SECTION 2 – HAZARD IDENTIFICATION

Atlantic County, New Jersey is vulnerable to a wide range of natural and human-caused hazards that threaten life and property. FEMA's current regulations and interim guidance under the Disaster Mitigation Act of 2000 (DMA 2000) require, at a minimum, an evaluation of a full range of natural hazards. An evaluation of human-caused hazards (i.e., technological hazards, terrorism, etc.) is encouraged, though not required, for plan approval. Atlantic County has focused solely on natural hazards at this time. Incorporation of human-caused hazards may be evaluated in future versions of the plan, as it is a "living document" which will be monitored, evaluated and updated regularly.

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, as well as the suite of hazards required for consideration in the 2019 New Jersey State Hazard Mitigation Plan (NJSHMP) Standardized Risk Template for Multijurisdictional Mitigation Plans, Atlantic County has identified a number of hazards that are to be addressed in its Multi-Jurisdictional Hazard Mitigation Plan. These hazards were identified through an extensive process that utilized input from three key sources: Planning Committee members, research of past disaster declarations in the County, and the New Jersey State Hazard Mitigation Plan. Readily available online information from reputable sources (such as federal and state agencies) was also evaluated to supplement information from these key sources. The most prominent online sources of data used in this assessment to identify the occurrence of various hazards were records of declared disasters and emergencies maintained by FEMA and NJOEM, and the National Oceanic and Atmospheric Administration's (NOAA) National Center for Environmental Information (NCEI) Storm Event Database.

AECOM conducted research and prepared initial updates to this plan section for planning team review and comment. AECOM solicited feedback from the planning team regarding their preliminary assessments and whether there was a need for adding or omitting any hazards that were previously covered in the 2016 Plan Update. The Atlantic County OEP was the first to review and comment on this section, during email coordination with AECOM on June 1, 2021 and subsequent telephone coordination on June 2, 2021. Thereafter, this section was provided to the CPG via email on June 3, 2021 and via posting on the internal CPG website on that same date. County OEP gave CPG members one week to review and return comments, which were requested by June 11, 2021. Feedback from the CPG on this section was positive, with respondents indicating their concurrence. As a result of this review and coordination, all hazards identified in the 2016 plan were deemed to have continued relevance and were recognized as continuing to be significant hazards meriting risk assessment in subsequent sections of this document.

Importantly, the following hazards were added into the suite of hazards considered during the 2021 plan update to better align with guidance set forth in the 2019 NJSHMP: levee failure, tsunamis, sea level rise, sinkholes, and abandoned mines and quarries. **Table 2.1** provides a summary of the hazard identification and reevaluation process noting which of the evaluated hazards were identified as significant enough for further evaluation through Atlantic County's multi-jurisdictional hazard risk assessment (marked with a "☑"). It also shows how these identified hazards will be carried forward to and presented in the Section 3 Risk Assessment in order to align with the State HMP organizational structure.

Table 2.1
Summary Results of the Hazard Identification and Evaluation Process, 2016 versus 2022

2016 Plan	2022 Plan	Organizational Structure of Identified Hazards for 2022 Section 3 - Risk Assessment [1]
ATMOSPHERIC ☐ Avalanche ☑ **Extreme Temperatures** ☑ **Extreme Wind** ☐ Hailstorm ☑ **Hurricane and Tropical Storm** ☑ **Lightning** ☑ **Nor'easter** ☑ **Tornado** ☑ **Winter Storm**	**ATMOSPHERIC** ☐ Avalanche ☑ **Extreme Temperatures** ☑ **Extreme Wind** ☑ **Hail** ☑ **Hurricane and Tropical Storm** ☑ **Lightning** ☑ **Nor'easter** ☑ **Tornado** ☑ **Severe Winter Weather**	**ATMOSPHERIC** Hurricane and Tropical Storms Nor'easters Severe Weather (high winds, tornadoes, thunderstorms, hail, and extreme temperatures) Severe Winter Weather (snow, blizzards, and ice storms)
HYDROLOGIC ☑ **Coastal Erosion** ☑ **Dam Failure** ☑ **Drought** ☑ **Flood** ☐ Ice Jams ☑ **Storm Surge** ☑ **Wave Action**	**HYDROLOGIC** ☑ **Coastal Erosion and Sea Level Rise** ☑ **Dam/Levee Failure** ☑ **Drought** ☑ **Flood** ☐ Ice Jams ☑ **Storm Surge** ☑ **Wave Action**	**HYDROLOGIC** Coastal Erosion and Sea Level Rise Dam/Levee Failure Drought Flood (riverine, coastal, storm surge, tsunami, and stormwater flooding)
GEOLOGIC ☑ **Earthquake** ☐ Expansive Soils ☐ Landslide ☐ Land Subsidence ☐ Tsunami ☐ Volcano	**GEOLOGIC** ☑ **Earthquake** ☐ Expansive Soils ☐ Landslide ☐ Land Subsidence/Sinkholes /Abandoned Mines and Quarries ☑ **Tsunami** ☐ Volcano	**GEOLOGIC** Earthquake **note - tsunamis moved up to the flood hazard*
OTHER ☑ **Wildfire**	**OTHER** ☑ **Wildfire**	**OTHER** Wildfire

☑ = Hazard considered significant enough for further evaluation through Atlantic County's multi-jurisdictional hazard risk assessment.

[1] Reorganized to better align with State HMP 2019

Table 2.2[2] documents the evaluation process rationale used for determining which of the initially identified hazards are considered significant enough for further evaluation through Atlantic County's multi-jurisdictional hazard risk assessment. For each hazard considered, the table indicates whether or not the hazard was identified as a significant hazard to be further assessed, how this determination was made, and why this determination was made. The table works to summarize not only those hazards that *were* identified (and why) but also those that *were not* identified (and why not). Hazard events not identified for inclusion at this time may be addressed during future evaluations and updates of the risk assessment if deemed necessary by the Planning Committee during the plan update process. Table 2.2 also documents the planning team's reassessment of hazard significance during the first plan update as part of its ongoing maintenance of the plan to ensure that it reflects current conditions.

Appendix 2.1 lists the full range of natural hazards initially considered for inclusion in the plan and provides a brief description for each. Some of these hazards are considered to be interrelated or cascading (i.e., hurricanes can cause flooding, storm surge and tornadoes), but for preliminary hazard identification purposes these individual hazards are broken out separately. It should also be noted that some hazards, such as earthquakes or winter storms may impact a large area yet cause little damage, while other hazards, such as a tornado, may impact a small area yet cause extensive damage.

[2] Table 2.2 was updated to include events captured by readily available data sources (particularly NCEI records) to January 2021; with updates in May 2021. The sources themselves are not updated to the same end date across all hazards; hence, Table 2.2 may show event records through different end dates. Most were current through late 2020, though particular variability across hazards is reflected in the table. Hazards included in bold in Table 2.2 are considered significant hazards.

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
ATMOSPHERIC HAZARDS					
Avalanche	⊘	Not identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update.	• NJ State Hazard Mitigation Plan (2019) • US Forest Service National Avalanche Center web site • FEMA's Multi-Hazard Identification and Risk Assessment (MHIRA) • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• The State Plan does not identify avalanches as a hazard of concern for New Jersey. • The current Atlantic County Plan does not identify avalanches as a hazard of concern. • The topography and climate of Atlantic County does not support conditions required for the occurrence of avalanches.

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Extreme Temperatures	✓	**Identified as a significant hazard to be addressed in the plan at that time.**	**Considered again and the earlier assessment was determined to still be applicable for the plan update.** **To better align with the state plan, this hazard will be further assessed under the risk assessment for severe weather.**	• **NJ State Hazard Mitigation Plan (2019)** • **FEMA's Multi-Hazard Identification and Risk Assessment** • **NOAA National Centers for Environmental Information (NCEI) Storm Events Database** • **Atlantic County Hazard Mitigation Plan (2016)** • **Input from CPG**	• **Extreme temperature events are identified in the State Plan (in the context of the drought hazard for extreme heat, and in the context of winter storms for extreme cold).** • **Extreme temperatures are also identified in the current Atlantic County Plan under severe storms.** • **NCEI reports 117 days of extreme temperature events (cold/wind chill, excessive heat, extreme cold/wind chill, frost/freeze, heat) for Atlantic County between February 1996 and January 2021 (approximately 74% extreme heat events and 26% extreme cold events). For these events there are no recorded property damages, crop damages, or deaths; but there are a number of attributed injuries reported (36, in total).** • **Primary impacts of concern for extreme temperatures include the life-threatening effects of heat stress or hypothermia on people, particularly the elderly or people in poor physical health. Other significant impacts include strains on livestock and agriculture and excessive demands for electricity during extended heat waves that can lead to power outages and intentional rolling blackouts. During periods of extreme cold, power outages caused by downed power lines can have tremendous impacts on members of the public whose homes do not have secondary heat sources. Pipes freezing and bursting can cause structural damage.**

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Extreme Wind	✓	**Identified as a significant hazard to be addressed in the plan at that time.**	**Considered again and the earlier assessment was determined to still be applicable for the plan update.** **To better align with the state plan this hazard will be assessed further under the risk assessment for severe weather.**	• **NJ State Hazard Mitigation Plan (2019)** • **FEMA's Multi-Hazard Identification and Risk Assessment** • **NOAA NCEI Storm Events Database** • **Maximum 3 second wind gust per the American Society of Civil Engineers (ASCE) Standard 7-98.** • **Atlantic County Hazard Mitigation Plan (2014)** • **Input from CPG**	• **Extreme wind events are identified in the State Plan.** • **Extreme wind events are identified in the Atlantic County 4 Plan as part of severe storms.** • **NCEI reports 332 days with high winds, strong winds, and thunderstorm winds for Atlantic County between September 1956 and January 2021. These events have resulted in recorded estimates of 8 injuries and more than $424 million in property damage (of which roughly $400 million are attributable to Superstorm Sandy).** • **Atlantic County is located in a climate region that is highly susceptible to numerous types of extreme wind events including severe thunderstorms, hurricanes, tropical storms, nor'easters and severe winter storms.** • **The maximum 3 second wind gust for Atlantic County per ASCE 7-98 is 160 mph.**

Hailstorm	✓	Not identified as a significant hazard to be addressed in the plan at that time.	Considered again and to better align with the state plan, hail will be discussed briefly (but not analyzed in detail)as a component of the severe weather risk assessment	• NJ State Hazard Mitigation Plan (2019) • FEMA's Multi-Hazard Identification and Risk Assessment • NOAA NCEI Storm Events Database and National Severe Storms Laboratory (NSSL) web site • Atlantic County 4 Hazard Mitigation Plan (2014) • Input from CPG	• Hailstorms are discussed in the State Plan under the section on severe weather. • Hailstorms are discussed in the Atlantic County 4 Plan in the context of severe storms. • NCEI reports 37 hail days (with 3/4 inch size hail or greater) for Atlantic County between July 1974 and January 2021. For these events there are no recorded deaths or injuries, but $10,000 in property damage and $5.01 million in crop damages. These damages were incurred during only two of the total number of reported events: (a) August 2008, Hammonton, with ping pong ball sized hail causing $5M in crop damages; and (b) $20,000 in damages to vehicles and crops in Buena Vista Township in June 2011. • Hail probability data available on the NSSL web site indicates that Atlantic County is at minimal risk to severe weather threats from damaging hail (at least 2 inches in diameter). NCEI reports only two events in which hail of this magnitude fell in Atlantic County (June 1980 and May 1993; neither event record included a report of deaths, injuries, property damages, or crop damages). • Atlantic County is located in a part of the country with the lowest annual number of days with hailstorms (less than 2). • Damaging hailstorm events in Atlantic County are not very likely, nor are they likely to be very intense. While hailstorms are possible and do occur in the County, they are not identified as a hazard of concern for the purposes of this mitigation plan. There are minimal hazard mitigation techniques available to reduce hailstorm impacts outside of the emergency preparedness procedures and severe weather warning systems already in place (i.e., mass public notifications that recommend immediate protective actions).

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Hurricane and Tropical Storm	✓	Identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update.	• NJ State Hazard Mitigation Plan (2019) • Analysis of NOAA NHC storm return periods • NOAA NCEI Storm Events Database • National Hurricane Center web site • FEMA's Multi-Hazard Identification and Risk Assessment • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• Hurricane and tropical storm events are identified as a hazard of concern in the State Plan. • The Atlantic County 4 Plan also identifies hurricanes and tropical storms as a hazard of concern. • NOAA NHC estimates the return period for hurricanes passing within 50 nautical miles of Atlantic County is approximately 18 years; for major hurricanes (Categories 3, 4, 5) the return period is estimated to be approximately 76 years. • Recent tropical storm events including Bertha (1996), Floyd (1999), Isabel (2003), Hanna (2008) and Irene (2011) have caused significant wind, flood and coastal erosion related damages in Atlantic County. • The remnants of Hurricane Sandy (Superstorm Sandy) in October 2012 caused catastrophic damage in Atlantic County. • NOAA NCEI records one additional tropical storm event affecting Atlantic County since 2014: the remnants of Hurricane Isaias, which passed through New Jersey in August 2020.

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Lightning	✓	Identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update. To better align with the state plan, this hazard will be further assessed under the severe weather risk assessment.	• NJ State Hazard Mitigation Plan (2019) • Vaisala's National Lightning Detection Network • NOAA NCEI Storm Events Database, NOAA lightning statistics, and National Severe Storms Laboratory (NSSL) web site • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• Lightning is identified as a hazard of concern in the State Plan, in the context of severe weather events. • Lightning is also identified as a hazard of concern in the Atlantic County 4 Plan (in the context of severe storms). • Atlantic County lies in an area that experiences a very low annual lightning flash density. Vaisala's National Lightning Detection Network for cloud-to-ground lightning incidence in the continental US (1997-2010) shows Atlantic County in a region experiencing 2 to 3 events per square kilometer per year. • NCEI reports 24 days with lightning events for Atlantic County between April 2001 and January 2021. These events have resulted in a recorded 2 deaths, 6 injuries and more than $1.3 million in property damage.

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Nor'easter	✓	Identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update.	• NJ State Hazard Mitigation Plan (2019) • FEMA's Multi-Hazard Identification and Risk Assessment • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• Nor'easters are discussed in the State Plan as a significant hazard of concern for New Jersey communities, particularly those located along the Atlantic shore. • Nor'easters are identified as a hazard of concern for the current Atlantic County Plan. • Atlantic County has a lengthy history of devastating impacts wrought by nor'easters. This includes major damages caused by the effects of high wind, rain, snow, heavy surf, coastal flooding and severe beach erosion. • Atlantic County's shore is vital to the local economy but remains highly susceptible to the effects of major coastal storms, including nor'easters.

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Tornado	✓	Identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update. To better align with the state plan update, this hazard will be assessed under the severe weather hazard risk assessment.	• NJ State Hazard Mitigation Plan (2016) • FEMA's Multi-Hazard Identification and Risk Assessment • NOAA NCEI Storm Events Database and National Severe Storms Laboratory (NSSL) web site • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• Tornados are discussed in the state plan as a hazard of concern, including historic events in Atlantic County. • NCDC reports seven tornado events affecting Atlantic County between November 1970 and January 2021. Of these, three were classed F2 on the Fujita Tornado Scale (considerable damage), one was classed F1 (moderate damage) and the remainder were classed F0 (light damage). A total of three injuries and just over $1 million in property damage was attributed to these events. No events have been reported since the last version of this plan was prepared. • According to NSSL data, Atlantic County is located in an area which is likely to experience between 0.25 and 0.50 tornado days per year within 25 miles of any point from 1990 to 2009, but life-threatening and damaging events do remain very possible.

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Winter Storm (Severe Winter Weather)	✓	**Identified as a significant hazard to be addressed in the plan at that time.**	**Considered again and the earlier assessment was determined to still be applicable for the plan update.**	• **NJ State Hazard Mitigation Plan (2019)** • **FEMA's Multi-Hazard Identification and Risk Assessment** • **NOAA NCEI Storm Events Database** • **Office of New Jersey State Climatologist web site** • **Atlantic County Hazard Mitigation Plan (2016)** • **Input from CPG**	• **Winter storms including snowstorms, blizzards and ice storms are discussed in the state plan. The State Plan notes that Atlantic County averaged about 16.5 inches of normal seasonal snowfall from 1981 to 2010 (the northernmost corner of the county averaging closer to 18.1 inches per season) with six winter storm disaster declarations.** • **NCEI reports 124 days with winter storms (blizzards, ice storm, winter storms, winter weather) in Atlantic County between January 1996 and January 2021. These events resulted in one reported death and approximately $5.3 million in property damage.** • **According to the Office of New Jersey State Climatologist, the extreme depth of snow on ground at individual weather stations across New Jersey ranges from roughly 22 to 24 inches per year (at individual weather stations over a minimum of 20 years).**
HYDROLOGIC HAZARDS					

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Coastal Erosion and Sea level Rise	✓	Identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update. Sea level rise has been added to better align with the state plan.	• NJ State Hazard Mitigation Plan (2019) • FEMA's Multi-Hazard Identification and Risk Assessment • New Jersey Department of Environmental Protection (NJDEP) Coastal Management Program web site • Richard Stockton College of New Jersey, Coastal Research Center: New Jersey Beach Profile Network (NJBPN) website • Atlantic County Hazard Mitigation Plan (2016) • Rutgers University Science and Technical Advisory Panel (STAP) Report (2019) • Input from CPG	• Coastal erosion is identified in the State Plan and in the current Atlantic County Plan as a hazard of concern for Atlantic County. indicates that since 1986 most of the ocean shoreline in the county has experienced alternating periods of accretion and erosion, rather than a constant long-term movement in one direction or the other, even when accounting for periods of beach renourishment in certain areas. • Shoreline areas of Atlantic County remain vulnerable to occasional severe coastal erosion from periodic storm events such as hurricanes, tropical storms, and nor'easters. • Shore protection projects are routinely initiated and funded in the county through NJDEP and the U.S. Army Corps of Engineers. These projects, in addition to many other elements of NJDEP's Coastal Management Program, serve to reduce damages to public and private property caused by coastal erosion. • The Rutgers STAP report includes a range of future sea level rise projections for New Jersey: under a low emissions scenario, levels have a 50% probability of rising by 1.9 ft by 2070 and 2.8 ft by 2100. Under a high emissions scenario, there is a 50% probability that levels will rise by 2.4 ft by 2070, by 3.9 ft by 2100, and there is a 5% probability that levels will rise by 8.8 ft by the same year. • With a significant number of coastal communities, including many on barrier islands, Atlantic County is considered highly vulnerable to the impacts of sea level rise.

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	Significant Hazard Meriting Risk Assessment	2016 Plan Assessment	Current Update Assessment	Sources of Hazard Information	Why was this determination made?
					• While the obvious impact of sea level rise is the permanent loss of land for human habitation, economic activity, and ecosystem conservation, even small amounts of sea level rise may significantly increase the annual probability that periodic coastal flooding events reach damaging or critical elevations.
Dam and Levee Failure		Dam Failure was identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update. Consideration of levee failure is new to this second plan update.	• NJ State Hazard Mitigation Plan (2019) • NJDEP Bureau of Dam Safety and Flood Control website and coordination with bureau staff • U.S. Army Corps of Engineers National Inventory of Dams (NID) database • U.S. Army Corps of Engineers National Levee Database (NLD) • Stanford University's National Performance of Dams Program website • Dam Emergency Action Plans (EAPs) in possession of Atlantic County, specifically: Lake Lenape Dam Emergency	• Dam and Levee Failure is identified in the State Plan as a hazard of concern for Atlantic County. • The National Levee Database (NLD), developed by the U.S. Army Corps of Engineers (USACE), is the focal point for comprehensive information about our nation's levees. The database contains information to facilitate and link activities, such as flood risk communication, levee system evaluation for the National Flood Insurance Program (NFIP), levee system inspections, flood plain management, and risk assessments. The NLD continues to be a dynamic database with ongoing efforts to add levee data from federal agencies, states, and tribes. The USACE NLD shows no levees in Atlantic County. The State Plan does not indicate the presence of levees in Atlantic County. However, it is reasonable to assume some smaller, agricultural type levees may exist.

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
				Action Plan (EAP) (2020); Pleasant Mills Dam EAP (2020); Bargaintown Mill Pond Dam EAP (2020) • FEMA FIRMs for Atlantic County (effective August 2018) • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• New Jersey has seen property damages as a result of small dam failures (including damage to or loss of bridges, roads and buildings), but has not experienced a catastrophic dam failure to date. • According to NJDEP data recorded in the 2019 State Plan, there are a total of 51 dams in Atlantic County. Of these, one is classified as High Hazard Potential (failure of the dam may result in loss of life and/or extensive property damage); seven are classified as Significant Hazard Potential (failure of the dam may result in significant property damage; however, loss of life is not envisioned); 31 are classified as Low Hazard Potential (failure of the dam is not expected to result in loss of life and or significant property damage); and 12 other dams (small dams with low hazard potential). [3] • The Lake Lenape Dam (Hamilton), is the only Major High Hazard Dam in the County. Its inundation area covers roughly a 5 mile reach of the Great Egg Harbor River from Mays Landing (Hamilton) to Steelman Landing (Estell Manor); including residential areas in Mays Landing (Hamilton) and Belcoville (Weymouth); and bordering residential areas in Clarkstown, Thompsontown, Catawba, and Harding Lakes (all in Hamilton). The County is in possession of EAPs for the Lake Lenape Dam, the Bargaintown Mill Pond Dam, and the Pleasant Mills Dam.

[3] While NJDEP data lists seven significant hazard dams in Atlantic County, USACE NID and the Stanford NPDP list eight and nine respectively.

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Drought	✓	Identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update.	• NJ State Hazard Mitigation Plan (2019) • NJDEP Drought Information web site • National Drought Mitigation Center web site and Palmer Drought Severity Index • NOAA NCEI database • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• Drought is identified in the State Plan as a hazard of concern state-wide. • Drought is also identified in the Atlantic County 4 Plan as a hazard of concern. • The State Plan records drought incidents affecting Atlantic County approximately 20 times between May 1929 and May 2012, including one event that received a FEMA Disaster Declaration (1965) and another receiving an Emergency Declaration (1980). • The NOAA NCEI database reports 38 drought days in Atlantic County between June 1997 and January 2021, the last of which occurred in October 2010. No deaths, injuries, property damages, or crop damages are recorded for these events. • The Atlantic County Plan reports one additional event in 2012 for which the USDA issued a drought-related disaster declaration for New Jersey (S3487) that included Atlantic County. • For the purposes of this plan the primary impacts of drought fall on agriculture, which is economically significant in the northern and western portions of Atlantic County.

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Flood	✓	**Identified as a significant hazard to be addressed in the plan at that time.**	**Considered again and the earlier assessment was determined to still be applicable for the plan update.**	• **NJ State Hazard Mitigation Plan (2019)** • **NOAA NCEI Storm Events Database** • **FEMA's NFIP Community Status Book and Community Rating System (CRS)** • **FEMA Digital Flood Insurance Rate Map (DFIRM) data, 2021, preliminary FIRM data 2014 for areas currently not included in 2021 DFIRMs** • **Atlantic County Hazard Mitigation Plan (2016)** • **Input from CPG**	• **Flooding is identified in the State Plan as a hazard of concern; it goes on to recognize flooding as the major disaster threat facing the State.** • **Flooding is also identified as a hazard of concern in the current Atlantic County Plan.** • **Atlantic County has an extensive history of flood-related disaster declarations.** • **NCEI reports that Atlantic County has been affected by flood conditions (coastal flood, flash flood and flood event types) on 122 days from January 1996 to January 2021. These event records have a total of $351 million recorded in property damages.** • **The remnants of Hurricane Sandy in October 2012 caused catastrophic flood damage in Atlantic County.** • **All of Atlantic County's municipalities participate in FEMA's National Flood Insurance Program; and 11 participate in the NFIP's Community Rating System (of these, 1 entered the CRS program since the last version of the plan was prepared).**

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Ice Jams	⊘	Not identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update.	• NJ State Hazard Mitigation Plan (2014) • FEMA's Multi-Hazard Identification and Risk Assessment • USACE Cold Regions Research and Engineering Laboratory (CRREL) Database • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• The State Plan identifies ice jams as a potential cause of flooding (flooding is identified as a hazard of concern). • CRREL records current as of 2021 include 109 reported ice jams occurring in New Jersey between 1780 and 2021. The CRREL database lists one ice jam event occurring in Atlantic County which occurred on the Great Egg Harbor River at Folsom in 1959. No specific impacts are recorded for this event, for which a gage height of 4.72 feet was recorded, as compared to bank-full stage of five feet. • The current Atlantic County Plan does not identify ice jams as a hazard of concern.

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Storm Surge	✓	**Identified as a significant hazard to be addressed in the plan at that time.**	**Considered again and the earlier assessment was determined to still be applicable for the plan update.** **To better align with the state plan, this hazard will be addressed in the flood hazard risk assessment.**	• **NJ State Hazard Mitigation Plan (2019)** • **FEMA's Multi-Hazard Identification and Risk Assessment** • **NOAA NCEI Storm Events Database** • **USACE SLOSH model data** • **Atlantic County Hazard Mitigation Plan (2016)** • **Input from CPG**	• **The State Plan identifies hurricanes and tropical storms as a hazard of concern, and storm surge is discussed in that context.** • **The Atlantic County 4 Plan also discusses storm surge in the context of an identified hurricane and tropical storm hazard.** • **SLOSH model data shows a large portion of Atlantic County's land area at risk to storm surge, and particularly those areas located within three to five miles of the shore. Categories 2 through 4 surge zones are not mapped substantially further inland than the Category 1 zone.** • **The NCEI reports 29 days with storm surge events between December 2002 and January 2021, causing $1.25 million in property damages. * the bulk of the damages from storm surge appear to be recorded under coastal flooding in this database *** • **The remnants of Hurricane Sandy in October 2012 caused catastrophic damage in Atlantic County; in part, due to storm surge impacts.**

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Wave Action	✓	**Identified as a significant hazard to be addressed in the plan at that time.**	**Considered again and the earlier assessment was determined to still be applicable for the plan update.** **To better align with the state plan, wave action will be addressed under the flood hazard risk assessment**	• **NJ State Hazard Mitigation Plan (2019)** • **FEMA's Multi-Hazard Identification and Risk Assessment** • **NOAA NCEI Storm Events Database** • **FEMA FIRMs for Atlantic County (effective August 2018)** • **Atlantic County Hazard Mitigation Plan (2016)** • **Input from CPG**	• **The State Plan identifies coastal erosion as a hazard of concern, and wave action is discussed in that context.** • **The current Atlantic County Plan also discusses wave action in the context of an identified coastal erosion hazard.** • **NCEI reports that Atlantic County has had 93 days with coastal flooding and heavy surf events between January 1996 and January 2021. These incidents resulted in a reported total of 2 deaths, 1 injury, and $314 million in property damages ($290 million of which is attributed to Hurricane Sandy).** • **The remnants of Hurricane Sandy in October 2012 caused catastrophic damage in Atlantic County; in part, due to wave impacts.** • **According to FEMA's Preliminary flood maps, 13 municipalities in Atlantic County include coastal flood hazard areas with storm-induced velocity wave action.**

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Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
GEOLOGIC HAZARDS					
Earthquake	✓	Identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update.	• NJ State Hazard Mitigation Plan (2019) • FEMA's Multi-Hazard Identification and Risk Assessment • USGS Earthquake Hazards Program web site • New Jersey Geological Survey website • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• Earthquakes are identified as a hazard of concern in the State Plan. • Earthquakes have occurred in and around the State of New Jersey in the past; however, historical records show no major earthquakes occurring in the state. • NJGS records 185 earthquakes epicentered in New Jersey, but only one in Atlantic County: near Pleasantville in 1912 for which no magnitude was recorded. • According to USGS seismic hazard maps, the peak ground acceleration (PGA) with a 10% probability of exceedance in 50 years for Atlantic County ranges between 2%g and 3%g. FEMA recommends that earthquakes be further evaluated for mitigation purposes in areas with a PGA of 3%g or more. • Historical earthquake events have caused documented damages in Atlantic County (though all reported damages to date have been minor). • The NJGS web site suggests that New Jersey is overdue for a moderate, damaging earthquake.

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Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Expansive Soils	⊘	Not identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update.	• NJ State Hazard Mitigation Plan (2019) • FEMA's Multi-Hazard Identification and Risk Assessment • USDA Soil Conservation Service's Soil Survey for Atlantic County (1989) • USDA Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• The 2019 State Plan does not identify expansive soils as a hazard of concern for New Jersey. • The Atlantic County Plan does not identify expansive soils as a hazard of concern for its planning area. • MHIRA places Atlantic County in an area with little or no potential for swelling of clay soils. • Report FHWA-76-82 places Atlantic County in an area designated non-expansive: where high volume change soils do not occur or are extremely limited. • New Jersey has adopted the International Building Code, of which Chapter 18 includes mitigation measures for building on expansive soils through design, removal, or stabilization.
Landslide	⊘	Identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update.	• NJ State Hazard Mitigation Plan (2019) • FEMA's Multi-Hazard Identification and Risk Assessment • USGS Landslide Incidence and Susceptibility Hazard Map • New Jersey Geological Survey GIS database of historic landslides in New Jersey • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• The State Plan identifies landslides as a hazard of concern for the State as a whole. The plan reports that landslides are not particularly common in New Jersey, and tend to occur in the northern portion of the state. The plan documents no record of any significant landslides in Atlantic County and shows no landslide susceptible areas in the County. • MHIRA places Atlantic County in an area of low potential for landslides and debris flows. • USGS mapping shows Atlantic County in an area of low incidence and low susceptibility to landslides. • The general topography of Atlantic County does not feature hilly terrain to any significant degree – the highest natural elevation in the county is approximately 150 feet above sea level. • The current Atlantic County Plan does not identify landslides as a hazard of concern.

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Land Subsidence / Sinkholes / Abandoned Mines and Quarries	⊘	Not identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update.	• NJ State Hazard Mitigation Plan (2019) • FEMA's Multi-Hazard Identification and Risk Assessment (MHIRA • New Jersey Geological and Water Survey (NJGWS) digital GIS layers of Bedrock Geology and Abandoned Mines of New Jersey • NJ GWS website maps • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• The State Plan indicates that land subsidence is a hazard in New Jersey. However, it documents no sinkhole/subsidence hazard areas for Atlantic County. Recorded sinkholes in New Jersey have been primarily located in the northern and northeastern part of the state, and there is essentially no history of underground mining in Atlantic County. • MHIRA mapping shows New Jersey as having a historical record of very little or zero cumulative damages from subsidence caused by mining or sinkholes. • The County does not have a history of underground mining. While NJGWS mapping shows 45 existing/historic quarries for the extraction of sand, gravel and fill dirt, these are mostly located away from developed areas and there is no readily available information to suggest that they should be considered a significant hazard of concern warranting further analysis. • NJGS mapping does not indicate the presence in Atlantic County of any rock types which have the potential for the formation of sinkholes. • The USGS has identified the City of Atlantic City as a location where land subsidence has been attributed to the compaction of aquifer systems following groundwater extraction. However, the observed rates of subsidence are very small (0.035 to 0.15 inches per year) and exhibit no wild variations across the studied area. Also, USGS records no significant engineering or structural issues due to subsidence in the Atlantic Coastal Plain (which includes Atlantic County).

Tsunami		Not identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update. To align with the state plan, tsunami will be considered under the flood hazard.	• NJ State Hazard Mitigation Plan (2019) • National Tsunami Hazard Mitigation Program (NTHMP) website • FEMA's Multi-Hazard Identification and Risk Assessment (MHIRA) • FEMA "How-to" mitigation planning guidance (Publication 386-2, "Understanding Your Risks – Identifying Hazards and Estimating Losses). • NOAA NCEI Storm Events Database • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• Tsunamis are discussed in the state plan. The plan states that the return period for a mid-Atlantic tsunami is 1 in every 36 years; however, this includes small scale events with waves of less than 0.5 meters. No record exists of a catastrophic Atlantic basin tsunami impacting the mid-Atlantic coast of the United States. The plan estimates that there is a probability of 0.3% in any given year for a tsunami of greater than one meter to occur. • The NTHMP considers the Atlantic coast to be at "Very low to low" risk of being impacted by tsunamis, and reports eight events over the whole coast since 1886. • Tsunami inundation zone maps are not available for communities located along the U.S. East Coast. • FEMA mitigation planning guidance suggests that locations along the U.S. East Coast have a relatively low tsunami risk. NCEI reports one tsunami event affecting Atlantic County between 1950 and January 2021, in June 2013. While no resulting injuries or damages were reported in Atlantic County, two people in Ocean County were injured by it. This event, however, was a "meteotsunami", in which tsunami-like conditions are generated by atmospheric rather than seismic/geological events. • The State Plan records two additional events impacting Atlantic County that are considered potential tsunamis, because their cause has not been confirmed: One caused significant damage in Longport in 1913, the other was observed in Atlantic City in 1931. While tsunamis are considered rare events in Atlantic County, their potential impacts are significant. Hence this plan update will include tsunamis as a hazard for further analysis within the wider context of coastal flooding, in line with the current State Plan.

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Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
Volcano	⊘	Not identified as a significant hazard to be addressed in the plan at that time.	Considered again and the earlier assessment was determined to still be applicable for the plan update.	• NJ State Hazard Mitigation Plan • USGS Volcano Hazards Program web site • Atlantic County Hazard Mitigation Plan (2016) • Input from CPG	• Volcanoes are not located anywhere remotely near Atlantic County. • Neither the State Plan nor the current Atlantic County Plan identifies volcanos as a hazard of concern for the State of New Jersey or its counties and jurisdictions.

Table 2.2 Documentation of the Hazard Evaluation Process					
Natural Hazards Considered	**Significant Hazard Meriting Risk Assessment**	**2016 Plan Assessment**	**Current Update Assessment**	**Sources of Hazard Information**	**Why was this determination made?**
OTHER HAZARDS					
Wildfire	✓	**Identified as a significant hazard to be addressed in the plan at that time.**	**Considered again and the earlier assessment was determined to still be applicable for the plan update.**	• **NJ State Hazard Mitigation Plan (2019)** • **NOAA NCEI Storm Events Database** • **New Jersey Forest Fire Service web site** • **Atlantic County Hazard Mitigation Plan (2016)** • **Input from CPG**	• **Wildfires are identified in the State Plan as a significant hazard of concern, particularly with regard to the Pine Barrens in south and central portions of the state.** • **The State Plan records 218 wildfires in Atlantic County burning 228,667 acres between 1924 and 2007. Of these, 10 were major wildfires (burning over 100 acres) between 1977 and 2007. An 11th major wildfire was recorded in 2009.** • **NCEI records that Atlantic County has had 9 days with wildfire events between January 1996 and January 2021. These incidents resulted in a reported total of 6 injuries.** • **The New Jersey Pine Barrens area, which lies partially within Atlantic County, is widely recognized as highly prone to forest fires, and the whole ecosystem is in some ways dependent on fire for its continued existence. Within these areas are a large number of homes and small communities, which were developed before the current regulations restricting development within the Pine Barrens.** • **NJFFS mapping shows that there are significant areas in Atlantic County considered by NJFFS to be High and Extreme hazard areas for fire risk.**