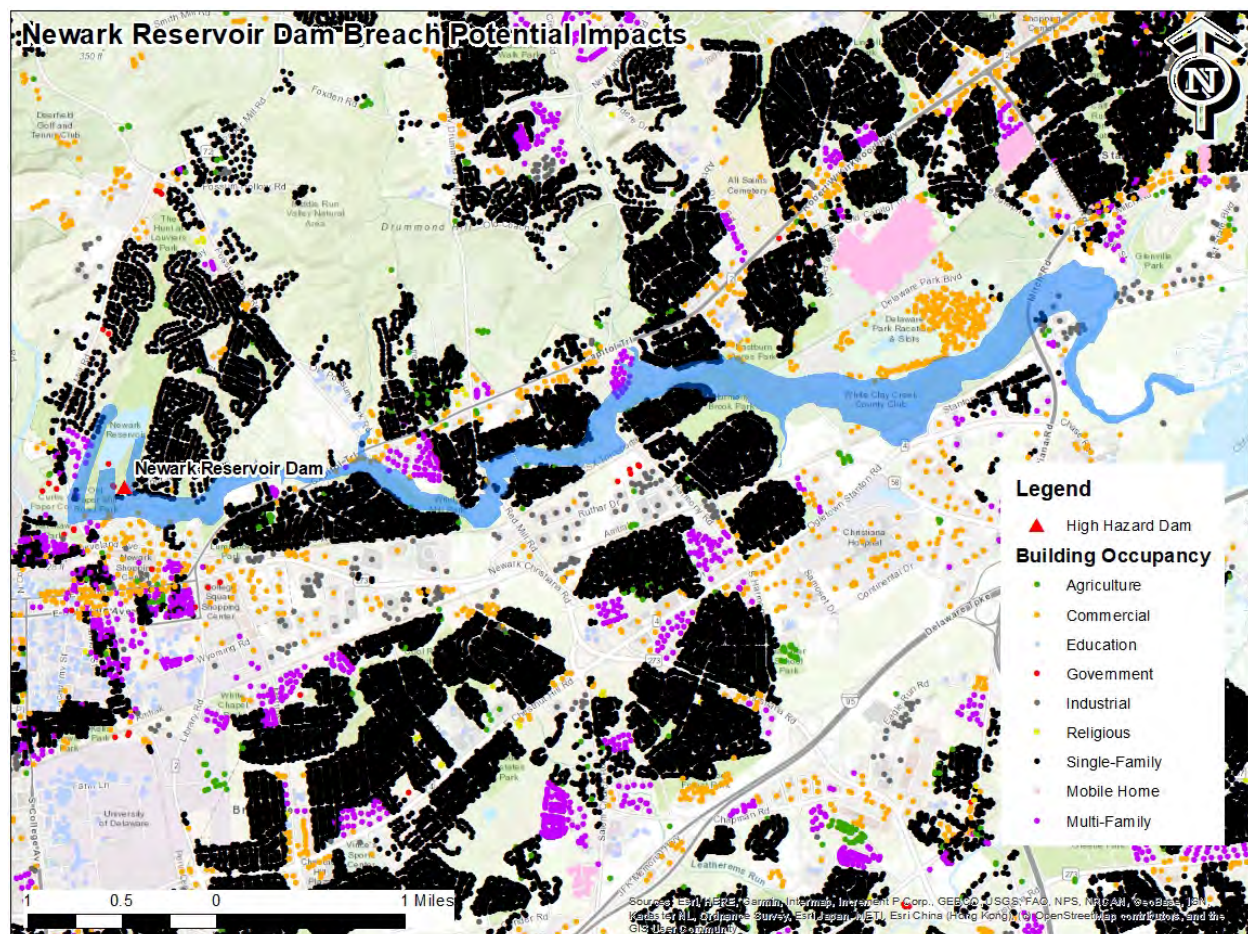
Multi Family	32	\$53,163,351	\$26,581,676	\$79,745,027
Agriculture	69	\$16,735,368	\$16,735,368	\$33,470,737
Commercial	209	\$168,998,327	\$169,413,816	\$338,412,143
Education	3	\$1,414,302	\$1,414,302	\$2,828,604
Government	12	\$2,934,419	\$2,934,419	\$5,868,838
Industrial	212	\$157,110,023	\$108,991,877	\$266,101,900

Hoopes Dam Losses

Municipality: Newport

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	2	\$223,443	\$223,443	\$446,887
Agriculture	15	\$10,941,594	\$10,941,594	\$21,883,187
Commercial	15	\$11,185,660	\$10,770,171	\$21,955,831
Industrial	55	\$96,236,293	\$144,354,439	\$240,590,732

Newark Reservoir Dam Breach Impacts



Estimated population at risk from Newark Reservoir Dam: 3,248

Newark Reservoir Dam Losses

Municipality: Unincorporated

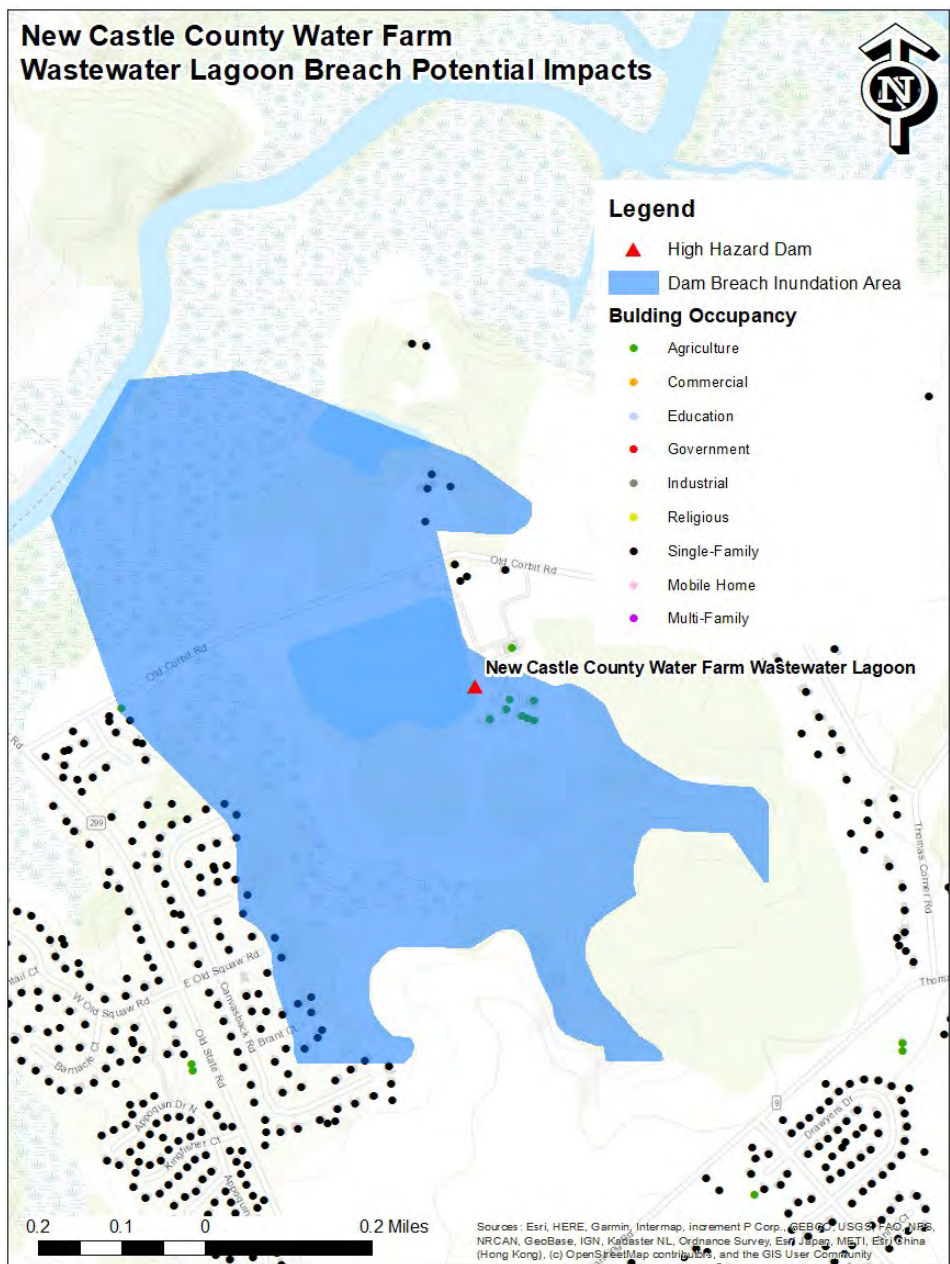
Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	106	\$14,898,121	\$14,898,121	\$29,796,243
Multi Family	106	\$14,024,319	\$19,259,157	\$33,283,476
Agriculture	1	\$30,625	\$30,625	\$61,250
Commercial	22	\$8,900,017	\$8,900,017	\$17,800,034
Government	2	\$27,796,893	\$27,796,893	\$55,593,785
Industrial	8	\$11,066,721	\$16,600,082	\$27,666,803

Newark Reservoir Dam Losses

Municipality: Newark

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	19	\$9,595,873	\$9,595,873	\$19,191,745
Multi Family	7	\$10,469,675	\$5,234,837	\$15,704,512
Commercial	7	\$19,041,708	\$19,041,708	\$38,083,416
Government	2	\$144,832	\$144,832	\$289,665

New Castle County Water Farm Wastewater Lagoon Breach Impacts



Estimated population at risk from NCC Water Farm Wastewater Lagoon: 462

New Castle County Water Farm Wastewater Lagoon Dam Losses
Municipality: Unincorporated

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)

Estimated population at risk from Porter Reservoir Dam: 523

Porter Reservoir Dam Losses

Municipality: Wilmington

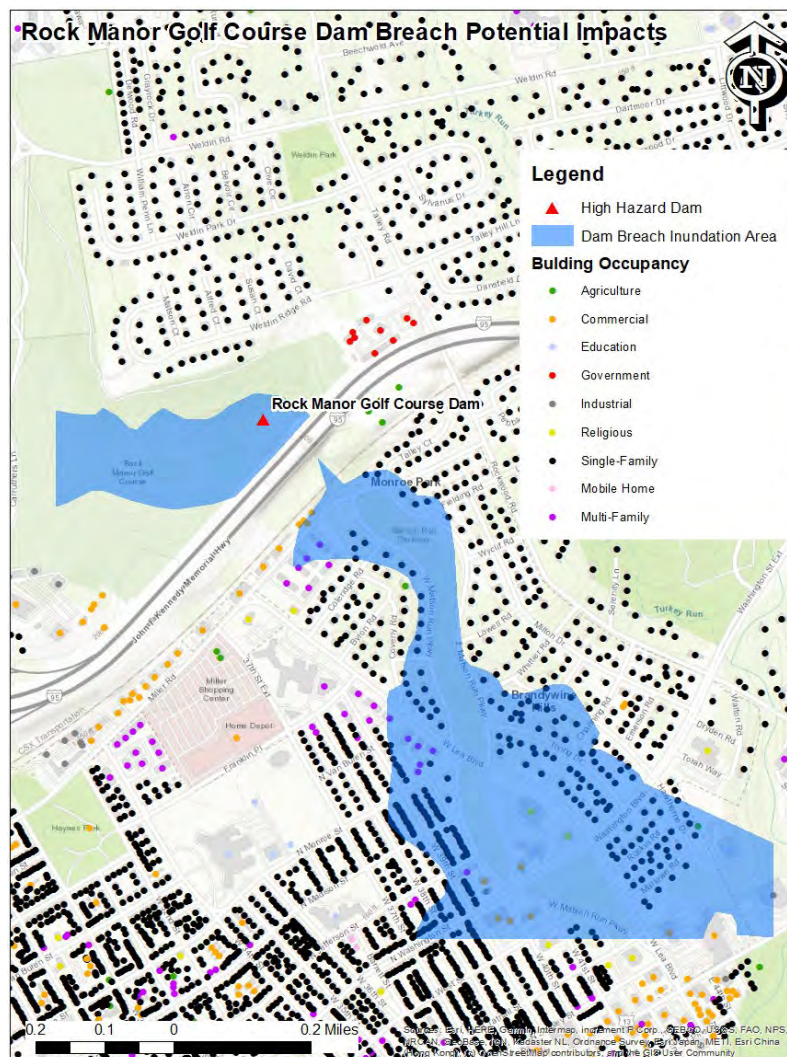
Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	2	\$302,125	\$302,125	\$604,249
Multi Family	3	\$7,044,467	\$3,522,234	\$10,566,701

Porter Reservoir Dam Losses

Municipality: Unincorporated

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	3	\$341,094	\$341,094	\$682,187
Commercial	4	\$12,597,838	\$12,597,838	\$25,195,676
Industrial	12	\$6,177,814	\$9,266,721	\$15,444,535

Rock Manor Golf Course Dam Breach Impacts



Estimated population at risk from Rock Manor Golf Course Dam: 1,242

Rock Manor Golf Course Dam Losses

Municipality: Wilmington

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	241	\$49,090,904	\$49,090,904	\$98,181,809
Multi Family	10	\$15,616,791	\$7,808,396	\$23,425,187
Commercial	6	\$12,060,183	\$13,335,180	\$25,395,363
Education	1	\$4,280,798	\$4,280,798	\$8,561,596
Industrial	1	\$420,208	\$630,311	\$1,050,519

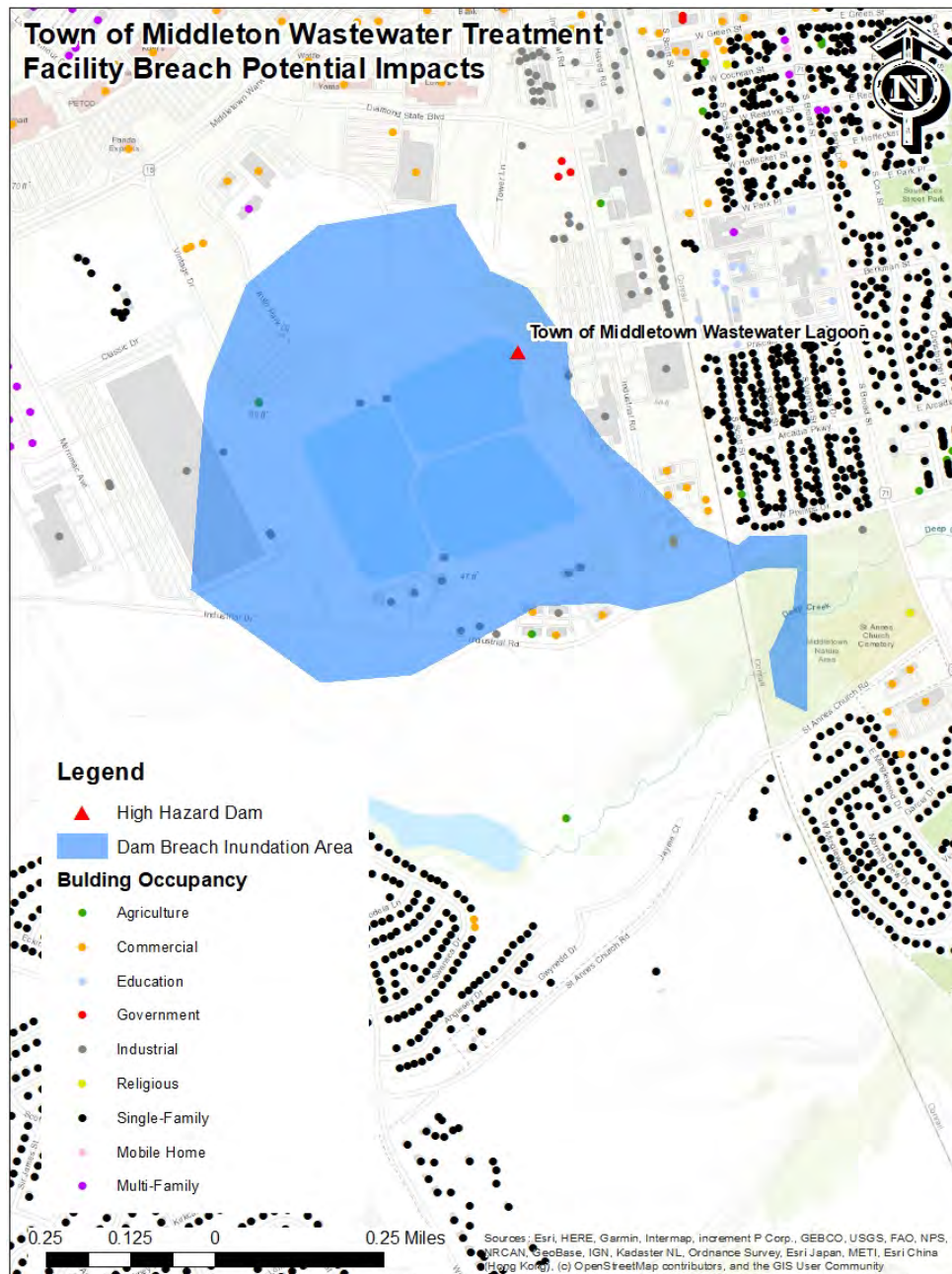
Religious	2	\$7,788,273	\$7,788,273	\$15,576,547

Rock Manor Golf Course Dam Losses

Municipality: Unincorporated

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	2	\$663,518	\$663,518	\$1,327,035
Agriculture	1	\$37,124	\$37,124	\$74,248
Commercial	3	\$805,755	\$805,755	\$1,611,509
Education	1	\$4,563,894	\$4,563,894	\$9,127,789

Town of Middletown Wastewater Treatment Facility Breach Impacts

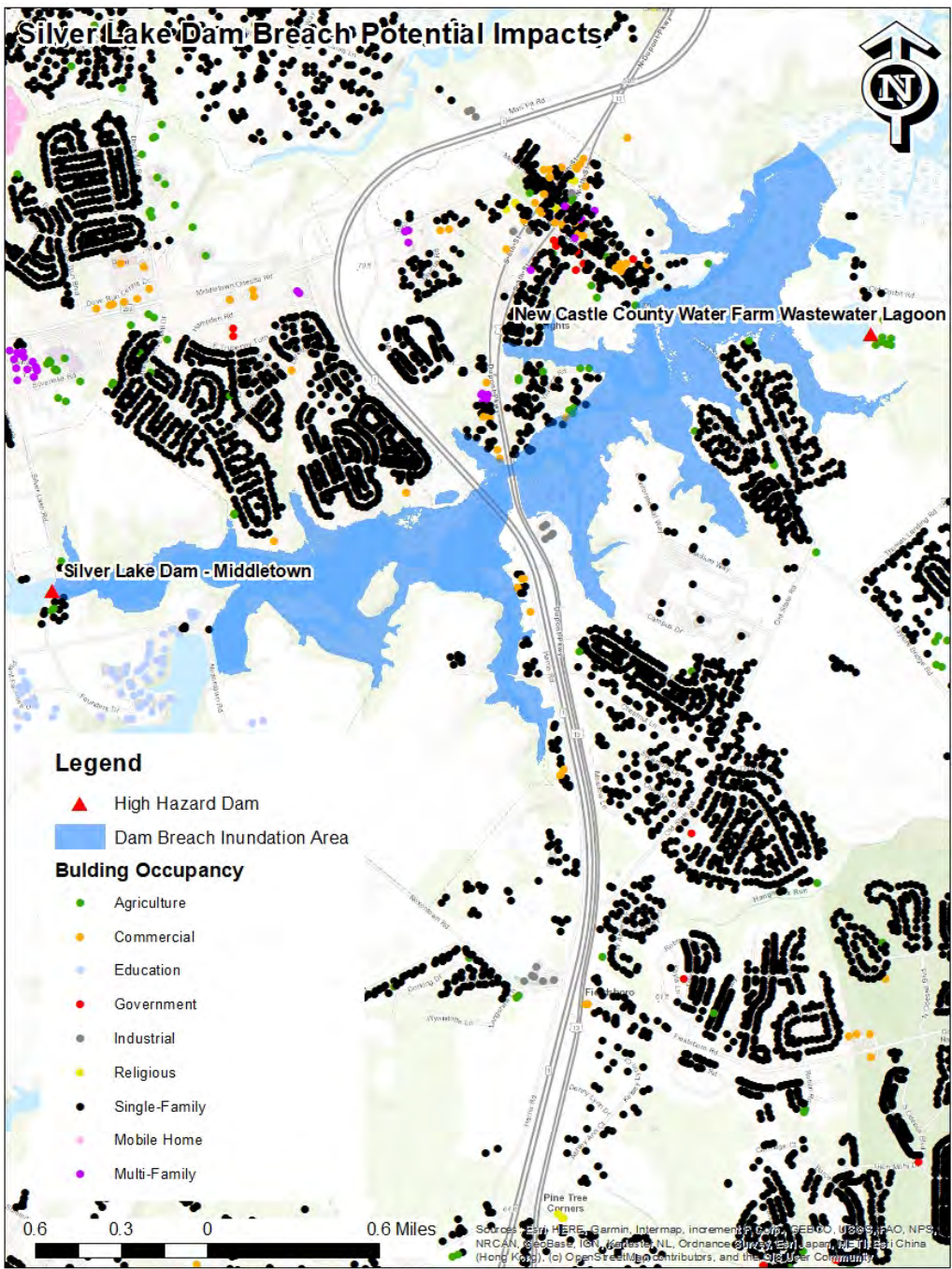


Estimated population at risk from Middletown Wastewater Treatment Dam: 272

Town of Middleton Wastewater Treatment
Facility Dam Losses
Municipality: Middleton

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Agriculture	2	\$42,178	\$42,178	\$84,357
Commercial	2	\$42,630	\$42,630	\$85,260
Industrial	14	\$5,745,150	\$8,617,725	\$14,362,876

Silver Lake Dam Breach Impacts



Estimated population at risk from Silver Lake Dam: 46

Silver Lake Dam Losses

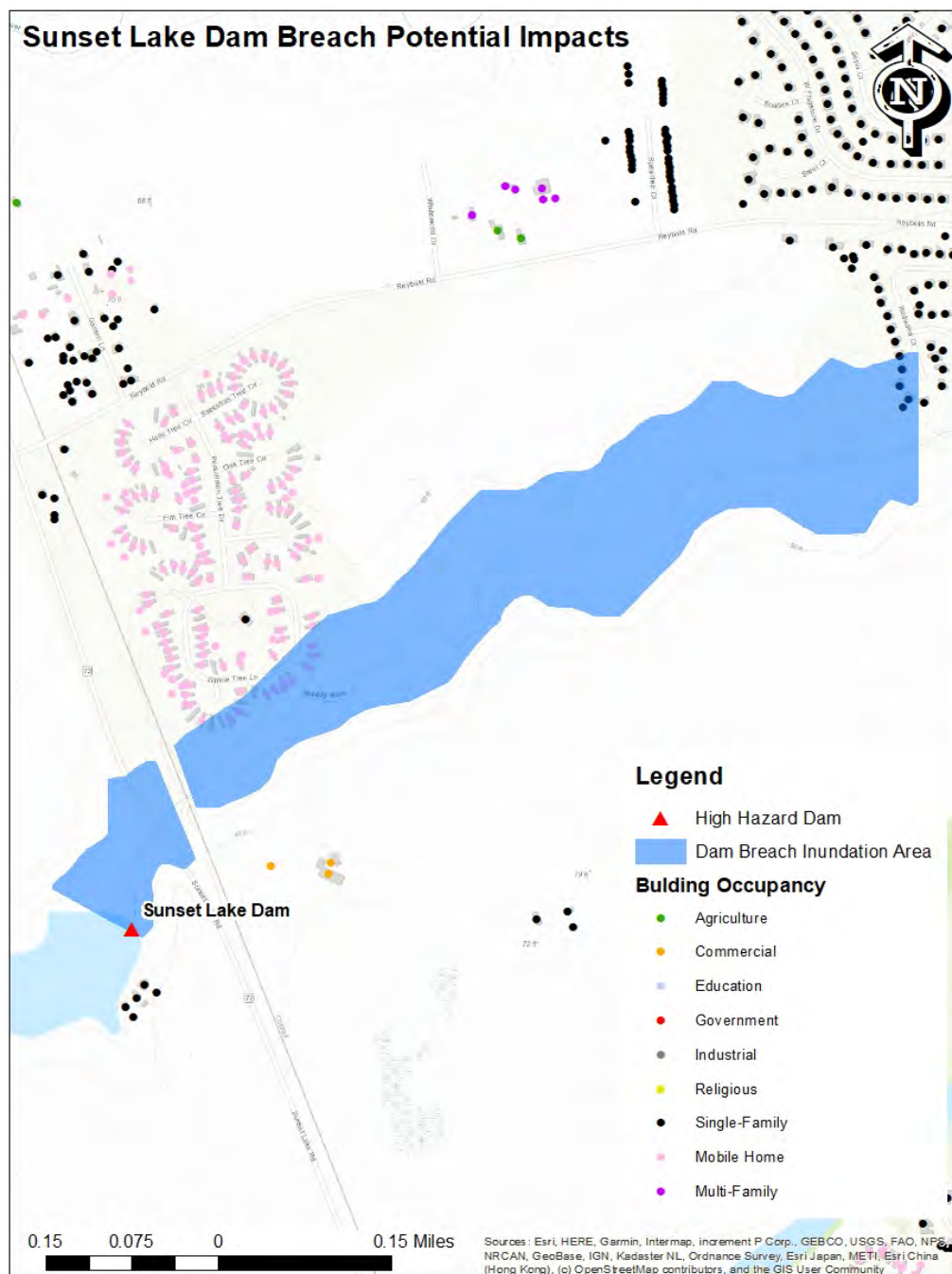
Municipality: Unincorporated

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)

Single Family	8	\$371,956	\$371,956	\$743,912
Agriculture	1	\$31,165	\$31,165	\$62,330
Commercial	1	\$116,199	\$116,199	\$232,399

Critical Facility Exposed: Wastewater Treatment Plant

Sunset Lake Dam Breach Impacts



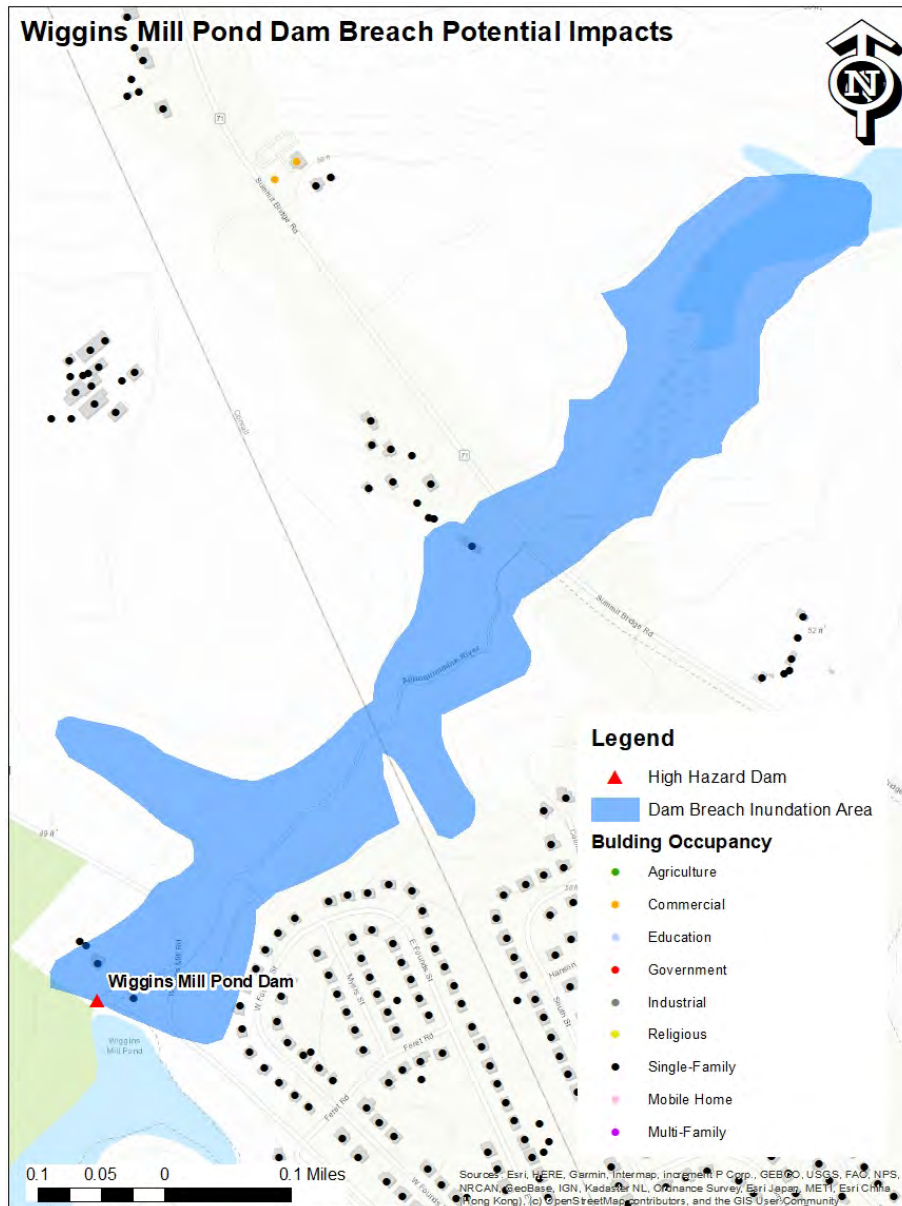
Estimated population at risk from Sunset Lake Dam: 1,329

Sunset Lake Dam Losses

Municipality: Unincorporated

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	5	\$989,612	\$989,612	\$1,979,224
Mobile Home	10	\$537,704	\$268,852	\$806,557

Wiggins Mill Pond Dam Breach Impacts



Estimated population at risk from Wiggins Mill Pond Dam: 24

Wiggins Mill Pond Dam Losses

Municipality: Townsend

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	1	\$108,771	\$108,771	\$217,542

Wiggins Mill Pond Dam Losses

Municipality: Unincorporated

Occupancy	Number of Buildings	Structure Loss (\$)	Content Loss (\$)	Total Loss(\$)
Single Family	3	\$841,668	\$841,668	\$1,683,337

Limitations and Deficiencies

A dam safety deficiency is defined as a load capacity limit or other issue that can result in a failure of the dam or appurtenant structure.⁴¹ It is a characteristic or condition that does not meet the applicable minimum regulatory criteria.⁴² Dam safety deficiencies are often caused by inadequate dam design, construction methods, or the results of inadequate operation and maintenance that have compromised the structural or operational integrity of the dam.⁴³ Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action.

The County will look to build off of this HHPD Analysis, included attempting to address any gaps in data. During the next plan update, the County will look to address any gaps in data related to the following components: inundation mapping and consequence data; population and receptor exposure; critical facilities and community lifelines; dam condition and structural performance; hydrology and climate stressors; and gaps in Emergency Action planning.

Corrective actions should be in place to address potential HHPD deficiencies in New Castle County. Corrective actions may include preventive maintenance; replacement of parts, systems, or components; and other activities needed to preserve or maintain a dam.⁴⁴ Capital improvement corrective actions should be in place, as well, directed towards expanding the capacity of a dam or otherwise upgrading it to serve needs different from, or significantly greater than, its current use.⁴⁵

HHPD Mitigation Strategy

HHPD Goals

HHPD Goal 1 - Participate in FEMA's High-Hazard Potential Dam Program (HHPD).

- Educate New Castle County municipalities, property owners, and businesses about FEMA's HHPD program.
- Reduce long-term vulnerability from eligible high-hazard potential dams that pose an unacceptable risk to the public.
- Identify, by area, locations in New Castle County that could potentially be impacted by FEMA's HHPD program.
- Develop floodplain management strategies to reduce HHPD risk.

⁴¹ FEMA, Rehabilitation of High Hazard Potential Dams, https://www.fema.gov/sites/default/files/2020-08/fema_hhpd_grant-guidance.pdf.

⁴² FEMA, Rehabilitation of High Hazard Potential Dams, https://www.fema.gov/sites/default/files/2020-08/fema_hhpd_grant-guidance.pdf.

⁴³ FEMA, Rehabilitation of High Hazard Potential Dams, https://www.fema.gov/sites/default/files/2020-08/fema_hhpd_grant-guidance.pdf.

⁴⁴ Washington Department of Ecology, Rehabilitation of High Hazard Potential Dams Grant Program Fiscal Year 2021, <https://apps.ecology.wa.gov/publications/documents/2111021.pdf>.

⁴⁵ Ibid.

HHPD Mitigation Actions

The following mitigation actions have been developed specifically for the breach of a High high-hazard dams and to reduce the vulnerabilities associated with HHPDs in New Castle County. All HHPD-related actions have been evaluated and prioritized through a process based on cost-effectiveness, impacts to the environment, and technical feasibility. Like the mitigation strategy for all other hazards, the same prioritization criteria were applied for the HHPD, as provided in Table 6.1. The three criteria (economic, administrative, and social considerations) were used to determine the level (high, medium, and low) for the social, administrative, and economic considerations for each action.

Appendix A Table 1 HHPD Mitigation Actions

Action #	Hazard	Action	Lead Agency	Prioritization Total	Timeline	Cost	Funding	Action Category
HHPD 1	Dam Failure	Distribute educational pamphlets about the HHPD program to municipalities and county residents.	County EMA and County Planning	10	1-2 years	<\$25,000	FEMA HHPD Grant Program	Outreach and Education
HHPD 2	Dam Failure	Provide education on local mitigation policies and programs that address high-hazard potential dams to county residents and municipalities.	County EMA and County Planning	10	1-2 years	<\$25,000	FEMA HHPD Grant Program	Outreach and Education
HHPD 3	Dam Failure	Maintain digitized dam inundation GIS polygons to determine at risk populations for dams designated High-Hazard Potential Dams.	County EMA and County Planning	12	1-2 years	<\$25,000	FEMA HHPD Grant Program	Structure and Infrastructure Projects
HHPD 4	Dam Failure	Explore the rehabilitation of high hazard potential dams within the County as the need arises by.	County EMA and Dam Owners	9	1-2 years	>\$100,000	FEMA HHPD Grant Program	Structure and Infrastructure Projects
HHPD 5	Dam Failure	Enforce land use and subdivision ordinances within identified dam breach flood zones.	County Planning	10	Continuous	<\$25,000	FEMA HHPD Grant Program	Local Plans and Ordinances
HHPD 6	Dam Failure	Explore the acquiring and/or elevating structures, and/or acquiring easements within identified high hazard dam inundation/flood zones.	County EMA and County Planning	12	1-2 years	<\$25,000	FEMA HHPD Grant Program	Structure and Infrastructure Projects
HHPD 7	Dam Failure	Implement flood protection measures such as berms, floodwalls or floodproofing within identified high hazard dam inundation/flood zones.	County EMA and County Planning	16	1-2 years	>\$100,000	FEMA HHPD Grant Program	Structure and Infrastructure Projects

Action #	Hazard	Action	Lead Agency	Prioritization Total	Timeline	Cost	Funding	Action Category
HHPD 8	Dam Failure	Identify HHPDs with deficiencies and work with the owners to perform an analysis to understand and address different deficiencies	County EMA and County Planning	12	1-2 years	>\$100,000	FEMA HHPD Grant Program	Structure and Infrastructure Projects
HHPD 9	Dam Failure	Pursue additional data and perform an in-depth analysis to understand the population at risk, including any vulnerable populations, for all HHPDs.	County EMA and County Planning and Dam Owners	12	1-2 years	<\$25,000	FEMA HHPD Grant Program	Structure and Infrastructure Projects

Each of the HHPD-related mitigation actions align with HHPD Goal #1. Appendix A Table 22 shows which actions align with the HMP's goals.

Appendix A Table 2 Alignment of HHPD Goals and Actions

HHPD Goal	Action Aligning with HHPD Goals
HHPD Goal #1: Participate in FEMA's High-Hazard Potential Dam Program (HHPD).	HHPD Actions 1 – 9
Goal 1: New Castle County and its municipalities will continue to maximize the use of technology (GIS, remote sensing, etc.) to develop sound mitigation policies and projects based upon risk and an enhanced risk assessment.	HHPD Actions 3, 9
Goal 2: New Castle County and its municipalities will continue to emphasize the use of sound planning practices to reduce the impacts of natural, technological, and human-caused hazards.	HHPD Actions 1 – 9
Goal 3: New Castle County and its municipalities will continue to acquire or upgrade existing equipment to improve disaster readiness and implement hazard mitigation measures.	HHPD 7,8
Goal 4: New Castle County and its municipalities will continue to improve communication and warning systems to better protect lives and property from the potential impacts of all hazards.	HHPD 4
Goal 5: New Castle County and its municipalities will continue to enhance and implement local codes and ordinances at higher standards to reduce the impacts of all hazards while considering a holistic approach at the project level.	HHPD 5
Goal 6: New Castle County and its municipalities, and the State (DELDOT) will continue to enhance measures to improve evacuation flow and operations, sheltering and security concerns.	N/A

Goal 7: New Castle County and its municipalities will continue to enhance education and outreach strategies to improve the dissemination of information to the public regarding hazards, including the steps that can be taken to reduce hazard impacts.	HHPD 1, 2
Goal 8: New Castle County and its municipalities will continue to adopt mitigation measures that better protect critical facilities and technology infrastructure from the impacts of all hazards.	HHPD 4, 6, 7
Goal 9: New Castle County and its municipalities will continue to identify and implement sound hazard mitigation projects.	HHPD 4, 6, 7
Goal 10: New Castle County and its municipalities will ensure that sound stormwater and drainage management principles are implemented throughout the County.	HHPD 5
Goal 11: New Castle County and its municipalities will continue to identify potential funding sources and partnerships for projects.	N/A

HHPD Funding Sources

A potential current funding source to help implement mitigation actions and activities for HHPDs is the FEMA Rehabilitation of High Hazard Dam Grant Program, which is a component of the National Dam Safety Program. The Rehabilitation of High Hazard Potential Dams Grant Program provides technical, planning, design, and construction assistance in the form of grants for the rehabilitation of eligible high-hazard potential dams. A state or territory with an enacted dam safety program, the State Administrative Agency (SAA), or an equivalent state agency, is eligible for the grant. Eligible subrecipients under the HHPD grant program include non-federal governmental organizations (other than the designated applicant) and nonprofit organizations.

Local Mitigation Policies, Programs, and Capabilities for HHPDs

For each High Hazard Potential Dam, it is required for an Emergency Action Plan (EAP) is required to be developed, and these Plans are an effective resource that lays out policies, programs, and capabilities associated with HHPDs in New Castle County. The EAP provides policies, programs, capabilities, and procedures related to the concept of operations, responsibilities and duties, administration and logistics, and exercise and training. Additionally, the EAP includes location and inundation maps, lists of traffic control points and the responsible entity for maintaining traffic control points, important contact lists, and pre-developed media announcements for early warning, warning, and evacuation, and incident resolved messages should a failure occur at an HHPD. The EAP identifies who and which entities will be involved in the Emergency Response to a dam failure.

Operation and Maintenance Inspection Reports are also important resources that can help describe and analyze the effectiveness of local mitigation policies, programs, and capabilities that address HHPDs. The Operations and Maintenance Inspection Report typically describe the inspection findings and recommendations, project location maps, dam inspection photos, and a dam inspection



checklist. This resource provides in-depth analysis and information about specific dams, helping to provide effective county policies, programs, and capabilities to address HHPDs.

In the future, the County may consider additional ways to reduce risk related to high-hazard dams, for example, by developing tools or policies to regulate land use around dams.

HHPD Funding Prioritization

The National Dam Safety Review Board recommends a Project Prioritization Method for applicants to use to meet the priority system process required by the Water Infrastructure Improvements for the Nation Act. The Project Prioritization Method launched in tandem with the HHPD Notice of Funding Opportunity. Once the Notice of Funding Opportunity (NOFO) was announced, the HHPD application process established the funding states will receive by successfully making an application for that grant period. Grant recipients can prioritize and document how the funds will be allocated to eligible subrecipients.

For prioritizing funding for HHPDs, a benefit and cost prioritization will be performed by the County. All benefit and cost analyses should be completed, effectively providing a criterion for prioritizing funding for HHPDs. Limitations and future deficiencies associated with high-hazard dams are still under review and will be addressed as part of the next County HMP Update.

APPENDIX B – BIBLIOGRAPHY

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APPENDIX C – MEETING AND OTHER PARTICIPATION DOCUMENTATION

Meeting Summaries, Meeting Attendance Lists, and all information request worksheets returned from municipalities are included herein Appendix C. Appendix C includes:

- Meeting Agendas
- Meeting Attendance Sheets
- Local Hazard Area Responses
- Hazard Mitigation Action Responses

**Capability Questionnaire Responses are included at the end of the PDF version of this Plan

Planning Process Timeline:

- Kickoff Meeting – 7/25/24
- Public Survey – 2/11/2025 – 4/1/2025 (13 total responses)
- Steering Committee Meeting 1 – 11/13/24
- Municipality Meeting 1 – 11/13/24
- Steering Committee Meeting 2 – 2/10/2025
- Municipality Meeting 2 – 2/10/2025
- Steering Committee Meeting 3 – 8/6/2025
- Public Meeting – 8/6/2025
- Public Draft Review Period – 10/23/2025-11/22/2025

Meeting Agendas and Attendance Sheets

New Castle County 2025 Hazard Mitigation Plan Update

Steering Committee/Municipality Meeting #1

Meeting Agenda

Date: November 13, 2024

Time: 2:00pm - 3:30pm/6:00pm-7:30

Introductions

- Welcome (NCC Emergency Management)
- Consultants Introduction (VPC)

Project Overview Presentation

- Background
- Progress to Date
- HIRA Overview and Preliminary Results
 - o Review/Discuss Hazard Rankings

Goals and Objectives Review

- Review Past Hazard Mitigation Plan Goals
- Discuss Potential New Goals or Suggested Edits for 2025 Update

Mitigation Actions Review

- Review Past Countywide Hazard Mitigation Actions and determine the status of all past actions.
- Discuss Proposed New Actions or Suggested Edits for 2025 Update
- Discussion of Outreach Packets for Municipalities

Open Discussion

Next Steps

- Continue to update the Risk Assessment
- Receive Information packets back from municipalities
- Develop new actions based on HIRA and County feedback, and begin updating the Mitigation Strategy Chapter
- Update capability assessment based on feedback received from County and municipalities
- Begin Planning for and determine timeframe for the 2nd Steering Committee/Municipal Meeting
- Continue developing the HHPD Analysis
- Begin Developing Draft Plan

Questions

Adjournment

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New Castle County Hazard Mitigation Plan Update
Steering Committee/Municipality Meeting #2

Agenda

Date: February 10, 2025

Past Actions Review

- Examine Remaining Past Mitigation Actions and Identify Status

New Actions Review

- Examine New Mitigation Actions that Address Goals and Objectives

Mitigation Actions

- Mitigation Action Finalization
- Prioritize Mitigation Actions
- Implementation Strategy

Open Discussion

Questions

Next Steps

- Develop Draft Plan for Public Review
- Develop Final Plan for PEMA/FEMA Review

Questions

Adjournment

SIGN-IN SHEET
New Castle County Hazard Mitigation Plan Update 2025
2nd Steering Committee Meeting
February 10, 2025

Name	Agency/Municipality	Email Address	Phone
Steven Schultz	Delco DES	SchultzS@CO.delaware, PA.US	610 909 5494
Muriel Allaband	DHSS	muriel.gillegree@Del	302 612-1058
JUANITA POOLE	DHSS	JUANITA.Pooler@Delaware.gov	13021 223-2999
Larry Bakk	DELCO	bakk@co.delaware,pa.us	484 486 4767
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Josh Kelly	Y D	Josh.Kelly@ndlr	302-304-894
Michael Harris	NCC PW	Michael.Harris@ndlr	580 6
Mark Logemann	NCC FMS	Mark.Logemann@newcastlede.gov	302-395-5186
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Chris Johnson	NCC EMS	Christopher.Johnson@newcastlede.gov	395-8123
Kathy Potter	DNREC	Kathy.Potter@delaware.gov	
Michael Berth	Cecil Co. DES	michael.berth@cecilcountymd.gov	443-945-2826
ANDREW BERW	NCC-Community SERVICES	ANDREW.BERW@NEWCASTLEDE.GOV	302 395-5890
William Ethridge	FEMA RS	William.Ethridge@FEMA.DHS.GOV	202-765-8592

VPC

SIGN-IN SHEET
New Castle County Hazard Mitigation Plan Update 2025
2nd Municipality Meeting
February 10, 2025

[illegible]

New Castle County Hazard Mitigation Plan Update

Steering Committee #3

Agenda

Date: August 6, 2025

Past Action Review

- Examine Remaining Past Mitigation Actions and Identify Status

New Actions Review

- Examine New Mitigation Actions that Address Goals and Objectives

Mitigation Actions

- Mitigation Action Finalization
- Prioritize Mitigation Actions
- Implementation Strategy

Open Discussion

Questions

Next Steps

- Develop Draft Plan for Public Review
- Develop Final Plan for PEMA/FEMA Review

Questions

Adjournment



SIGN-IN SHEET
New Castle County Hazard Mitigation Plan Update 2025
3rd Steering Committee Meeting
August 6, 2025

Name	Agency/Municipality	Email Address	Phone
Lorri Wall	DHSS	lorri.wall@delaware.gov	302 223-2944
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Doug HOKUF	NCCDLU	STEPHEN.HOKUF@NEWCASTLEDE.GOV	395-5448
Janice Shute	DNREC Dam Safety	Janice.Shute@delaware.gov	302-
Phillip Cane	DEMA	Phillip.cane@delaware.gov	302-650-8052
Cleow Cante	Public Works	Cleow.Cante@newcastlecountyde.gov	302 373-7882
Adam Andresen	University of Delaware	andresen@udel.edu	740-457-8407
Andrew Estrain	VPC	-	-

Public meeting:

The press release was also sent to the local newspaper via email. There was one member of the public in attendance. The announcement is included below.

New County Public Invitation Language

The New Castle County Department of Public Safety will hold a public meeting on Wednesday, August 6th, 2025, from 6:00 p.m. to 7:00 p.m. The meeting will take place at the New Castle County Gilliam Building Multipurpose Room, located at 67 Reads Way, New Castle, DE 19720.

This meeting will solicit input and discuss the County's Hazard Mitigation Plan Update. These plans define goals and actions that can be taken to mitigate impacts from a variety of hazards, including flooding, within the County. Every five years the County is required to update these plans.

Staff members from the County's Department of Public Safety will be on hand, as will Vision Planning & Consulting, LLC, to explain the update process, to answer any questions, and to gather public comments.

If interested in attending, send an email to astrain@vision-pc.net or Christopher.Hodgden@newcastlede.gov.

Those unable to attend the meeting who would like to view the information and/or have questions regarding the County Hazard Mitigation Plan Update should contact Chris Hodgden by email at Christopher.Hodgden@newcastlede.gov.

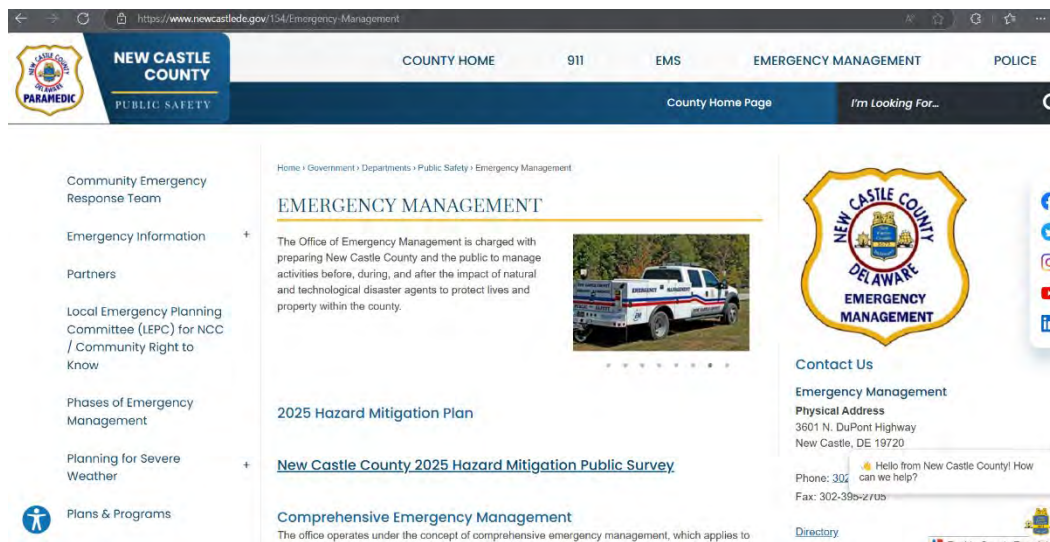
Public Meeting Advertisement

The screenshot shows the Delaware Online website with a navigation bar at the top. The main content area is titled "Govt Public Notices" and dated "07/25/2025". It features a "Share" button with social media icons and a "Print" button. The notice text reads: "New Castle County Public Invitation. The New Castle County Department of Public Safety will hold a public meeting on Wednesday, August 6th, 2025, from 6:00 p.m. to 7:00 p.m. The meeting will take place at the New Castle County Gilliam Building MultipurposeRoom, located at 67 Reads Way, New Castle, DE 19720. This meeting will solicit input and discuss the County's Hazard Mitigation Plan Update. These plans define goals and actions that can be taken to mitigate impacts from a variety of hazards, including flooding, within the County. Every five years the County is required to update these plans. Staff members from the County's Department of Public Safety will be on hand, as will Vision Planning & Consulting, LLC, to explain the update process, to answer any questions, and to gather public comments. July 25 2025 LDOV0337834". On the left side, there is a sidebar with a "Public notices, delivered" section that includes a form to enter an email address for delivery.

[illegible]

Public Survey Documentation

The public survey was open from 2/11/2025-4/1/2025, and received a total of 13 responses. Below are snapshots from the survey's advertisement. The survey was advertised on the Emergency Management website, its social media account, and QR code flyers were placed in County libraries.





Public Review:

The Draft Plan was posted for public review for one month, from 10/23/25-11/22/25. During the 30-day review period, no public comments were received, therefore, no public comment log has been included. The advertisement for the public review period was posted on the OEM website, its social media accounts, and on QR code flyers at county libraries. The photo below shows the ad at the Kirkwood Library.



Municipal Local Hazard Areas

Arden

HAZARD AREA IDENTIFICATION

Municipality: Arden

Contact Name:

Contact Email:

Contact Phone Number:

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas: NONE AT THIS TIME

Hazard Area #1:

Location (ex. – address, cross streets, or road segments.):

Hazard type (ex. – flood area):

Hazard Description (ex. – no stormwater pipes along roadway, rainwater washes out roads)

Notes:

Ardencroft

HAZARD AREA IDENTIFICATION

Municipality: Ardencroft

Contact Name:

Contact Email:

Contact Phone Number:

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas: NONE AT THIS TIME

Hazard Area #1:

Location (ex. – address, cross streets, or road segments.):

Hazard type (ex. – flood area):

Hazard Description (ex. – no stormwater pipes along roadway, rainwater washes out roads)

Notes:

Ardentown

HAZARD AREA IDENTIFICATION

Municipality: Ardentown

Contact Name:

Contact Email:

Contact Phone Number:

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas: NONE AT THIS TIME

Hazard Area #1:

Location (ex. – address, cross streets, or road segments.):

Hazard type (ex. – flood area):

Hazard Description (ex. – no stormwater pipes along roadway, rainwater washes out roads)

Notes:



HAZARD AREA IDENTIFICATION

Municipality: Town of Bellefonte

Contact Name: Scott MacKenzie

Contact Email: townofbellefonte@hotmail.com

Contact Phone Number: 302-761-9638

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas:

Hazard Area #1: NONE

Location (ex. – address, cross streets, or road segments.):

Hazard type (ex. – flood area):

Hazard Description (ex. – no stormwater pipes along roadway, rainwater washes out roads):

Notes:

Hazard Area #2: NONE

Location (ex. - address, cross streets, or road segments):

Hazard type (ex. - flood, pipeline, land subsidence):

Hazard Description:

Notes:

Hazard Area #3: NONE

Location (ex. - address, cross streets, or road segments):

Hazard type (ex. - flood, pipeline, land subsidence):

Hazard Description:

Notes:

Delaware City

HAZARD AREA IDENTIFICATION

Municipality: Delaware City

Contact Name:

Contact Email:

Contact Phone Number:

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas: NONE AT THIS TIME

Hazard Area #1:

Location (ex. – address, cross streets, or road segments.):

Hazard type (ex. – flood area):

Hazard Description (ex. – no stormwater pipes along roadway, rainwater washes out roads)

Notes:

Elsmere

HAZARD AREA IDENTIFICATION

Municipality: Elsmere

Contact Name:

Contact Email:

Contact Phone Number:

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas: NONE AT THIS TIME

Hazard Area #1:

Location (ex. – address, cross streets, or road segments.):

Hazard type (ex. – flood area):

Hazard Description (ex. – no stormwater pipes along roadway, rainwater washes out roads)

Notes:

Middletown

HAZARD AREA IDENTIFICATION

Municipality: Middletown

Contact Name:

Contact Email:

Contact Phone Number:

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas: NONE AT THIS TIME

Hazard Area #1:

Location (ex. – address, cross streets, or road segments.):

Hazard type (ex. – flood area):

Hazard Description (ex. – no stormwater pipes along roadway, rainwater washes out roads)

Notes:

New Castle

HAZARD AREA IDENTIFICATION

Municipality: New Castle City

Contact Name:

Contact Email:

Contact Phone Number:

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas:

Hazard Area #1: Battery Park/ Homes on The Strand/ Along the Delaware River

Location (ex. – address, cross streets, or road segments.): 200 SOUTH ST, The Strand, 2nd Street to Bull Hill
NEW CASTLE

Hazard type (ex. – flood area): flooding

Hazard Description (ex. – no stormwater pipes along roadway, rainwater washes out roads):

Notes: This area is open to potential flooding, etc. This area is protected by dykes but needs to be raised again.

Hazard Area #2: Route 9 southbound

Location (ex. - address, cross streets, or road segments): Rt. 9 South of Washington street into the County area

Hazard type (ex. - flood, pipeline, land subsidence): flooding

Hazard Description: flooding issues- recently mitigated by a pervious layer of asphalt installed by DeIDOT- working for now but could be an issue down the road.

Notes:

Hazard Area #3: Route 9 northbound at bridge

Location (ex. - address, cross streets, or road segments): Road Between the following parcels:
2101100010, 2101100009, 2101100006, 2101100005

Hazard type (ex. - flood, pipeline, land subsidence): flooding

Hazard Description: roadway faces flooding as there is a marsh beneath. DeIDOT is working on this area.

Notes:

Hazard Area #4: RR crossing by school

Location (ex. - address, cross streets, or road segments): Delaware St. and Ferry Cut off

Hazard type (ex. - flood, pipeline, land subsidence):Transportation. RR, etc.

Hazard Description: heavy traffic, near many schools, etc. No railroad arms currently, but DeIDOT is working to fix.

Notes:

Newark

HAZARD AREA IDENTIFICATION

Municipality: City of Newark

Contact Name:

Contact Email:

Contact Phone Number:

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas:

Hazard Area #1:

Location (ex. – address, cross streets, or road segments.): 1323 Old Coochs Bridge Road

Hazard type (ex. – flood area): Tributary to the Christina River crosses Bellevue Road (located in 100-year floodplain)

Hazard Description (ex. – no stormwater pipes along roadway, rainwater washes out roads): Two existing lined corrugated metal arch pipes frequently clog with debris during moderate to severe storm events. Requires frequent clearing of the upstream inverts.

Notes:

Hazard Area #2:

Location (ex. - address, cross streets, or road segments): 212 & 300 Edjil Drive

Hazard type (ex. - flood, pipeline, land subsidence): Tributary to the Christina River crosses Edjil Drive

Hazard Description: Two (2) Existing lined corrugated metal circular pipes frequently clog with debris during moderate to severe storm events. Requires frequent clearing of the upstream inverts prior to and after storm events to avoid road flooding.

Notes:

Hazard Area #3:

Location (ex. - address, cross streets, or road segments): 678 Brook Drive

Hazard type (ex. - flood, pipeline, land subsidence): Tributary to the Christina River crosses Brook Drive

Hazard Description: Three (3)) Existing lined corrugated metal circular pipes frequently clog with debris during moderate to severe storm events. Requires frequent clearing of the upstream inverts prior to and after storm events to avoid road flooding.

Notes:

Hazard Area #4:

Location (ex. - address, cross streets, or road segments): 3 and 5 Julie Lane

Hazard type (ex. - flood, pipeline, land subsidence): 48" diameter corrugated metal pipe that begins behind homes and runs under Julie Lane cartway.

Hazard Description: Three (3)) Julie Lane has experienced significant flooding over the past few years due to stormwater runoff overtopping the 48-inch diameter culvert. The Julie Lane culvert conveys

stormwater runoff from an approximate 166-acre drainage area which includes Hill Park, Casho Mill Road, Casho Mill Station Subdivision, Barksdale Road, Handloff Park, Nottingham Green Subdivision, and Oaklands Subdivision.

Notes:

Hazard Area #5:

Location (ex. - address, cross streets, or road segments): 924 and 968 Rahway Drive (Christina River)

Hazard type (ex. - flood, pipeline, land subsidence): Christina River flood plain adjacent to residential structures. Several city owned and maintained storm sewer outfalls are located along the watercourse.

Hazard Description: The floodplain in this area encroaches on 19 residential properties and has frequently flooded the rear yards and in several instances resulted in loss of property during moderate to severe storm events. The flooding can be exacerbated by obstructions to the downstream culvert that crosses Barksdale Road. City crews clear debris from the upstream side of the culvert before and after storm events to minimize potential for flooding. PWWR is conducting a pilot study using internal check valves in the storm sewer system that discharges to the watercourse to reduce surcharging of the city system through the subdivision.

Notes:

Hazard Area #6:

Location (ex. - address, cross streets, or road segments): 924 and 968 Rahway Drive (Christina River)

Hazard type (ex. - flood, pipeline, land subsidence): Christina River floodplain adjacent to residential structures. Several city owned and maintained storm sewer outfalls are located along the watercourse.

Hazard Description: The flood plain in this area encroaches on 19 residential properties and has frequently flooded the rear yards and in several instances resulted in loss of property during moderate to severe storm events. The flooding can be exacerbated by obstructions to the downstream box culvert that crosses Barksdale Road. City crews clear debris from the upstream side of the culvert before and after storm events to minimize potential for flooding. PWWR is conducting a pilot study using internal check valves in the storm sewer system that discharges to the watercourse to reduce surcharging of the city system through the subdivision.

Notes:

Hazard Area #7:

Location (ex. - address, cross streets, or road segments): Delrem Drive and Nottingham Road

Hazard type (ex. - flood, pipeline, land subsidence): Catch basin and DelDOT owned storm sewer frequently obstructed with debris resulting in flooding of the intersection at Delrem Drive and Nottingham Road

Hazard Description: The existing storm sewer excepts runoff from Nottingham Road and surrounding residential and commercial properties. Runoff is conveyed via a shallow roadside swale to the existing catch basins. Debris carried from the overland flows collects on top of the existing basins and restricts the inlets' ability to collect and convey stormwater to the Christina River. City crews clear debris from the nearby catch basins before and after storm events to minimize potential for flooding of the intersection.

Notes:

Hazard Area #8:

Location (ex. - address, cross streets, or road segments): 208 Old Paper Mill Road (Old Paper Mill Road and Curtis Lane)

Hazard type (ex. - flood, pipeline, land subsidence): Frequent overtopping of Old Paper Mill Road during moderate to severe storm event. This corridor is the primary means of ingress and egress to Paper Mill Farm, Nonantum Mills, Ridgewood Glen, and Creek Bend subdivisions.

Hazard Description: The existing dual barrel storm culverts run beneath Old Paper Mill Road and convey flows from Bogey Run (tributary to the White Clay Creek). A combination of debris obstructing the upstream side of the culverts during high intensity storm events results in frequent flooding of Old Paper Mill Road and Curtis Lane. Capacity of the culverts could be increased by replacing the culverts with larger diameter pipes or adding additional culverts. City crews clear debris from the upstream side of the culvert before and after storm events to minimize potential for flooding.

Notes:



HAZARD AREA IDENTIFICATION

Municipality: *Newport*
Contact Name: *Wendy King*
Contact Email: *Wendyking99@yahoo.com*
Contact Phone Number: *302-994-6403*

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas:

Hazard Area #1: *Walnut / Christian streets*

Location (ex. - address, cross streets, or road segments.):

Hazard type (ex. - flood area): *flooding*

Hazard Description (ex. - no stormwater pipes along roadway, rainwater washes out roads):

poor drainage. Ices in the winter, floods when rainy. washes away asphalt.

Notes:

There is only one catchbasin at the end of Walnut Street so Walnut carries runoff from Highland down to the catchbasin @ Justice



HAZARD AREA IDENTIFICATION

Municipality: Town of Odessa

Contact Name: Amy Marie Ottinger

Contact Email: townofodessa@gmail.com

Contact Phone Number: 302-378-2510

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas:

Hazard Area #1:

Location (ex. - address, cross streets, or road segments): Cantwells Tavern Rt 299 and 2nd Street
Odessa

Hazard type (ex. - flood area): Flood Area

Hazard Description (ex. - no stormwater pipes along roadway, rainwater washes out roads):

During heavy rains the street floods and due to handicap accessible corner and swale removed to make the property more handicap accessible, it diverted the water into the tavern and into their electrical boxes. DelDOT is aware of issue and has assured the town they are attempting to address the issue.

Hazard Area #2: Main Street (SR299 and Main Street X-Street Front Street)

Location (ex. - address, cross streets, or road segments):

Hazard type (ex. - flood, pipeline, land subsidence): Flood Area

Hazard Description: Due to a pavement project on Main Street (see Hazard Area #1) a swale was removed. Flood waters come down the road and are washing away the front of a property.

Notes:

Hazard Area #3:

Location (ex. - address, cross streets, or road segments):

Hazard type (ex. - flood, pipeline, land subsidence):

Hazard Description:

Notes:

Townsend

HAZARD AREA IDENTIFICATION

Municipality: Townsend

Contact Name:

Contact Email:

Contact Phone Number:

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas: NONE AT THIS TIME

Hazard Area #1:

Location (ex. – address, cross streets, or road segments.):

Hazard type (ex. – flood area):

Hazard Description (ex. – no stormwater pipes along roadway, rainwater washes out roads)

Notes:

Wilmington

HAZARD AREA IDENTIFICATION

Municipality: City of Wilmington

Contact Name:

Contact Email:

Contact Phone Number:

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas: NONE AT THIS TIME

Hazard Area #1:

Location (ex. – address, cross streets, or road segments.):

Hazard type (ex. – flood area):

Hazard Description (ex. – no stormwater pipes along roadway, rainwater washes out roads)

NFIP Questionnaire Responses

New Castle County – Floodplain Coordinator Questionnaire (NFIP Questionnaire)

Flood Identification and Mapping	County	Municipalities
Does the County/Municipality make the Flood Insurance Rate Map and Flood Insurance Studies available to the public? Where are these documents housed within the County?		Available at Town Hall
Will the recently developed Digital Flood Insurance Rate Maps be made available to the public as well? How?		See Above
Are Letters of Map Revisions (LOMRs) reviewed and signed by County/Municipality officials		No
If during the subdivision review process a new development determines a reduction in the floodplain delineation of the FIRM floodplain, is the developer required to submit a LOMR submission to FEMA?		NA
Does the County/Municipality provide advice to community residents regarding elevation certificates and Letter of Map Amendment (LOMA) applications?		NA
Does the County/Municipality maintain records of approved letters of map change?		NA
Does the County/Municipality assist residents in interpreting the FIRM and County flood studies to determine the property's status in the floodplain? If yes, which department?		NA
Floodplain Management		
Are any restrictions on floodplain use enforced through the subdivision and building permit process?		No
Do all proposed developments require plans to go through the County/Municipality subdivision approval process or to acquire a building permit for new structures?		No
Are all new structures required to be at least 1.5 feet above the 100-year base flood elevation?		No
Flood Insurance		
Is the County/Municipality committed to educating residents about the value and availability of flood insurance?		NA
Is an annual letter sent to residents in the floodplain explaining the importance of flood insurance and where it may be obtained?		No
Does the County/Municipality assist residents in interpreting the FIRM and County flood studies to determine the resident's property's flood plain status, and offer advice regarding elevation certificates and LOMA applications?		NA
When was the last Community Assistance Visit conducted and, as of that date, was the County found to meet the requirements for continued participation in the NFIP?		NA

Elsmere

Middletown

New Castle

Flood Identification and Mapping	County	Municipalities
Does the County/Municipality make the Flood Insurance Rate Map and Flood Insurance Studies available to the public? Where are these documents housed within the County?		Municipality, city website https://newcastlecity.delaware.gov/departments/flood-plain-management/
Will the recently developed Digital Flood Insurance Rate Maps be made available to the public as well? How?		Municipality, city website https://newcastlecity.delaware.gov/departments/flood-plain-management/
Are Letters of Map Revisions (LOMRs) reviewed and signed by County/Municipality officials.		Municipality
If during the subdivision review process a new development determines a reduction in the floodplain delineation of the FIRM floodplain, is the developer required to submit a LOMR submission to FEMA?		Municipality
Does the County/Municipality provide advice to community residents regarding elevation certificates and Letter of Map Amendment (LOMA) applications?	county	Municipality
Does the County/Municipality maintain records of approved letters of map change?	County	Municipality
Does the County/Municipality assist residents in interpreting the FIRM and County flood studies to determine the property's status in the floodplain? If yes, which department?		Municipality, building/ zoning
Floodplain Management		
Are any restrictions on floodplain use enforced through the subdivision and building permit process?		Municipality
Do all proposed developments require plans to go through the County/Municipality subdivision approval process or to acquire a building permit for new structures?		Municipality
Are all new structures required to be at least 1.5 feet above the 100-year base flood elevation?		yes

Flood Insurance		
Is the County/Municipality committed to educating residents about the value and availability of flood insurance?		Yes
Is an annual letter sent to residents in the floodplain explaining the importance of flood insurance and where it may be obtained?	unsure	
Does the County/Municipality assist residents in interpreting the FIRM and County flood studies to determine the resident's property's flood plain status, and offer advice regarding elevation certificates and LOMA applications?		Yes
When was the last Community Assistance Visit conducted and, as of that date, was the County found to meet the requirements for continued participation in the NFIP?		unsure

Newark

Flood Identification and Mapping	County	Municipalities
Does the County/Municipality make the Flood Insurance Rate Map and Flood Insurance Studies available to the public? Where are these documents housed within the County?		Yes. FIRMs, both current and old, are kept in the Planning and Development Department
Will the recently developed Digital Flood Insurance Rate Maps be made available to the public as well? How?		Yes. The City of Newark can provide a link on its City website.
Are Letters of Map Revisions (LOMRs) reviewed and signed by County/Municipality officials.		Yes. LOMRs are viewed by Public Works and Water Resources Department and signed by the Flood Plain Administrator.
If during the subdivision review process a new development determines a reduction in the floodplain delineation of the FIRM floodplain, is the developer required to submit a LOMR submission to FEMA?		Yes.
Does the County/Municipality provide advice to community residents regarding elevation certificates and Letter of Map Amendment (LOMA) applications?		Yes.
Does the County/Municipality maintain records of approved letters of map change?		Yes.
Does the County/Municipality assist residents in interpreting the FIRM and County flood studies to determine the property's status in the floodplain? If yes, which department?		Yes. Public Works and Water Resources Department.
Floodplain Management		
Are any restrictions on floodplain use enforced through the subdivision and building permit process?		Yes.

Do all proposed developments require plans to go through the County/Municipality subdivision approval process or to acquire a building permit for new structures?		Yes.
Are all new structures required to be at least 1.5 feet above the 100-year base flood elevation?		Yes.
Flood Insurance		
Is the County/Municipality committed to educating residents about the value and availability of flood insurance?		Yes.
Is an annual letter sent to residents in the floodplain explaining the importance of flood insurance and where it may be obtained?		No. Letters are sent annually to properties in frequent flood areas – not to all properties in SFHA.
Does the County/Municipality assist residents in interpreting the FIRM and County flood studies to determine the resident's property's flood plain status, and offer advice regarding elevation certificates and LOMA applications?		Yes.
When was the last Community Assistance Visit conducted and, as of that date, was the County found to meet the requirements for continued participation in the NFIP?		The last Community Assistance Visit was completed on 12/15/21. Newark has met the requirements of the NFIP program

New Castle County – Floodplain Coordinator Questionnaire (NFIP Questionnaire)

Flood Identification and Mapping	County	Municipalities
Does the County/Municipality make the Flood Insurance Rate Map and Flood Insurance Studies available to the public? Where are these documents housed within the County?		<i>We are not members.</i>
Will the recently developed Digital Flood Insurance Rate Maps be made available to the public as well? How?		
Are Letters of Map Revisions (LOMRs) reviewed and signed by County/Municipality officials?		
If during the subdivision review process a new development determines a reduction in the floodplain delineation of the FIRM floodplain, is the developer required to submit a LOMR submission to FEMA?		
Does the County/Municipality provide advice to community residents regarding elevation certificates and Letter of Map Amendment (LOMA) applications?		
Does the County/Municipality maintain records of approved letters of map change?		
Does the County/Municipality assist residents in interpreting the FIRM and County flood studies to determine the property's status in the floodplain? If yes, which department?		
Floodplain Management		
Are any restrictions on floodplain use enforced through the subdivision and building permit process?		
Do all proposed developments require plans to go through the County/Municipality subdivision approval process or to acquire a building permit for new structures?		
Are all new structures required to be at least 1.5 feet above the 100-year base flood elevation?		
Flood Insurance		
Is the County/Municipality committed to educating residents about the value and availability of flood insurance?		
Is an annual letter sent to residents in the floodplain explaining the importance of flood insurance and where it may be obtained?		
Does the County/Municipality assist residents in interpreting the FIRM and County flood studies to determine the resident's property's flood plain status, and offer advice regarding elevation certificates and LOMA applications?		
When was the last Community Assistance Visit conducted and, as of that date, was the County found to meet the requirements for continued participation in the NFIP?		

Municipal Hazard Mitigation Actions

Arden

New Castle County Municipal Hazard Mitigation Actions					
Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Status (In Progress, On-going, Not Applicable, Completed, Cancelled)	Notes
Sample	Flood	Sample Action	Municipal Utilities (MUC)	On-Going	Backflow prevention devices are being installed throughout the township. Four of seven have been installed. Expected completion by Fall 2019
Village of Arden	All-Hazards	Work closely with the County and continue to improve public outreach within the community to include distributing informative pamphlets and other outreach materials and workshops to educate citizens about hazard awareness./ Arden / NCC OEM & Council		Not started	To be started – Chris to give guidance on that.
	HAZMAT	Establish emergency notification procedures for rail and Interstate HAZMAT incidents and chemical facilities. Cancel		Complete/In Progress	Ask Chris how he feels – Chris did demonstration – will continue to find audiences for County OEM. Referring to notification system.
	All-Hazards	Retrofit Gild Hall so that it can be used as a temporary shelter/ Arden/NCC OEM and DHSS		In Progress	Will have generator and act as resilience hub similar to Buzz Ware
	Flood	Create a Storm Water Management Plan / Arden & DNREC / \$ 50,000		Complete	Engineering firm came out and helped with plan.
	Flood	Implement a Water Management Plan / Arden / \$ 500,000+ or more for overall		In Progress	
	All-Hazards	Upgrade Buzz Ware Village Center for Emergency Shelter use / Arden and NCC OEM / \$ TBD up to \$ 100,000		In Progress	Intention not to be full definition of shelter – Step below emergency center – meeting hub – resilience hub – alter some wording – going to be a resiliency hub...installed solar panels, battery backup system.
	All-Hazards	Village Wide Tree Risk Assessment / Arden / \$ TBD up to 50,000		In Progress	Always in progress – can check with forest committee if needed – tree survey were in plans and were done.

Ardencroft

New Castle County Municipal Hazard Mitigation Actions					
Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Status (In Progress, On-going, Not Applicable, Completed, Cancelled)	Notes
Sample	Flood	Sample Action	Municipal Utilities (MUC)	On-Going	Backflow prevention devices are being installed throughout the township. Four of seven have been installed. Expected completion by Fall 2019
Ardencroft	Flood	Investigate appropriate mitigation measures to protect 16 lease holders adjacent to the creek. Assess Perkins Run flooding potential.		Carry Forward	
	All-Hazards	Develop and implement an information awareness system to include notification, mail outs, recorded messages, and email during and after an event.		Carry Forward	
	All-Hazards	Ensure adequate training and resources for emergency organizations and personnel.		Carry Forward	
	All-Hazards	Conduct Community Emergency Response Team (CERT) classes for emergency response personnel		Carry Forward	
	All-Hazards	Increase the number of trained citizen emergency responders.		Carry Forward	
	Wind Event, Flood, Winter Weather	Conduct a vegetative vulnerability assessment to determine what plant types pose a wind, water, or snow hazard to private and public property.		Carry Forward	
	Flood	Conduct an assessment to determine the vulnerability if Perkins Run overtops its banks (Due to increased population growth, development, and encroachment).		Carry Forward	

Ardentown

New Castle County Municipal Hazard Mitigation Actions

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Status (In Progress, On-going, Not Applicable, Completed, Cancelled)	Notes
Sample	Flood	Sample Action	Municipal Utilities (MUC)	On-Going	Backflow prevention devices are being installed throughout the township. Four of seven have been installed. Expected completion by Fall 2019
Ardentown	All-Hazards	Prepare Candlelight Theater as needed for use as a shelter or search for another location in cooperation with the State Shelter Strategy / Ardentown, NCC OEM, DHSS / \$ 1,000		Carry Forward	
	All-Hazards	Develop a call out database to notify residents in the event of a disaster.		Carry Forward	
	Flood	Marsh Road Property Acquisition Project / Ardentown and NCCD		Carry Forward	
	Flood	Survey Storm Water Issues / Ardentown and NCC / \$ 10,000+		Carry Forward	
	All-Hazards	Scan Town Data to preserve information to prevent loss of Town Data and History / Ardentown and State Archives / \$ 1,000-\$ 5,000		Carry Forward	
	All-Hazards	Village Wide Tree Risk Assessment / Ardentown / \$ Unknown		Carry Forward	

Bellefonte

Municipal Mitigation Actions (By Hazard)

Please fill out the table below. A sample action update has been completed in orange.

New Castle County Municipal Hazard Mitigation Actions					
Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Status (In Progress, On-going, Not Applicable, Completed, Cancelled)	Notes
Sample	Flood	Sample Action	Municipal Utilities (MUC)	On-Going	Backflow prevention devices are being installed throughout the township. Four of seven have been installed. Expected completion by Fall 2019
Bellefonte	All-Hazards	Work closely with and obtain assistance from the County to implement an information awareness system to include notification, recorded messages, and/or email during and after an event. Continue to send out hazard notifications via the State/County Police Alert System and through the Brandywine Hundred Fire Company.			Ongoing- communication via Social Media and Town Website.

Delaware City

New Castle County Municipal Hazard Mitigation Actions					
Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Status (In Progress, On-going, Not Applicable, Completed, Cancelled)	Notes

Sample	Flood	Sample Action	Municipal Utilities (MUC)	On-Going	Backflow prevention devices are being installed throughout the township. Four of seven have been installed. Expected completion by Fall 2019
Delaware City		Create displays for use at public events (health fair, public awareness day, county fair, etc.). DC Main Street, DCFC, Town.	DC Main Street/DCFC/Town	Carry Forward	
	Flood	Construct flood barrier, drainage improvements, and wetlands enhancements for Dragon Run. Town	Town	Carry Forward	
	Flood	Evaluate solutions for flooding of Route 9 at Dragon Run which is a major evacuation route out of Delaware City.	DELDOT/Town	Carry Forward	
	All-Hazards	Provide training for Delaware City Town Council on the CRS program and encourage residents to participate.	Town Admin	Carry Forward	
	Flood	Construct flood barrier and drainage improvements along C&D Canal and evaluate wetlands enhancements.	ACE	Carry Forward	
	Eco	Develop a Phragmites elimination program. ACE, Town Admin.	ACE/Town Admin	Carry Forward	
	Flood	Replace or eliminate tidal flushing pipe and valve at Old Locks.		Carry Forward	
	Flood	Washington Street Flood Mitigation Project		Carry Forward	

Elsmere

New Castle County Municipal Hazard Mitigation Actions					
Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Status (In Progress, On-going, Not Applicable, Completed, Cancelled)	Notes
Sample	Flood	Sample Action	Municipal Utilities (MUC)	On-Going	Backflow prevention devices are being installed throughout the township. Four of seven have been installed. Expected completion by Fall 2019

Elsmere	Flood	Implement stormwater study recommendations.	Town	Carry Forward	
	Flood	Increase the storage capacity of the Little Mill, Chestnut Run, Silverbrook, Derrickson Run and other creeks throughout the Town.		Carry Forward	
	Flood	Evaluate storm water management infrastructure.		Carry Forward	
	Flood	Study and recommend solutions to alleviate the periodic flooding threat on Chestnut Run at Kirkwood Hwy (SR-2) , added in 2020 - Chestnut Run at VA Hospital, and Little Mill by Fuel station. / DELDOT and Elsmere	DELDOT/Town	Carry Forward	
	Fire	Water Supply to the CSX Wilsmere Rail Yard for Fire Protection		Carry Forward	

Middletown

New Castle County Municipal Hazard Mitigation Actions					
Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Status (In Progress, On-going, Not Applicable, Completed, Cancelled)	Notes
Sample	Flood	Sample Action	Municipal Utilities (MUC)	On-Going	Backflow prevention devices are being installed throughout the township. Four of seven have been installed. Expected completion by Fall 2019
Middletown	All-Hazards	Conduct a vulnerability assessment of the Town's water distribution system, to identify measures designed to reduce the potential impacts of natural hazards./ Middletown DPW	DPW	Carry Forward	

	Drought	Develop a water restriction policy that can be implemented during drought conditions. / Middletown DPW	DPW	Carry Forward	
	All-Hazards	Develop an Emergency Operations Plan with an integrated evacuation procedure for the Town in cooperation with DELDOT's NCC Evacuation Plan. / Town Manager, Town Planner, NCC OEM, DELDOT	Town Manager, Town Planner/NCC OEM/DELDOT	Carry Forward	
	All-Hazards	Develop a website to notify residents of important information before, during and after emergencies, storms, etc. (include links to other major sources of information: DEMA, FEMA, DELDOT and the weather channel).	DEMA/FEMA/DELDOT	Carry Forward	
	Flood	Perform Sharondale outfall rehabilitation to eliminate erosive velocities of stormwater runoff in the outfall.		Carry Forward	
	Flood	Develop and Establish a Drainage Code. / Middletown Administration / \$ 1,000-1,500	Middletown Admin	Carry Forward	
	Flood	Consider participation in the NFIP's Community Rating System (CRS) / Town Administration / \$ Unknown	Middletown Admin	Carry Forward	
	All-Hazards	Coordinate with Emergency Services to identify available resources and increase preparedness awareness. / Town and other agencies as needed / \$ Unknown		Carry Forward	
	All-Hazards	Identify an Alternate location for Middletown Town Hall to provide continuity of operations in the event of a disaster or the building is compromised. / Town Administration and other agencies / \$ Unknown		Carry Forward	

New Castle

Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Status (In Progress, On-going, Not Applicable, Completed, Cancelled)	Notes
Sample	Flood	Sample Action	Municipal Utilities (MUC)	On-Going	Backflow prevention devices are being installed throughout the township. Four of seven have been installed. Expected completion by Fall 2019
	Transportation	Introduce railroad crossings at main highway intersections with gate and better signals (three major roadways cross the railroad near schools, businesses and residential areas).	Town / DELDOT Railroad program / Norfolk Southern RR	In Progress/Not started	Have not done yet – looking into how to implement where city owns streets – DelDOT is working too – had delays on timing and program. Norfolk Southern has to review the plans again – hope to start by spring or fall 26. Have made some improvements – not the gates. Railroad arms for what city owns – attended rail webinars on how to go about this and look for grants to fund.
	Flooding	Develop a detailed flood vulnerability study for the entire City along the Delaware River and Bay to focus on coastal/riverine flooding from severe storm events and sea level rise.	Town Admin / DNREC Coastal Programs	In Progress	Have done vuln study and have some recommendations for plans of action. Applied for numerous grants but having difficulty – applied for NRCS Grant (2023), advised funding was no longer available – not a hopeful outlook – reached out to USACE to request funding and assistance, not available until 2026. Applied for BRIC grant, funding taken away – looking into other alternatives
	HazMat	Work with railroad lines to notify citizens of hazardous shipments that run through the City of New Castle.	Town / NCC OEM & DEMA	Ongoing	Attempts have been made to make that connection – fire dept gets some info from rail lines – not yet detailed enough – need better answers
		Expand the flooding aspect – inland flooding that comes from dykes and roadway flooding going over bridges – DelDOT looking into resolve for that along northern portion of route 9		New	
		Flooding on Route 9 southbound – was a big issue for city people leaving town – have to constantly close – DelDOT road – impervious surfacing recently installed by DelDOT, have not had to close the road yet – look into maintaining – DelDOT issue, but impacts New Castle – work with agencies to ensure it is maintained properly – if additional issues, they are addressed rapidly.		New	

	Transportation is cut through traffic on route 9, from North to South – summer issue with beach traffic – makes traffic bad in city, egress difficult getting out of city if there were emergency		New	Mentioned to DeIDOT earlier on a call – some conversations have been had – DeIDOT to look into past history.

Newark

Newport

Municipal Mitigation Actions (By Hazard)

Please fill out the table below. A sample action update has been completed in orange.

New Castle County Municipal Hazard Mitigation Actions					
Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Status (In Progress, On-going, Not Applicable, Completed, Cancelled)	Notes
Sample	Flood	Sample action.	Municipal Utility (MUC)	On-going	Lead flow prevention devices are being installed throughout the township. Several others have been installed or under completion by fall 2019.
Newport	Flooding	Initiate wetlands protective measures along the Christina River.			
	Flooding	Work with the County to conduct a detailed flood vulnerability study for the entire Town.	Town / NCC DLU		I don't believe this has started but I am interested in this
	Flooding	Study and recommend solutions to alleviate the periodic flooding threat on the Christina River at Interstate 95/US 141/202.			
	Flooding	Install catch basins throughout Town.	Town Admin		This has not begun because our budget has not allowed. Still interested
	Flood	Install two (2) new sewer pump stations in the Industrial Park	Town		Motors were replaced in 2021.

New Castle County Municipal Hazard Mitigation Actions					
Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Status (In Progress, On-going, Not Applicable, Completed, Cancelled)	Notes
Sample	Flood	Sample Action	Municipal Utilities (MUC)	On-Going	Backflow prevention devices are being installed throughout the township. Four of seven have been installed. Expected completion by Fall 2019
Odessa					
Odessa	All-Hazards	Establish a comprehensive all- hazards warning system.	Town	Complete	DeIDOT installed flood warning system – signage throughout area. Flashing signs on bridge
	All-Hazards	Educate residents on hazards that can impact the community.	FEMA	Ongoing	
	All-Hazards	Develop an evacuation policy for the Town.	FEMA	Not Started	
	Flood	Update the local Flood Damage Prevention Ordinance.		Completed	If requirement for updating, will be let know
	Flood	Encourage citizens to purchase flood insurance.	Town Admin	Not Applicable	
	All-Hazards	Identify and evaluate shelters.		Not Applicable	Red Cross – Odessa does not have this
	Flood	Study and recommend solutions to alleviate the periodic flooding threat on Appoquinimink River at Main Street (SR-299)	DELDOT	Ongoing	
	All-Hazards	Develop and Improve Public Water Distribution system.	Town Admin	Complete	Now have an agreement with Artesian – have to hook up City Water, city water is available – not everybody has gotten on board but moving forward do have that
	NEW ACTION	Cantwell Tavern – take care of flooding issue – handicapped accessibility at corner, now water comes in properties		NEW	
	NEW ACTION	Flooding on Main Street in Odessa		NEW	

Townsend

New Castle County Municipal Hazard Mitigation Actions					
Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Status (In Progress, On-going, Not Applicable, Completed, Cancelled)	Notes
Sample	Flood	Sample Action	Municipal Utilities (MUC)	On-Going	Backflow prevention devices are being installed throughout the township. Four of seven have been installed. Expected completion by Fall 2019
Townsend					
	All-Hazards	Develop an educational and outreach program for residents, business owners and government employees to include specific actions that can be taken to reduce the impact of natural hazards.	Town Admin	Carry Forward	
	Flood	Research and Consider adoption into the NFIP.	Townsend / DNREC & NCC OEM, NCC DLU	Carry Forward	
	All-Hazards	Evacuation Flow Study for Town due to limited outlets	Townsend / DELDOT & NCC OEM	Carry Forward	

Wilmington

New Castle County Municipal Hazard Mitigation Actions					
Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Status (In Progress, On-going, Not Applicable, Completed, Cancelled)	Notes
Sample	Flood	Sample Action	Municipal Utilities (MUC)	On-Going	Backflow prevention devices are being installed throughout the township. Four of seven have been installed. Expected completion by Fall 2019
Wilmington					
Wilmington	Flood	Educate and encourage citizens to purchase and install backflow preventers in flood-prone homes.	Wilm. DPW	Carry Forward	
	All-Hazards	Continue to increase public education, people should be ready to survive for three days without power.	Wilm. OEM	Carry Forward	

	All-Hazards	Continue to increase public education for all hazards.		Carry Forward	
	Severe Weather	Evaluate the adequacy of existing code to address potential wind-related damages	Wilm. L & I	Carry Forward	
	Flood	Reduce the likelihood of sewer overflow during flood events through real-time control (RTC).	Wilm. DPW	Carry Forward	
	All-Hazards	Develop building construction code requiring shatter-proof glass for new city buildings.	Wilm L&I	Carry Forward	
	All-Hazards	Establish a citywide disaster recovery/business continuity plan.	Wilm. OEM and all departments	Carry Forward	
	All-Hazards	Coordinate with the Department of Public Works to apply traffic flow study to evacuation procedures.	Wilm. OEM and DPW	Carry Forward	
	All-Hazards	Evaluate Comprehensive Plan to check for hazard mitigation elements.		Carry Forward	
	All-Hazards	Ensure NIMS training for all appropriate City personnel and engage in tabletop exercises.	Wilm. OEM	Carry Forward	
	Flood	On South Wilmington Wetland Park - Reestablish wetland to process stormwater from South Wilmington Area east of Walnut Street, south of A street; Partial separation of stormwater in Southbridge and from Garaches Lane	Wilm. DPW	Carry Forward	
	Flood	Reestablish drainage along RR property between New Castle Avenue and Christiana Avenue to relieve street flooding on New Castle Avenue and to create a drainage path for the redevelopment of the Southbridge Extension area.	Wilm. DPW	Carry Forward	
	All-Hazards	Develop an Emergency Management GIS training program (including hardware and software).	Wilm. OEM and DPW	Carry Forward	
	Flood	Study and recommend solutions to alleviate the periodic flooding threat on Brandywine Creek at E 12 th Street/Wilmington Industrial Park and on Shellpot Creek at Governor Printz Blvd (US 13).	DPW	Carry Forward	
	All-Hazards	Implement a Tree Maintenance Program.	Wilm. DPW	Carry Forward	



	Flood	Educate and encourage citizens to purchase and install backflow preventers in flood-prone homes.	Wilm. DPW	Carry Forward	

APPENDIX D – MUNICIPAL FLOOD MAPS

Appendix D includes FEMA FIRM maps for all 13 municipalities in New Castle County. Each map is provided via FEMA's National Flood Hazard Layer (NFHL).⁴⁶ The NFHL is a geospatial database that contains current effective flood hazard data.⁴⁷ FEMA provides the flood hazard data to support the National Flood Insurance Program, and jurisdictions can use the information to better understand their level of flood risk and type of flooding.

Arden



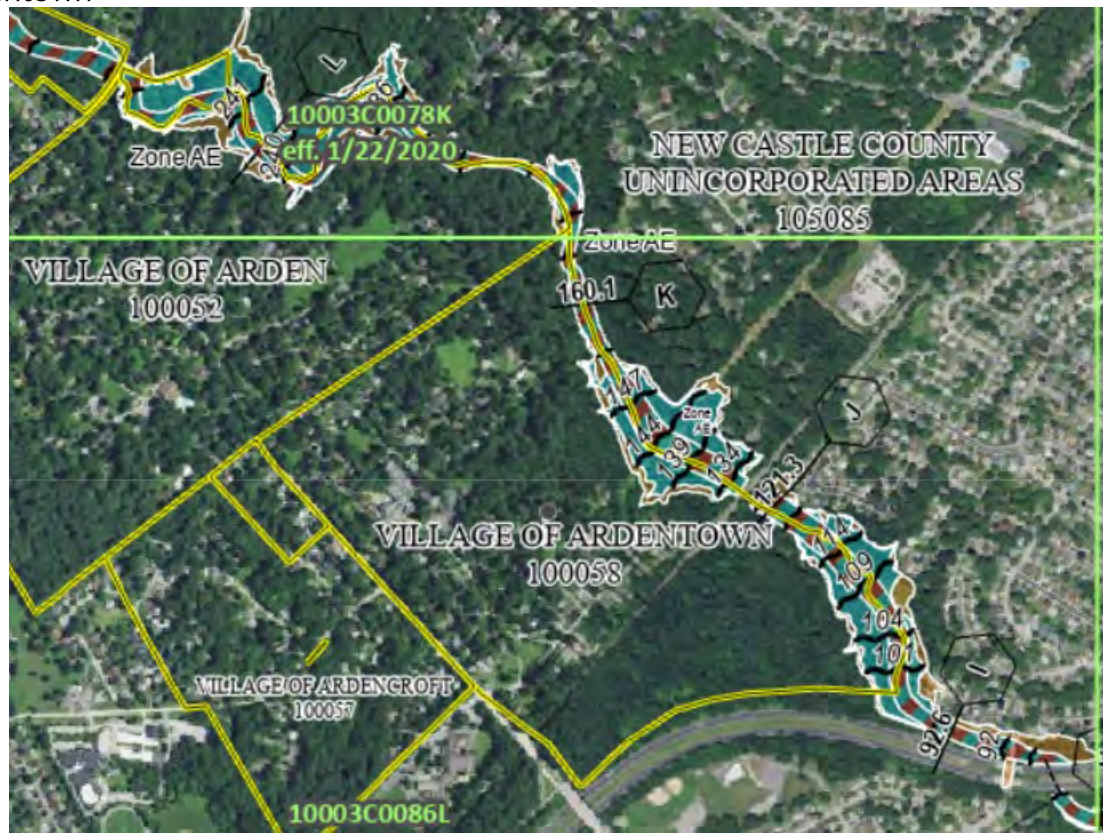
⁴⁶ Federal Emergency Management Agency, National Flood Hazard Layer Viewer, available at <https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd>.

⁴⁷ <https://www.fema.gov/flood-maps/national-flood-hazard-layer>

Ardencroft



Ardentown

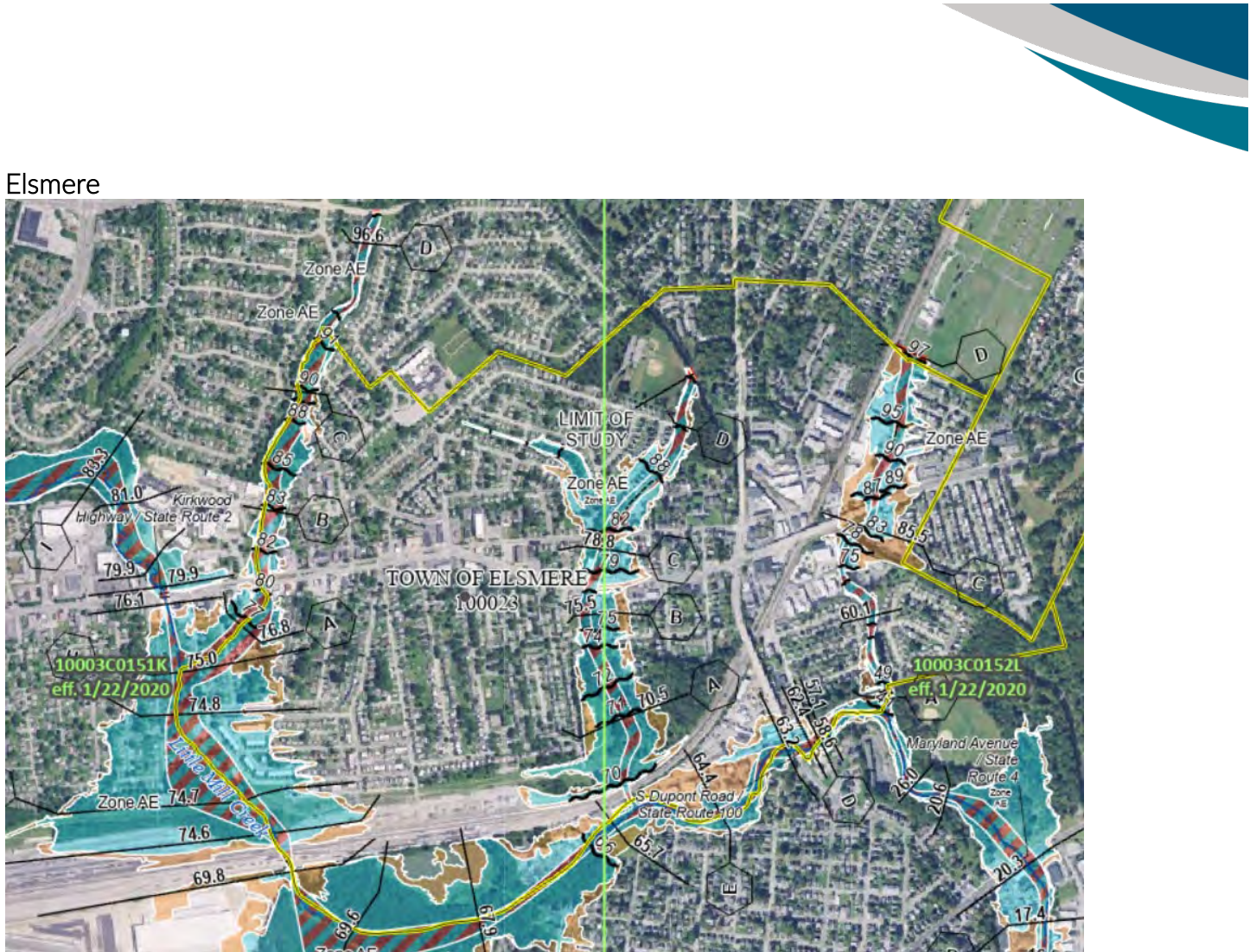


Bellefonte



Delaware City

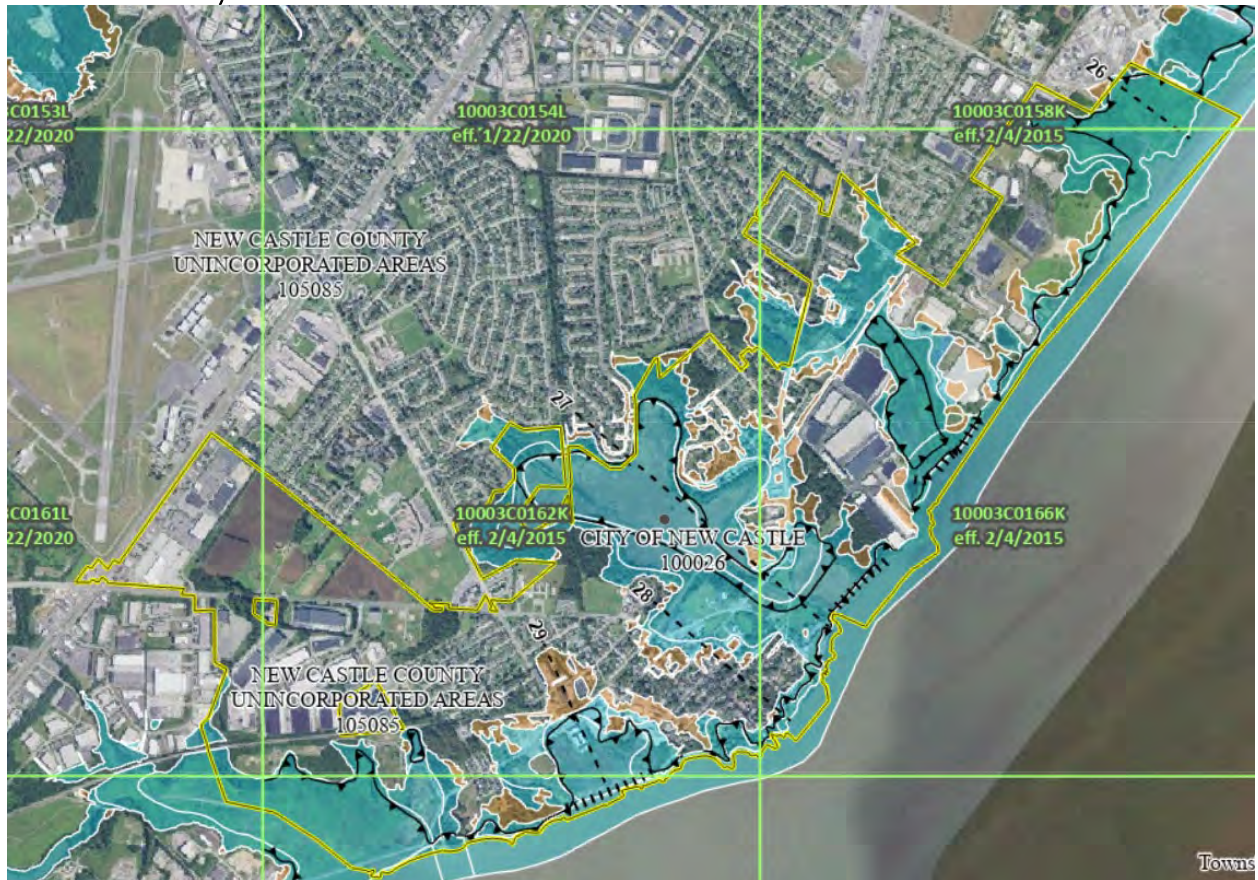




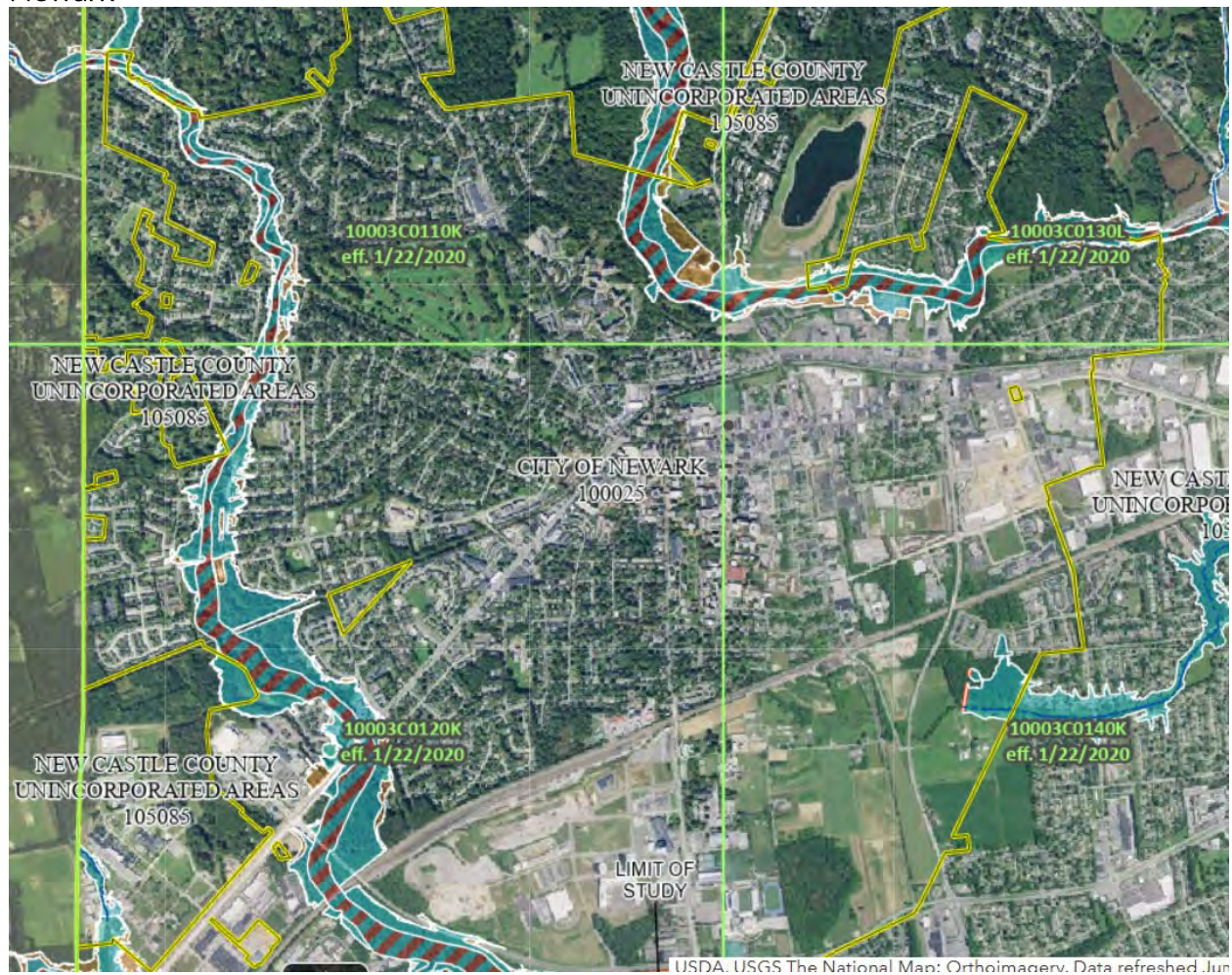
Middletown



New Castle City



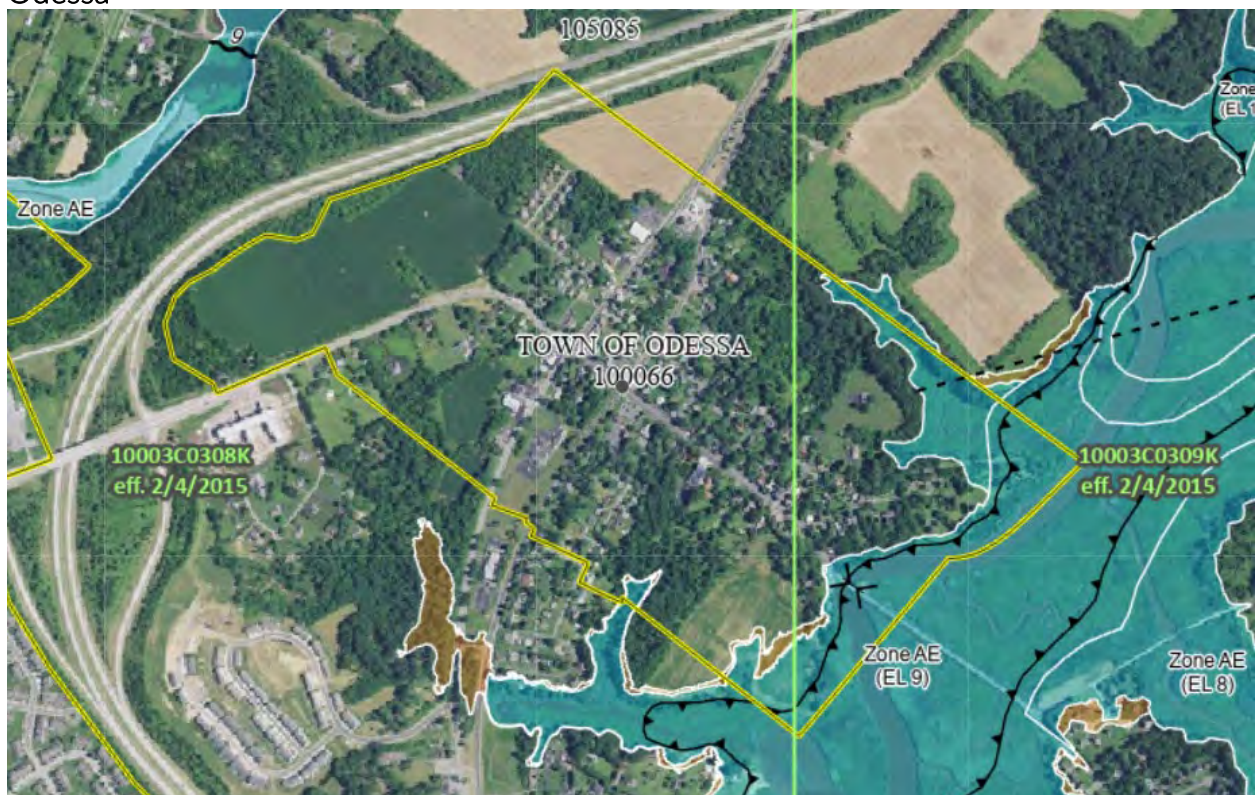
Newark



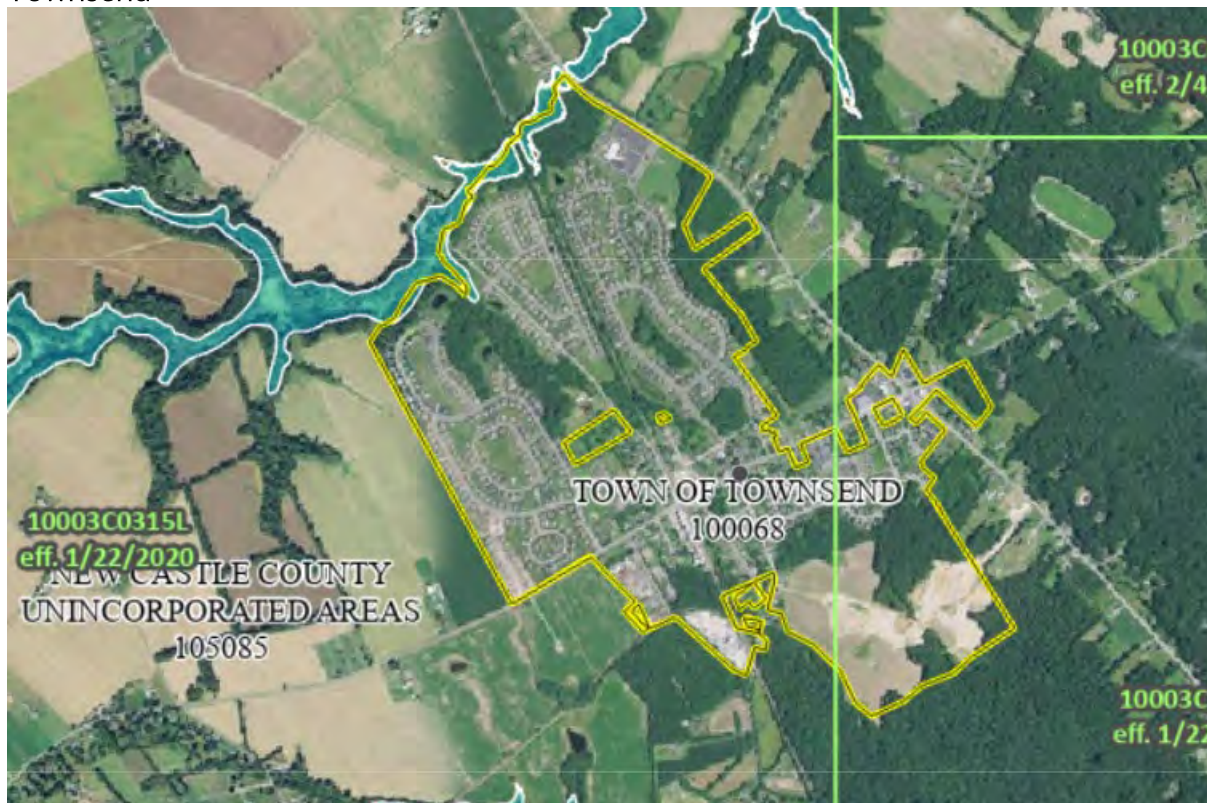
Newport



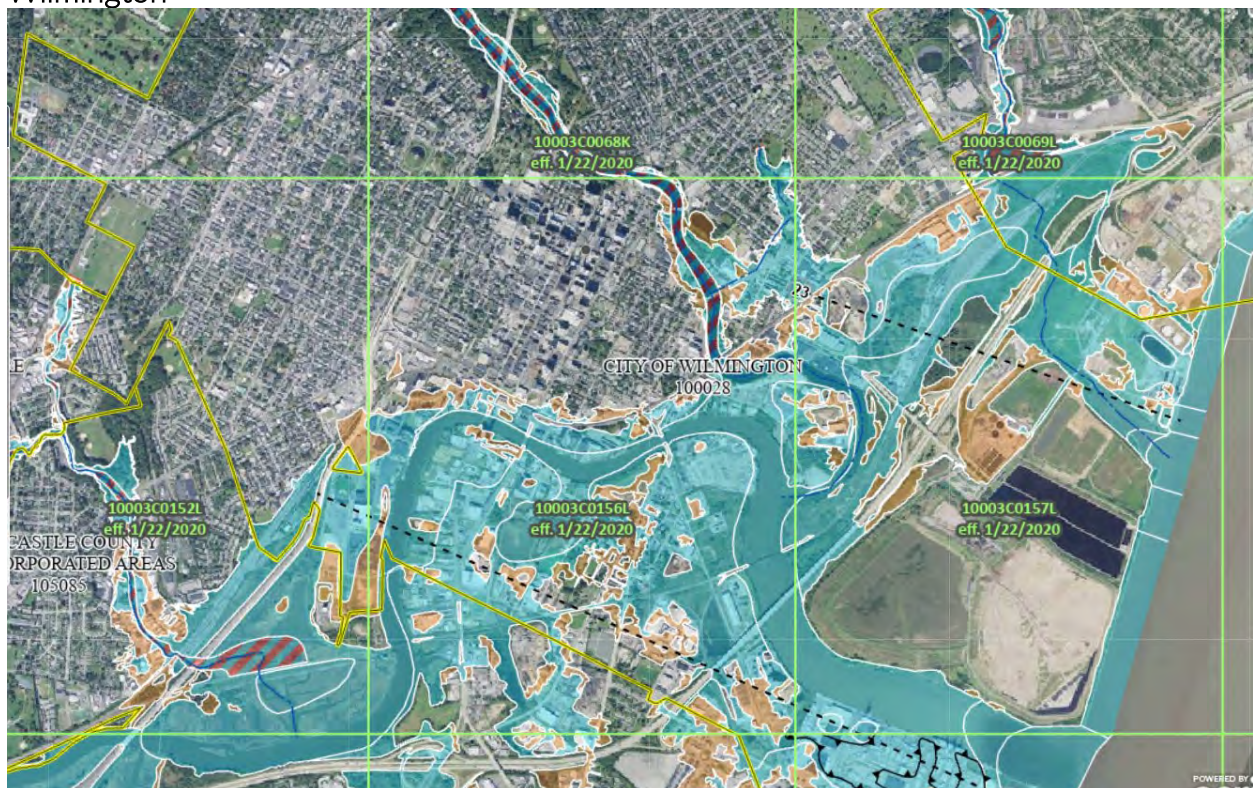
Odessa



Townsend



Wilmington





APPENDIX E – CAPABILITY QUESTIONNAIRE RESPONSES

1. Municipality Information

1. Municipality Information

Municipality Name

Town of Bellefonte

Point of Contact

Scott Mackenzie

Title

Town Secretary

Email Address

townofbellefonte@hotmail.com

Phone Number

302-761-9638

2. Please provide information on buildings in the floodplain within your municipality.

Total buildings in floodplain

0

Total flood insurance
policies

0

Total Repetitive Loss (RL)
Properties

0

Total Severe Repetitive
Loss (SRL) Properties

0

2. Critical Facilities

* 3. Do any critical facilities (police station, fire stations, hospitals, schools, etc.) fall within flood hazard areas?

☐ Yes

☒ No

4. Please indicate the name of each facility and location.

Facility #1 Name and
Location

NA

Facility #2 Name and
Location

NA

Facility #3 Name and
Location

NA

Facility #4 Name and
Location

NA

Facility #5 Name and
Location

NA

* 5. How many critical facilities have been damaged in the past five years from natural hazards?

☒ 0

☐ 2

☐ 1

☐ 3 or more

6. Please indicate details of each facility damaged.

Facility #1 - Name, Hazard

Event, Damage

Description

None

Facility #2 - Name, Hazard

Event, Damage

Description

None

Facility #3 - Name, Hazard

Event, Damage

Description

None

Facility #4 - Name, Hazard

Event, Damage

Description

None

Facility #5 - Name, Hazard

Event, Damage

Description

None

3. Existing Plans and Ordinances

* 7. Do any of your plans and ordinances contain the following policies? (Check all that apply)

☐ Freeboard requirement?	☐ A requirement that critical facilities be protected from higher flood levels?
☐ A policy preventing new development or substantial improvements to structures in floodplains?	☐ A policy encouraging cluster development near floodplains, wetlands?
☐ A regulation prohibiting fill in the floodplain?	

Please Indicate Name and Year of each Plan/Ordinance

None

8. Are there any other policies that mitigate/reduce risk? (If yes, please include plan/ordinance name and year)

No

* 9. Are any restrictions on floodplain use enforced through the municipality's subdivision and building permit process? (If yes, please explain)

No

* 10. Do all proposed developments require plans to go through the Municipality's subdivision approval process or to acquire a building permit for new structures? (If yes, please explain)

NA

4. Emergency Services

* 11. What types of emergency response services does your municipality have in place? (Check all that apply)

☐ Municipal Police Force

☒ County Police Force

☒ Volunteer Fire Department

☐ Paid Fire Department

☐ Other (please specify)

☒ Paid Emergency Medical Services (EMS)

☒ Volunteer ALS/BLS (Ambulance Service)

☐ Local Emergency Management Coordinator

☐ Specialized Response Teams (Dive Team, USAR, High-Angle Rescue, etc.)

5. Mitigation Projects

* 12. Has your municipality completed any mitigation projects in the past five years?

☐ Yes

☒ No

* 13. Please indicate the type of projects undertaken in the past five years. (Check all that apply)

☐ Buy-outs (acquisition and relocation)	☐ Post disaster recovery (clearing streets, debris removal)
☐ Elevation of structures	☐ Critical Facilities Protection (power stations, water/sewer
☐ Floodproofing	☐ facilities police fire EMS hospitals)
☐ Berms/floodwalls	☐ Wetlands protection
☐ Levees	☐ Erosion and sedimentation control
☐ Retrofit projects for critical facility structures	☐ Outreach projects (newsletters, brochures)
☐ Retention/detention basins	☐ Environmental education programs
☐ Hazard warning (sirens, reverse 911)	☐ Promotion of flood insurance sales
☐ Hazard response (EOC activation, evacuation orders)	

Please provide project type, location, and year completed for each checked project

None

6. Staffing

* 14. Do you currently have the following staffing?

	Yes	No	Responsibilities Covered by Other Staff
Floodplain Administrator	☐	☒	☐
Building Official/Inspector	☐	☒	☐
Site Plan Reviewer	☒	☐	☐
Surveyor	☐	☒	☐
GIS Specialist	☐	☒	☐

7. Training

* 15. Does your staff need on-going or additional training/certification in the following proficiencies?

	Yes	No
Geographic Information Systems (GIS)	☐	☒
Floodplain management/NFIP regulations	☐	☒
Building inspection/code administration	☐	☒

Please specify training type

None

8. Mitigation Goals and Projects

* 16. List three mitigation projects that your community wishes to undertake in the next one to five (1-5) years, and provide a brief explanation of each.

Mitigation Project #1 -
Name

None

Project #1 - Details

Mitigation Project #2 -
Name

None

Project #2 - Details

Mitigation Project #3 -
Name

None

Project #3 - Details

HAZARD AREA IDENTIFICATION

Municipality: Town of Bellefonte

Contact Name: Scott MacKenzie

Contact Email: townofbellefonte@hotmail.com

Contact Phone Number: 302-761-9638

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas:

Hazard Area #1: NONE

Location (ex. – address, cross streets, or road segments.):

Hazard type (ex. – flood area):

Hazard Description (ex. – no stormwater pipes along roadway, rainwater washes out roads):

Notes:

Hazard Area #2: NONE

Location (ex. - address, cross streets, or road segments):

Hazard type (ex. - flood, pipeline, land subsidence):

Hazard Description:

Notes:

Hazard Area #3: NONE

Location (ex. - address, cross streets, or road segments):

Hazard type (ex. - flood, pipeline, land subsidence):

Hazard Description:

Notes:

New Castle County – Floodplain Coordinator Questionnaire (NFIP Questionnaire)

Flood Identification and Mapping	County	Municipalities
Does the County/Municipality make the Flood Insurance Rate Map and Flood Insurance Studies available to the public? Where are these documents housed within the County?		Available at Town Hall
Will the recently developed Digital Flood Insurance Rate Maps be made available to the public as well? How?		See Above
Are Letters of Map Revisions (LOMRs) reviewed and signed by County/Municipality officials		No
If during the subdivision review process a new development determines a reduction in the floodplain delineation of the FIRM floodplain, is the developer required to submit a LOMR submission to FEMA?		NA
Does the County/Municipality provide advice to community residents regarding elevation certificates and Letter of Map Amendment (LOMA) applications?		NA
Does the County/Municipality maintain records of approved letters of map change?		NA
Does the County/Municipality assist residents in interpreting the FIRM and County flood studies to determine the property's status in the floodplain? If yes, which department?		NA
Floodplain Management		
Are any restrictions on floodplain use enforced through the subdivision and building permit process?		No
Do all proposed developments require plans to go through the County/Municipality subdivision approval process or to acquire a building permit for new structures?		No
Are all new structures required to be at least 1.5 feet above the 100-year base flood elevation?		No
Flood Insurance		
Is the County/Municipality committed to educating residents about the value and availability of flood insurance?		NA
Is an annual letter sent to residents in the floodplain explaining the importance of flood insurance and where it may be obtained?		No
Does the County/Municipality assist residents in interpreting the FIRM and County flood studies to determine the resident's property's flood plain status, and offer advice regarding elevation certificates and LOMA applications?		NA
When was the last Community Assistance Visit conducted and, as of that date, was the County found to meet the requirements for continued participation in the NFIP?		NA

Please fill out the table below. A sample action update has been completed in orange.

Bellefonte

1. Municipality Information

1. Municipality Information

Municipality Name	City of Newark
Point of Contact	Thomas Coleman, PE
Title	City Manager
Email Address	tcoleman@newark.de.us
Phone Number	302-366-7000

2. Please provide information on buildings in the floodplain within your municipality.

Total buildings in floodplain	199
Total flood insurance policies	Unknown
Total Repetitive Loss (RL) Properties	5
Total Severe Repetitive Loss (SRL) Properties	Unknown

2. Critical Facilities

* 3. Do any critical facilities (police station, fire stations, hospitals, schools, etc.) fall within flood hazard areas?

☐ Yes

☒ No

4. Please indicate the name of each facility and location.

Facility #1 Name and
Location

Facility #2 Name and
Location

Facility #3 Name and
Location

Facility #4 Name and
Location

Facility #5 Name and
Location

* 5. How many critical facilities have been damaged in the past five years from natural hazards?

☒ 0

☐ 2

☐ 1

☐ 3 or more

6. Please indicate details of each facility damaged.

Facility #1 - Name, Hazard

Event, Damage

Description

Facility #2 - Name, Hazard

Event, Damage

Description

Facility #3 - Name, Hazard

Event, Damage

Description

Facility #4 - Name, Hazard

Event, Damage

Description

Facility #5 - Name, Hazard

Event, Damage

Description

3. Existing Plans and Ordinances

* 7. Do any of your plans and ordinances contain the following policies? (Check all that apply)

☒ Freeboard requirement?	☒ A requirement that critical facilities be protected from higher flood levels?
☒ A policy preventing new development or substantial improvements to structures in floodplains?	☒ A policy encouraging cluster development near floodplains, wetlands?
☒ A regulation prohibiting fill in the floodplain?	

Please Indicate Name and Year of each Plan/Ordinance

- Freeboard Requirement: Section 14A-21 (Year: 2015)
- No new development in the SFHA Section 32-97 (Year:1977) and 14A-22(b) (Year: 2015)
- Regulations on adding Fill in SFHA - Section 14A-22 (year: 2015)

8. Are there any other policies that mitigate/reduce risk? (If yes, please include plan/ordinance name and year)

* 9. Are any restrictions on floodplain use enforced through the municipality's subdivision and building permit process? (If yes, please explain)

Yes. All uses and construction plans are reviewed during our subdivision and building permit processes.

* 10. Do all proposed developments require plans to go through the Municipality's subdivision approval process or to acquire a building permit for new structures? (If yes, please explain)

Yes. Developments that meet the definition of a minor and major subdivision go through subdivision process.
All new construction requires a building permit if

4. Emergency Services

* 11. What types of emergency response services does your municipality have in place? (Check all that apply)

☒ Municipal Police Force	☒ Paid Emergency Medical Services (EMS)
☒ County Police Force	☒ Volunteer ALS/BLS (Ambulance Service)
☒ Volunteer Fire Department	☒ Local Emergency Management Coordinator
☒ Paid Fire Department	☒ Specialized Response Teams (Dive Team, USAR, High-Angle Rescue, etc.)
☒ Other (please specify)	

5. Mitigation Projects

* 12. Has your municipality completed any mitigation projects in the past five years?

☒ Yes

☐ No

* 13. Please indicate the type of projects undertaken in the past five years. (Check all that apply)

☐ Buy-outs (acquisition and relocation)

☐ Post disaster recovery (clearing streets, debris removal)

☐ Elevation of structures

☐ Critical Facilities Protection (power stations, water/sewer

☐ Floodproofing

☐ facilities, police, fire, EMS, hospitals)

☐ Berms/floodwalls

☐ Wetlands protection

☐ Levees

☒ Erosion and sedimentation control

☐ Retrofit projects for critical facility structures

☒ Outreach projects (newsletters, brochures)

☒ Retention/detention basins

☒ Environmental education programs

☐ Hazard warning (sirens, reverse 911)

☐ Promotion of flood insurance sales

☐ Hazard response (EOC activation, evacuation orders)

Please provide project type, location, and year completed for each checked project

- Hillside Park and Stormwater Facility (151 Forest Lane): Completed 2022
- E&S Control (various locations): continuous
- Outreach and education programs: continuous
- Rain barrel giveaway program: twice annually

6. Staffing

* 14. Do you currently have the following staffing?

	Yes	No	Responsibilities Covered by Other Staff
Floodplain Administrator	☒	☐	☐
Building Official/Inspector	☒	☐	☐
Site Plan Reviewer	☒	☐	☐
Surveyor	☒	☐	☐
GIS Specialist	☒	☐	☐

7. Training

* 15. Does your staff need on-going or additional training/certification in the following proficiencies?

	Yes	No
Geographic Information Systems (GIS)	☒	☐
Floodplain management/NFIP regulations	☒	☐
Building inspection/code administration	☒	☐

Please specify training type

Open to any available trainings

8. Mitigation Goals and Projects

* 16. List three mitigation projects that your community wishes to undertake in the next one to five (1-5) years, and provide a brief explanation of each.

Mitigation Project #1 -
Name

Catch Basin Repair/Replacement

Project #1 - Details

See attached (Project No. Q2501)

Mitigation Project #2 -
Name

Outfall and City Owned Stormwater Management Facility

Project #2 - Details

See attached (Project No. Q2201)

Mitigation Project #3 -
Name

Storm Drainage Improvements

Project #3 - Details

See attached (Project No. Q1301)



PROJECT NO: Q2501
PROJECT TITLE: Catch Basin Repair/Replacement
PROJECT STATUS: New Project

FUNDING SUMMARY:

*Prior Authorized Balance includes 2024 carryover funding only.

	2025	2026	2027	2028	2029	Total 5 Year
New Funding:	\$ 50,000	\$ 100,000	\$ -	\$ -	\$ -	\$ 150,000
*Prior Authorized Balance:	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ 100,000
2025-2029 Funding:	\$ 150,000	\$ 100,000	\$ -	\$ -	\$ -	\$ 250,000

CAPITAL BUDGET - PROJECT DETAIL	
DEPARTMENT:	PWWR
DIVISION:	Stormwater
FUND:	Stormwater
PROJECT LOCATION:	Various
PROJECT PRIORITY:	3 - Medium-High
The City would be taking a calculated risk in the deferral of this item	
COMPREHENSIVE DEVELOPMENT PLANNING VISION ELEMENT:	Healthy & Active Community

§ 806.1(3) SUMMARY OF PROJECT DATA	
First Year in Program:	2025
Est. Completion Date:	2026
Est. Useful Life (in years):	N/A
Est. Total Cost:	\$ 250,000
Est. Spend @ 12/31/2024 (if underway) ¹ :	\$ -
% Complete (if underway):	0.0%
Balance to be funded ¹ :	\$ 250,000

¹ For ongoing projects, we must estimate total spent since inception through current year to derive the balance to be funded thereafter.

PROJECT COST BY CATEGORY		
CLASSIFICATION	ACCOUNT NUMBER	AMOUNT
Labor:		\$ -
Materials:		\$ -
Other Contracts:	5595506.9720	\$ 250,000
TOTAL PROJECT COST		\$ 250,000

² Council is not required to authorize budget year funding for this portion, but this portion of the project will indeed represent a cash outflow in the budget year and/or "out years."

Charter § 806.1(2) DESCRIPTION & JUSTIFICATION:

Based on our in-house inspections, we have over 480 catch basins (where rain enters our storm sewer system) on our repair list, graded like a report card A through F with no E. There are currently 72 basins with a Grade D or F, in need of reconstruction. Most of these basins were constructed of individual bricks and mortar, which continue to deteriorate and fall out, requiring more repairs. This project would remove the existing brick basins and replace with a pre-cast or poured in place concrete basin. We expect that a contractor will be needed to perform this work until our crews are filled out and experienced enough to complete these replacements efficiently. This contract would be similar to our HC Ramp contract in scope and duration.

PROJECT FINANCING BY PLAN YEAR

§ 806.1(3) SOURCE OF FUNDS:	Prior Authorized ²	Actual Funds Utilized as of 04/30/24	Estimated Expenditures 04/01/24 - 12/31/24	Estimated Authorized Balance ² 12/31/24	2025	2026	2027	2028	2029	TOTAL 5 Year CIP
CURRENT RESOURCES	-	-	-	\$ -	50,000	100,000	-	-	-	\$ 150,000
CAPITAL RESERVES	-	-	-	\$ -	100,000	-	-	-	-	\$ 100,000
EQUIPMENT REPLACEMENT	-	-	-	\$ -	-	-	-	-	-	\$ -
GRANTS (SPECIFY)	-	-	-	\$ -	-	-	-	-	-	\$ -
BOND ISSUES	-	-	-	\$ -	-	-	-	-	-	\$ -
STATE REVOLVING LOAN	-	-	-	\$ -	-	-	-	-	-	\$ -
AMERICAN RESCUE PLAN ACT	-	-	-	\$ -	-	-	-	-	-	\$ -
OTHER (SPECIFY)	-	-	-	\$ -	-	-	-	-	-	\$ -
TOTAL:	\$ -	\$ -	\$ -	\$ -	\$ 150,000	\$ 100,000	\$ -	\$ -	\$ -	\$ 250,000
§ 806.1(4) ESTIMATED ANNUAL COST OF OPERATING / MAINTAINING PROJECT OR ASSET					OPERATING IMPACT:					
					2025	2026	2027	2028	2029	TOTAL
					-	-	-	-	-	\$ -



PROJECT NO: Q2201
PROJECT TITLE: Outfall and City Owned SWM Facility
Repair
PROJECT STATUS: Reoccurring (with no end date)

FUNDING SUMMARY:

*Prior Authorized Balance includes 2024 carryover funding only.

	2025	2026	2027	2028	2029	Total 5 Year
New Funding:	\$ 150,000	\$ 700,000	\$ 400,000	\$ 500,000	\$ 500,000	\$ 2,250,000
*Prior Authorized Balance:	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2025-2029 Funding:	\$ 150,000	\$ 700,000	\$ 400,000	\$ 500,000	\$ 500,000	\$ 2,250,000

CAPITAL BUDGET - PROJECT DETAIL	
DEPARTMENT:	PWWR
DIVISION:	Stormwater
FUND:	Stormwater
PROJECT LOCATION:	Various
PROJECT PRIORITY:	2 - High Priority Level
Critical need to remediate failing service, prevent failure, or generate savings	
COMPREHENSIVE DEVELOPMENT PLANNING VISION ELEMENT:	Sustainable Community

§ 806.1(3) SUMMARY OF PROJECT DATA	
First Year in Program:	2022
Est. Completion Date:	Perpetual
Est. Useful Life (in years):	100
Est. Total Cost:	\$ 2,795,875
Est. Spend @ 12/31/2024 (if underway) ¹ :	\$ 545,875
% Complete (if underway):	19.5%
Balance to be funded ¹ :	\$ 2,250,000

¹ For ongoing projects, we must estimate total spent since inception through current year to derive the balance to be funded thereafter.

PROJECT COST BY CATEGORY		
CLASSIFICATION	ACCOUNT NUMBER	AMOUNT
Labor:		\$ -
Materials:		\$ -
Other Contracts:	5595506.9720	\$ 2,250,000
TOTAL PROJECT COST		\$ 2,250,000

² Council is not required to authorize budget year funding for this portion, but this portion of the project will indeed represent a cash outflow in the budget year and/or "out years."

Charter § 806.1(2) DESCRIPTION & JUSTIFICATION:

City-owned stormwater facilities and outfalls need rehabilitation per annual inspections. Most major repairs are outside of the scope of in-house crew and equipment capabilities. This funding can also be used to repair Home Owner Association-owned facilities prior to take over by the City for long term maintenance.

2025 Update:

Moss Court Outfall rehab complete. Similar outfalls that are not quite as dramatic need to be addressed. 2025 funding will cover the engineering design of at least 2 identified outfalls needing significant rehabilitation with 2026 funding to complete the repairs. 2027-2029 will design and construct in same year due and may incorporate multiple outlets due to the reduced scope of work.

PROJECT FINANCING BY PLAN YEAR

§ 806.1(3) SOURCE OF FUNDS:	Prior Authorized ²	Actual Funds Utilized as of 04/30/24	Estimated Expenditures 04/01/24 - 12/31/24	Estimated Authorized Balance ² 12/31/24	2025	2026	2027	2028	2029	TOTAL 5 Year CIP		
CURRENT RESOURCES	-	-	-	\$ -	-	700,000	400,000	500,000	500,000	\$ 2,100,000		
CAPITAL RESERVES	-	-	-	\$ -	150,000	-	-	-	-	\$ 150,000		
EQUIPMENT REPLACEMENT	-	-	-	\$ -	-	-	-	-	-	\$ -		
GRANTS (SPECIFY)	-	-	-	\$ -	-	-	-	-	-	\$ -		
BOND ISSUES	-	-	-	\$ -	-	-	-	-	-	\$ -		
STATE REVOLVING LOAN	-	-	-	\$ -	-	-	-	-	-	\$ -		
AMERICAN RESCUE PLAN ACT	545,875	-	545,875	\$ -	-	-	-	-	-	\$ -		
OTHER (SPECIFY)	-	-	-	\$ -	-	-	-	-	-	\$ -		
TOTAL:	\$ 545,875	\$ -	\$ 545,875	\$ -	\$ 150,000	\$ 700,000	\$ 400,000	\$ 500,000	\$ 500,000	\$ 2,250,000		
§ 806.1(4) ESTIMATED ANNUAL COST OF OPERATING / MAINTAINING PROJECT OR ASSET					OPERATING IMPACT:		2025	2026	2027	2028	2029	TOTAL
					INCREMENTAL COSTS (NET SAVINGS)		-	-	-	-	-	\$ -



PROJECT NO: Q1301
PROJECT TITLE: Storm Drainage Improvements
PROJECT STATUS: Reoccurring (with no end date)

FUNDING SUMMARY:

*Prior Authorized Balance includes 2024 carryover funding only.

	2025	2026	2027	2028	2029	Total 5 Year
New Funding:	\$ -	\$ 550,000	\$ 605,000	\$ 665,500	\$ 732,050	\$ 2,552,550
*Prior Authorized Balance:	\$ 584,855	\$ -	\$ -	\$ -	\$ -	\$ 584,855
2025-2029 Funding:	\$ 584,855	\$ 550,000	\$ 605,000	\$ 665,500	\$ 732,050	\$ 3,137,405

CAPITAL BUDGET - PROJECT DETAIL	
DEPARTMENT:	PWWR
DIVISION:	Stormwater
FUND:	Stormwater
PROJECT LOCATION:	Various
PROJECT PRIORITY:	1 - Highest Priority Level Project underway and must be completed
COMPREHENSIVE DEVELOPMENT PLANNING VISION ELEMENT:	Sustainable Community

§ 806.1(3) SUMMARY OF PROJECT DATA	
First Year in Program:	2013
Est. Completion Date:	Perpetual
Est. Useful Life (in years):	75+
Est. Total Cost:	\$ 3,137,405
Est. Spend @ 12/31/2024 (if underway) ¹ :	\$ -
% Complete (if underway):	0.0%
Balance to be funded ² :	\$ 3,137,405

¹ For ongoing projects, we must estimate total spent since inception through current year to derive the balance to be funded thereafter.

PROJECT COST BY CATEGORY		
CLASSIFICATION	ACCOUNT NUMBER	AMOUNT
Labor:		\$ -
Materials:	5595506.9720	\$ 3,137,405
Other Contracts:		\$ -
TOTAL PROJECT COST		\$ 3,137,405

² Council is not required to authorize budget year funding for this portion, but this portion of the project will indeed represent a cash outflow in the budget year and/or "out years."

Charter § 806.1(2) DESCRIPTION & JUSTIFICATION:

This project is an ongoing project to tackle stormwater and drainage problems throughout the City. An engineering consultant has completed a detailed CCTV Inspection and Priority Ranking in order to aid the decision making for the future replacement or rehabilitation of all of the known Corrugated Metal Pipe (CMP) in the City. The issues with the premature failure and deterioration of CMP has been well documented over the past several years and will be the focus of this Capital Project. The memorandum from JMT identifies approximately \$3,500,000 in lining and replacement of CMP. JMT has prepared a 14 year plan for the repairs and annual repair locations are presented as part of any Contract Recommendation brought to Council. Exhibits are attached for the anticipated work in 2023. Emergent and newly identified problems which may be priority over the CMP progress may arise over the term of this project and will be paid for under this project.

2025 Update:

Academy Street: Expect to have plans and specs for bidding in Fall 2024 and construction in early 2025. Will need to use reserves to complete this project and expect BA in late 2024 to award project. We expect to utilize significant reserves in 2025 to address long-standing drainage concerns along Swarthmore Drive and more recent CMP additions at Windsor Drive.

The funding for this project was inadvertently moved to SRF funding in the 2024 budget. Funding should be moved back to Current Resources and values reverted to roughly \$500,000 per year with inflation added. Reserves exist in SW Utility fund due to the forethought of it's creators and partially due to the creators inability to complete the projects on time.

PROJECT FINANCING BY PLAN YEAR

§ 806.1(3) SOURCE OF FUNDS:	Prior Authorized ²	Actual Funds Utilized as of 04/30/24	Estimated Expenditures 04/01/24 - 12/31/24	Estimated Authorized Balance ² 12/31/24	2025	2026	2027	2028	2029	TOTAL 5 Year CIP
CURRENT RESOURCES	-	-	-	\$ -	-	550,000	605,000	665,500	732,050	\$ 2,552,550
CAPITAL RESERVES	84,855	-	-	\$ 84,855	584,855	-	-	-	-	\$ 584,855
EQUIPMENT REPLACEMENT	-	-	-	\$ -	-	-	-	-	-	\$ -
GRANTS (SPECIFY)	-	-	-	\$ -	-	-	-	-	-	\$ -
BOND ISSUES	-	-	-	\$ -	-	-	-	-	-	\$ -
STATE REVOLVING LOAN	500,000	-	-	\$ 500,000	-	-	-	-	-	\$ -
AMERICAN RESCUE PLAN ACT	-	-	-	\$ -	-	-	-	-	-	\$ -
OTHER (SPECIFY)	-	-	-	\$ -	-	-	-	-	-	\$ -
TOTAL:	\$ 584,855	\$ -	\$ -	\$ 584,855	\$ 584,855	\$ 550,000	\$ 605,000	\$ 665,500	\$ 732,050	\$ 3,137,405
§ 806.1(4) ESTIMATED ANNUAL COST OF OPERATING / MAINTAINING PROJECT OR ASSET					OPERATING IMPACT:					
					2025	2026	2027	2028	2029	TOTAL
					-	-	-	-	-	\$ -

1. Municipality Information

1. Municipality Information

Municipality Name

Newport

Point of Contact

Wendy King

Title

Town manager

Email Address

Wendy.king99@yahoo.com

Phone Number

302-994-6403

2. Please provide information on buildings in the floodplain within your municipality.

Total buildings in floodplain

Unknown

Total flood insurance
policies

0

Total Repetitive Loss (RL)
Properties

Unknown

Total Severe Repetitive
Loss (SRL) Properties

Unknown

2. Critical Facilities

* 3. Do any critical facilities (police station, fire stations, hospitals, schools, etc.) fall within flood hazard areas?

☐ Yes

☒ No

4. Please indicate the name of each facility and location.

Facility #1 Name and
Location

Facility #2 Name and
Location

Facility #3 Name and
Location

Facility #4 Name and
Location

Facility #5 Name and
Location

* 5. How many critical facilities have been damaged in the past five years from natural hazards?

☒ 0

☐ 2

☐ 1

☐ 3 or more

6. Please indicate details of each facility damaged.

Facility #1 - Name, Hazard

Event, Damage

Description

Facility #2 - Name, Hazard

Event, Damage

Description

Facility #3 - Name, Hazard

Event, Damage

Description

Facility #4 - Name, Hazard

Event, Damage

Description

Facility #5 - Name, Hazard

Event, Damage

Description

3. Existing Plans and Ordinances

* 7. Do any of your plans and ordinances contain the following policies? (Check all that apply)

☐ Freeboard requirement?	☐ A requirement that critical facilities be protected from higher flood levels?
☐ A policy preventing new development or substantial improvements to structures in floodplains?	☐ A policy encouraging cluster development near floodplains, wetlands?
☐ A regulation prohibiting fill in the floodplain?	

Please Indicate Name and Year of each Plan/Ordinance

8. Are there any other policies that mitigate/reduce risk? (If yes, please include plan/ordinance name and year)

our zoning ordinance addresses development in a flood zone.

* 9. Are any restrictions on floodplain use enforced through the municipality's subdivision and building permit process? (If yes, please explain)

our zoning ordinance addresses development in a flood zone.

* 10. Do all proposed developments require plans to go through the Municipality's subdivision approval process or to acquire a building permit for new structures? (If yes, please explain)

there is no "development" here - no open land to develop. we are waiting for redevelopment. All new structures would require a building permit.

4. Emergency Services

* 11. What types of emergency response services does your municipality have in place? (Check all that apply)

☒ Municipal Police Force

☐ County Police Force

☒ Volunteer Fire Department *

☐ Paid Fire Department

☐ Other (please specify)

☐ Paid Emergency Medical Services (EMS)

☐ Volunteer ALS/BLS (Ambulance Service)

☐ Local Emergency Management Coordinator

☐ Specialized Response Teams (Dive Team, USAR, High-Angle Rescue, etc.)

* The volunteer fire company is not under the town's purview although located in town.

5. Mitigation Projects

* 12. Has your municipality completed any mitigation projects in the past five years?

☐ Yes

☒ No

* 13. Please indicate the type of projects undertaken in the past five years. (Check all that apply)

☐ Buy-outs (acquisition and relocation)

☐ Post disaster recovery (clearing streets, debris removal)

☐ Elevation of structures

☐ Critical Facilities Protection (power stations, water/sewer

☐ Floodproofing

☐ facilities, police, fire, EMS, hospitals)

☐ Berms/floodwalls

☐ Wetlands protection

☐ Levees

☐ Erosion and sedimentation control

☐ Retrofit projects for critical facility structures

☐ Outreach projects (newsletters, brochures)

☐ Retention/detention basins

☐ Environmental education programs

☐ Hazard warning (sirens, reverse 911)

☐ Promotion of flood insurance sales

☐ Hazard response (EOC activation, evacuation orders)

Please provide project type, location, and year completed for each checked project

6. Staffing

* 14. Do you currently have the following staffing?

	Yes	No	Responsibilities Covered by Other Staff
Floodplain Administrator	☐	☒	☐
<u>Building</u> <u>Official/Inspector</u>	☒	☐	☐
Site Plan Reviewer	☒ - the building inspector does this	☐	☐
Surveyor	☐	☒	☐
GIS Specialist	☐	☒	☐

7. Training

* 15. Does your staff need on-going or additional training/certification in the following proficiencies?

	Yes	No
Geographic Information Systems (GIS)	☐	☐
Floodplain management/NFIP regulations	☐	☐
Building inspection/code administration	☐	☐

Please specify training type

We never had GIS training, but I can navigate the county's website/gis system okay.

8. Mitigation Goals and Projects

- * 16. List three mitigation projects that your community wishes to undertake in the next one to five (1-5) years, and provide a brief explanation of each.

Mitigation Project #1 -
Name

Project #1 - Details

Mitigation Project #2 -
Name

Project #2 - Details

Mitigation Project #3 -
Name

Project #3 - Details

*We have not identified any mitigation projects
because our budget rarely allows for it.*

HAZARD AREA IDENTIFICATION

Municipality: *Newport*
Contact Name: *Wendy King*
Contact Email: *Wendyking99@yahoo.com*
Contact Phone Number: *302-994-6403*

Please identify problem/hazard areas within the municipality along with a brief description of the hazard and any past occurrences.

Hazard Areas:

Hazard Area #1: *Walnut / Christian streets*

Location (ex. - address, cross streets, or road segments.):

Hazard type (ex. - flood area): *flooding*

Hazard Description (ex. - no stormwater pipes along roadway, rainwater washes out roads):

poor drainage. Ices in the winter, floods when rainy. washes away asphalt.

Notes:

There is only one catchbasin at the end of Walnut Street so Walnut carries runoff from Highland down to the catchbasin @ Justice

Hazard Area #2:

Location (ex. - address, cross streets, or road segments):

Hazard type (ex. - flood, pipeline, land subsidence):

Hazard Description:

Notes:

Hazard Area #3:

Location (ex. - address, cross streets, or road segments):

Hazard type (ex. - flood, pipeline, land subsidence):

Hazard Description:

Notes:

New Castle County – Floodplain Coordinator Questionnaire (NFIP Questionnaire)

Flood Identification and Mapping	County	Municipalities
Does the County/Municipality make the Flood Insurance Rate Map and Flood Insurance Studies available to the public? Where are these documents housed within the County?		<i>We are not members.</i>
Will the recently developed Digital Flood Insurance Rate Maps be made available to the public as well? How?		
Are Letters of Map Revisions (LOMRs) reviewed and signed by County/Municipality officials?		
If during the subdivision review process a new development determines a reduction in the floodplain delineation of the FIRM floodplain, is the developer required to submit a LOMR submission to FEMA?		
Does the County/Municipality provide advice to community residents regarding elevation certificates and Letter of Map Amendment (LOMA) applications?		
Does the County/Municipality maintain records of approved letters of map change?		
Does the County/Municipality assist residents in interpreting the FIRM and County flood studies to determine the property's status in the floodplain? If yes, which department?		
Floodplain Management		
Are any restrictions on floodplain use enforced through the subdivision and building permit process?		
Do all proposed developments require plans to go through the County/Municipality subdivision approval process or to acquire a building permit for new structures?		
Are all new structures required to be at least 1.5 feet above the 100-year base flood elevation?		
Flood Insurance		
Is the County/Municipality committed to educating residents about the value and availability of flood insurance?		
Is an annual letter sent to residents in the floodplain explaining the importance of flood insurance and where it may be obtained?		
Does the County/Municipality assist residents in interpreting the FIRM and County flood studies to determine the resident's property's flood plain status, and offer advice regarding elevation certificates and LOMA applications?		
When was the last Community Assistance Visit conducted and, as of that date, was the County found to meet the requirements for continued participation in the NFIP?		

Municipal Mitigation Actions (By Hazard)

Please fill out the table below. A sample action update has been completed in orange.

New Castle County Municipal Hazard Mitigation Actions					
Municipality	Hazard Mitigated	Mitigation Action	Lead Agency	Status (In Progress, On-going, Not Applicable, Completed, Cancelled)	Notes
Sample	Flood	Sample Action	Municipal Utilities (UIG)	on-going	Backflow prevention devices are being installed throughout the township. Four of seven have been installed. Expected completion by fall 2019.
Newport	Flooding	Initiate wetlands protective measures along the Christina River.			
	Flooding	Work with the County to conduct a detailed flood vulnerability study for the entire Town.	Town / NCC DLU		I don't believe this has started but I am interested in this
	Flooding	Study and recommend solutions to alleviate the periodic flooding threat on the Christina River at Interstate 95/US 141/202.			
	Flooding	Install catch basins throughout Town.	Town Admin		This has not begun because our budget was not allowed. Still interested
	Flood	Install two (2) new sewer pump stations in the Industrial Park	Town		motors were replaced in 2021.

1. Municipality Information

1. Municipality Information

Municipality Name

Town of Odessa

Point of Contact

Amy Marie Ottinger

Title

Town Secretary

Email Address

townofodessa@gmail.com

Phone Number

302-378-2510

2. Please provide information on buildings in the floodplain within your municipality.

Total buildings in floodplain

Total flood insurance
policies

Total Repetitive Loss (RL)
Properties

Total Severe Repetitive
Loss (SRL) Properties

2. Critical Facilities

* 3. Do any critical facilities (police station, fire stations, hospitals, schools, etc.) fall within flood hazard areas?

☐ Yes

☒ No

4. Please indicate the name of each facility and location.

Facility #1 Name and
Location

Facility #2 Name and
Location

Facility #3 Name and
Location

Facility #4 Name and
Location

Facility #5 Name and
Location

* 5. How many critical facilities have been damaged in the past five years from natural hazards?

☒ 0

☐ 2

☐ 1

☐ 3 or more

6. Please indicate details of each facility damaged.

Facility #1 - Name, Hazard

Event, Damage

Description

Facility #2 - Name, Hazard

Event, Damage

Description

Facility #3 - Name, Hazard

Event, Damage

Description

Facility #4 - Name, Hazard

Event, Damage

Description

Facility #5 - Name, Hazard

Event, Damage

Description

3. Existing Plans and Ordinances

* 7. Do any of your plans and ordinances contain the following policies? (Check all that apply)

☐ Freeboard requirement?	☐ A requirement that critical facilities be protected from higher flood levels?
☐ A policy preventing new development or substantial improvements to structures in floodplains?	☐ A policy encouraging cluster development near floodplains, wetlands?
☐ A regulation prohibiting fill in the floodplain?	

Please Indicate Name and Year of each Plan/Ordinance

8. Are there any other policies that mitigate/reduce risk? (If yes, please include plan/ordinance name and year)

* 9. Are any restrictions on floodplain use enforced through the municipality's subdivision and building permit process? (If yes, please explain)

* 10. Do all proposed developments require plans to go through the Municipality's subdivision approval process or to acquire a building permit for new structures? (If yes, please explain)

YES

4. Emergency Services

* 11. What types of emergency response services does your municipality have in place? (Check all that apply)

☐ Municipal Police Force

☐ County Police Force

☒ Volunteer Fire Department

☐ Paid Fire Department

☒ Other (please specify)

☒ Paid Emergency Medical Services (EMS)

☒ Volunteer ALS/BLS (Ambulance Service)

☐ Local Emergency Management Coordinator

☒ Specialized Response Teams (Dive Team, USAR, High-Angle Rescue, etc.) *Through Fire Company*

State Police Force

5. Mitigation Projects

* 12. Has your municipality completed any mitigation projects in the past five years?

☐

Yes

☒

No

* 13. Please indicate the type of projects undertaken in the past five years. (Check all that apply)

☐

Buy-outs (acquisition and relocation)

☐

Post disaster recovery (clearing streets, debris removal)

☐

Elevation of structures

☐

Critical Facilities Protection (power stations, water/sewer

☐

Floodproofing

☐

facilities, police, fire, EMS, hospitals)

☐

Berms/floodwalls

☐

Wetlands protection

☐

Levees

☐

Erosion and sedimentation control

☐

Retrofit projects for critical facility structures

☐

Outreach projects (newsletters, brochures)

☐

Retention/detention basins

☐

Environmental education programs

☐

Hazard warning (sirens, reverse 911)

☐

Promotion of flood insurance sales

☐

Hazard response (EOC activation, evacuation orders)

Please provide project type, location, and year completed for each checked project

6. Staffing

* 14. Do you currently have the following staffing?

	Yes	No	Responsibilities Covered by Other Staff
Floodplain Administrator	☐	☒	☐
Building Official/Inspector <i>Outside Agency</i>	☒	☐	☐
Site Plan Reviewer <i>Outside Agency</i>	☒	☐	☐
Surveyor	☐	☒	☐
GIS Specialist	☐	☒	☐

7. Training

* 15. Does your staff need on-going or additional training/certification in the following proficiencies?

	Yes	No
Geographic Information Systems (GIS)	☐	☒
Floodplain management/NFIP regulations	☐	☒
Building inspection/code administration	☐	☒

Please specify training type

8. Mitigation Goals and Projects

- * 16. List three mitigation projects that your community wishes to undertake in the next one to five (1-5) years, and provide a brief explanation of each.

Mitigation Project #1 -
Name

Project #1 - Details

Mitigation Project #2 -
Name

Project #2 - Details

Mitigation Project #3 -
Name

Project #3 - Details

