Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

BARKHAMSTED, CT

67 Ripley Hill Road
Barkhamsted, CT 06063
MMI #3843-06

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Barkhamsted and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Barkhamsted is located in the northeastern part of Litchfield County in northwestern Connecticut. It is bordered on the north by Hartland, on the west by Winchester, on the east by Granby and Canton and on the south by New Hartford.

Barkhamsted contains two villages, Pleasant Valley and Riverton. The Town has a total area of 38.8 square miles (100.6 km^2), of which 36.2 square miles (93.8 km^2) is land and 2.6 square miles (6.8 km^2) of it (6.72%) is water. A high percentage of the land in the town is owned by the State of Connecticut as state forest (People's State Forest, American Legion State Forest, Tunxis State Forest and Enders State Forest) and by the Metropolitan District Commission as watershed and recreational land. Major bodies of water include the Barkhamsted Reservoir, Lake McDonough, and the Farmington River.

Barkhamsted was incorporated in October of 1779 and has a population of around 3,649.

Barkhamsted is part of the Northeastern Highlands Ecoregion, which is characterized by hills and mountains, a mostly forested land cover, nutrient-poor frigid and cryic soils (mostly Spodosols), and numerous high gradient streams and glacial lakes. Other notable characteristics of the municipality include a forested and hilly landscape, the Farmington River, Barkhamsted Reservoir, and Lake McDonough.

The Metropolitan District Commission, a quasi-public water company serving the metropolitan Hartford area, owns about a quarter of the land in Barkhamsted adjacent to the Barkhamsted Reservoir and Lake McDonough. This reservoir is a major source of water supply for the MDC. The Saville Dam, located at the southern end of Barkhamsted Reservoir, was completed in 1940. This dam holds a 30-billion-gallon reservoir that is 8.5 miles long with a water surface of 3.63 square miles and a maximum depth of 120 feet. The Richards Corner Dam at Lake McDonough was completed twenty years earlier in 1920 and provides recreational opportunities for boaters, swimmers, and fishermen.

Another quarter of the land in Barkhamsted consists of State Forests. These include People's Forest, American Legion Forest, Tunxis Forest, and Enders Forest.

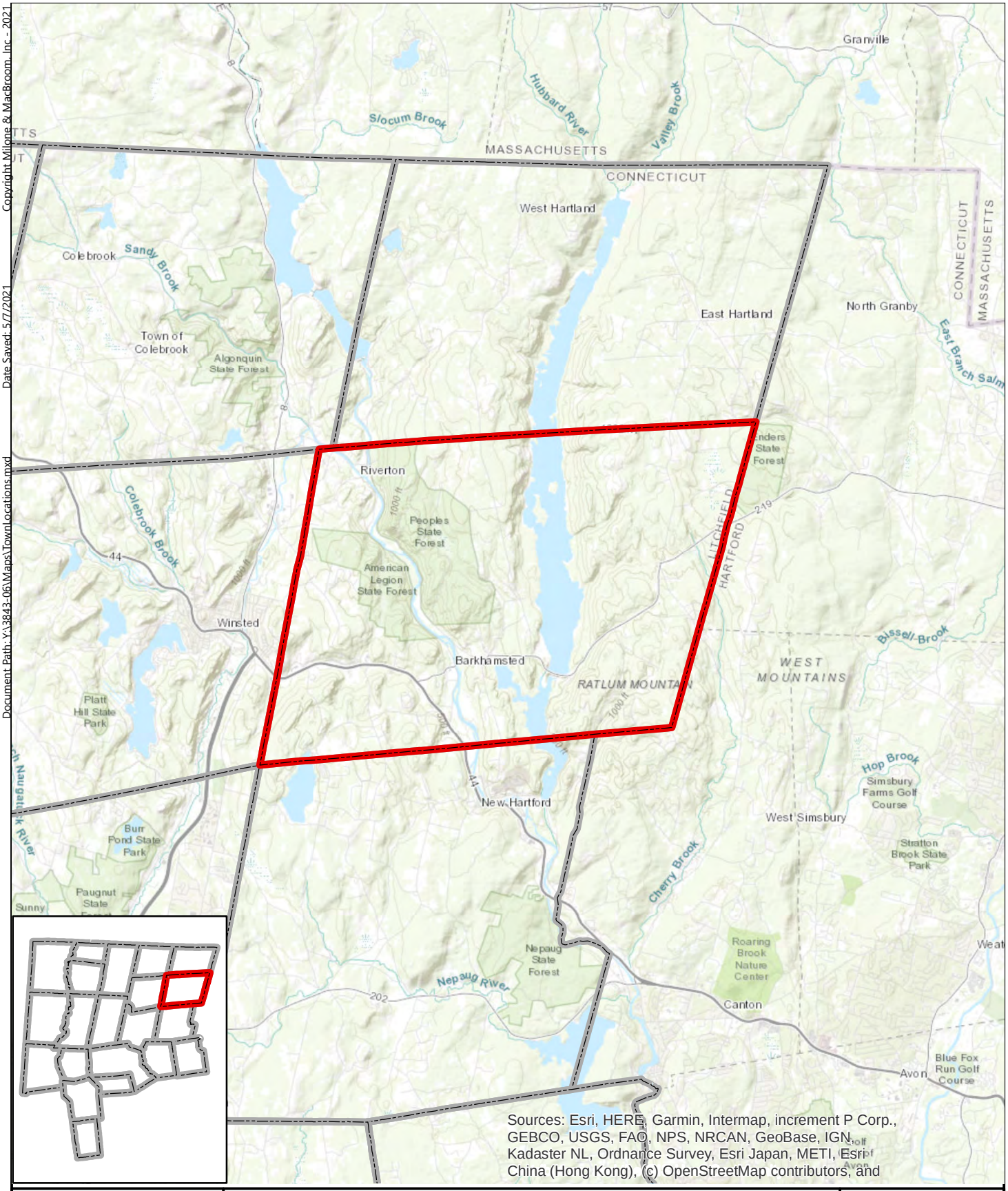
2.2 Existing Land Use

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 79% of Barkhamsted is forested and approximately 7% is developed.

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REGIONAL LOCATION: BARKHAMSTED

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FIG. 2-1

Table 2-1: 2015 Land Cover by Area

Land Cover	Area (acres)	Percent of Community
Developed	1,826.6	7.37%
Turf & Grass	494.5	2.00%
Other Grass	320.1	1.29%
Agricultural Field	548.1	2.21%
Deciduous Forest	6,932.8	27.98%
Coniferous Forest	11,942.5	48.20%
Water	1,821.8	7.35%
Non-Forested Wetland	86.3	0.35%
Forested Wetland	692.1	2.79%
Tidal Wetland	0.0	0.00%
Barren	57.8	0.23%
Utility Row	52.9	0.21%
TOTAL	**24,776**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

Land use today is characterized by water company and state forest land, along with large lot residential development and two village/community centers – Pleasant Valley and Riverton.

2.3 Development Trends

Barkhamsted has a history of agricultural and timber land use in the 1700's, followed by diverse water powered industries in the 1800's. According to the US Census data, the population of the town increased from a population 1,370 persons in 1960 to a population of 3,799 persons in 2010, an average of 49 persons per year. The Town's population has remained relatively stable since 2010. U.S. Census Bureau estimates for 2019 show a population around 3,649 individuals, a decrease from 2010 of 3.9%. The Connecticut State Data Center predicts that population will increase by 0.7% through 2025 to an estimated population of 3,675 individuals.

According to the Connecticut Office of Policy and Management, Barkhamsted's 2019 Total Equalized Net Grand List was valued at $357,841,267. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

According to the Connecticut Data Collaborative, the number of annual housing permits in Barkhamsted decreased slightly between 2013 and 2017. The number of permits issued in 2013 and 2014 was 4 and 6, respectively, while 0 permits were issued in 2016, and 0 permits were issued in 2017. On average, 3 housing permits were issued each year in Barkhamsted between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Barkhamsted dropped by approximately 10.7-percent between 2010 and 2019, from 1,589 units in 2010 to 1,435 units in 2019. In 2019, the housing stock was made up of approximately 95% single-unit structures, 0% two-unit structures, 5% multi-unit structures, and 0% mobile-homes or other types of structures.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Barkhamsted, included as Appendix C.

There is very little new development in town. There are only 2 to 4 new permits issued per year, and these are typically residential. There is currently a proposal for a 20-unit apartment building to be constructed in the west end of town which will house socially vulnerable populations. Overall, development in Barkhamsted has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the future is not expected to increase exposure over the next five years.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Barkhamsted is considered to have a low level of social vulnerability across all SVI categories.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Barkhamsted.

The bedrock in Barkhamsted is primarily metamorphic gneisses and schists. Soils consist of glacial till in the uplands and stratified drift in the valleys.

2.5 Climate and Climate Change

Over the course of the year, the temperature in Barkhamsted typically varies from 16°F to 81°F and is rarely below 0°F or above 88°F. The warm season lasts for 3.6 months, from May 28 to September 15, with an average daily high temperature above 71°F. The hottest day of the year is July 19, with an average high of 81°F and low of 61°F. The cold season lasts for 3.3 months, from December 1 to March 11, with an average daily high temperature below 41°F. The coldest day of the year is January 29, with an average low of 16°F and high of 32°F.

Precipitation falls throughout the year in Barkhamsted. The wetter season lasts 4.3 months, from April 10 to August 21, with a greater than 30% chance of a given day being a wet day. The chance

of a wet day peaks at 38% on June 2. The drier season lasts 7.7 months, from August 21 to April 10. The smallest chance of a wet day is 21% on January 29.

The most rain falls during the 31 days centered around October 1, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts for 6.0 months, from October 23 to April 22, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 25, with an average total liquid-equivalent accumulation of 1.4 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Barkhamsted as 4.88 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Barkhamsted at 5.77 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.9	6.1	8.7
NOAA Atlas 14	5.8	7.2	9.3

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Barkhamsted can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.3 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

The Farmington River runs through the center of Barkhamsted. The subregional drainage basin of the East Branch Farmington River covers the eastern half of the Town, defined by the Barkhamsted Reservoir and Lake Mcdonough. The southwestern corner of Town is drained by Morgan Brook, which in turn flows into the Farmington near the southern border of Town. The northwestern corner of Town drains to the Farmington River by way of Sandy Brook, which also drains much of Colebrook, some of Norfolk, and a portion of Massachusetts. Other subregional drainage basins in Barkhamsted drain water away from the Town; these include West Branch Salmon Brook, Cherry Brook, and the Still River.

2.7 Governmental Structure and Capabilities

Barkhamsted is run by a Selectmen/Town Meeting form of government.

The Town of Barkhamsted has a number of existing authorities, policies, programs and regulations that serve to mitigate the impact of natural hazards. Existing local authorities include the Barkhamsted Board of Selectmen, Planning and Zoning Commission, Inland Wetlands Commission, Emergency Management Director, Fire Department, and Department of Public Works.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce

neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic resources in Barkhamsted are concentrated within the Barkhamsted Center Historic District, and include homes, churches, monuments, factories, and the Saville Dam. Resources near flood sources may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

The primary transportation routes into and out of the town are Route 20 (running through Riverton in the northwest), Route 44 (passing through the southwest corner), Route 318 (running from Route 44 east through Pleasant Valley to Route 219), 181 (running north-south through the center of Barkhamsted), and Routes 179 and 219 (in the eastern half of Town). Other key roads include East River Road and Old North Road. There is no local public transit system in Barkhamsted.

Utilities

Public water in Barkhamsted is provided by numerous small Community Water Systems and Non-Community Public Water Systems. Many residents and businesses rely on private well water. There is no public sewer system in Town; residents and businesses rely on septic systems.

Eversource is the primary provider in Town for electricity and natural gas. Residents and businesses also utilize oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Barkhamsted.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Barkhamsted has identified several critical facilities throughout the town, as summarized on Table 2-3 below.

Table 2-3: Critical Facilities

Facility	Address or Location	Type	Emergency Power	Shelter	SFHA
Barkhamsted Town Hall	67 Ripley Hill Rd	Municipal Facility	✓		
Barkhamsted Highway Garage	33 New Hartford Rd	Emergency Operations Center	✓		
Barkhamsted East Fire Company	54 North Canton Rd	Fire Station	✓		
Pleasant Valley Volunteer Fire Department	44 Pleasant Valley Rd	Fire Station	✓		
Riverton Volunteer Fire Company	3 Riverton Rd	Fire Station	✓		
Barkhamsted Elementary School	65 Ripley Hill Rd	School/Shelter	✓	✓	
Regional Refuse Disposal, District 1	31 New Hartford Rd	Municipal Solid Waste			
Metropolitan District Police	39 Beach Rock Rd	Law Enforcement Maintenance Facility			
Connecticut State Police Troop B Resident State Trooper	67 Ripley Hill Rd	Law Enforcement			
Northwest Regional Middle School	100 Battistoni Dr, Winsted, CT	School			
MDC Barkhamsted Headquarters	39 Beach Rock Rd	Regional Utility			

The Town Highway Garage was recently rebuilt and includes a new stormwater management system.

The major natural hazards of concern in Barkhamsted are flooding, high winds, and severe winter storms. Forest fires, drought, and earthquakes occur much less frequently in the community, and are therefore of somewhat lesser concern.

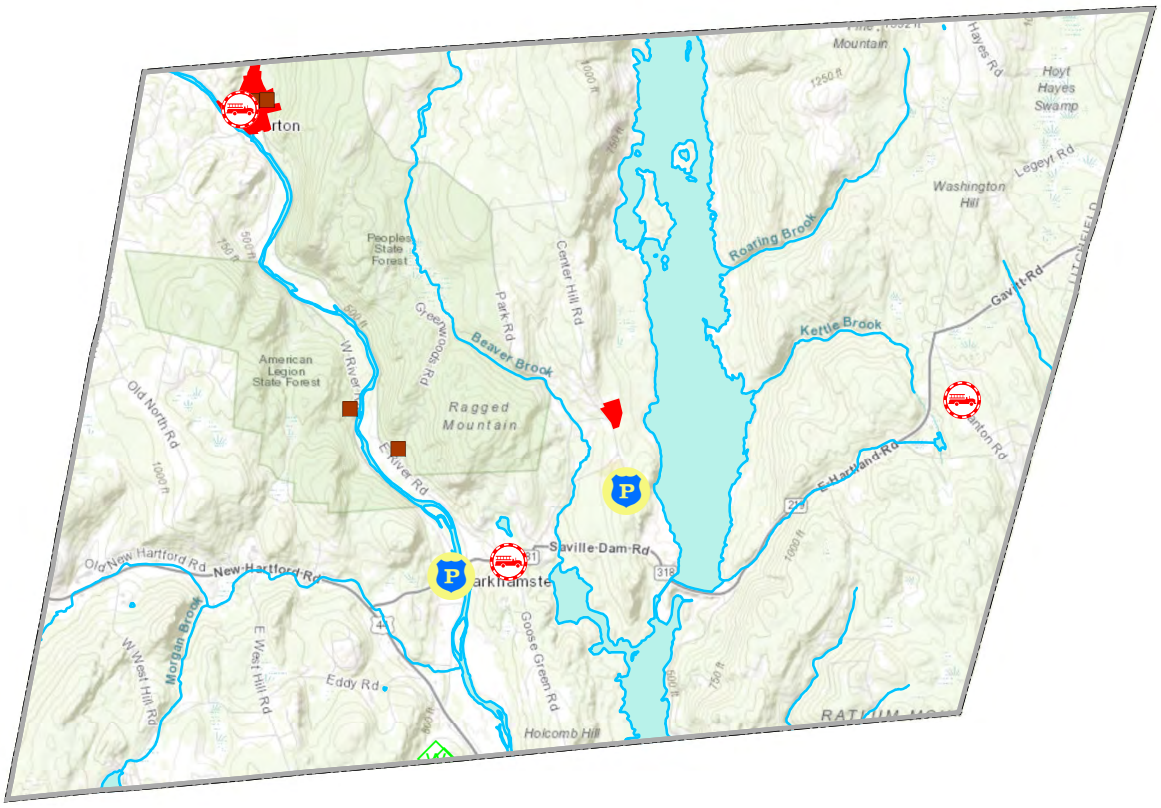
The major facilities at risk in the event of a natural hazard include the State highway network, Barkhamsted Town Hall, Barkhamsted Elementary School, Northwest Regional Middle School, three Fire Stations, MDC's Supply Headquarters, and the town's Public Works Garage. These are considered critical facilities in the event of a natural disaster because they might be needed for effective emergency response. All are potentially vulnerable to tornados, winter storms, wildfire, and earthquakes.

With the exception of the Town's Class C dams, there are no high potential loss facilities that could cause substantial loss of property and life. There are also no significant hazardous material facilities.

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Critical Facilities & Cultural Resources

- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District

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CRITICAL FACILITIES AND CULTURAL RESOURCES

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FIG. 2-2

Emergency Response Capabilities

Barkhamsted's three Volunteer Fire Departments, operating under the Barkhamsted Fire District, Department of Public Works, two volunteer EMS organizations and Emergency Management Director all possesses emergency equipment that can be deployed as needed in the event of an emergency. Procedures are also in place to open and maintain the Emergency Operations Center in the Highway Garage and emergency shelter in the Elementary School.

The Town utilizes the Everbridge public notification system and maintains a number of generators for emergency use. The Town has a verbal understanding with the local school bus companies that allows the Town to utilize school buses for mass transportation in the case of an emergency requiring evacuation. Barkhamsted intends to develop a written Memorandum of Understanding, including more detailed procedures, in coordination with the school bus companies.

Barkhamsted has a Geographical Information System (GIS) that it uses to help understand and respond to natural hazards.

Barkhamsted has also been working with other towns in the Litchfield Hills Region through the Northwest Hills Public Safety Task Force to enhance communication and coordination. This has included efforts to standardize communication equipment and the equipment in local emergency operation centers, to upgrade supplies at emergency shelters, and to implement a coordinated public notification system, a badging registration system for emergency responders, and improved training opportunities.

3 FLOODING

3.1 Existing Capabilities

Ordinances, Regulations and Plans

Land use regulations exist to protect natural resources, including erosion and sediment control regulations for new development, stormwater control regulations to minimize drainage problems, and a floodplain overlay district to control development in flood prone areas.

The floodplain overlay district provides that any new construction or substantial improvement of any residential structure shall have the lowest floor, including the basement, elevated to at least the base flood elevation. Nonresidential construction is required to have the lowest floor, including basement, elevated to at least one foot above the base flood level or be flood-proofed to one foot above the base flood elevation. A registered professional engineer or architect is required to design and certify the construction of structures in the floodplain in order to minimize flood damage. Additionally, all attendant utilities or sanitary facilities should be located or designed to avoid infiltration or impairment by flood waters. Manufactured homes and recreational vehicles are prohibited or highly restricted within the floodplain overlay zone, respectively.

Barkhamsted's subdivision regulations have detailed standards for the planning, design and construction of storm drainage systems in order to minimize adverse impacts with new construction activity. The Barkhamsted Inland Wetlands Commission enforces regulations to direct development away from wetlands, watercourses and floodplains. These regulations also direct development and subdivision away from inland wetlands, water courses, and stream-belt protection areas. In addition to these regulations, the Barkhamsted Public Works Department routinely examines and clears public storm drains and catch basins of debris following periods of rainfall, snowfall, or windstorms.

NFIP, Flood Insurance, and Community Rating System

Barkhamsted uses a variety of tools to maintain compliance with NFIP, including the Connecticut State Building Code, a code of ordinances, wetland regulations, zoning regulations, and subdivision regulations. Barkhamsted expects to continue participation in NFIP.

According to FEMA, there are 17 flood insurance policies in force in Barkhamsted as of 6/30/2019 with an insurance value of $4,761,000. The previous edition of this HMP noted 16 flood insurance policies in force as of 8/31/2015 with an insurance value of $4,546,600.

New FEMA maps covering the Town are expected in the next couple of years. The Town intends to revise its zoning and subdivision regulations following adoption of the new maps such that these regulations specifically reference the updated maps, and are in line with CT DEEP's "Model Floodplain Management Regulations."

Drainage and Street Flooding

The Town cleans and maintains all catch-basins and drainage facilities as needed. These assets, and their statuses with regard to cleaning and maintenance, are tracked within a GIS software.

New Capabilities and Completed Actions

Barkhamsted continues to maintain its strong flood mitigation capabilities.

The Town has recently made repairs and upgrades to several bridges, including Park Road, Legeyt Road, Ratlum Road, and East West Hill Road.

Barkhamsted implemented a riverbank restoration project along Mountain Road adjacent to the Farmington River. An historic inn flooded in the past due to the eroding banks; the restoration project worked to mitigate future problems.

The Town is pursuing a bank restoration project along West River Road. The project is "shovel-ready"; the Town has applied for FEMA funding for this project in the past, but did not receive funding. The Town is currently pursuing a STEAP Grant to implement the project.

Summary

Barkhamsted mitigates flood damages primarily through regulating development in floodprone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate.

The Public Works Department tracks and addresses flooding and other complaints.

3.2 Vulnerabilities and Risk Assessment

Setting

There has long been a history of flooding in Barkhamsted. According to the publication "Barkhamsted Heritage – Culture and Industry in a Rural Connecticut Town" edited by Richard G. Wheeler and George Hilton in 1975, "the Long Bridge at Pleasant Valley washed away in the 1938 hurricane" and there is also a history of ice jams at the current bridge location. The publication also states, "Water causing haphazard floods has often caused the relocation of Barkhamsted highways".

Vulnerability Analysis

Flood prone areas in the community today, as mapped by FEMA, are presented in Figure 3-1. The most significant flood prone area is along the Farmington River. In the past, the Town has questioned the accuracy of the FEMA mapping along the Farmington River, particularly with regard to the flood control protection afforded by the Colebrook River Dam and the Goodwin Dam located upstream. According to the MDC, no water has passed over the spillway of the Colebrook River Dam since its construction in 1969.

Recent events have caused localized flooding. A heavy spring rainstorm in 2018 resulted in flood damage to Park Road; roughly 90 feet of road had to be repaved, and culverts along the road had to be replaced, due to washout. That storm also resulted in high flood waters near a residential property, requiring the resident to be evacuated.

There are two bridges in town that have been identified as being scour critical: Morgan Brook Road (identified as the higher concern), and Day Road. Both bridges cross Morgan Brook. The Town is concerned that a heavy or intense rain event may further jeopardize the integrity of the bridges. Both CT DOT and a private contractor (Cardinal Engineering) have evaluated the bridges and prepared reports on the current state of the infrastructure.

There is a stretch of Rust Road that often washes out during heavy rainstorms due to poor drainage. The Town periodically regrades the road as necessary, however, it continues to be a concern.

There is also an area along West River Road that presents an erosion concern to the Town. The Town is pursuing a bank restoration project at this site, and is awaiting grant funding.

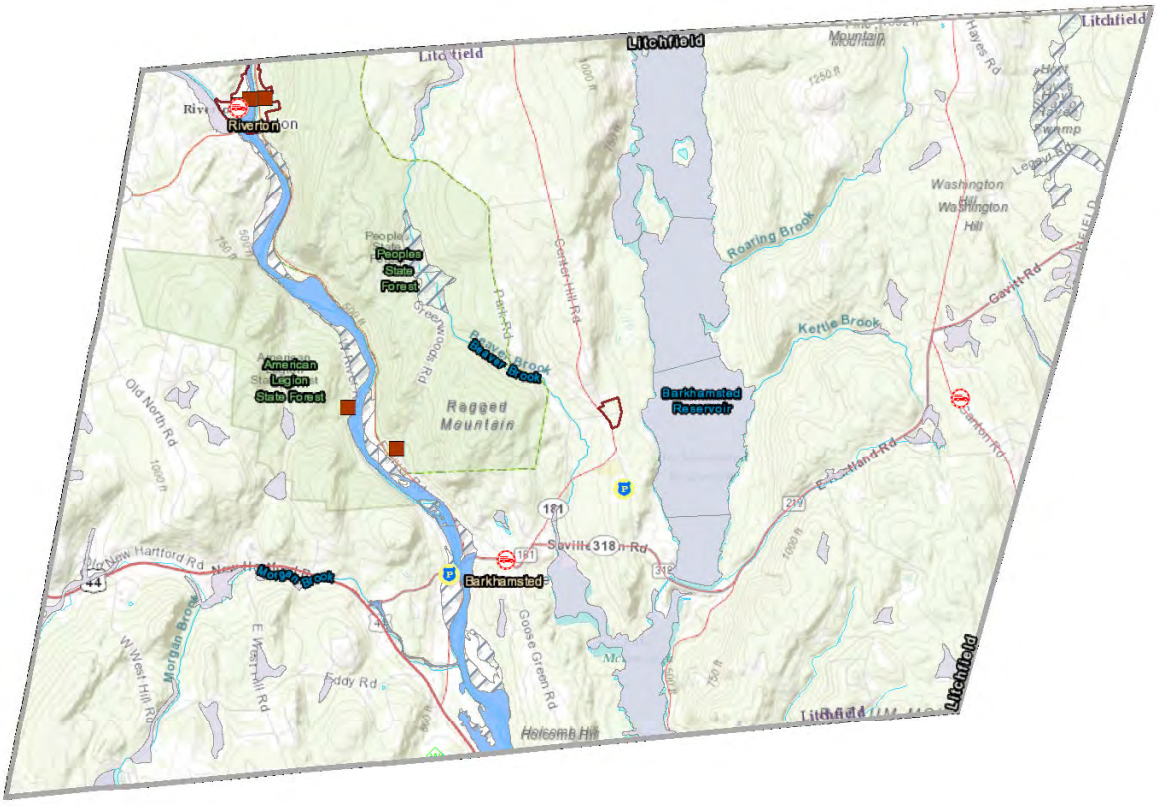
Vulnerability Analysis of Critical Facilities

The Riverton Fire Station, Barkhamsted Town Hall, and Barkhamsted School are located along the Farmington River and are therefore somewhat more subject to flooding in the event of a major storm event. In addition, the two bridges over the Farmington River are critical for access and egress to the community, and may be susceptible to impacts from flooding.

Vulnerability Analysis of Repetitive Loss Properties

There are no Repetitive Loss Properties in the communities.

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Legend

- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District

Flood Zone

- A
- AE
- X500

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FLOOD RISK AREAS

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FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing capabilities appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Barkhamsted is 110 mph for a Category 1 event, 120 mph for a Category 2, and 125 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

The Public Works Department conducts regular tree maintenance, and also conducts clean-ups after storms on Town roads where power lines are not an issue. The Town tree warden is responsible for overseeing tree removal and maintenance.

Eversource, the local electric utility, provides tree maintenance near its power lines. The Town has a liaison from Eversource that they work closely with.

New Capabilities and Completed Actions

Barkhamsted continues to maintain its strong tropical cyclone mitigation capabilities. The Town has increased funding for tree maintenance in recent years.

Summary

Barkhamsted mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

As with the rest of the Litchfield Hills region, Barkhamsted is vulnerable to high winds from a hurricane or tropical storm. As the town is located far inland, coastal flooding is not a concern, but riverine flooding caused by heavy rain during a hurricane is (see above). Due to the lack of coastal flooding vulnerability, the entire town is equally vulnerable to wind damage from hurricanes or other strong storms.

Impacts will be greatest in densely settled areas, where power outages will be more widespread.

Power outages are a concern throughout Town during storms because of the rural nature of the Town. There are some streets that reportedly experience outages more frequently because service lines are "single strand." There are several roads in Town that are an elevated concern because of severe Emerald Ash Borer damage. The highest concern roadways in that regard are Old North Road, Goose Green Road, Park Road, West River Road, and Wallens Hill Road.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Barkhamsted as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

New Capabilities and Completed Actions

Barkhamsted continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

Barkhamsted mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Barkhamsted has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

The central and southern portions of the United States are at higher risk for lightning and thunderstorms than is the northeast. However, FEMA reports that more deaths from lightning occur on the East Coast than elsewhere. Lightning-related fatalities have declined in recent years due to increased education and awareness.

Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Barkhamsted area is very high during any given thunderstorm although no one area of the Town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Barkhamsted is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the Town is believed to be low for any given year. All areas of the Town are susceptible to damage from high winds.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Such fires can be extremely dangerous during the summer months during dry and drought conditions.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

6 WINTER STORMS

6.1 Existing Capabilities

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas. As a result of the winter of 2010-2011, it is anticipated that many communities will develop and utilize programs for roof snow removal.

The town's DPW monitors weather reports and maintains loaded trucks in preparation of winter storm events.

New Capabilities and Completed Actions

Barkhamsted continues to maintain its strong winter storm mitigation capabilities.

Summary

Barkhamsted mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

Vulnerability to the effects of severe winter storms is primarily limited to developed areas, where snow and ice accumulations can cause buildings to collapse. In Barkhamsted, 9% of the land is developed. Another factor in the town's vulnerability is the road network. Municipalities are only required to clear local roads, so this will be the primary source of their cleanup costs. Barkhamsted has 65 miles of local roads to clear, or 7% of the region's total. In comparison, Torrington has 190 miles of roads to clear. The cost to clear a mile of road varies considerably, depending on the width of the road, the depth of snow, and the density of intersections, making cost estimates difficult. This does, however, give an idea of relative vulnerability.

The long bridge at Pleasant Valley has a history of ice jams.

Power outages are a consistent problem during severe winter storms.

Old North Road has severe problems with snow drifting. Public Works often has to address the issue multiple times a day after a snow event. There are also sections of Route 179 that are prone to snow drifts.

Icing is a concern along Ratlum Mountain Road at the "devil's elbow" or "dead man's curve".

7 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Barkhamsted. The Town has adopted these codes for new construction, and they are enforced by the Building Official.

New Capabilities and Completed Actions

Barkhamsted continues to maintain its earthquake and landslide mitigation capabilities.

Summary

Barkhamsted mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Earthquake Vulnerabilities

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Barkhamsted. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Barkhamsted

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

The Barkhamsted Fire Department, along with CT DEEP, assists with beaver dam concerns as needed.

Emergency sirens are located in Riverton to alert residents in case of an emergency at Goodwin Dam.

Actions Completed and New Capabilities

Barkhamsted continues to maintain its capabilities for mitigating and responding to dam failure risks. Within the past three years the West Hill Pond dam was repaired and reconstructed. The sluiceway had been collapsing, and erosion was occurring.

Summary

Barkhamsted mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 10 DEEP-inventoried dams within the Town of Barkhamsted. These dams are listed in Table 8-1 and shown in Figure 8-1. Note that an additional three dams are included in the DEEP inventory, but have been identified as being breached and therefore no longer pose a risk.

Table 8-1: DEEP-Inventoried Dams in Barkhamsted

Number	Name	Class
501	SAVILLE DAM	C
502	WEST HILL POND DAM	B
503	ELMER BEEBE DAM	A
504	SCZGIEL DAM	A
505	MICRO BALL LAKE DAM	A
506	ISABELLE POND DAM	Unclassified
507	HITCHCOCK DAM	BREACHED
508	EDDY POND DAM	A
509	SWEETON POND DAM	A
510	NEW POND DAM	AA
511	TOM'S GRAVE POND	BREACHED
512	WEST CENTER POND DAM	BREACHED
513	HOLCOMB DAM	A

Nine of the ten dams in Barkhamsted are privately owned.

Barkhamsted Elementary School and the Barkhamsted Town Hall are both located in dam-failure inundation zones.

Saville Dam

The Saville Dam at Barkhamsted Reservoir is owned by the Metropolitan District Commission. The Saville Dam is rated as Hazard Type C. Saville Dam lacks a dam failure study, making the risk from the dam unknown.

Goodwin Dam

Located two miles upstream from the village of Riverton, in Hartland, the Goodwin Dam poses a potential hazard to downstream assets in Barkhamsted along the Farmington River. The Riverton Fire Station, Barkhamsted Town Hall, and Barkhamsted School, as well as two essential bridges, are located along the Farmington River and are therefore vulnerable to flooding in the event of failure of the Goodwin dam than other assets.

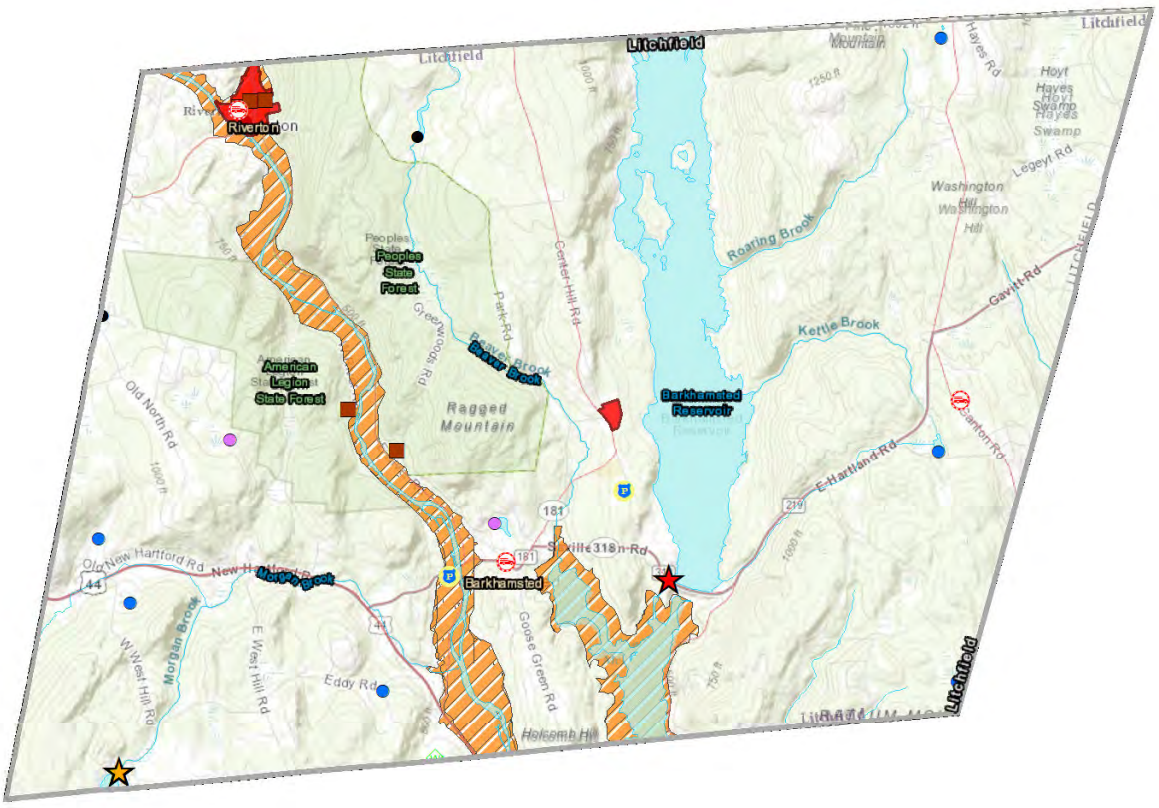
The Metropolitan District Commission prepared an EAP for the Goodwin Dam in 2007. The Plan defines responsibilities and procedures in the event of a possible, impending, or actual failure of the dam. The plan also serves to facilitate "notification to appropriate authorities when flood releases may create major flooding downstream". The dam is an earth and rockfill embankment that impounds the 200-acre West Branch Reservoir. Hydroelectric power is generated 24-hours per day when sufficient water is available from the Goodwin Powerhouse located just downstream from the Goodwin Dam.

According to the MDC report, a breach at Goodwin Dam could increase the normal river elevation in Riverton by 28 feet in 15-20 minutes time. In a little over an hour, the elevation at the Route 318 Bridge would be 22 feet above normal. Inundation maps are included in the MDC report that show areas flooded by both a fair-weather Goodwin Dam Break and a wet-weather Goodwin Dam Break. Major portions of Riverton and Pleasant Valley would be flooded under either scenario. The report states that the inundated areas shown on the map reflect events of an "extremely remote nature".

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Legend

- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District

Dam Hazard Class

- C - High Hazard
- B - Significant Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - BARKHAMSTED ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,500 7,000
Feet

SCALE 1 " = 7,535 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 8-1

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Barkhamsted is compliant with this program and has a designated Burning Official.

Actions Completed and New Capabilities

Barkhamsted continues to maintain its capabilities for mitigating and responding to wildfire risks.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

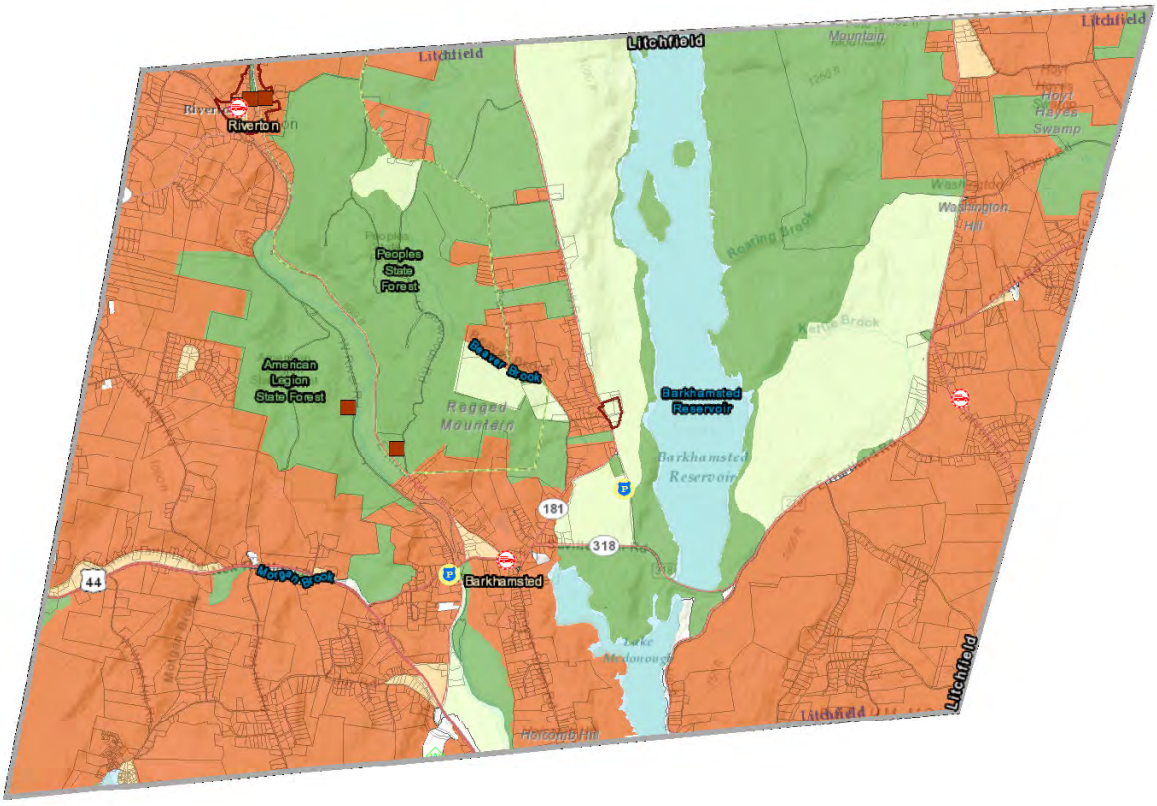
Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

The extensive forests in Barkhamsted are prime locations for a wildfire. The many areas of Town where development has occurred adjacent to forestland are at an elevated risk of damage from wildfires. Such areas that are also located far from firefighting water sources are at highest risk.

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Legend

- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - BARKHAMSTED ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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Feet

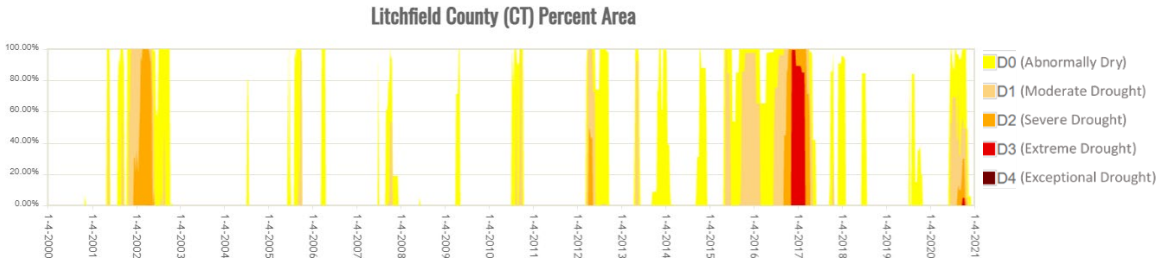
SCALE 1 " = 7,535 '
DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.



The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Strategies	Who	Status	Notes
1	Visit schools and educate children about natural hazards and how to prepare for them.	VFD, EMD	Carry Forward	*Fire department visits schools multiple times a year for fire safety – may need more natural hazard discussion*
2	Make literature available on natural hazards and preparedness at Barkhamsted Town Hall. Provide email notifications/links on town web- site.	EMD, First Selectman	Capability	*Do town wide emails as appropriate, send out emails ahead of events also*
3	Maintain local Emergency Operations Plan and continue to coordinate with the Regional Public Safety Task Force and Red Cross on community planning, preparedness, response, and training.	EMD, First Selectman	Capability	*LEOPs are maintained, town does have periodic communication with shelters, town has a Red Cross Liaison for sheltering*
4	Maintain a Public Notification System (i.e., Everbridge system) to provide emergency information to residents in the entire town or in a specific geographic area. This notice can provide not only warning of an impending situation but also information regarding how to prepare for a particular event.	EMD, First Selectman	Capability	*Utilizes Everbridge for emergency situations*
5	Routinely inspect emergency response equipment, and train for response to natural disasters.	VFD, EMD	Capability	*Fire department inspects equipment routinely, town has performed desktop emergency response exercises (which coincide with state exercise) and emergency (CPR) training municipal staff*
6	Cooperate with the Metropolitan District Commission in emergency response training exercises and updates of the Goodwin Dam Emergency Action Plan.	EMD, First Selectman	Capability	*This is a capability*

#	Strategies	Who	Status	Notes
7	Acquire additional emergency response equipment such as communication equipment as needed.	EMD, Fire Chief	Carry Forward with Revisions	*Currently upgrading fire dept. radio systems. Revise action to refer specifically to participation in the communication and coordination enhancement efforts through the Northwest Hills Public Safety Task Force*
8	Promote the use of interoperable communication equipment, and the development of standard operating procedures for emergency response in the regional area.	EMD, Fire Chief, First Selectman	Capability	*Town upgrades and maintains emergency communications equipment and procedures as needed. Participating in efforts to improve interoperability and coordination through Northwest Hills Public Safety Task Force (see above).*
9	Develop a Memorandum of Understanding with schools or bus companies to utilize school buses for mass transportation during an emergency.	EMD, First Selectman	Carry Forward with Revisions	*There is a verbal understanding in place. Revise to include a documented MOU that includes detailed procedures.*
10	Develop basic GIS capabilities as needed for access to aerial photos showing the number and location of properties and structures that could be affected by a natural disaster.	EMD, Fire Chief, First Selectman	Completed	*Town has a full GIS system.*
11	Implement control measures to mitigate the flooding created by beavers.	DPW	Completed	*Fire department and DEEP addresses these concerns as needed.*
12	Develop clean-out schedules for all catch basins and drainage facilities	DPW	Capability	*Town cleans and maintains as needed – have software that identifies location.*
13	Review floodplain regulations and ordinances and update as necessary based on DEEP's "Model Flood- plain Management Regulations" and FEMA Guide- lines	P&Z, IWC	Carry Forward with Revision	*Anticipating new digitized maps by end of 2020. Include a new action to revise regulations after the maps are adopted by the town.*
14	Identify the location of structures that are susceptible to flooding to facilitate risk assessment and potential control measures	DEMHS, DEEP	Capability	*Town is continuously aware of these sites; some have been addressed.*
15	Pursue additional funding to supplement the municipal tree trimming program and enhance the Eversource tree program.	DPW, First Selectman	Carry forward with Revisions	*The town has increased funding for tree maintenance. They have a liaison from Eversource that they work closely with. Town wishes to continue to increase budget until it has addressed Emerald Ash Borer impacts.*
16	Maintain new generators in all town buildings, including the three firehouses	First Selectman	Capability	*The Town maintains generators.*
17	Take an active role in siting new housing for vulnerable populations such as seniors and the elderly. Encourage housing developers to discuss proposed actions with the town prior to submitting applications.	First Selectman, PZD	Capability	*Currently underway, formed a housing trust, trust is considering a 20-unit apartment building with the addition of sewers.*

#	Strategies	Who	Status	Notes
18	Ensure adequate barricades are available to block flooded areas in flood prone areas of the town.	DPW	Carry Forward	*Town has not yet completed due to limited funding.*
19	Require the location of utilities underground in new developments or during redevelopment whenever possible.	Building, P&Z, DPW	Drop	*The Town works to do this as much as possible where feasible. It is encouraged in the regulations, though not required. Town does not believe requiring underground utilities is necessary.*
20	Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	EMD, DPW	Capability	*Routine tracking during storms, current protocol is to address roadways completely blocked.*
21	Include dam failure inundation areas in the CTAlert emergency contact database.	EMD, DEEP	Capability	*There are Riverton sirens for MDC issues. Some inundation areas do not impact residential/structures. (West Hill Lake)*
22	Develop a plan to coordinate with the owners of privately owned dams to ensure proper maintenance.	First Selectman, EMD, DEEP	Capability	*High hazard dams in Town are owned by MDC; MDC maintains dam properly, and Town coordinates with them on Dam safety.*
23	The Town should continue to require the installation of fire protection water in new developments.	Building, P&Z	Capability	*Town is doing this in the regulations.*

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. These include the following:

- Pursue mitigation actions regarding the scour-critical bridges.
- Increase funding to tree management to support the level of work needed to address the severe tree damage from the Emerald Ash Borer.
- Pursue a STEAP Grant, or other grant, to fund the bank restoration project along West River Road.

Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action BKHM-01	
Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action BKHM-02	
Increase funding to tree management to support the level of work needed to address the severe tree damage from the Emerald Ash Borer, especially along Old North Road, Goose Green Road, Park Road, West River Road, and Wallens Hill Road.	
Lead	DPW, First Selectman
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action BKHM-03	
Develop a written Memorandum of Understanding with schools or bus companies to utilize school buses for mass transportation during an emergency. MOU should include detailed procedures.	
Lead	EMD, First Selectman
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action BKHM-04	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action BKHM-05	
Visit schools and educate children about natural hazards and how to prepare for them.	
Lead	EMD; School
Cost	$0 - $25,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2023
Priority	Low

Action BKHM-06	
Upon adoption of new digitized FEMA maps, fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including requiring at least one foot of freeboard for construction in the 1% annual-chance flood zone, and increasing the Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action BKHM-07	
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, Sustainable CT
Timeframe	2022 – 2024
Priority	High

Action BKHM-08	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action BKHM-09	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action BKHM-10	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action BKHM-11	
Pursue a STEAP Grant, or other grant, to fund the bank restoration project along West River Road.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2023 – 2025
Priority	High

Action BKHM-12	
Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	High

Action BKHM-13	
Improve drainage on Ratlum Mountain Road at the "devil's elbow" or "dead man's curve" to mitigate icing issues.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	High

Action BKHM-14	
Mitigate scour risk at Morgan Brook Road bridge (high priority), referring to the findings of CT DOT and Cardinal Engineering.	
Lead	DPW
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action BKHM-15	
Mitigate scour risk at Day Road bridge, referring to the findings of CT DOT and Cardinal Engineering.	
Lead	DPW
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action BKHM-16	
Participate in the communication and coordination enhancement efforts through the Northwest Hills Public Safety Task Force	
Lead	EMD
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEMHS
Timeframe	2024 – 2026
Priority	Low

Action BKHM-17	
Ensure adequate barricades are available to block flooded areas in flood prone areas of the town.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	OB, CIP, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
BKHM-01	Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
BKHM-02	Increase funding to tree management to support the level of work needed to address the severe tree damage from the Emerald Ash Borer, especially along Old North Road, Goose Green Road, Park Road, West River Road, and Wallens Hill Road.	Tree and Debris Management	DPW, First Selectman	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	0	1	0	0	0	0	0	0	0	5
BKHM-03	Develop a written Memorandum of Understanding with schools or bus companies to utilize school buses for mass transportation during an emergency. MOU should include detailed procedures.	Evacuation Bus	EMD, First Selectman	$0 - $25,000	OB	2022 – 2023	1	0.5	1	0	1	0	0	0	0	0	0	0	0	0	4
BKHM-04	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
BKHM-05	Visit schools and educate children about natural hazards and how to prepare for them.	School Education	EMD; School	$0 - $25,000	OB, CT DEMHS	2022 – 2023	1	0	0	1	1	1	0	0	0	-1	0	0	0	0	4
BKHM-06	Upon adoption of new digitized FEMA maps, fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including requiring at least one foot of freeboard for construction in the 1% annual-chance flood zone, and increasing the Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
BKHM-07	Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	Sustainable CT	Planning	$25,000 - $50,000	OB, Sustainable CT	2022 – 2024	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
BKHM-08	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
BKHM-09	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
BKHM-10	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
BKHM-11	Pursue a STEAP Grant, or other grant, to fund the bank restoration project along West River Road.	River Restoration	DPW	$50,000 - $100,000	CIP, FEMA Grant, CT DEEP	2023 – 2025	1	1	0	1	1	1	1	0	0	0	0	-1	0	0	7
BKHM-12	Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
BKHM-13	Improve drainage on Ratlum Mountain Road at the "devil's elbow" or "dead man's curve" to mitigate icing issues.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6
BKHM-14	Mitigate scour risk at Morgan Brook Road bridge (high priority), referring to the findings of CT DOT and Cardinal Engineering.	Culvert & Bridge Upgrades	DPW	More than $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
BKHM-15	Mitigate scour risk at Day Road bridge, referring to the findings of CT DOT and Cardinal Engineering.	Culvert & Bridge Upgrades	DPW	More than $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
BKHM-16	Participate in the communication and coordination enhancement efforts through the Northwest Hills Public Safety Task Force	Emergency Communication	EMD	$50,000 - $100,000	OB, CIP, CT DEMHS	2024 – 2026	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3
BKHM-17	Ensure adequate barricades are available to block flooded areas in flood prone areas of the town.	Emergency Equipment	DPW	$100,000 - $500,000	OB, CIP, CT DEMHS	2025 – 2027	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3

APPENDIX B
RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
BARKHAMSTED BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Barkhamsted has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Barkhamsted Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Barkhamsted and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Barkhamsted; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Barkhamsted, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Barkhamsted eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Barkhamsted;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of the Town of Barkhamsted, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the the Town of Barkhamsted this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

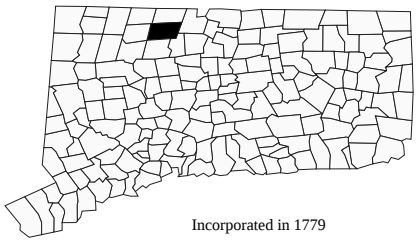
2019 CERC TOWN PROFILE

Barkhamsted, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
67 Ripley Hill Road
Barkhamsted, CT 06063
(860) 379-8285

Belongs To
Litchfield County
LMA Hartford
Northwest Hills Planning Area



Incorporated in 1779

Demographics

Population

	Town	County	State
2000	3,494	182,193	3,405,565
2010	3,799	189,927	3,574,097
2013-2017	3,693	184,454	3,594,478
2020	3,779	193,116	3,604,591
'17 - '20 Growth / Yr	0.8%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	36	921	4,842
Pop./Sq. Mile (2013-2017)	102	200	742
Median Age (2013-2017)	46	47	41
Households (2013-2017)	1,375	74,605	1,361,755
Med. HH Inc. (2013-2017)	$111,198	$76,438	$73,781

	Town	State
Veterans (2013-2017)	197	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	76	2%	539	15%	458	12%	692	19%	1,321	36%	607	16%	3,693	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	3,549	164,992	2,446,049
Black Non-Hisp	2	2,843	350,820
Asian Non-Hisp	83	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	31	2,320	84,917
Hispanic or Latino	28	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	2.4%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	601	23%	673,582	27%
Associates Degree	298	11%	188,481	8%
Bachelors or Higher	1,155	44%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	86	560
23 - Construction	10	24
31-33 - Manufacturing	6	120
44-45 - Retail Trade	11	94
56 - Administrative and Waste Services	7	27
72 - Accommodation and Food Services	6	51
Total Government	11	102

Top Five Grand List (2018)

	Amount
The Metropolitan District	$34,354,060
Connecticut Light and Power	$5,941,330
Mallory Brook Plaza, LLC	$1,833,420
Sound Garrett Barkhamsted LLC	$1,648,630
Air Realty Group, LLC	$1,573,300
Net Grand List (SFY 2016-2017)	$347,111,840

Major Employers (2014)

Sterling Engineering Corp
Lombard Ford Inc
Log House Restaurant
LightSTAT Inc
TRU Hitch Inc

Education

2018-2019 School Year

	Grades	Enrollment
Barkhamsted School District	PK-6	227
Regional School District 07	7-12	1075

Pre-K Enrollment (PSIS)

	2018-2019
Barkhamsted School District	20

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 07	98.2%	97.6%	98.8%

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	67.9%	53.8%	*	51.3%	NA	43.0%
ELA	71.4%	53.1%	*	54.9%	NA	56.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Barkhamsted School District	3.1%
Regional School District 07	5.3%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	92.4%	84.0%	86.8%
Private	7.6%	16.0%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Barkhamsted, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$12,546,786	Total Expenditures (2017)	$12,364,265	Annual Debt Service (2017)	$712,300
Tax Revenue	$9,903,442	Education	$9,992,374	As % of Expenditures	5.8%
Non-tax Revenue	$2,643,344	Other	$2,371,891	Eq. Net Grand List (2017)	$502,811,081
Intergovernmental	$2,429,469	Total Indebtedness (2017)	$2,973,376	Per Capita	$137,719
Per Capita Tax (2017)	$2,714	As % of Expenditures	24.0%	As % of State Average	91.2%
As % of State Average	92.6%	Per Capita	$814	Moody's Bond Rating (2017)	-
		As % of State Average	32.4%	Actual Mill Rate (2017)	28.36
				Equalized Mill Rate (2017)	19.71
				% of Net Grand List Com/Ind (2017)	4.7%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	1,469	88,068	1,507,711
% Single Unit (2013-2017)	94.6%	73.6%	59.2%
New Permits Auth (2017)	0	142	4,547
As % Existing Units	0.0%	0.2%	0.3%
Demolitions (2017)	0	32	1,403
Home Sales (2017)	37	1,753	21,880
Median Price	$258,500	$250,100	$270,100
Built Pre-1950 share	11.9%	31.2%	29.3%
Owner Occupied Dwellings	1,262	57,330	906,798
As % Total Dwellings	91.8%	76.8%	66.6%
Subsidized Housing (2018)	22	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	0	57	536
$100,000-$199,999	2	563	5,237
$200,000-$299,999	23	538	6,681
$300,000-$399,999	9	315	3,863
$400,000 or More	3	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$1,121	$995	$1,123
Cost-burdened Renters	7.1%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	2,236	101,000	1,827,070
Residents Unemployed	93	4,014	78,242
Unemployment Rate	4.0%	3.8%	4.1%
Self-Employed Rate	8.5%	13.0%	10.0%
Total Employers	86	6,177	122,067
Total Employed	560	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Winchester, CT	100	Hartford, CT	192
Barkhamsted, CT	96	Torrington, CT	148
Torrington, CT	79	Winchester, CT	136
New Hartford, CT	50	Simsbury, CT	109
Hartland, CT	13	Barkhamsted, CT	96
Goshen, CT	12	New Hartford, CT	95
Harwinton, CT	12	Farmington, CT	94

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	326	1,777
Violent	0	228

Disengaged Youth (2013-2017)

	Town	State
Female	0.0%	4.2%
Male	0.0%	5.6%

	Town
Library circulation per capita	NA

Distance to Major Cities

	Miles
Hartford	19
Providence	80
New York City	101
Boston	104
Montreal	251

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Gas Provider
Eversource Energy
(800) 989-0900

Water Provider
Municipal Provider
Local Contact

Cable Provider
Charter Communications of Western CT
(800) 827-8288

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

BURLINGTON, CT

200 Spielman Highway
Burlington, CT 06013
MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
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SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Burlington and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Burlington is located at the eastern edge of the NHCOG region. Neighboring communities include Harwinton to the west, New Hartford to the north, Canton to the northeast, Avon and Farmington to the east, and Bristol to the South. Burlington encompasses 29.7 square miles of land area and was home to an estimated 9,659 residents in 2019.

2.2 Existing Land Use

The community is considered a scenic hill town that is predominantly residential, with a small commercial zone located along Route 4. The Town of Burlington contains hundreds of acres of protected State Forest (approximately 40%), with significant acreage (approximately 31%) belonging to three water supply companies. Miles of recreational trail systems cross its woods.

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 74% of Burlington is forested and approximately 12% is developed.

Table 2-1: 2015 Land Cover by Area

Land Cover	Area (acres)	Percent of Community
Developed	2,253.6	11.56%
Turf & Grass	990.8	5.08%
Other Grass	400.8	2.06%
Agricultural Field	578.6	2.97%
Deciduous Forest	12,646.5	64.86%
Coniferous Forest	1,335.1	6.85%
Water	553.8	2.84%
Non-Forested Wetland	123.0	0.63%
Forested Wetland	451.8	2.32%
Tidal Wetland	0.0	0.00%
Barren	165.3	0.85%
Utility Row	0.0	0.00%
Total	**19,499**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

2.3 Development Trends

The 2010 U.S. Census reported a population in Burlington of 9,301 individuals. U.S. Census Bureau estimates for 2019 show a population around 9,659 individuals, an increase from 2010 of 3.8%. The Connecticut State Data Center predicts that population will decrease by 1.7% through 2025 to an estimated population of 9,495 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Burlington decreased between 2013 and 2017. The number of permits issued in 2013 and 2014 was 43 and 29, respectively, while 20 permits were issued in 2016, and 27 permits were issued in

2017. On average, 27 housing permits were issued each year in Burlington between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Burlington rose by approximately 8.1-percent between 2010 and 2019, from 3,389 units in 2010 to 3,688 units in 2019. In 2019, the housing stock was made up of approximately 94% single-unit structures, 2% two-unit structures, 3% multi-unit structures, and 0% mobile-homes or other types of structures.

According to the Connecticut Office of Policy and Management, Burlington's 2019 Total Equalized Net Grand List was valued at $962,823,273. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Burlington, included as Appendix C.

In general, development occurs slowly and consistently around Town, consisting almost entirely of two- to five-unit single-family home subdivisions. In a relatively rare exception to this trend, a 17-unit townhouse development is underway at 29 Covey Road near the Town center. The development is called the Meadowbrook Luxury Rental Townhomes. Note that focusing development close to the Town center, and increasing density even slightly with attached townhomes, helps mitigate hazard risks by avoiding development in distant, difficult-to access areas.

Overall, Burlington continues to grow and develop. The slow pace of development has somewhat increased the community's exposure to natural hazards over the last five years; however, this increase has been effectively balanced by improvements to hazard mitigation capabilities. Risks are not expected to increase because of development over the next five years.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

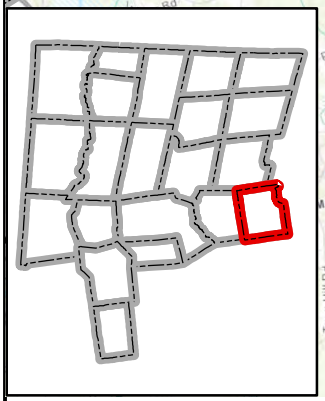
- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Burlington is considered to have a low level of social vulnerability.

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Date Saved: 5/7/2021

Document Path: Y:\3843-06\Maps\TownLocations.mxd



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

REGIONAL LOCATION: BURLINGTON

HAZARD MITIGATION PLAN UPDATE - BURLINGTON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

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Feet

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PROJ. NO.	3843-06

FIG. 2-1

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Burlington.

Situated at the edge of the Western Highlands, Burlington experiences large changes in elevation that result in different weather patterns in different areas of town. Elevation in Burlington ranges from approximately 235 to 1160 feet.

2.5 Climate and Climate Change

Over the course of the year, the temperature in Burlington typically varies from 19°F to 82°F and is rarely below 4°F or above 90°F. The warm season lasts for 3.6 months, from May 28 to September 15, with an average daily high temperature above 73°F. The hottest day of the year is July 20, with an average high of 82°F and low of 64°F. The cold season lasts for 3.3 months, from December 1 to March 10, with an average daily high temperature below 43°F. The coldest day of the year is January 30, with an average low of 19°F and high of 34°F.

The wetter season lasts 3.5 months, from May 3 to August 20, with a greater than 29% chance of a given day being a wet day. The chance of a wet day peaks at 37% on May 30. The drier season lasts 8.5 months, from August 20 to May 3. The smallest chance of a wet day is 22% on January 29.

The most rain falls during the 31 days centered around October 2, with an average total accumulation of 3.9 inches. The least rain falls around January 24, with an average total accumulation of 1.5 inches.

The snowy period of the year lasts for 5.6 months, from October 28 to April 15, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.2 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature
Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by

5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Hartford County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Burlington as 4.98 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Burlington at 5.83 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	6.9
NRCC	5.0	6.3	8.9
NOAA Atlas 14	5.8	7.2	9.3

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Burlington can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.3 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

Nearly all of the land area in Burlington eventually drains to the Farmington River, a tributary to the Connecticut River. Aside from the Farmington River which makes a loop through the northeast corner of the town (where elevations are low) before heading into Farmington to the

east, other major streams in Burlington include Phelps Brook, Bunnell Brook, Burlington Brook, Whigville Brook, Wildcat Brook, and Negro Hill Brook.

2.7 Governmental Structure and Capabilities

The Town of Burlington is professionally managed by a full-time First Selectman as assisted by municipal staff. The Town Hall serves as the Emergency Operations Center with the Fire Department Headquarters serving as back-up. Police services are provided by the Resident State Trooper program. Fire protection is provided by four volunteer fire stations.

Burlington updated its Plan of Conservation and Development (POCD) in 2020. The POCD explicitly calls for implementation of the Hazard Mitigation Plan actions.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

> **Historic preservation planning** helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
> *- Paraphrased from FEMA Report 386-6*

Historic resources in Burlington are concentrated within the Hart's Corner Historic District, and near the Burlington Town center. Resources near flood sources may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

Major transportation routes through Burlington include State Routes 4, 69, and 179. Railroads are not located in the community. Natural gas lines were recently installed from Farmington into the Lake Garda area. There is no local public transit system in Burlington.

Utilities

Public water in Burlington is provided by the Connecticut Water Company (in the Collinsville area), the Torrington Water Company (along Route 4 west of Route 69, as well as a handful of small Community Water Systems and Non-Community Public Water Systems. Most residents and businesses rely on private well water. The Town is served almost exclusively by septic systems, although some areas have sewer service.

Eversource is the primary provider in Town for electricity and gas. Many residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Burlington.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Burlington has identified several critical facilities throughout the town, as summarized on Table 2-3 below.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Town Hall	200 Spielman Hwy	EOC Comfort Station	✓	✓	
Volunteer Fire Department Station 1 - Headquarters	719 George Washington Tpk	Backup EOC	✓		
Resident State Trooper	200 Spielman Hwy				
Volunteer Fire Department Station 2 – Chippens Hill	120 West Chippens Hill Road				
Volunteer Fire Department Station 3 – Whigville	354 Jerome Ave				
Volunteer Fire Department Station 4 – Lake Garda	87 Monce Road				
Lewis Mills High School	26 Lyon Rd	Primary Shelter	✓	✓	
Har-Bur Middle School	24 Lyon Rd		✓		
Lake Garda Elementary School	61 Monce Rd		✓		

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Town Garage	200 Spielman Hwy		✓		
Senior Center	200 Spielman Hwy		✓		

Town Hall has full backup power from a generator, but the generator is 30 years old and should be replaced. The Town Garage has a generator, as does the Fire Department Headquarters and the Senior Center. None of the remaining three fire stations have generators.

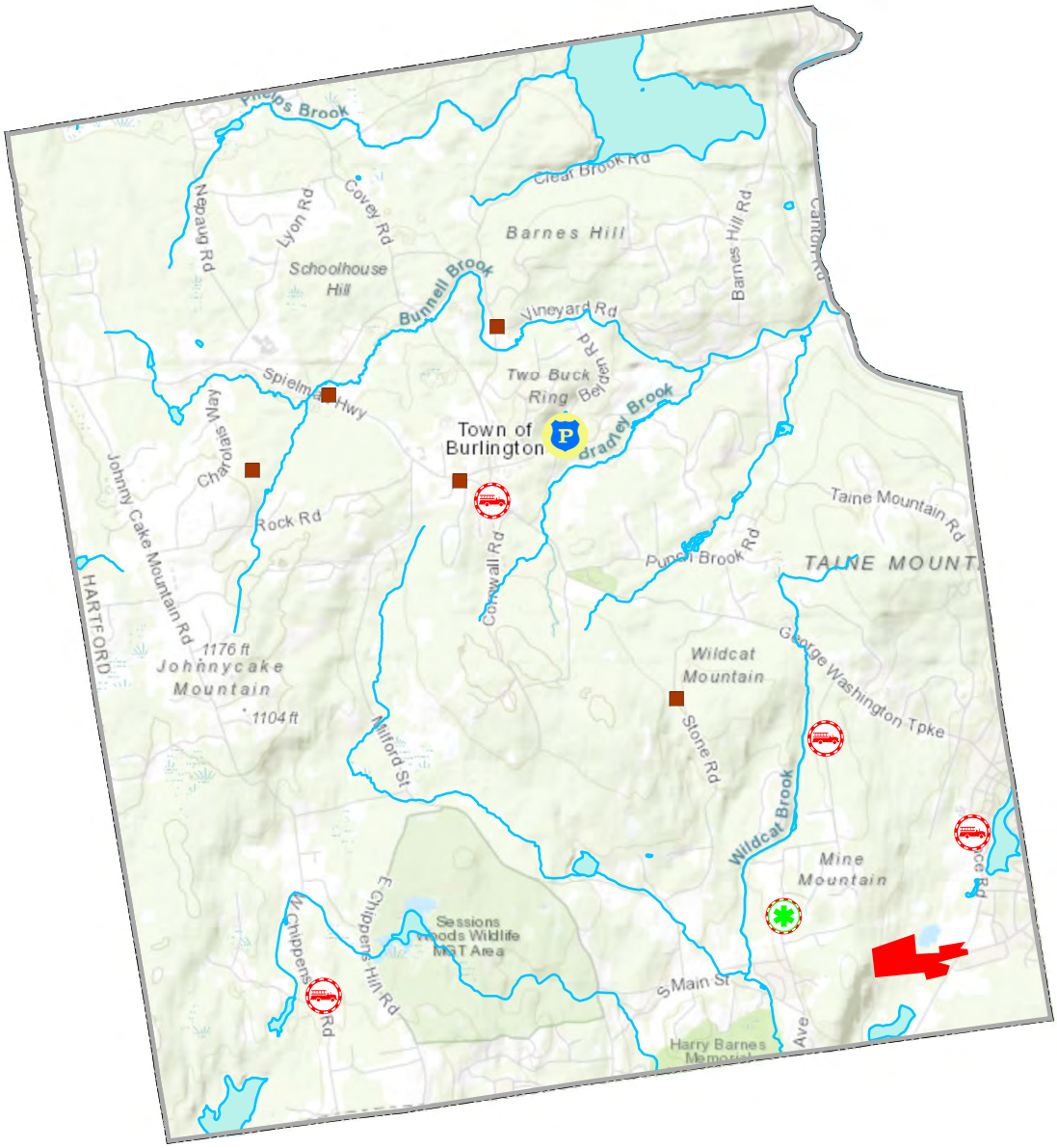
One major concern for Burlington is that individual sewer grinder pumps will not work during a power outage, preventing people from directing wastewater from their properties to the sewer.

Emergency Response Capabilities

Burlington maintains an Emergency Operations Plan (updated annually) and an Emergency Operations Center, and has identified a variety of resources to assist with response to natural hazard events. The Town also maintains a training program for its emergency personnel.

The Town has developed some GIS capacity to assist with emergency planning. Currently mapped features include fire hydrants and flood zones.

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Critical Facilities & Cultural Resources

- EMS
- Fire Station
- Law Enforcement
- National Register Building
- National Register District

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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - BURLINGTON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 2-2

Sheltering Capabilities

Lewis Mills High School is the primary shelter. The Town has 70 cots (21 were used during Winter Storm Alfred in 2011, when the shelter was open for eight consecutive days). Staffing is an issue at the shelter. The Town started a Community Emergency Response Team (CERT) following Alfred in part to assist with staffing shelters for future emergencies, as limited staff were available. A Teen CERT program has also been considered. Burlington acquires shelter supplies whenever possible.

The Town Hall is used as a backup shelter, and as a comfort station. The building has an old generator that continues to be operational, but is a concern to municipal staff.

The Town has previously reported that all schools in Town are Red Cross approved shelters and are equipped with generators.

Communications

A locally-managed Everbridge emergency notification system provides additional coverage above the statewide CT Alerts system. The town uses an electric sign in front of the Town Hall to communicate important messages to residents. The Town has upgraded its radio equipment and mobile base units. All staff have portable radios.

The Town developed an emergency response pamphlet and mailed it to all residents in 2013. The Town distributes it at Town functions such as Tavern Day, and it is available at Town Hall and at all of the schools. It is also on the Town website along with a significant amount of other information regarding mitigating the impacts of natural hazards.

3 FLOODING

3.1 Existing Capabilities

Town staff believe that existing ordinances do a good job of discouraging development in and near wetlands and in floodplains. Enforcement and outreach regarding floodplain activities is performed by the Zoning Enforcement Officer and the Land Use Department, with outreach typically occurring on a case-by-case basis.

Ordinances, Regulations and Plans

The Town of Burlington has in place codes and ordinances to reduce the risks to public health and property posed by flooding. These regulations primarily limit any activities on floodplains that would increase flood heights and velocities, or reduce or alter naturally occurring floodplains and water catchment areas, but also stipulate the use of flood-resistant materials, floodproofing, and requirements for the elevation of the lowest floor and on-site water storage. The Town defines floodplains, hereafter special flood hazard areas, off of the Federal Flood Insurance Rate Maps identified in FEMA's Flood Insurance Study.

Plan of Conservation and Development (2009):

- Town adopted low impact development (LID) strategies to encourage developers to use sustainable on-site storm water drainage strategies. The POCD also recommends the zoning and subdivision regulations promote effective management of open space and land use.
- Town continues to apply buildable land provisions to inventory land available for development and exclude areas located in floodplains and floodways, along streams and wetlands, and steep slopes. Instead, land in these exempt categories is severely limited to development other than for temporary or passive recreational usage.
- The Plan encourages the Planning and Zoning Commission to ensure current zoning codes limit "additional development" in these vulnerable areas.
- The Plan lists "strengthening and coordinating municipal regulation of flood hazard areas to protect life, property and the continued functioning of the natural flood management system" as an ongoing priority for the Conservation Commission and Planning and Zoning.

Community Emergency Response Team (2015):

- Burlington has Community Emergency Response Teams (CERT).
- CERT is composed of volunteers who received training in disaster preparedness and response.
- CERT members are able to assist town personnel and support emergency response functions, such as staffing the emergency shelter.
- CERT members engage with the community to educate about disaster preparedness. They have a library of resources online that provide information about emergency situations. CERT is an important resource to residents for preparedness.

Municipal Building Codes:

- Burlington requires buildings be constructed in accordance with the Connecticut State Building Code.

Zoning Regulations:

- Burlington addresses building standards for floodplains, defined as: areas of special flood hazard, including all territories that fall below the 1% annual flood hazard elevation as determined by the Federal Emergency Management Agency in their Flood Insurance Study.
- This includes land adjacent to the Farmington River and other watercourses. The stated purpose of these regulations is to "regulate land uses and activities in the floodplain in order to minimize loss of life and injury to persons and property, and to preserve the floodplains as a valuable natural resource that can accommodate flooding with minimal adverse effects."
- These regulations identify several agricultural uses as permitted in the floodplains so long as there is no regrading or filling.
- All other uses are allowed by permit only.
- The flood damage prevention ordinance does not require freeboard for new construction or substantial improvement.

Inland Wetlands and Watercourses Regulations (2011):

- Adopted Inland Wetlands and Watercourses Regulations in 1974, amended 2011. While these regulations are primarily for the protection of environmental and ecological assets, they do address impacts to safety and public health.
- Burlington also publishes a Designated Inland Wetlands and Watercourses Map identifying all ponds, rivers, streams brooks and wetlands within the boundaries of the town.

Subdivision Regulations (2013):

- The Subdivision Regulations state that: "Land of such character that in its natural state, is unsuitable for occupancy or building purposes because of danger to the public health, safety and welfare by reason of… flooding conditions, erosion hazards… or other similar conditions, shall not be subdivided for residential use or for any other uses that may increase the danger to health, life or property or otherwise aggravate the hazard, unless and until appropriate corrective measures have been taken by the subdivider to eliminate such hazards."
- Reduce future risk associated with flooding by protecting natural drainage systems. Streams, watercourses, and bodies of water (year-round or intermittent) are protected from relocation, dredging, and diversion.
- Areas contiguous to special flood hazard areas, such as the 1% annual flood hazard areas, are protected from filling or confinement to a conduit without specific authorization from the Burlington Inland Wetlands and Watercourses Commission.
- All natural contours within 50 feet of waterbodies and watercourses will be preserved. Authorization for any activity that will modify protected areas will be authorized by the Inland Wetlands and Watercourses Commission under only "highly unusual circumstances."
- Drainage infrastructure related to subdivision for roads shall be designed for not less than the 4% annual flood hazard event.

Local Emergency Operations Plan:

- These plans are meant to be applied during an emergency to maximize survival, give direction, integrate departments and expertise, define roles to departments and community leaders, and provide a basis for continued preparation.
- The plans identify town personnel and assign responsibilities to each department and its personnel during disasters and emergencies. As part of the plan, instructions are also outlined for activation of the emergency operations center.

NFIP, Flood Insurance, and Community Rating System

The Town strives to maintain flood hazard controls that ensure compliance with NFIP and the Community Rating System (CRS).

The Town of Burlington is a participating community in FEMA's National Flood Insurance Program since 1981 and intends to continue participation in the NFIP for the foreseeable future. According to FEMA, there are 11 flood insurance policies in force in Burlington as of 6/30/2019 with an insurance value of $3,168,000.

The National Flood Insurance Program has paid 5 property damage claims in Burlington totaling $23,601.94 to date.

There is one Repetitive Loss Property (RLP) located in Burlington. The property is a residential building, and has experienced two losses from flooding caused by Phelps Brook. It was reported to have been mitigated in 2017.

Drainage and Street Flooding

The Town has an annual inspection and maintenance (if needed) schedule for its bridges and culverts. Drainage and flooding complaints are routed to either the Fire Department or the First Selectman, depending on if it is an emergency. Usually, Public Works will be involved in resolving any complaint. The Fire Department receives many calls each year requesting basement pump outs. The Town has portable sump pumps to remove water, and Public Works attempts to fix problems that are caused by poor drainage.

Structural Projects

The Town owns many bridges on local roads. The DPW performs bridge replacements when funding is available. Past bridge projects include Belden Road, Reservoir Road in Whigville, and Vineyard Road (completed in 2016). A bridge replacement on Barnes Hill Road has been completed since adoption of the previous HMP. All new construction is designed using the most recent NRCC rainfall return periods in accordance with December 2014 CT DOT guidance. The Town has also evaluated other culverts in the community based on the new rainfall return periods and will continue to use updated guidance in the future.

The Town has also identified new road and bridge projects to include in the plan moving forward. These include:

- The Foote Road Bridge over Bunnell Brook
- The Alto Road and Alpine Drive culverts over the Unionville Brook north branch [unsure of name] have been assessed, and need to be replaced or repaired.
- The bridge on South Main Street near Milford Street / Route 69

Beaver Dams

Burlington has invested thousands of dollars on installation of beaver management structures, such as beaver grates, in past years. The Town clears out debris caused by beavers before large storms in order to prevent flooding. The Town hired a consultant to mitigate its long-standing beaver issue several years ago; a total of 36 beavers were removed and relocated.

New Capabilities and Completed Actions

Burlington continues to maintain its strong flood mitigation capabilities.

The Town has made progress on identifying and repairing or upgrading roads at risk of flooding. Scoville Road and Prospect Street have both been repaired, and improvement projects at Main Street and at the Covey and Hotchkiss Intersection have both been progressed to 30% design. A bridge replacement on Barnes Hill Road has been completed since adoption of the previous HMP.

Summary

Burlington's capability to mitigate flooding damage is considered to be effective at preventing damage to new development and substantial improvements. The Town mitigates flood damages primarily through regulating development in floodprone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate.

3.2 Vulnerabilities and Risk Assessment

Flooding has been identified as one of the top natural hazards that present a high risk to Burlington. The October 2005 storms produced 16 inches of rainfall in Burlington over five days. The storm washed out a number of roads and bridges, and overwhelmed culverts throughout the town. Damage from the storm was widespread.

Flood prone areas in the community today, as mapped by FEMA, are presented in Figure 3-1.

3.2.1 Vulnerability Analysis of Areas Along Watercourses

Most of the most densely populated areas of town are close to a flood zone, but not in one.

Flooding problems in Burlington arise in two main areas: along the brooks that feed into the Farmington River from the northwest, and in the Whigville area, in the southeast.

Notable locations prone to flooding include:

- Upson Road
- Foote Road (specifically the recreation facility off that road)
- Covey & Hotchkiss Roads over Bunnell Brook
- Main Street over Whigville Brook

- Prospect Street over Whigville Brook
- Members of the public have identified flood problems along Vineyard Road, Westside Boulevard, Monce Road, and Route 4.
- The Town also identified that George Washington Turnpike is one of the primary routes through the center of Town, and that the road is in need of paving and drainage.

Another site of flooding risk is the Foote Road Recreational Center. This site would have limited economic impact if flooded.

3.2.2 Vulnerability of Repetitive Loss Properties

There is one Repetitive Loss Property (RLP) in Town. The property has experienced two losses.

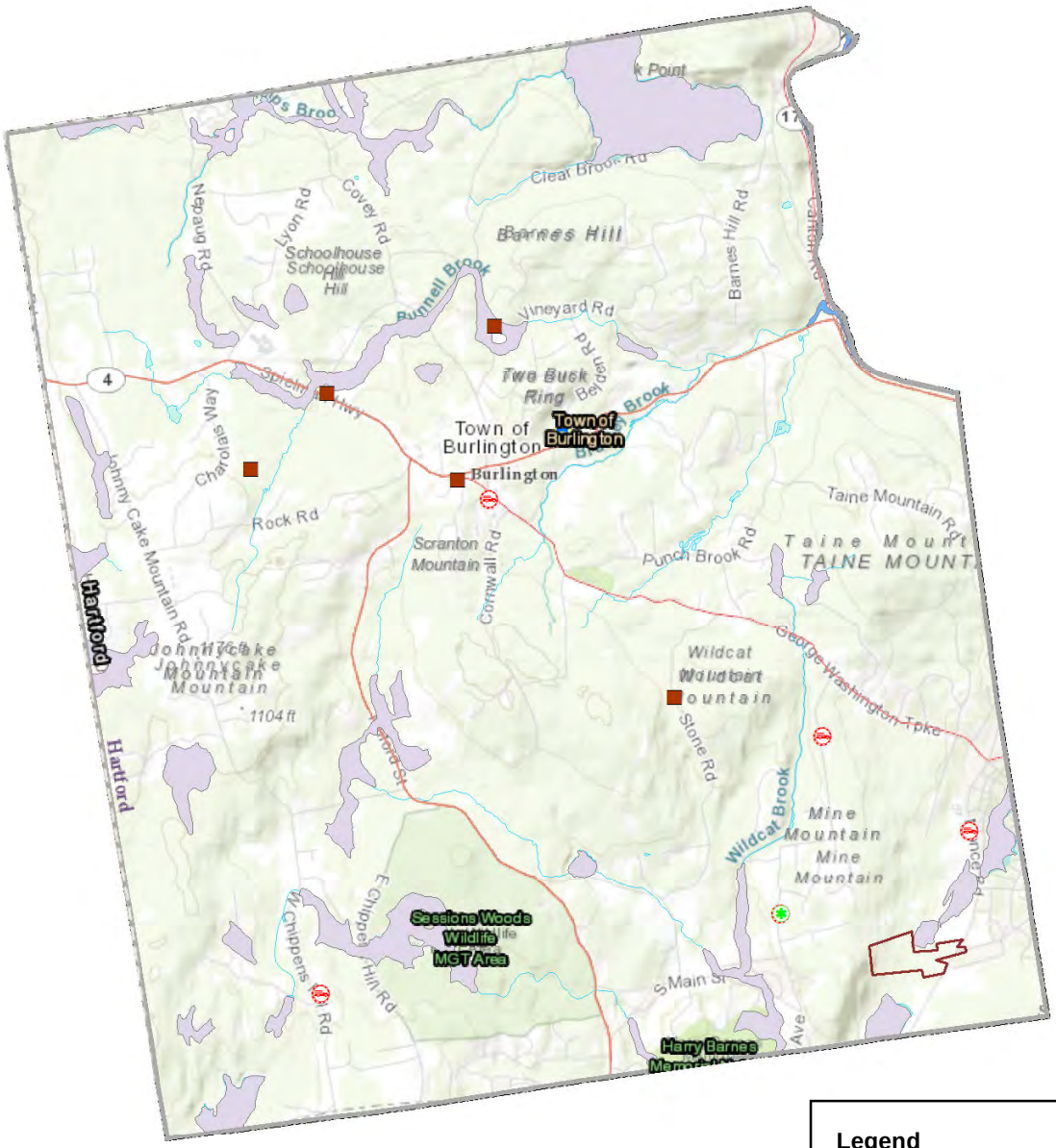
3.2.3 Vulnerability of Other Areas

Several historical flooding problems in the town arose from persistent conflicts with beavers, which build dams inside culverts and obstruct the flow. The dams resulted in surprising problems including landslides, undermined bridges, and road collapses.

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FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - BURLINGTON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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3843-06
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FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing capabilities appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Burlington is 110 mph for a Category 1 event, 120 mph for a Category 2, and 130 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

The Town of Burlington uses a variety of preparedness and response procedures to deal with the impacts of tropical storms and hurricanes. Town departments have purchased sufficient supplies to be prepared for the next major storm event.

The Town has a small budget ($11,000) for maintaining trees on town land and along rights-of-way. The Town does not cut privately owned trees. Tree complaints are directed to Public Works, and the Town has a chipping and trimming contractor on-call when assistance is needed such as for large jobs. Much of the tree trimming in Burlington near power lines is conducted by Eversource Energy. A significant amount of trimming occurred in Burlington following the 2011 storms.

New Capabilities and Completed Actions

Burlington continues to maintain its strong tropical cyclone mitigation capabilities.

Summary

Burlington mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements

related to high winds. The Town's capabilities are considered to be effective with regard to mitigating hurricane damage.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Hartford County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

Tropical storms and hurricanes have been identified as one of the top natural hazards that present a high risk to Burlington. Burlington faces a number of challenges due to tropical storms and hurricanes. The primary problem is dealing with the impact of downed trees which can interrupt power supply for many days and hinder egress through neighborhoods. Secondary impacts are generally caused by heavy rainfall accompanying the storm.

Following Tropical Storm Irene in 2011, power was lost for approximately three days in Burlington, although some residents lost power for up to six days. A maximum of 449 customers were without power.

All areas of Burlington are susceptible to tropical storms and hurricanes. Higher elevations may be at a greater risk because the speed of the wind may be greater. Areas in floodplains are at

increased risk of tropical storm and hurricane damage due to any flooding that may accompany such an event.

There is one small (six-unit) mobile home park in town, and another single mobile home on another parcel. These buildings are more susceptible to wind than others in the community.

One challenge identified by municipal staff is the fact that the Town is highly dependent on communication and power utility companies (electricity, cellphone reception) but has limited control over the actions of those private companies.

The cell phone towers serving the Town have emergency generators, but they reportedly last for a short duration; during the power outages following Tropical Storm Isaias, the generators reportedly lasted only for one day. The cell phone towers have up to three carriers on one tower (ATT, Verizon, TMobile). There is some coordination between the Town and the cellphone service carriers, but Town staff find it to be inconsistent. Town staff describe the problem as follows: they are given a contact person from the cell phone company to work with, and develop a relationship, but then after a few months that person leaves and a new person takes over, and the coordination has to start from scratch. Sometimes the companies themselves get acquired. This turnover makes long term coordination difficult. Cell-phone reception is a high priority for the town with regards to hazard mitigation. A new action related to improving coordination with cell providers is added.

Tropical Storm Isaias

Tropical Storm Isaias on August 5th, 2018 caused severe impacts to Burlington's power and communications infrastructure. The town lost electricity, energy delivery, cellular phone service, internet, and cable. The cellular towers have backup generators, but they reportedly maintained power for only about 24 hours, despite power being out for multiple days. These outages were widespread and impacted the Town's ability to respond.

- **Emergency Communication**: The Town's Everbridge System was not able to be used reliably because widespread outage prevented access both by Town officials and by members of the public. The Town's Emergency Operations Center was rendered useless because, despite having power, it had no connection to communications utilities. Burlington coordinated with the Town of Canton to operate out of the Canton EOC. The First Selectman drove to West Hartford daily in order to access internet and post information online on the Town website and Facebook account, in case any residents were able to access online information.
- **Emergency Response**: The generator at the town hall was run, and residents were invited to use it as a charging station and comfort station. Non-potable water was available at the Town Hall and Fire Houses that residents were able to bring home [assumedly to wash and flush toilets]. Food was distributed through the Town Food Bank as needed. The High School was not available for sheltering or showering (as it typically would be) because of COVID-19 concerns; the Town opened the swimming pond at the Foote Road Recreation area for public use to cool off. The Town was fortunate that the weather was warm, as a winter event (or an event during a period of extreme heat) of this magnitude would have created dangerous conditions for residents without power.
- **Recovery**: Coordination with Eversource was not effective, and the utility company was highly delayed in responding to the Town's needs.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

The strategies used to mitigate tornado and thunderstorm damage are similar to those used to mitigate damage from tropical storms and hurricanes. The town has a limited budget for tree maintenance ($11,000) which is considered sufficient at this time. This is only for town properties and rights-of-way. The Town has conducted extensive tree trimming in the community, and implemented a local Everbridge system.

The Town's ability to mitigate tornado damage is relatively limited. Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

New Capabilities and Completed Actions

Burlington continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

Burlington mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

The central and southern portions of the United States are at higher risk for lightning and thunderstorms than is the northeast. However, FEMA reports that more deaths from lightning occur on the East Coast than elsewhere. Lightning-related fatalities have declined in recent years due to increased education and awareness.

Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Burlington area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Burlington is considered moderate in any given year.

Vulnerabilities and Risk

Burlington faces regular challenges due to tornadoes and thunderstorms, although these events are typically less damaging than tropical storms or hurricanes. The primary problem is dealing with the impact of downed trees which can interrupt power supply and hinder egress through

neighborhoods. Secondary impacts are generally caused by heavy rainfall accompanying the storm, and direct wind damage or lightning and hail damage to structures and vehicles.

All areas of Burlington are susceptible to tornadoes and thunderstorms. Higher elevations may be at a greater risk because the speed of the wind may be greater. Areas in floodplains are at increased risk of thunderstorm damage due to any flooding that may accompany such an event.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

6 WINTER STORMS

6.1 Existing Capabilities

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas.

The Town has 90 miles of local roads as well as many miles of state roads. Removal of the ice and snow for Burlington's town-owned roads is handled by town workers. Contractors are not used. The plow trucks do a very good job of keeping roads clear. There are several areas of Burlington where ice is a problem on hills. This is mitigated through additional treatment during and following snow events.

The majority of roofs on Town-owned buildings are flat, including the schools. The Town has an informal program to review snow accumulation on town-owned roofs each winter, with clearing occurring when depths are sufficiently deep or wet. The Town does not believe that it needs a formal snow load evaluation and removal program at this time. The Town zoning regulations require that utilities in new developments are installed underground.

Although there is interest in burying existing aboveground lines, this is cost-prohibitive based on initial discussions with Eversource.

New Capabilities and Completed Actions

Burlington continues to maintain its strong winter storm mitigation capabilities.

Summary

Burlington mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events. The Town's capabilities are considered to be effective in regard to response to winter storms, although the Town's capability to mitigate severe winter storm damage is limited to Town facilities.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

Winter storms have been identified as one of the top natural hazards that present a high risk to Burlington. Burlington faces challenges during winter storms as ice and snow make roads impassable and knock down tree limbs which in turn disrupts utility service. The combined effect can leave people stranded in their homes, potentially without heat or power. The Town receives an average of approximately 66 inches of snow each year, and some recent severe storms have used up the entire plowing budget in one event.

All areas of Burlington are susceptible to winter storms. Higher elevations may be at a greater risk because the frequency of winter storm events is typically greater in such areas. Areas in floodplains are at increased risk of winter storm damage due to any flooding that may accompany a winter storm. The topography of the town means that some areas may be inundated with snow and ice while others are barely affected by the same storm.

Johnny Cake Mountain Road is very prone to drifting snow due to its elevation. When this area of town (elevation of roughly 1100 feet above sea level) gets a foot of snow, the southeast corner (at 600 feet) might only see an inch or two. The Town spent an extra 50 hours plowing drifts in this area during the winter of 2014-2015. All of the higher elevations have problems with drifting snow which are mitigated through additional plowing efforts.

Winter Storm Alfred dropped snow on Burlington in late October 2011. Debris removal was the biggest impact which took months to clean up as 30,000 cubic yards of tree debris was removed. Power was out for up to 11 days. The January 2013 blizzard produced 42 inches of snow in parts of Burlington. Snow removal was the primary financial impact, as only minimal power outages occurred.

7 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of TOWN. The Town has adopted these codes for new construction, and they are enforced by the Building Official.

New Capabilities and Completed Actions

Burlington continues to maintain its earthquake and landslide mitigation capabilities.

Summary

Burlington mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Earthquake Vulnerabilities

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Burlington. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of TOWN

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

The Town of Burlington does not own any dams. The Town has copies of EAPs prepared for dams whose failure could affect Burlington; this information is maintained by the Emergency Management Director. The Town participates in the annual training for the Goodwin Dam on the West Branch Farmington River, and every five years there is a major training exercise conducted by MDC. The Whigville Reservoir dam is owned by New Britain Water Department and believed to be in satisfactory condition.

Actions Completed and New Capabilities

Burlington continues to maintain its capabilities for mitigating and responding to dam failure risks.

Summary

Burlington mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

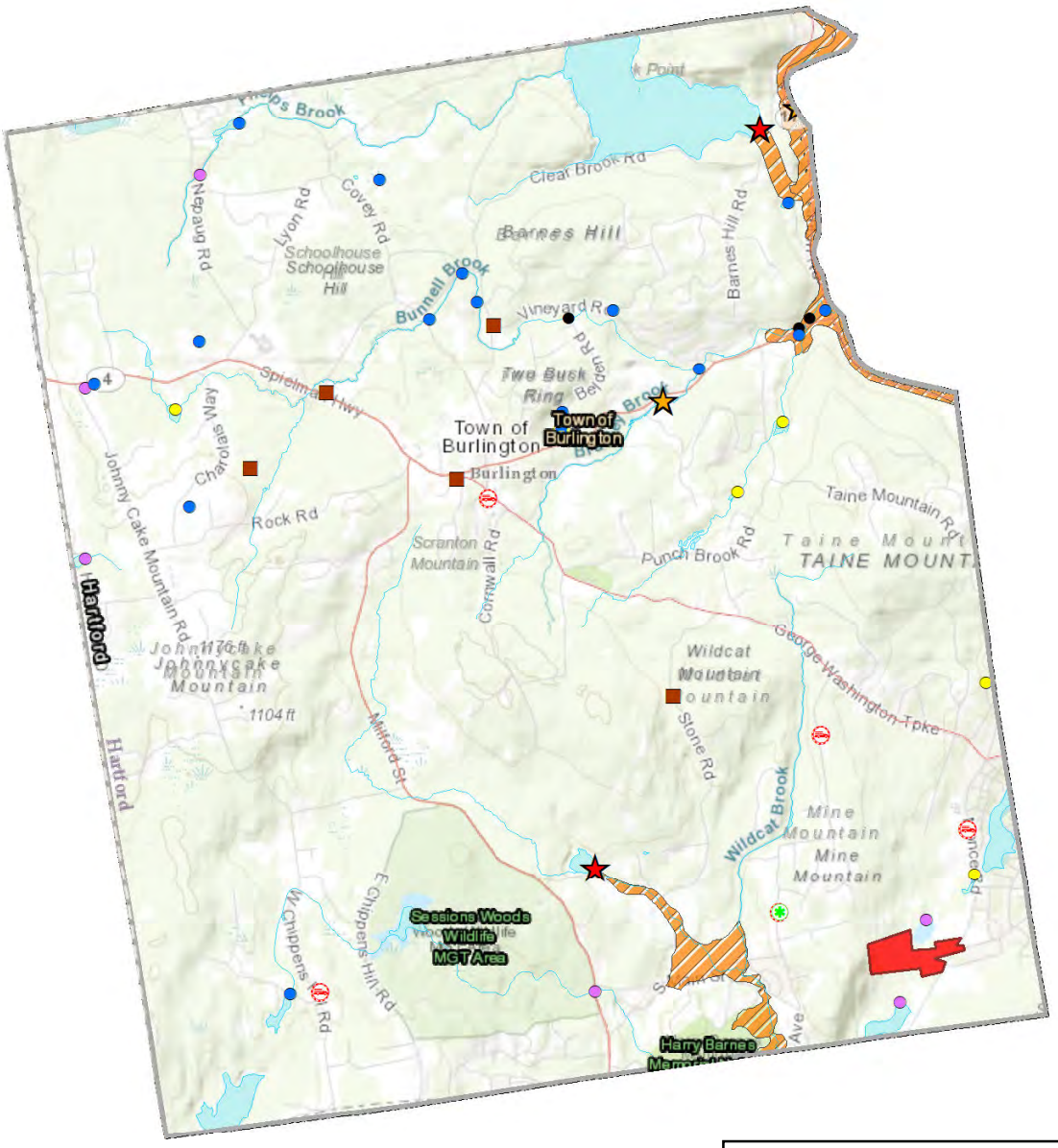
- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 37 DEEP-inventoried dams within the Town of Burlington. These dams are listed in Table 8-1and shown in Figure 8-1.

Table 8-1: DEEP-Inventoried Dams in TOWN

CT Dam#	Dam Name	Hazard Class	Owner Type
2001	NEPAUG PHELPS DAM	C	Water Utility
2002	WHIGVILLE RESERVOIR DAM	C	Municipal
2004	COLLINS COMPANY LOWER DAM	B	State Owned
2005	MONCE POND DAM	BB	Association
2006	FROST POND DAM	A	Private
2007	BRADLEY POND DAM	B	Private Corporation
2008	TRACEY POND DAM	BB	Private
2009	PUNCH BROOK POND DAM	BB	Private
2010	FISH & GAME POND	A	Private
2011	WOODPOND DAM	A	Lake Association
2012	PINTA POND	Unrated	Private
2013	NINA POND DAM	AA	State Owned
2014	SANTA MARIA POND	A	Private
2015	BELDEN ROAD POND	A	Private
2016	TROUT CLUB POND	A	Private
2017	FOOTE ROAD DAM	A	Private Corporation
2018	ZURLES POND DAM	Unrated	Private
2019	NATURAL POND	AA	Private
2020	LAKE COMO DAM	AA	Private
2021	DUNNING POND	A	Private
2022	ROYKO POND	A	Private
2023	COUNTRY POND	A	Land Trust
2024	BROHO POOL & BDGE DAM	A	Municipal
2025	HOGAN BROTHERS DAM	AA	Private Corporation
2026	SABATINO DAM	AA	Water Utility
2027	GAGE POND	A	Municipal
2028	RATLUM FISH AND GAME CLUB POND DAM	BB	Private Club
2029	KELLERSTEDT POND	AA	Private
2030	C BARN POND #1	A	Private
2031	HUMPHERY POND	Unrated	Association
2032	WOLLMAN POND	A	Private

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Legend

- EMS
- Fire Station
- Law Enforcement
- National Register Building
- National Register District

Dam Hazard Class

- C - High Hazard
- B - Significant Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - BURLINGTON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 2,500 5,000
Feet

SCALE 1 " = 5,700 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 8-1

Additional dams are located upstream of Burlington.

Only areas of Burlington that lie immediately downstream of dams, or near watercourses that are downstream of dams, are susceptible to dam failure. In many cases a breach could flood a similar area to the 1% annual chance or 0.2% annual chance flood; in some cases (particularly for high hazard dams) the impacted area could be much wider.

A failure of any the major MDC dams could impact Burlington, including the Nepaug Reservoir Dam which is located in town.

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Zoning regulations require the installation of fire ponds with dry hydrants or cisterns. The Town refurbishes a few of these each year, and a new dry hydrant or cistern is typically installed each year.

The Town uses its tankers to shuttle water into outlying areas for fire-fighting, and utilizes its mutual aid agreements for assistance. The Town maintains mutual aid agreements with all surrounding communities for fire protection. The Town has an outdoor fire ordinance effective August 20, 1970 which allows for contained fires but requires a permit from the Burlington Fire Marshal for any other types of burn. The Town has two Open Burning Officials certified through the Connecticut DEEP Open Burning Program who enforce the permit process.

The Town primarily relies on regional and statewide measures for mitigating the impacts of drought such as the Connecticut Drought Management Plan; the Town is a member of the Water Utility Coordinating Committee. The Town does not perform any mitigation activities for drought and its capability to mitigate drought is relatively limited.

Actions Completed and New Capabilities

Burlington continues to maintain its capabilities for mitigating and responding to wildfire risks.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

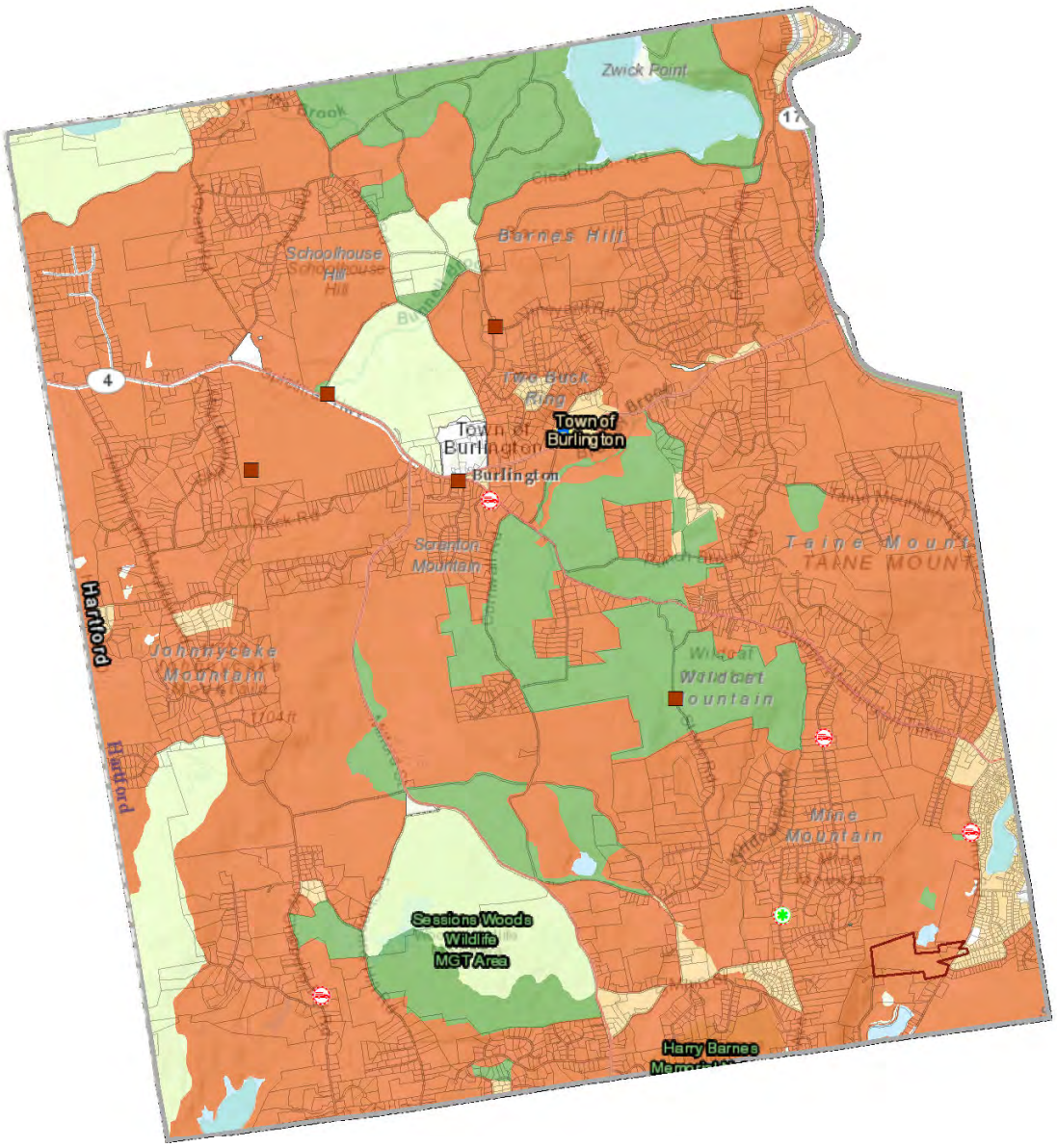
Wildfire Vulnerabilities and Risk

Because of its extensive wooded areas, Burlington has a slightly greater risk of wildfires than more developed towns. Many small brush fires occur each year. Most are accidentally set by human activities, although some have been ignited by lightning or undetermined sources. Most fires are very small (less than 250 square feet). It is difficult for the Town to estimate the cost to fight wildfires because the fire department is all volunteer.

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Legend

- EMS
- Fire Station
- Law Enforcement
- National Register Building
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - BURLINGTON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 2,500 5,000
Feet

SCALE 1 " = 5,701 '
DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 9-1

Nearly the entire community is at risk for wildfires. The greatest areas of concern are in large contiguous tracks of forest that have limited access. The areas most prone to wildfires include the Sessions Woods Management Area due to poor vehicle access, and the forests off West Chippens Hill Road.

A 10-acre brush fire occurred behind the Town Library several years ago. This fire required four engines, EMS, and Emergency Management staff to contain. Some equipment had to be abandoned when the fire suddenly turned back on the firefighters and retreat was necessary. Another significant brush fire occurring on New Britain Water Department land in 2011, and the City fire department assisted in putting out that fire.

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Hartford County since 2000, where the warmer colors represent more advanced drought stages.

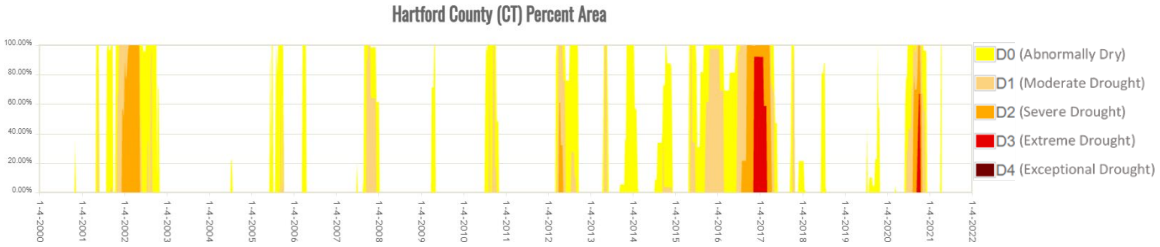


Figure 9-2: USDM Drought Time Series for Hartford County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Hartford County accounts for roughly 15% of the state's total number of farms, with a market value of nearly $114 million in product sold from these farms.

Only severe droughts would have the potential to cause damages in Burlington. The short-duration and moderate droughts that generally occur every few years are not a concern to Town staff. all property owners have private wells which may have an increased risk of damage due to drought as lower groundwater levels could impact water supply wells.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Action	Status	Notes
1.1	The Town wishes to offer subsidized CPR training for residents, but needs to secure funding to do so.	In Progress Carry Forward	The Town has made progress on improving its capabilities to enable residents to perform first-aid and CPR. They have received grant funding from the Main Street Community Fund (in Bristol, CT) install defibrillators around town and perform "stop the bleeding" trainings; this initiative is primarily intended to address mass incidents at schools. The Town will carry this action forward.
1.2	The last POCD update was in 2009 and it is updated every 10 years. The Town intends to include discussions of natural hazards in the document and use the information to help formulate planning goals.	Completed	This action has been completed. The 2020 POCD has been completed and is available through the Town website. The plan explicitly calls for implementation of HMP (Sustainability Strategies Action B.3). Additionally, the Plan addresses environmental sustainability and climate resiliency in Chapter 6: Enhance Sustainability.
1.3	The Town wishes to inform new residents of natural hazard mitigation and preparedness strategies. This will involve developing a packet of information that can be provided to new homeowners and renters. While new homeowners can be tracked through the Assessor's office, the Town has not determined how to track renters at this time.	Carry Forward	Information has been made available on the town website, but has not been mailed out to residents due to budget constraints and the relatively high costs of such an effort. The Town still feels this action would be beneficial.
1.4	Hazard mitigation information will be incorporated into future Town plan updates	Completed	This is redundant with Action 1.2

#	Action	Status	Notes
2.1	The Town identified roads that have been at risk of flooding for nearly a decade. These include Upson Road, Scoville Road, Prospect Street, Main Street, and the intersection of Covey and Hotchkiss Roads. The existing conveyance infrastructure needs to be upsized.	Carry Forward with Revisions	The Town has made progress on this action: Scoville Road has been repaired. Prospect Street repair is currently underway. Main Street has been brought to 30% design. The Town intends to put the project out to bid in 2021. This project will include a drainage conveyance upgrade. Covey and Hotchkiss Intersection has been brought to 30% design, and will also go out to bid for 2021. This project will also include a drainage conveyance upgrade. Upson Road is still on the Town's list of roads needing improvements. Repairing road and addressing drainage issues will be listed as a new action moving forward. Town has also identified new road and bridge projects to include in the plan moving forward. These include: The Foote Road Bridge over Bunnell Brook The Alto Road and Alpine Drive culverts over the Unionville Brook north branch [unsure of name] have been assessed, and need to be replaced or repaired. The bridge on South Main Street near Milford Street / Route 69
2.2	The Town identified George Washington Turnpike as being in need of paving and drainage.	Carry Forward	Town is currently working on securing a grant through the Connecticut Local Transportation Capital improvement Program (LOTCIP) to fund this project in 2021 or 2022.
2.3	The Town wishes to evaluate areas at greater risk of wildfires and determine mitigation measures to reduce overall risk	Carry Forward with Revisions	A large portion of forest land in Burlington is owned by the State (Nassahegon State Forest). CT DEEP performs forest management activities in these areas, and coordinates closely with the Town. The First Selectman took a tour of Nassahegon with CT DEEP foresters in 2020 to view their management efforts. Additionally, the Burlington Fire Department is involved in wildfire management. The Town purchases forest-fire fighting equipment such as All-Terrain Vehicles. Carry Forward, specifically for Town Properties
3.1	The Town recently contracted with Everbridge to provide a town-wide emergency notification system. Targeted mailings may be used to encourage signups in particularly vulnerable areas, such as special flood hazard areas and dam failure inundation areas.	Capability	Town continues to subscribe to Everbridge system. They have utilized the system to send messages, and understand how to use it and how effective it is. Residents are encouraged to sign up on town Website. This is a capability.
5.1	The Town wishes to provide portable GPS and computer technology to emergency vehicles to assist with real time tracking during events.	Carry Forward	Action has not yet been completed due to lack of funding.

#	Action	Status	Notes
5.2	The Town wishes to use GIS technology to track natural hazard impacts and vulnerable areas and use this information to plan and respond accordingly. The Town has begun developing this technology but has not yet implemented it fully.	Capability	Town is continually updating their GIS capabilities. They currently have features including fire hydrant locations and flood zones. They will continue to upgrade in the future. This is a capability. Add new action to add locations of homebound residents or those with mobility issues or other special needs (such as individuals requiring supplemental oxygen) to help focus emergency response efforts.
5.3	The Town has developed a CERT program, and wishes to expand it to include teenagers to assist with emergency response activities such as assisting at shelters	Carry Forward with Revisions	The Town completed this action, but the Teen CERT program has lapsed in recent years. The Town is interested in carrying forward an action to reengage the Teen CERT program, possibly in coordination with the Fire Department's youth programming.
5.4	The Town has developed a list of generator needs. The Town Hall generator is nearly 30 years old and powers the EOC and needs replacement. The Town would also like to acquire a portable generator that can be driven around town to pump out private sewer grinder pumps during extended power outages.	Carry Forward as Separate Actions	The Town has not yet acquired generators due to budget constraints. The Town is interested in the following emergency power capabilities: Updating the generator at the Town Hall Updating the generator at the Town Garage Acquiring a portable generator that can be used to power private sewer grinder pumps during extended power outages.
5.5	A member of the Fire Department indicated that a regional tornado drill needs to be conducted to heighten awareness and preparedness.	Carry Forward	Town has not yet completed this action due to coordination and staffing challenges. This action is carried forward, but may be best coordinated by the COG.
5.6	The Connecticut DPH is preparing a Coordinated Water Supply Plan for the entire state beginning in 2016. The Town will participate to address drought-related public water supply needs throughout the community.	Completed	This was completed in 2016-2018.
5.7	The Connecticut Drought Management Plan is periodically updated. Local officials, land use commissions, health departments, fire departments, and local water utilities should all be made aware of updates to this plan.	Capability	This is a capability. The Connecticut Drought Preparedness and Response Plan was adopted in 2018. Burlington is part of the Bristol-Burlington Health District. The Health District Sanitarian visited Burlington during the 2020 summer drought by to discuss drought mitigation and messaging to Burlington residents about water conservation measures. 4-5 weeks ago.
6.1	One repetitive loss property is located in Burlington that has experienced two flood losses. Mitigation could include acquisition/demolition, elevation, floodproofing, or other techniques.	Carry Forward	The RLP has been mitigated.

#	Action	Status	Notes
6.2	The Town of Burlington last updated this ordinance in 2008. Since that time, FEMA and the Connecticut DEEP have revised the model ordinance including recommending the increase of the freeboard requirement to two feet for new buildings and substantial improvements.	Carry Forward	Floodplain management ordinance was updated most recently August 13, 2020. Floodplain regulations do not call for freeboard for residential structures. The State Building Code has been updated and now requires freeboard. Action is carried forward, as the State will require freeboard in local flood regulations to match the State Building Code.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action BLGN-01	
Work to improve communication and coordination with cell phone companies providing service in Town to facilitate restoration of service following storm events.	
Lead	DPW
Cost	$0 - $25,000
Funding	OB
Timeframe	2022
Priority	High

Action BLGN-02	
Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action BLGN-03	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action BLGN-04	
The Town of Burlington last updated its floodplain management ordinance in 2008. The Town should fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention ordinance, including requiring at least one foot of freeboard for construction in the 1% annual-chance flood zone, and increasing the Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action BLGN-05	
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, Sustainable CT
Timeframe	2022 – 2024
Priority	High

Action BLGN-06	
Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Med

Action BLGN-07	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action BLGN-08	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action BLGN-09	
Reengage the Teen CERT program, possibly in coordination with the Fire Department's youth programming.	
Lead	EMD; Fire
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action BLGN-10	
A member of the Fire Department indicated that a regional tornado drill needs to be conducted to heighten awareness and preparedness.	
Lead	EMD; Fire
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action BLGN-11	
The Town wishes to offer subsidized CPR training for residents, but needs to secure funding to do so.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	FEMA Grant, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action BLGN-12	
The Town wishes to inform new residents of natural hazard mitigation and preparedness strategies. This will involve developing a packet of information that can be provided to new homeowners and renters. While new homeowners can be tracked through the Assessor's office, the Town has not determined how to track renters at this time.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action BLGN-13	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action BLGN-14	
Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action BLGN-15	
Evaluate Town-owned properties at risk of wildfires and determine mitigation measures to reduce overall risk.	
Lead	Fire; EMD
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action BLGN-16	
Update the generator at the Town Hall	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action BLGN-17	
Update the generator at the Town Garage	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action BLGN-18	
Acquire a portable generator that can be used to power private sewer grinder pumps during extended power outages.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action BLGN-19	
Complete Prospect Street repair and drainage improvements.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	Med

Action BLGN-20	
Complete upgrade of drainage conveyance under Main Street, as part of overall Main Street improvement project.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	Med

Action BLGN-21	
Complete upgrade of drainage conveyance under Covey and Hotchkiss intersection, as part of overall Covey and Hotchkiss intersection improvement project.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	Med

Action BLGN-22	
Perform road repairs and drainage improvements on Upson Road.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	Med

Action BLGN-23	
The Town identified George Washington Turnpike as being in need of paving and drainage.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	Med

Action BLGN-24	
Replace or repair Foote Road Bridge over Bunnell Brook	
Lead	0
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action BLGN-25	
Replace or repair the Alto Road and Alpine Drive culverts over the Unionville Brook north branch.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action BLGN-26	
Replace or repair the bridge on South Main Street near Milford Street / Route 69.	
Lead	0
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action BLGN-27	
The Town wishes to provide portable GPS and computer technology to emergency vehicles to assist with real time tracking during events.	
Lead	EMD
Cost	$100,000 - $500,000
Funding	OB, CIP, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
BLGN-01	Work to improve communication and coordination with cell phone companies providing service in Town to facilitate restoration of service following storm events.	Coordinate with Utilities	DPW	$0 - $25,000	OB	2022	1	1	1	1	1	1	0	0	0	-1	0	0	0	0	7
BLGN-02	Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
BLGN-03	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
BLGN-04	The Town of Burlington last updated its floodplain management ordinance in 2008. The Town should fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention ordinance, including requiring at least one foot of freeboard for construction in the 1% annual-chance flood zone, and increasing the Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
BLGN-05	Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	Sustainable CT	Planning	$25,000 - $50,000	OB, Sustainable CT	2022 – 2024	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
BLGN-06	Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	RLP	Planning	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
BLGN-07	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
BLGN-08	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
BLGN-09	Reengage the Teen CERT program, possibly in coordination with the Fire Department's youth programming.	Other Emergency Response	EMD; Fire	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	0	0	1	1	1	1	0	0	0	0	0	0	0	0	5
BLGN-10	A member of the Fire Department indicated that a regional tornado drill needs to be conducted to heighten awareness and preparedness.	Other Emergency Response	EMD; Fire	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	0	0	1	1	1	1	0	0	0	0	0	0	0	0	5
BLGN-11	The Town wishes to offer subsidized CPR training for residents, but needs to secure funding to do so.	Public Education	EMD; First Selectman	$25,000 - $50,000	FEMA Grant, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
BLGN-12	The Town wishes to inform new residents of natural hazard mitigation and preparedness strategies. This will involve developing a packet of information that can be provided to new homeowners and renters. While new homeowners can be tracked through the Assessor's office, the Town has not determined how to track renters at this time.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
BLGN-13	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
BLGN-14	Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
BLGN-15	Evaluate Town-owned properties at risk of wildfires and determine mitigation measures to reduce overall risk.	Study	Fire; EMD	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
BLGN-16	Update the generator at the Town Hall	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
BLGN-17	Update the generator at the Town Garage	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
BLGN-18	Acquire a portable generator that can be used to power private sewer grinder pumps during extended power outages.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
BLGN-19	Complete Prospect Street repair and drainage improvements.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6
BLGN-20	Complete upgrade of drainage conveyance under Main Street, as part of overall Main Street improvement project.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
BLGN-21	Complete upgrade of drainage conveyance under Covey and Hotchkiss intersection, as part of overall Covey and Hotchkiss intersection improvement project.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6
BLGN-22	Perform road repairs and drainage improvements on Upson Road.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6
BLGN-23	The Town identified George Washington Turnpike as being in need of paving and drainage.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6
BLGN-24	Replace or repair Foote Road Bridge over Bunnell Brook	Culvert & Bridge Upgrades	0	More than $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
BLGN-25	Replace or repair the Alto Road and Alpine Drive culverts over the Unionville Brook north branch.	Culvert & Bridge Upgrades	DPW	$100,000 - $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
BLGN-26	Replace or repair the bridge on South Main Street near Milford Street / Route 69.	Culvert & Bridge Upgrades	0	More than $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
BLGN-27	The Town wishes to provide portable GPS and computer technology to emergency vehicles to assist with real time tracking during events.	Emergency Equipment	EMD	$100,000 - $500,000	OB, CIP, CT DEMHS	2025 – 2027	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3

APPENDIX B
RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF BURLINGTON BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Burlington has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Burlington Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Burlington and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Burlington; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Burlington, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Burlington eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Burlington;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Burlington, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Burlington this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

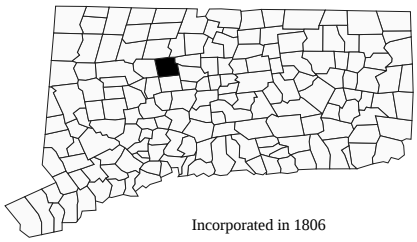
2019 CERC TOWN PROFILE

Burlington, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
200 Spielman Highway
Burlington, CT 06013
(860) 673-6789

Belongs To
Hartford County
LMA Hartford
Northwest Hills Planning Area



Incorporated in 1806

Demographics

Population

	Town	County	State
2000	8,190	857,183	3,405,565
2010	9,301	894,014	3,574,097
2013-2017	9,598	897,417	3,594,478
2020	9,568	925,492	3,604,591
'17 - '20 Growth / Yr	-0.1%	1.0%	0.1%

	Town	County	State
Land Area (sq. miles)	30	735	4,842
Pop./Sq. Mile (2013-2017)	323	1,221	742
Median Age (2013-2017)	44	40	41
Households (2013-2017)	3,363	348,871	1,361,755
Med. HH Inc. (2013-2017)	$121,635	$69,936	$73,781

	Town	State
Veterans (2013-2017)	479	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	350	4%	1,535	16%	1,087	11%	2,086	22%	3,225	34%	1,315	14%	9,598	100%
County	47,813	5%	108,578	12%	118,163	13%	226,627	25%	251,235	28%	145,001	16%	897,417	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	8,942	560,997	2,446,049
Black Non-Hisp	57	114,711	350,820
Asian Non-Hisp	238	45,178	154,910
Native American Non-Hisp	0	1,338	5,201
Other/Multi-Race Non-Hisp	80	20,021	84,917
Hispanic or Latino	281	154,977	551,916

	Town	County	State
Poverty Rate (2013-2017)	2.3%	11.2%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	1,473	22%	673,582	27%
Associates Degree	461	7%	188,481	8%
Bachelors or Higher	3,258	49%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	188	963
23 - Construction	34	87
31-33 - Manufacturing	NA	NA
44-45 - Retail Trade	9	45
62 - Health Care and Social Assistance	9	68
72 - Accommodation and Food Services	9	91
Total Government	11	452

Top Five Grand List (2018)

	Amount
NEW BRITAIN CITY OF	$13,099,940
METROPOLITAN DISTRICT COMMISSION	$11,034,920
CONNECTICUT LIGHT & POWER	$8,754,680
CARRIER HOME BUILDERS INC	$3,331,880
BRISTOL CITY OF	$3,013,850
Net Grand List (SFY 2016-2017)	$907,063,811

Major Employers (2018)

SUPREME FOREST PRODUCTS INC
BURLINGTON ACADEMY OF LEARNING
BURLINGTON VETERINARY CENTER
CRESCENT MFG OPERATING CO
DUNKIN DONUTS (295 SPIELMAN LLC)

Education

2018-2019 School Year

	Grades	Enrollment
Regional School District 10	PK-12	2273

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	77.1%	53.8%	80.1%	51.3%	58.9%	43.0%
ELA	70.1%	53.1%	78.5%	54.9%	75.6%	56.1%

Pre-K Enrollment (PSIS)

	2018-2019
Regional School District 10	45

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 10	95.5%	97.0%	94.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Regional School District 10	6.9%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	87.3%	89.4%	86.8%
Private	12.7%	10.6%	13.2%

profiles.ctdata.org

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Burlington, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$37,307,375	Total Expenditures (2017)	$38,772,959	Annual Debt Service (2017)	$3,052,583
Tax Revenue	$29,041,188	Education	$25,217,101	As % of Expenditures	7.9%
Non-tax Revenue	$8,266,187	Other	$13,555,858	Eq. Net Grand List (2017)	$1,296,612,791
Intergovernmental	$7,024,898	Total Indebtedness (2017)	$15,756,978	Per Capita	$134,503
Per Capita Tax (2017)	$3,002	As % of Expenditures	40.6%	As % of State Average	89.1%
As % of State Average	102.4%	Per Capita	$1,635	Moody's Bond Rating (2017)	Aa2
		As % of State Average	65.0%	Actual Mill Rate (2017)	31.60
				Equalized Mill Rate (2017)	22.32
				% of Net Grand List Com/Ind (2017)	1.7%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	3,595	377,840	1,507,711
% Single Unit (2013-2017)	94.5%	55.6%	59.2%
New Permits Auth (2017)	27	957	4,547
As % Existing Units	0.8%	0.3%	0.3%
Demolitions (2017)	1	509	1,403
Home Sales (2017)	111	4,581	21,880
Median Price	$316,200	$235,300	$270,100
Built Pre-1950 share	8.7%	27.8%	29.3%
Owner Occupied Dwellings	3,205	225,378	906,798
As % Total Dwellings	95.3%	64.6%	66.6%
Subsidized Housing (2018)	64	52,368	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	0	59	536
$100,000-$199,999	5	1,524	5,237
$200,000-$299,999	28	1,642	6,681
$300,000-$399,999	41	721	3,863
$400,000 or More	37	635	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$980	$1,044	$1,123
Cost-burdened Renters	45.0%	50.1%	52.3%

Labor Force

	Town	County	State
Residents Employed	5,514	459,939	1,827,070
Residents Unemployed	182	20,380	78,242
Unemployment Rate	3.2%	4.2%	4.1%
Self-Employed Rate	12.5%	7.7%	10.0%
Total Employers	188	28,871	122,067
Total Employed	963	510,814	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Burlington, CT	297	Hartford, CT	556
Bristol, CT	106	Bristol, CT	554
Harwinton, CT	94	Farmington, CT	530
Torrington, CT	69	Burlington, CT	297
Avon, CT	29	New Britain, CT	199
Southington, CT	27	Plainville, CT	168
Plymouth, CT	26	West Hartford, CT	157

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	255	1,777
Violent	23	228

Disengaged Youth (2013-2017)

	Town	State
Female	0.0%	4.2%
Male	0.0%	5.6%

	Town
Library circulation per capita	5.63

Distance to Major Cities

	Miles
Hartford	14
Providence	80
New York City	91
Boston	107
Montreal	263

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Gas Provider
Connecticut Natural Gas
(860) 727-3000

Water Provider
Connecticut Water Company
(800) 286-5700

Cable Provider
Comcast Plainville
(800) 266-2278

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

CANAAN, CT

108 Main St
Falls Village, CT 06031

MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 Torrington Road
Goshen, CT 06756
(860) 491-9884
https://northwesthillscog.org

Prepared by:
SLR CONSULTING
99 Realty Drive
Cheshire, Connecticut 06410
(203) 271-1773
www.slrconsulting.com

global **environmental** and **advisory** solutions

SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Canaan and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Canaan is a picturesque rural town of approximately 33 square miles, situated east of the Housatonic River. The town is often referred to as Falls Village.

Canaan is located in northwest Litchfield County and is home to a population of approximately 1,143 residents. Canaan is bordered by the municipalities of Cornwall to the south, Norfolk to the east, North Canaan to the north, and Salisbury to the west.

The topography of the town is characterized by steep slopes, rocky hills, small hills and valleys, and generally rolling terrain. The Housatonic River, the Hollenbeck River, Wangum Lake Brook, and other small rivers and streams course through the town. The varying terrain of Canaan makes the town vulnerable to an array of natural hazards.

2.2 Existing Land Use

According to the 2013 Plan of Conservation and Development, approximately 55% of the total land area is dedicated or managed open space.

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 80% of Canaan is forested and approximately 4.7% is developed.

Table 2-1: 2015 Land Cover by Area

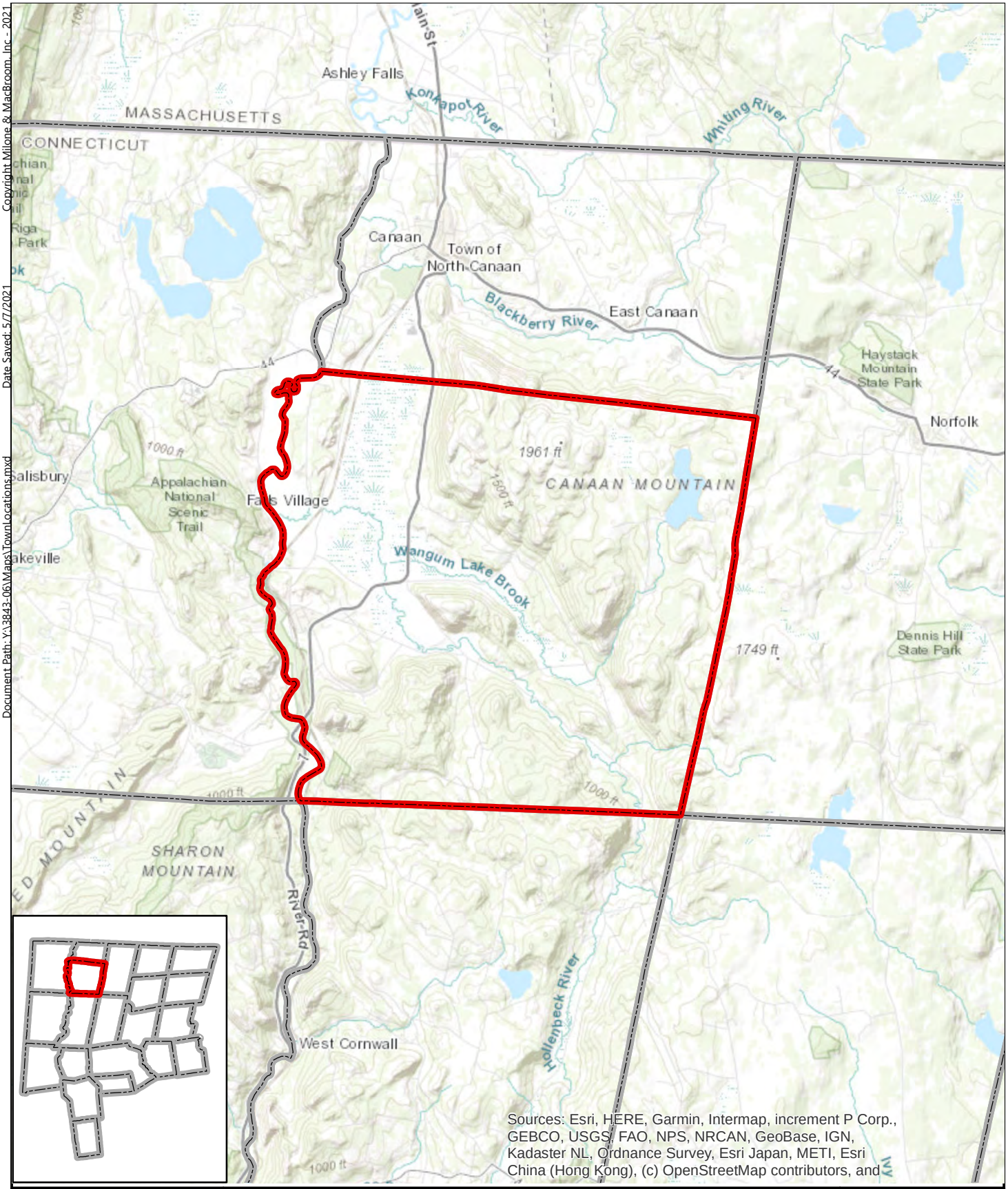
Land Cover	Area (acres)	Percent of Community
Developed	1,004	4.73%
Turf & Grass	366	1.72%
Other Grass	398.6	1.88%
Agricultural Field	1,815	8.56%
Deciduous Forest	9,947	46.89%
Coniferous Forest	5,172	24.38%
Water	350.3	1.65%
Non-Forested Wetland	215.3	1%
Forested Wetland	1834.1	8.65%
Tidal Wetland	0	0.00%
Barren	45	0%
Utility Row	65.5	0%
Total	21,212	100%

Source: UCONN Center for Land Use Education and Research (CLEAR)

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REGIONAL LOCATION: CANAAN

HAZARD MITIGATION PLAN UPDATE - CANAAN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-1

2.3 Development Trends

The 2010 U.S. Census reported a population in Canaan of 1,234 individuals. U.S. Census Bureau estimates for 2019 show a population around 1,143 individuals, a decrease from 2010 of 7.4%. The Connecticut State Data Center predicts that population will increase by 24.1% through 2025 to an estimated population of 1,419 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Canaan remained steady between 2013 and 2017. The number of permits issued in 2013 and 2014 was 0 and 1, respectively, while 0 permits were issued in 2016, and 0 permits were issued in 2017. On average, 0 housing permits were issued each year in Canaan between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Canaan dropped by approximately 8.6-percent between 2010 and 2019, from 779 units in 2010 to 717 units in 2019. In 2019, the housing stock was made up of approximately 95% single-unit structures, 3% two-unit structures, 1% multi-unit structures, and 2% mobile-homes or other types of structures.

The lack of affordable housing in Canaan has directly affected the town's ability to attract new residents. The Town adopted an Incentive Housing Zone in 2013 that spans over 65 acres on River Road. The designated site can accommodate more than 20 bedrooms (constrained by the septic system).

According to the Connecticut Office of Policy and Management, Canaan's 2019 Total Equalized Net Grand List was valued at $182,623,414. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Canaan, included as Appendix C.

New development in Canaan is minimal and is generally limited to single family homes. Town staff report that a couple of more significant developments are being explored for the future, but these are in the early stages of planning, have not yet received permits, and are not expected to change the town's risk profile within the planning period of the HMP.

It is likely that growth in Canaan will continue at a relatively slow place. While there is certainly acreage in the town for additional growth, it is unlikely that development would occur on much of the land due to unsuitable construction conditions such as steep slopes, wetlands and/or floodplains. In addition, approximately 55% of the towns land area is dedicated or managed open space.

Any future growth within the town will need to be addressed in a manner that is in the best interest of the town by maintaining the overall character and rural feel of the community.

Overall, development in Canaan has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the future is not expected to increase exposure over the next five years.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

The Town of Canaan is considered to have a low level of vulnerability, with higher vulnerability scores for the SVI categories of "Housing and Transportation" and "Household Composition / Disability. " In other words, limited access to affordable housing and public transportation, and the presence of residents who may need additional assistance during a disaster event due to disabilities, are vulnerabilities of concern in Canaan.

2.4 Geology

Canaan is underlain by relatively hard metamorphic and igneous bedrock including a variety of gneiss, schist, marble and granite. The bedrock formations trend generally north to south.

Continental ice sheets moved across Connecticut at least twice in the late Pleistocene era. As a result, Canaan's surficial geology is characteristic of the depositional environments that occurred during glacial and postglacial periods. Stratified glacial meltwater deposits are generally coincident with inland floodplains; the amount of stratified drift also has bearing on the relative intensity of earthquakes.

Canaan is covered primarily (nearly 70%) by glacial till. Tills contain an unsorted mixture of clay, silt, sand, gravel, and boulders deposited by glaciers as a ground moraine. The deposits are generally less than 50 feet thick although deeper deposits of till are scattered across the hillier sections of the town. Stratified glacial meltwater deposits are related to the various water bodies in town, particularly the Housatonic River, Hollenbeck River and Wangum Lake Brook. These deposits primarily contain stratified sands and gravels.

2.5 Climate and Climate Change

Over the course of the year, the temperature in Canaan typically varies from 17°F to 81°F and is rarely below 0°F or above 89°F. The warm season lasts from May 27 to September 15, with an average daily high temperature above 71°F. The cold season lasts from December 1 to March 10, with an average daily high temperature below 41°F.

Precipitation falls throughout the year in Canaan. The wetter season lasts from April 9 to September 29, with a greater than 30% chance of a given day being a wet day. The chance of a

wet day peaks at 38% on June 1. The drier season lasts from September 29 to April 9. The smallest chance of a wet day is 21% on January 29.

The most rain falls during the 31 days centered around September 30, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts from October 26 to April 20, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.3 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Canaan as 4.64 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Canaan at 5.13 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.64	5.85	8.35
NOAA Atlas 14	5.13	6.4	8.36

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Canaan can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.0 to 5.6 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

Canaan is divided among the following five subregional drainage basins: Hollenbeck River, Housatonic River, Wangum Lake Brook, Blackberry River and Brown Brook. The watersheds are described in detail below.

Housatonic River

The Housatonic River drains an area of 1,948 square miles from Pittsfield, Massachusetts to Milford, Connecticut where it empties into Long Island Sound. The river flows a total of 134 miles from its upper reach to the sound with 1,234 square mile of the total drainage area existing in Connecticut. After crossing into Connecticut, the river creates the border for several towns including Salisbury, North Canaan, Canaan and just south, Sharon and Cornwall. In Canaan, the Housatonic River meanders along Route 7 before entering neighboring Cornwall. Many of the sub regional drainages in these towns flow into the Housatonic River along with small tributaries that flow directly into the river, which make up the Housatonic sub regional drainage basin. The main channel of the Housatonic is lined with 1% annual chance floodplains that extend on either side of the river with areas that further extend making up the 0.2% annual chance floodplains.

Hollenbeck River

Flowing with a northern orientation, the headwaters of the Hollenbeck River begin in Cornwall, just south of Canaan. The drainage basin begins in the northeast corner as it flows into Canaan. The Hollenbeck River enters Canaan in the vicinity of Route 63 and generally meanders in a north-northwest direction until it flows into the Housatonic River to the west of Point of Rock Road. Many tributaries enter into the main channel of the river including Brown Brook and Wangum Lake Brook both which make up sub drainage basins of their own. This pattern of flow has created extensive 1% annual chance floodplains surrounding the last couple miles of river stretch before reaching the Housatonic. Two low hazard classified dams sit along the Hollenbeck River,

one in Canaan holding back the Hollenbeck Pond Dam and the other in Cornwall just off Bradford Brook called Van Doren Pond Dam.

Wangum Lake Brook

Beginning at Wangum Lake, Wangum Lake Brook flows out of the south end continuing south and eventually shifts to the northwest. A single dam is in place at the southern tip of Wangum Lake where the river begins to flow, and it is classified as a significant hazard dam. Some small tributaries enter into the brook from the north including Ledgy, Whiting, and Deming Brooks. The river begins to meander heavily for the second half of its extent and becomes adjacent to the also highly sinuous Hollenbeck River. Wangum Lake Brook ends where it flows into the Hollenbeck River. The 1% annual chance floodplains associated with the Hollenbeck River and Wangum Brook merge and become vast.

Blackberry River

The Blackberry River drainage basin is part of a large network of converging streams covering a land area of around 27 square miles. With much of the headwaters in Norfolk, a few large ponds feed the tributaries that flow into the Blackberry River including Bigelow Pond, Tobey Pond and Wood Creek Pond. A few small tributaries begin in Canaan and flow north intersecting with the Blackberry River, responsible for the drainage of the northeast edge of Canaan. The majority of the drainage lies within Norfolk and North Canaan, with a small portion located in the northeast corner of Canaan. The river flows west along Route 44 into North Canaan and flows into the Housatonic River.

Brown Brook

Brown Brook makes up a 5.6 square mile drainage basin with the mouth emptying into the Hollenbeck River. Only a quarter of the basin sits in Canaan while the headwaters and majority of land area reside in Norfolk. The river drains a series of three ponds including Wampee, Bear Swamp and Wapato Ponds and flows to the west receiving input from the North Branch of Brown Brook before reaching the Hollenbeck River.

2.7 Governmental Structure

The Town of Canaan is governed by a Selectman-Town Meeting form of government in which legislative responsibilities are shared by the Board of Selectmen and the Town Meeting. The First Selectman serves as the chief executive.

In addition to Board of Selectmen and the Town Meeting, there are boards, commissions and committees providing input and direction to Town administrators. Also, Town departments provide municipal services and day-to-day administration. Many of these commissions and departments play a role in hazard mitigation, including the Planning and Zoning Commission, Inland Wetland Commission, the Zoning Officer, the Building Official, the Fire Department, Emergency Medical Services, and the Highway Department. The Emergency Management Director coordinates emergency preparedness in the Town.

Drainage complaints are routed through the First Selectman's office and the highway department. These complaints are usually received via phone, mail, or email and are recorded in a logbook. The complaints are investigated as necessary until remediation surrounding the individual complaint is concluded.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

> **Historic preservation planning** helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
> - Paraphrased from FEMA Report 386-6

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Canaan include the South Canaan Meeting House, Beebe Hill School House, and the Falls Village Train Depot. Sites like the Falls River Bridge and the Housatonic Valley regional High School may be susceptible to flood hazards in particular.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

2.9.1 Transportation

Route 7, Route 126, and Route 63 are the major transportation routes in Canaan. Routes 7 and 126 run north to south from New Canaan to Falls Village center. Route 63 travels southeast from Falls Village center along the Hollenbeck River toward Goshen. The northeast corner of Town is relatively isolated, with only more minor Town and private roads serving that population.

There is no public transportation in Canaan.

2.9.2 Utilities

The Town of Canaan has public water supply provided by the Canaan Water Department, the Pine Grove Association, and a number of Non-Community Public Water Systems.

There is no sanitary sewer collection system in Canaan, with residents and businesses relying on septic systems.

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet is available to most residents in Canaan. There are 2 DSL Providers (AT&T and Connecticut Education Network), 1 Cable Internet provider (Xfinity), and 2 Fiber Internet providers (Fibertech Networks, LLC, and Connecticut Education Network). There are also 3 Mobile Broadband (cellular) providers with service available.

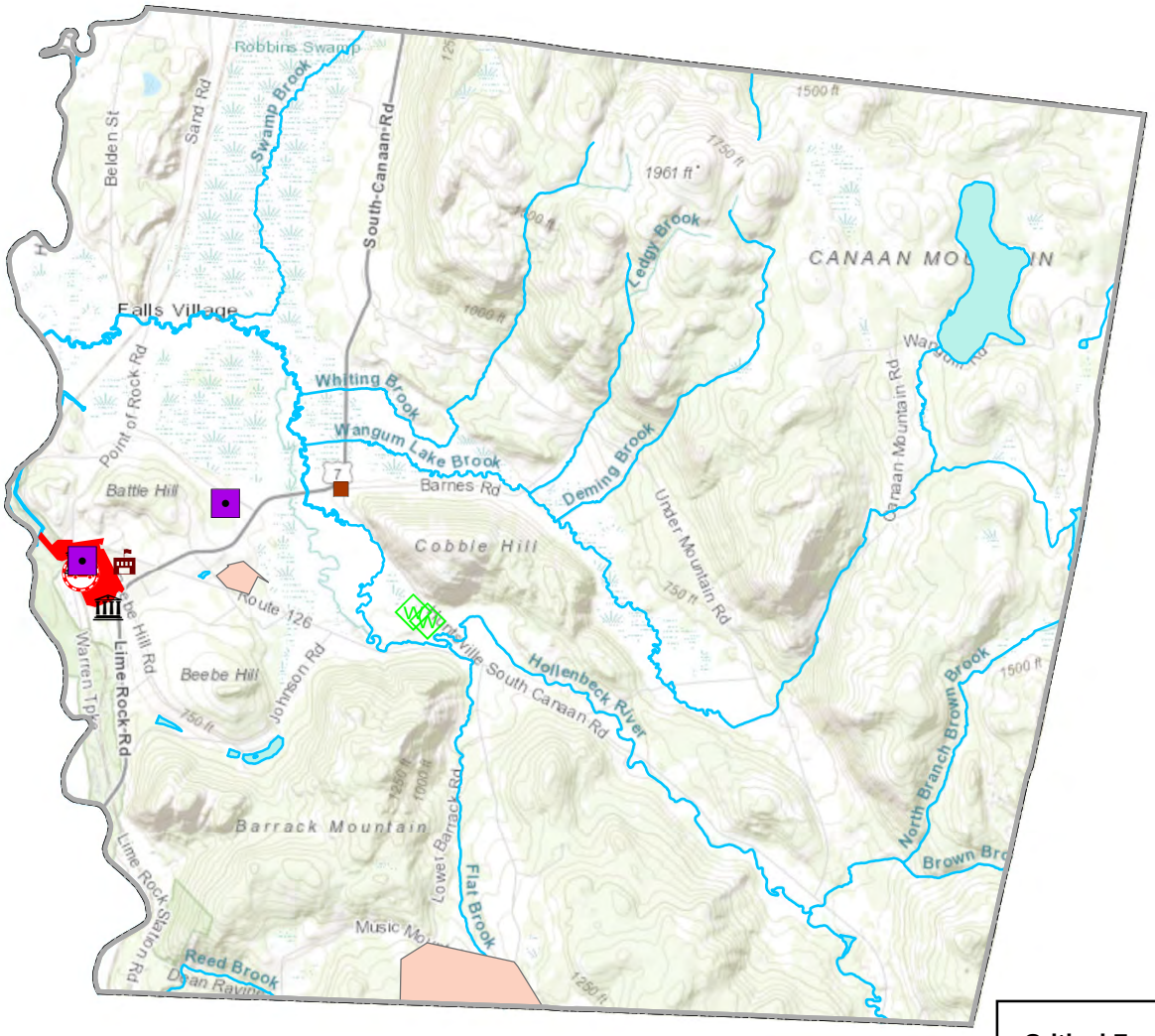
2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Canaan has identified seven critical facilities, such as fire, and governmental buildings as well as utilities which are required to ensure that day-to-day management of the town continues. Other facilities such as senior centers and schools are also considered critical facilities since these contain populations that are more susceptible in an emergency or house important supplies. Not all municipal buildings are critical facilities. Table 2-3 presents a list of critical facilities in Canaan.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power?	Shelter?	In 1% Annual Chance Floodplain?
Falls Village Fire Department	188 Route 7 South	Emergency Operations Center and Primary Shelter	✓	✓	No
Town Hall	108 Main Street	Critical Records/ Back-up shelter	✓	✓	No
Lee H. Kellogg School	47 Main Street	Public School			No
Highway Garage	100 Railroad Street	Regional Emergency Support	✓		No
Senior Center	107 Main Street	Senior Housing			No
Falls Village Day Care Center	35 Page Road	Day Care Facility			No
Region 1 High School	246 Warren Turnpike	Public School	P		P

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Critical Facilities & Cultural Resources

- School
- Care Facility
- EMS
- Fire Station
- Municipal Facility
- Municipal Solid Waste
- National Register Building
- National Register Area
- National Register District

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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - CANAAN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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SCALE	1 " = 5,880 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-2

A small grocery and market called The Village Market is being developed on the first floor of the Senior Center at 107 Main Street. The Town sees this market as a local hub, gathering place, and landmark for residents. An internet hot spot will be installed outside this location to allow for public internet access. Additionally, the presence of this grocery will improve the access of local residents to food and supplies in the event of an emergency.

A recommended action in this plan is to install an emergency generator at the public market to allow it to serve as a comfort station during power outages.

Emergency Response Capabilities

A new Fire Department has been built at 188 Route 7 South, replacing the previous facility at 35 Railroad Street. The new Fire Department serves as the Town's Emergency Operations Center (EOC) and Emergency Communications Center, as well as its primary shelter. It has emergency power and is not located in a FEMA-mapped floodplain.

The old Fire Department on Railroad Street is now vacant and has been removed from the list of critical facilities.

The Emergency Management Director and the Falls Village Fire Department coordinate emergency preparedness in the Town of Canaan. That department develops plans, protocols, and procedures that assure the safety of Canaan's citizens. It also provides training for emergency response personnel, supports state and local emergency response exercises, and provides technical assistance to state and local emergency response agencies and public officials. Its goal is to provide citizens with the highest level of emergency preparedness before, during, and after disasters or emergencies.

The Town has an EOP that guides its response to emergencies arising from both natural and anthropogenic hazards.

State and federal roads are the major transportation arteries (and therefore evacuation routes) into and out of the town. In Canaan, Route 7, is integral in transporting patients to area hospitals.

Emergency services can also be cut off by fallen trees or washed-out culverts during certain emergencies. The Town performs tree and tree limb removal, with a focus on critical roadways. During emergencies and following storms, the highway garage responds to calls related to downed trees.

Sheltering Capabilities

Emergency shelters are an important subset of critical facilities as they are needed in many emergency situations. The new Fire Department facility at 188 Route 7 South along the Housatonic River is the primary shelter for the Town, and the Town Hall is the secondary shelter. Both facilities have standby power. In case of a sustained power outage, it is anticipated that 10 to 20% of the population (110 to 220) would relocate, although not all of those relocating would necessarily utilize the shelter facilities.

Emergency Alerts and Communication

Canaan participates in the CT Alert emergency notification system which directs geographically specific emergency notification telephone calls into affected areas.

Additionally. the Town utilizes Mailchimp software for emergency communications. The Town conducted a campaign in the summer of 2020 to collect emergency contact information (landlines, cell phones, and emails) from all residents to develop an emergency notification system with more capabilities. The system will primarily focus on those with limited access to or knowledge of internet sources; it is intended to be operational in 2021.

Town encourages residents to stay up-to-date on hazard information through any means available, which is typically through internet and smart-phone applications. The First Selectman has a blog on the Town website to keep residents updated on projects and issues. In June of 2020 he posted about the lack of rainfall and requested that residents limit water usage to mitigate potential impacts of a drought.

Town staff report that many property owners in Canaan are second-home owners, and so spend much of the year out of town. This creates a challenge for Canaan staff to warn those property owners about disasters, so that the property owners in turn can communicate with their property managers or other individuals to take any steps necessary to protect the property. The Town will pursue an action to address this challenge moving forward.

Records and Operational Continuity

Canaan can run emergency operations out of either the Fire House (primary) or the Town Hall (secondary). The Town has backed-up all electronic records to the cloud. The Town is currently scanning all hardcopy records from the past 30 years and backing those up to the cloud as well.

3 FLOODING

3.1 Existing Capabilities

The Town of Canaan has Zoning and Subdivision Regulations that regulate development, and Inland Wetland Regulations that regulate activities near wetlands. While regulations have not been updated to specifically address hazard mitigation, the DEEP's model regulations are used to update the regulations as necessary.

Ordinances, Regulations, and Plans

Regulations, codes, and ordinances that apply to flood hazard mitigation in conjunction with and in addition to NFIP regulations include:

- ***Zoning Regulations:*** The Zoning regulations were most recently revised in July 2018 and are intended to help maintain and enhance community character and help protect the public health safety and welfare.
  - **Section 3.e:** outlines the standards for the Housatonic River Overlay Zone and states that "the purpose of this Section s to protect a carefully defined corridor of land along the Housatonic River which is flood prone, environmentally sensitive, and possesses many valuable natural resources."
  - **Section 4.2:** regulates floodplain development in Canaan (Floodplain Overlay Zone) by referencing "An Ordinance Concerning Flood Hazards" (p. 15 of the Town Ordinances). The Ordinance was last updated in 2007.
    - An Ordinance Concerning Flood Hazards establishes areas of special flood hazard, restrictions, development permit requirements, permitted uses, and standards for flood hazard reduction. The Ordinance notes local adoption of Connecticut State Building Code.
    - Section 6(a) states that "new construction or substantial improvement of any residential structure shall have the lowest floor, including basement, elevated at least to two feet above the base flood elevation."
    - Section 6(b) states that "new construction or substantial improvement of any commercial, industrial, or non-residential structure located in Zone Al-30, AE & AH shall have the lowest floor, including basement, elevated at least to two feet above the level of the base flood elevation; or Non-residential structures located in all A-Zones may be flood proofed in lieu of being elevated…"
  - State Model Floodplain Management Regulations have not yet been incorporated into the Town's Zoning Regulations or Ordinances.

- ***Inland Wetlands and Watercourse Regulations***. The regulations were adopted in 1973, amended in 1975, and updated in 2020. The purpose of the inland wetlands and watercourses regulations is to protect the quality of the inland wetlands and watercourses within the Town of Canaan by making provisions for the protection, preservation, maintenance, and use of inland wetlands and watercourses, including deterring and inhibiting the danger of flood and pollution.

- Section 1.1 defines "Regulated Activity" as any operation or activity within or use of a wetland or watercourse involving removal or deposition of material, or any obstruction, construction, alteration or pollution, of such wetlands or watercourses, but shall not include the specified activities in Section 2 of these regulations.
- Section 2-2 states a residential home for which a building permit has been issued or on a subdivision lot, providing the permit has been issued or the subdivision approved as of the effective date of these regulations shall be permitted as of right.
- Section 3 states that subject to the provisions of Section 2 hereof, regulated activities affecting the wetlands and watercourses of the Town are prohibited except as they may be licensed by the Commission, as herein provided.

❑ ***Plan of Conservation and Development.*** This 2013 document is the Town's vision statement for future development. It is updated every 10 years.
- Planning Visions for Falls Village (Page 20) recommends balancing future open space planning with development needs.
- Planning Visions for Falls Village (Page 21) recommends updating the Inland Wetland and Watercourse Regulations to reflect the most recent DEEP Model Floodplain Management Regulations.
- Planning Visions for Falls Village (Page 21) recommends reviewing the floodplain ordinance to ensure it meets the National Flood Insurance Program requirements.

The latter two bullets above have directly led to a mitigation action listed in Section 3.7.

❑ ***Subdivision Regulations.*** Adopted in 2003, the Town's Subdivision Regulations establish minimum acceptable standards of street construction; regulate the layout and development of lots and streets; and outline measures to prevent degradation of potable water sources, control erosion and siltation, preserve adequate and convenient open spaces, and retain the natural features of the land.
- Section 4.03 states that subdivisions shall be designed and arranged and provisions made to preserve natural features; make best use of the terrain; prevent pollution of wetlands, watercourses and waterbodies; protect the quality and quantity of water supplies and minimize flood damage.
- Section 4.12(1)(a) states that the subdivider shall be fully responsible for constructing adequate facilities for the control, collection, conveyance and acceptable disposal of stormwater, other surface water and subsurface water whether originating in the subdivision or in a tributary drainage area.
- Section 4.12(2)(c)(iii) requires that storm drain facilities are constructed and in a manner that will not cause flooding of abutting property from the headwater and backwater produced by bridges, culverts and other structures.
- Section 4.12(4) states that no storm drain system shall outlet into a natural watercourse, whether continually flowing or intermittent, so as not to exceed the capacity of the watercourse.
- Section 4.16 states that in areas subject to flooding, proper provisions shall be made for protective flood control measures including, but not limited to the following: storm drainage shall be designed to reduce exposure to flood hazards; roads shall be of such an elevation or shall be suitably protected so as to allow emergency access during flood conditions; roads, drainage and other improvements shall be safe from flood damage;

public and private improvements shall be designed to minimize flood damage and shall be capable of use without danger from flooding or flood related damages; all utilities and services (including water, sewage and electric systems) shall be located and constructed to minimize or eliminate flood damage.
- Section 5.04(3) requires the submittal of a report by a registered professional engineer identifying the proposed drainage plan for the property, existing drainage areas, and the drainage treatment for different areas, including the methodology used to compute pipe sizes and drainage volumes.
- Section 5.04(4) requires the submittal of an erosion and sediment control plan.

Overall, the intent of these regulations is to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas of the Town of Canaan by the establishment of standards designed to:

- Protect human life and public health.
- Minimize expenditure of money for costly flood control projects.
- Minimize the need for rescue and relief efforts associated with flooding.
- Minimize prolonged business interruptions.
- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone, and sewer lines; and streets and bridges located in floodplains.
- Maintain a stable tax base by providing for the sound use and development of floodprone areas in such a manner as to minimize flood blight areas.
- Ensure that purchasers of property are notified of special flood hazards.
- Ensure the continued eligibility of owners of property in Canaan for participation in the NFIP.

NFIP, Flood Insurance, and Community Rating System

The NFIP administrator for the Town oversees the enforcement of NFIP regulations. The degree of flood protection established by the variety of regulations in the Town exceeds the minimum NFIP requirements. Specifically, the town requires two feet of freeboard. The Town is not enrolled in the Community Rating System program.

According to FEMA, there are 19 flood insurance policies in force in Canaan as of 6/30/2019 with an insurance value of $4,868,400.

Drainage and Street Flooding

There are areas of minor street flooding throughout the town, and these are addressed by the Highway Department as necessary. These typically relate to small areas and result in limited, if any, property impacts.

Town officials have noted that flooding often occurs along Sand Road (the northern section of Route 126) and Routes 7, 63 and 126. Much of this flooding is predominantly caused by the proximity of the roads to adjacent floodplain areas including the Housatonic River, the Hollenbeck River and Robbins Swamp. Flooding also occurs along Cobble Road; however, this is predominantly due to beaver activity.

The Highway Department is in charge of the maintenance of the town's drainage systems and performs clearing of bridges and culverts and other maintenance as needed. Drainage complaints are routed to the Office of the First Selectman and the Highway Department. The Town uses these reports to identify potential problems and plan for maintenance and upgrades.

Regional Studies

CT DOT Climate Change and Extreme Weather Pilot Project

The CT DOT completed a "Climate Change and Extreme Weather Pilot Project" in 2014 using a grant from the Federal Highway Administration. The project included vulnerability assessments of culverts and bridges in Litchfield County with regard to flooding caused by increasing precipitation and extreme rainfall events. The hydraulic capacity of structures was evaluated using existing storm event design standards (based on NOAA TP-40 precipitation figures), the recent (ten year) historic actual rainfall intensity and frequency, and the projected increases in rainfall based on best available data and studies. The project also assigned a criticality value to each structure assessed to assist the Department in prioritizing replacement and reconstruction efforts.

The results of this project provide a model process for assessing the hydraulic capacity and criticality of culverts and bridges in the NHCOG region. Importantly, the project identified precipitation figures from the NRCC as a preferred alternative to the more obsolete TP-40 figures. These figures are provided in Table 2-2.

Housatonic River Valley Association Studies

The Housatonic River Valley Association has been conducting stream habitat continuity assessments in the Connecticut portion of the Housatonic River Watershed. The purpose of the assessment is to identify road crossings that may be barriers for fish and wildlife, public hazards or impediments to emergency services during flood events. Canaan can use the results of these assessments to identify structures in need of attention.



Structural Projects

The Amesville/Water Street Bridge which spans the Housatonic River between Salisbury and Falls Village is scheduled for replacement in 2014-15. This bridge is a conduit for the Falls Village Fire Department and Ambulance Services who serve the hamlet of Amesville in Salisbury. Since the bridge is currently closed, the replacement is critical to ensuring appropriate response times in emergency situations.

Communications

The National Weather Service issues a flood watch or a flash flood watch for an area when conditions in or near the area are favorable for a flood or flash flood, respectively. A flash flood watch or flood

The Town can access the National Weather Service website at www.weather.gov to obtain the latest flood watches and warnings before and during precipitation events.

watch does not necessarily mean that flooding will occur. The National Weather Service issues a flood warning or a flash flood warning for an area when parts of the area are either currently flooding, highly likely to flood, or when flooding is imminent.

3.1.1 New Capabilities and Completed Actions

Falls Village is conducting a new bridge study, which will involve inspection of every bridge in town to develop cost-estimates and prioritize repairs needed to extend their service lives. Many of the bridges were built in the 1930s and in 1955. Most bridges are believed to be in pretty good shape. Cobble Road Bridge is a specific bridge of concern.

3.1.2 Summary

In summary, the Town primarily attempts to mitigate future flood damage and flood hazards by restricting building activities in floodprone areas. This process is carried out through both the Planning and Zoning and the Inland Wetlands Commissions. All watercourses are to be encroached minimally or not at all to maintain the existing flood-carrying capacity. These regulations rely primarily on the FEMA-defined 1% annual chance flood elevations to determine flood areas. With two feet of freeboard, the town exceeds the minimum criteria established by the NFIP.

Other mitigation measures the Town implements are road and drainage improvements, and public outreach and alerts about flood hazards.

3.2 Vulnerabilities and Risk Assessment

Flooding can impact a variety of river corridors and cause severe damages in the Town of Canaan but most often occurs in the Housatonic River watershed. Flooding due to poor drainage and other factors is also a persistent hazard in the town and can cause minor infrastructure damage and create nuisance flooding of yards and basements.

3.2.1 Vulnerability Analysis of Critical Facilities

The list of critical facilities provided by the Town (Table 2-3) was used with the parcel data to accurately locate each critical facility throughout the town. None of the critical facilities are within the 1% annual chance floodplain.

3.2.2 Vulnerability Analysis of Areas Along Watercourses

The primary waterways in the town are the Housatonic River and the Hollenbeck River. The remaining waterways in Canaan are mostly small streams and brooks. Floodplains with and without elevations are delineated for the majority of the floodprone brooks in the town. The majority of the brooks have minimal flooding concerns.

The most frequently flooded areas in the town are adjacent to the Housatonic and Hollenbeck Rivers, specifically along Routes 7, 63 and 126. Flooding is relatively common along Route 7 due to rising waters from the Housatonic and Hollenbeck Rivers. Of particular note is the low-lying area north of Page Road in the vicinity of Robbins Swamp. In general, Town staff report that flooding along the Hollenbeck River is not a significant concern for the Town.



It should also be noted that the portions of the Housatonic Valley Regional High School property are located within the 1% annual chance floodplain (as shown in blue in the picture to the right). The High School building itself is reportedly not at risk of flooding from a 1% annual-chance event.

Town officials believe that the Robbins Swamp, located north and east of the Hollenbeck and Housatonic Rivers, respectively, is a major contributor to flooding in the town.

South of Robbins Swamp, Cobble Road where it crosses the Hollenbeck River east of Route 63 has been identified by municipal staff as a particular location of concern. The bridge here is over 60 years old and in a degraded condition. The town is looking at upgrading Cobble Road, including raising the road, installing culverts, and repairing the Cobble Road Bridge.

The Town discourages new construction and substantial reconstruction within the 1% annual chance floodplain by raising concerns during the floodplain permit process. However, given the historic development patterns of the town, many areas within floodplains were developed before floodplain management was even a consideration. New development is strictly managed through the Town's land use process.

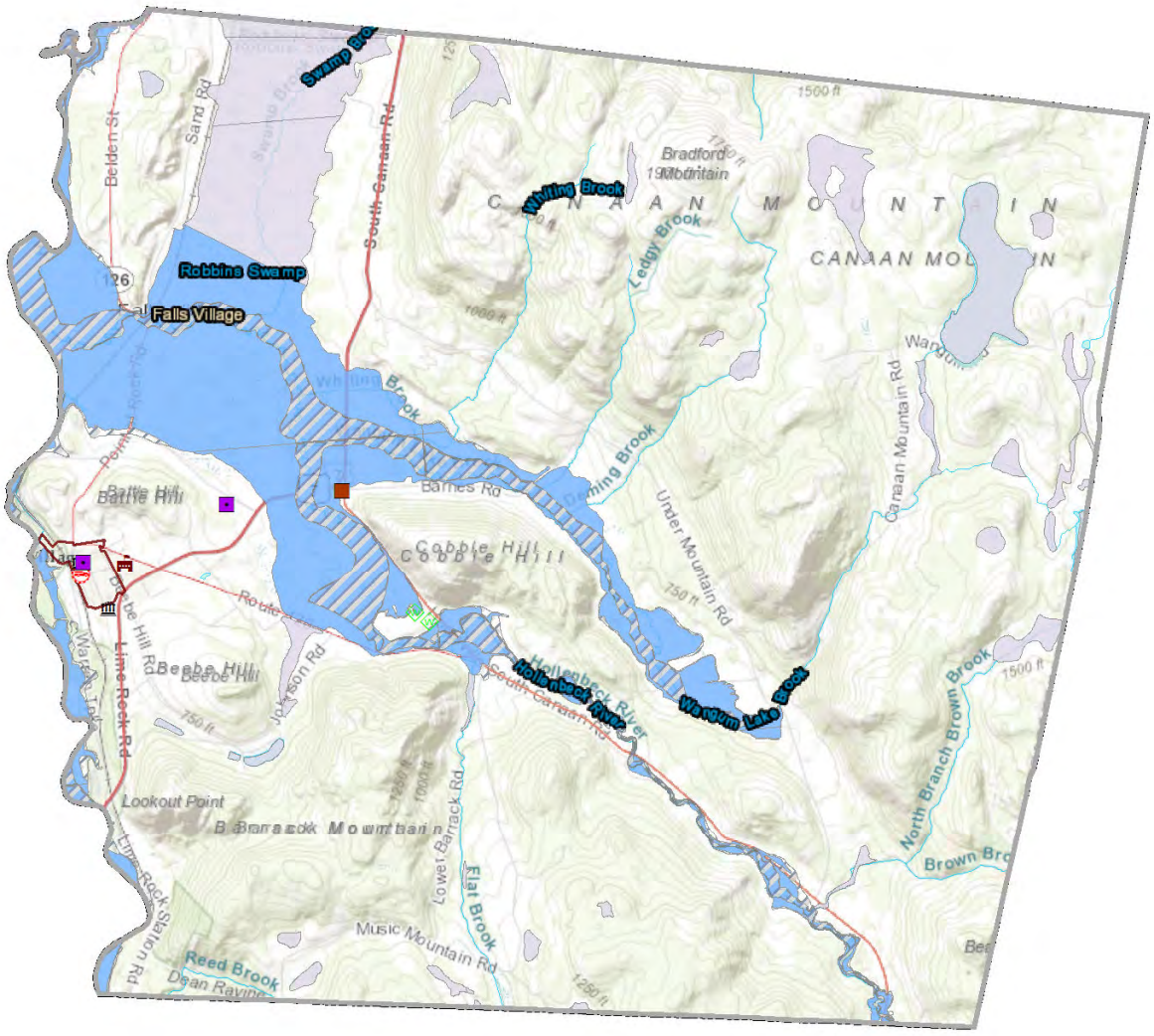
Beaver Dams

Town of Canaan officials have indicated that Cobble Road continually floods due to beaver activity. Culverts have been replaced throughout the years, but it has not necessarily helped to alleviate flooding impacts. Historically, the landowners have not wanted to trap the beavers and therefore, the problem has been ongoing.

Music Mountain is also a chronic flooding area due to beaver activity. However, the landowners have been open to trapping and the flooding problems in this area are not as severe as they are on Cobble Road.

Despite these incidences, Town staff report that they have sufficient capacity for managing beaver populations, and that beaver activities have not caused significant damage or other issues.

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Legend

- School
- Care Facility
- EMS
- Fire Station
- Municipal Facility
- Municipal Solid Waste
- National Register Building
- National Register District

Flood Zone

- A
- AE
- FLOODWAY
- X500

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - CANAAN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 2,500 5,000
Feet

SCALE 1 " = 5,880 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing mitigation measures appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Canaan is 105 mph for a Category 1 event, 115 mph for a Category 2, and 120 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Parts of tall and older trees may fall during heavy wind events, potentially damaging structures, utility lines, and vehicles. Eversource, the local electric utility, provides tree maintenance near its power lines. The Town of Canaan has indicated that they have a great working relationship with Eversource.

The Town has a tree warden who assists in managing all trees on Town-owned property, including within the street rights-of-way. With its limited budget, the town tends to focus on the most critical roadways.

During emergencies, the Town currently has two shelters available for residents. Prior to severe storm events, the Town ensures that communication equipment is working properly and prepares for the possible evacuation of impacted areas.

4.1.1 New Capabilities and Completed Actions

The new Fire Department, housing the Town's EOC and primary shelter, has been constructed to the most up-to-date building code. This facility represents an increase in the Town's hurricane mitigation and emergency response capabilities. The Town has also been working to improve its emergency communication tools.

4.1.2 Summary

Canaan mitigates hurricane risks primarily through implementation of building codes (to protect structures from flooding and wind damages), zoning regulations (to protect structures from flooding), and debris management. The Town's emergency response and sheltering capabilities also mitigate hurricane damages.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

In general, as the residents and businesses of the state of Connecticut become more dependent on the internet and mobile communications, the impact of hurricanes on commerce will continue to increase. A major hurricane has the potential of causing complete disruption of power and communications for up to several weeks, rendering electronic devices and those that rely on utility towers and lines inoperative.

Debris such as signs, roofing material, and small items left outside become flying missiles in hurricanes. Extensive damage to trees, towers, aboveground and underground utility lines (from uprooted trees or failed infrastructure), and fallen poles cause considerable disruption for

residents. Streets may be flooded or blocked by fallen branches, poles, or trees, preventing egress. Downed power lines from heavy winds can also start fires during hurricanes with limited rainfall.

The Town of Canaan is vulnerable to hurricane damage from wind and flooding. Wind from hurricanes and tropical storms has the ability to affect all areas of Canaan, while areas susceptible to flooding are even more vulnerable. Factors that influence vulnerability to tropical cyclones in the town include building codes currently in place, local zoning and development patterns, and the age and number of structures located in highly vulnerable areas of the community.

The Town is uncertain whether any Town-owned critical facilities have wind-mitigation measures installed to specifically reduce the effects of wind. Thus, it is believed that nearly all of the critical facilities in the town are as likely to be damaged by hurricane-force winds as any other. Many of the Town's older structures, such as the Town Hall, may not meet current building code with respect to wind.

Canaan's housing stock consists of historic buildings greater than 50 and sometimes 100 years old, relatively younger buildings built before 1990 when the building code changed to address wind damage, and relatively recent buildings that utilize the new code changes. Since most of the existing housing stock in the town predates the recent code changes, many structures are highly susceptible to roof and window damage from high winds. Homes located within SFHAs are also at risk from flooding as a result of the heavy rainfall that typically occurs during tropical storms and hurricanes.

As the Town of Canaan is not affected by storm surge, hurricane sheltering needs have not been calculated by the U.S. Army Corps of Engineers for the town. The Town determines sheltering need based upon areas damaged or needing to be evacuated within the town. Under limited emergency conditions, a high percentage of evacuees will seek shelter with friends or relatives rather than go to established shelters. During extended power outages, it is believed that only 10% to 20% of the affected population of the town will relocate while most will stay in their homes until power is restored. In the case of a major (Category Three or above) hurricane, it is likely that the Town will depend on state and federal aid to assist sheltering displaced populations until normalcy is restored.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Canaan as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

Municipal responsibilities relative to summer storm and tornado mitigation and preparedness include:

- Developing and disseminating emergency public information and instructions concerning tornado, thunderstorm wind, lightning, and hail safety, especially guidance regarding in-home protection and evacuation procedures and locations of public shelters.
- Designating appropriate shelter space in the community that could potentially withstand lightning and tornado impact.
- Periodically testing and exercising tornado response plans.
- Putting emergency personnel on standby at tornado "watch" stage.
- Once subscribed, utilizing the CT Alert notification system to send warnings into potentially affected areas.

Although tornadoes pose a threat to all areas of the state, their occurrence is not considered frequent enough to justify the construction of tornado shelters. Instead, the state has provided NOAA weather radios to all public schools as well as many local governments for use in public buildings. The general public continues to rely on mass media for knowledge of weather warnings. Warning time for tornadoes is very short due to the nature of these types of events, so predisaster response time can be limited. However, the NOAA weather radios provide immediate notification of all types of weather warnings in addition to tornadoes, making them very popular with communities.

5.1.1 New Capabilities and Completed Actions

Canaan continues to improve its emergency response and communication capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

5.1.2 Summary

Canaan mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Canaan has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

An EF1 tornado struck Falls Village on August 2, 2020. The storm tracked for about 1.7 miles, was about 30 yards wide, had a maximum wind speed of 90 mph. The storm took down trees, closed roads, and damaged a business.

Thunderstorms are expected to impact Canaan 20 to 30 days each year. The majority of these events do not cause any measurable damage. Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Canaan area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Canaan is considered moderate in any given year.

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the Town of Canaan is believed to be low for any given year. All areas of the town are susceptible to damage from high winds although more building damage is expected in the town center while more tree damage is expected in the less densely populated areas.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Eversource trims trees along powers lines.

Town personnel note that strong thunderstorms will cause power lines to fall all over the town. Most downed power lines in Canaan are detected quickly, and any associated fires are quickly extinguished. Such fires can be extremely dangerous during the summer months during dry and drought conditions. It is important to have adequate water supply for fire protection to ensure the necessary level of safety is maintained.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

The Town of Canaan reports that most cleanup from thunderstorms is done during working hours. The volunteer fire department responds to downed wires and trees. Cleaning of downed trees from tornadoes and thunderstorms outside of working hours is rare and is usually done by the town crew if electrical wires aren't involved. If it something the town crew cannot handle, which has happened a few times, the Town estimates the cost to be between $500 and $1,500. If

downed trees need to be addressed outside of normal hours by the town crew, overtime costs are in the range of $400 to 600.

Summary – The entire Town of Canaan is at relatively equal risk for experiencing damage from summer storms and tornadoes. However, more frequent storm damages are relatively site specific and occur to private property (and therefore are paid for by private insurance). For municipal property, the Town budget for tree removal and minor repairs is generally adequate to handle summer storm damage.

6 WINTER STORMS

6.1 Existing Capabilities

Programs that are specific to winter storms are generally those related to preparing plows and sand and salt trucks, tree trimming to protect power lines, and other associated snow removal and response preparations.

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas.

CTDOT plows all State roads and Interstates. The Town primarily uses Town staff for plowing operations on the remaining miles of roadway. The Town has four routes and five trucks for plowing. The fifth truck is primarily used for plowing parking lots.

Prior to a winter weather event, the Town ensures that all warning/notification and communications systems are ready and ensures that appropriate equipment and supplies, especially snow removal equipment, are in place and in good working order. In some known problem areas, prestorm treatment is applied to roadways to reduce the accumulation of snow. The town uses sand and salt for deicing. The Town also prepares for the possible evacuation and sheltering of some populations that could be impacted by the upcoming storm (especially the elderly and special needs persons).

The Town budget for tree removal and minor repairs is generally adequate to handle winter storm damage, although the plowing budget is often depleted.

6.1.1 New Capabilities and Completed Actions

Canaan is continually updating its snowplow fleet, and currently has sufficient capabilities to effectively clear snow from roads, including areas with significant drifting impacts.

The Town installed heating coils in the Town Hall roof to mitigate icing and snow load risks.

6.1.2 Summary

Canaan mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events and snow events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years, although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019

Connecticut Natural Hazard Mitigation Plan Update, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and fewer snow-covered days, with a decreased overall snowpack, in the future. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

After a storm, snow piled on the sides of roadways can inhibit sight lines and reflect a blinding amount of sunlight. When coupled with slippery road conditions, poor sightlines and heavy glare create dangerous driving conditions. Stranded motorists, especially senior and/or handicapped citizens, are at particularly high risk of injury or death from exposure during a blizzard. The elderly population in Canaan, in particular, is susceptible to the impacts created by winter storms due to resource needs (heat, electricity loss, safe access to food, etc.). Lower Barrack Road and Yelping Hill Road off Music Mountain (dirt, state forest road) are known areas with accessibility issues during storm events.

The structures and utilities in Canaan are vulnerable to a variety of winter storm damage. Tree limbs and some building structures may not be suited to withstand high wind and snow loads. Ice can damage or collapse power lines, render steep gradients impassable for motorists, undermine foundations, and cause "flood" damage from freezing water pipes in basements. Drifting snow can occur after large storms, but the effects are generally mitigated through municipal plowing efforts. However, the areas along Music Mountain, Canaan Mountain, Sand Road near Sunset Hill Farm, and Wangum Lake Road near Wangum Lake are more prone to drift than others and are a concern to the town.

Icing causes difficult driving conditions throughout the hillier sections of the town. Exposed hilltops are more at risk to high winds and snow drifts. Snowfall characteristics can vary widely between the valleys and the hilltops. The Town's standard of presalting has been helpful in controlling ice in these problem areas.

No critical facilities are known to be more susceptible to winter storm damage than any other, although the age of the Town Hall may indicate increased vulnerability at that site, while the new Fire Department is likely less vulnerable. The recent installation of heating coils in the Town Hall roof should help mitigate the risk of roof damage during winter events. Some critical facilities are more susceptible than others to flooding damage due to winter storms.

Summary – The entire Town of Canaan is at relatively equal risk for experiencing damage from winter storms although some areas (such as icing trouble spots and neighborhoods with a high concentration of flat roofs) are more susceptible. Based on the historic record, it is difficult to determine if any winter storms have resulted in costly damages to the Town as damage estimates for severe storms are generally spread over an entire county. Many damages are relatively site

specific and occur to private property (and therefore are paid for by private insurance) while repairs for power outages are often widespread and difficult to quantify to any one municipality.

7 EARTHQUAKES

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Canaan. The Town has adopted these codes for new construction, and they are enforced by the Building Official. Due to the infrequent nature of damaging earthquakes, land use policies in the Town do not directly address earthquake hazards. However, various documents do indirectly discuss areas susceptible to earthquake damage and regulations that help to minimize potential earthquake damage:

- ***Subdivision Regulations***. The 2003 regulations do not explicitly address the issue of construction on steep slopes. The regulations do require that soil erosion and sediment control plans be developed for proposed projects. In addition, the regulations state that the Commission shall not approve unsuitable land for subdivision unless adequate provisions are made by the subdivider to mitigate the unsuitable conditions. Land may be deemed unsuitable because of flooding, inadequate drainage, steep slopes, depth to bedrock, erosive soils, utility easements or similar features.

- ***Zoning Regulations***. Section 4.3 of the regulations describes standards for the Steep Slope Overlay Zone and states that the purpose of this Section is "to carefully monitor development in areas of steep slopes in order to determine whether public services (such as fire, ambulance, and public works) can be reasonably provided, to minimize soil erosion and sedimentation, and to minimize adverse visual impacts on the rural character of the community. It is not the intent of this Section to prohibit or preclude development in designated areas. Rather, this Section is intended to establish a process whereby property owner's interests in capitalizing on scenic views or other assets can be balanced with the community's desire to provide a reasonable level of services and to protect environmentally sensitive steep slopes and hillsides from inappropriate development."

7.2 Vulnerabilities and Risk Assessment

Surficial earth materials behave differently in response to seismic activity. Unconsolidated materials such as sand and artificial fill can amplify the shaking associated with an earthquake. In addition, artificial fill material has the potential for liquefaction. When liquefaction occurs, the strength of the soil decreases, and the ability of soil to support building foundations and bridges is reduced. Increased shaking and liquefaction can cause greater damage to buildings and structures and a greater loss of life.

Some areas in the Town of Canaan are underlain by sand and gravel. Structures in these areas are at increased risk from earthquakes due to amplification of seismic energy and/or collapse. The best mitigation for future development in areas of sandy material may be application of the most stringent building codes or possibly the prohibition of new construction. However, many of these areas occur in floodplains associated with the various streams and rivers in Canaan, so they are already regulated. The areas that are not at increased risk during an earthquake due to unstable soils are those underlain by glacial till, which includes most of the town.

Areas of steep slopes can collapse during an earthquake, a severe precipitation event, or during the spring thaw cycle, creating landslides. Seismic activity can also break utility lines such as water mains, electric and telephone lines, and stormwater management systems. Damage to utility lines can lead to fires, especially in electric and gas mains. Dam failure can also pose a significant threat to developed areas during an earthquake.

According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut is at a low to moderate risk for experiencing an earthquake of a magnitude greater than 3.5 and at a moderate risk of experiencing an earthquake of a magnitude less than 3.0 in the future. No earthquake with a magnitude greater than 3.5 has occurred in Connecticut within the last 30 years, and the USGS currently ranks Connecticut 43rd out of the 50 states for overall earthquake activity.

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Canaan. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Canaan

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

Based on the historic record and the probability maps generated from the USGS database, the state of Connecticut possesses areas of seismic activity. It is likely that Connecticut will continue to experience minor earthquakes (magnitude less than 3.0) in the future. While the risk of an earthquake affecting Canaan is relatively low over the short term, long-term probabilities suggest that a damaging earthquake (magnitude greater than 5.0) could occur within the vicinity of Canaan.

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is charged with the responsibility for administration and enforcement of Connecticut's dam safety laws. The existing statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard to life, health, or property.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

The dam safety requirements are codified in Sections 22a-401 through 22a-411 inclusive of the Connecticut General Statutes. Sections 22a-409-1 and 22a-409-2 of the Regulations of Connecticut State Agencies have been enacted and set requirements for the registration, classification, and inspection of dams. Dams must be inventoried by the owner with the Connecticut DEEP according to Connecticut Public Act 83-38.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an EAP after the Commissioner of DEEP adopts regulations. The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. New regulations shall establish the requirements for such EAPs, including but not limited to (1) criteria and standards for inundation studies and inundation zone mapping; (2) procedures for monitoring the dam or structure during periods of heavy rainfall and runoff, including personnel assignments and features of the dam to be inspected at given intervals during such periods; and (3) a formal notification system to alert appropriate local officials who are responsible for the warning and evacuation of residents in the inundation zone in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board program, which can provide noncompetitive state funding for repair of municipality-owned dams. Funding is limited by the State Bond Commission. State statute Section 25-84 allows municipalities to form Flood and Erosion Control Boards, but municipalities must take action to create the board within the context of the local government such as by revising the municipal charter. The Town's Planning and Zoning Commission is responsible for reviewing all development activities that occur within flood hazard or flood-prone areas.

The Town uses the CT Alert system for emergency notification. The dam failure inundation mapping discussed in the next section can be used to help streamline the geographic contact areas if the failure of a major dam is imminent.

The high hazard Great Falls dam in Canaan is inspected biennially by a licensed engineer and weekly by First Light Power Resources. The Connecticut DEEP routinely performs the inspections and prepares summary reports. First Light Power has developed an EAP that is on-file with

Canaan; the EAP includes emergency alert protocols, and municipal staff are familiar with those protocols.

8.1.1 Actions Completed and New Capabilities

Canaan continues to maintain its capabilities for mitigating and responding to dam failure risks. The Town has been working to improve its emergency alert and communications capabilities.

8.1.2 Summary

The Town mitigates dam failure hazards by supporting State Dam Safety Program efforts locally, familiarizing municipal staff on dam EAPs and warning systems, and maintaining an emergency alert system.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 15 DEEP-inventoried dams within the Town of Canaan. These dams are listed in Table 8-1 and shown in Figure 8-1. This section primarily discusses the possible effects of failure of high hazard (Class B and C) dams. Failure of a Class C dam has a high potential for loss of life and extensive property and infrastructure damage.

Table 8-1: DEEP-Inventoried Dams in Canaan

Number	Name	Class
2101	Great Falls Dam	C
2102	Camp Freedman Pond Dam	BB
2103	Hollenbeck Pond Dam	A
2104	Wangum Lake Dam	B
2105	Beebe Pond Dam	A
2106	Coolidge Farm Pond Dam	A
2107	Kellogg Pond Dam	Unclassified
2108	Tunnard Pond Dam	AA
2109	Fosters Swimming Hole Pond Dam	AA
2110	Sawmill Pond #1 Dam	AA
2111	Sawmill Pond #2 Dam	Unclassified
2112	Manassa Pond Dam	AA
2113	O'man Mc'mullen Pond Dam	Unclassified
2114	Yale Forestry Camp Pond Dam	AA
2115	Beatie Pond Dam	AA

Great Falls Dam (Dam No. 2101) - Housatonic River, Canaan

The Great Falls Dam is a run-of-river dam located on the Housatonic River. It is owned by First Light Power Resources and used to impound a reservoir for hydroelectric generation at the Falls Village Hydrostation. The Housatonic River forms the boundary between Canaan and Salisbury at this location. The dam impounds a reservoir with a surface area of 150 acres, and a storage volume of 1,135 acre-feet from a contributing watershed of 634 square miles.

The concrete dam was constructed in 1913 and consists of a concrete ogee spillway that is 14 feet in height and 300 feet in length. The pumped-storage generation utilizes underground components connecting the upper and lower reservoirs. These components include a powerhouse, water tunnel, shafts, and access tunnel. In March 1987, CL&P constructed a fourth hydroelectric generating unit at the dam.

The dam was designed to pass all flows except the PMF (113,000 cfs), and a Phase II report notes that failure would not cause significant incremental downstream damage. The structure was not designed to have any freeboard during the design flood event.

There was in incident on May 24, 1989 that resulted in 386 feet of canal being washed out and undermined, and a 400-foot section was unstable under railroad loading conditions. Earth backfill on the river side of canal washed out, consisting of 30% of the area between the failure and the bend upstream in the canal.

In accordance with the EAP on file, test messages are sent to downstream residents regarding failure and flooding on the Housatonic River. The EAP for the Housatonic Project/Falls Village Development is up to date. The inundation map developed with the dam breach analysis indicates that the extent of impact includes the Warren Turnpike, high school athletic fields, Route 7, Route 112, the Lime Rock Race Track (adjacent to Salmon Creek), and a covered bridge. The mapping notes that an incremental rise in water surface elevations of 2.04 feet extends 15.3 miles downstream of the Falls Village Dam.

Wangum Lake Dam (Dam No. 2104) - Wangum Lake Brook, Canaan

The Wangum Lake Dam is located at the southern end of Wangum Lake and impounds a storage volume of 543 acre-feet from a contributing watershed of 1.04 square miles. It is owned by the Aquarion Water Company of Connecticut and used to impound a public water supply reservoir.

The earthen dam was constructed in 1890 and is ten feet in height, and 40 feet in length. The structure provides one foot of freeboard for the design storm. The concrete spillway is four feet high and six feet long, with a 12-inch cast iron outlet structure. The USACE completed a Phase I report in 1979 and spillway improvements were completed in 1987.

Wangum Lake Brook flows southwest along Canaan Mountain Road and then northwest to Hollenbeck River and on to the Housatonic River.

The dam was last formally inspected in 2011 by the CT DEEP. GZA prepared an ECP in 2002 that is on file at the CT DEEP. There is no dam breach analysis or inundation map on file.

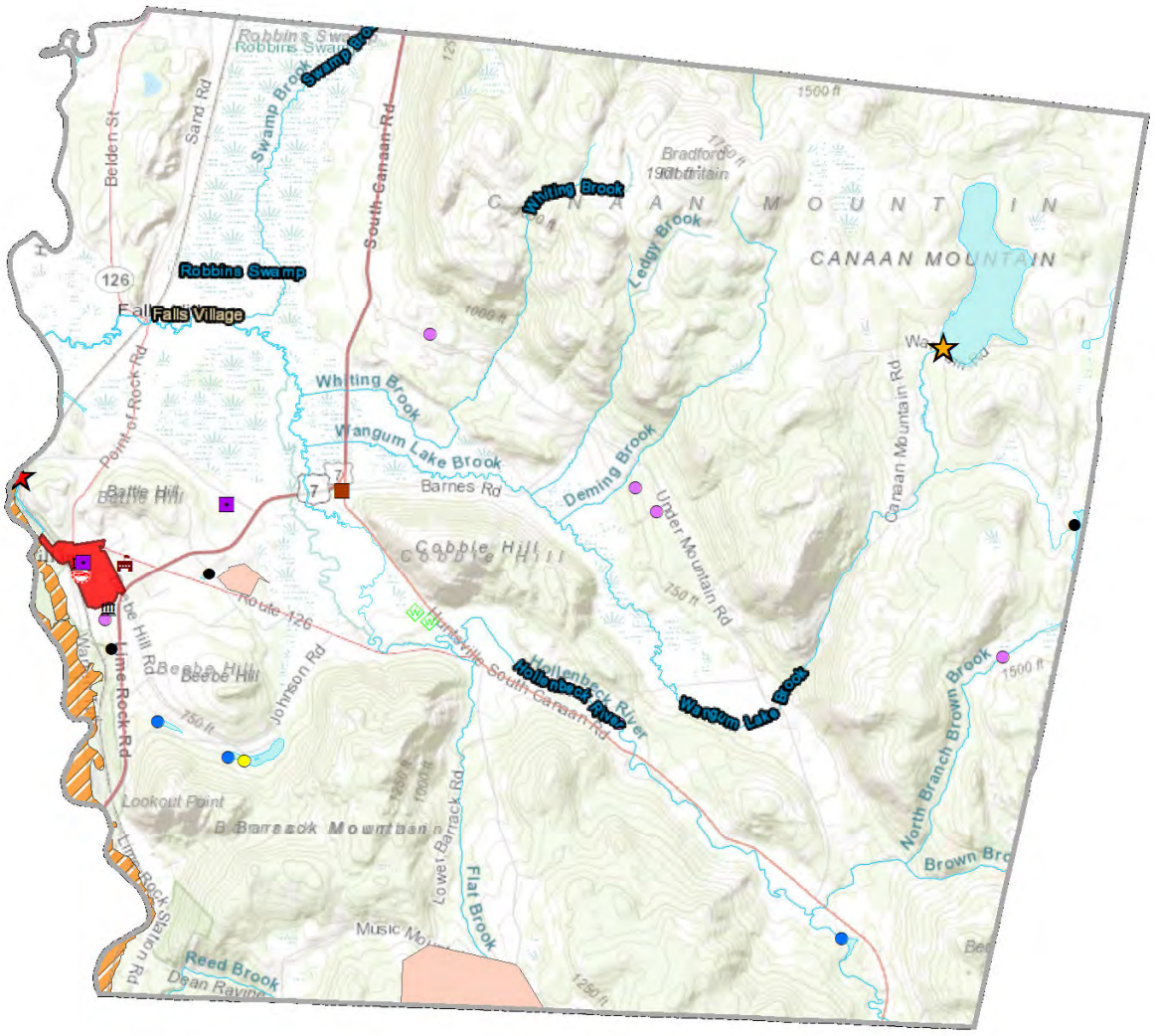
Bear Swamp Pond Dam (Dam No. 9802) - Norfolk

Bear Swamp Pond Dam is a Class B dam located in Norfolk on the west side of Bear Swamp Pond, near the border of Norfolk and Canaan. Bear Swamp is the middle pond in a series of three ponds that drain into each other. Wampee Pond discharges through a Class BB dam into Bear Swamp, and Bear Swamp discharges to Wapato Pond, which is impounded by an unclassified dam. The three ponds discharge to Brown Brook, a tributary of the Hollenbeck River. Although located in an adjacent town, failure of these dams may create a flood wave downstream in Canaan.

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Legend

- School
- Care Facility
- EMS
- Fire Station
- Municipal Facility
- Municipal Solid Waste
- National Register Building
- National Register
- National Register District

Dam Hazard Class

- C - High Hazard
- B - Significant Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - CANAAN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 2,500 5,000
Feet

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DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 8-1

9 WILDFIRES AND DROUGHT

9.1 Existing Capabilities

Mitigation for wildland fire control is typically focused on Fire Department training and maintaining an adequate supply of equipment. Firefighters are typically focused on training for either structural fires or wildland fires and maintain a secondary focus on the opposite category.

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. The Division utilizes precipitation and soil moisture data to compile and broadcast daily forest fire probability forecasts. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when winds will be sustained or there will be frequent gusts above a certain threshold (usually 25 mph), the relative humidity is below 30%, and precipitation for the previous five days has been less than one-quarter inch. Such conditions can cause wildfires to quickly spread from their source area.

In addition, the Connecticut DEEP Open Burning Program requires individuals to be nominated and designated by the Chief Executive Officer in each municipality that allows open burning to take an online training course and exam to become certified as an "Open Burning Official." Permit template forms were also revised that provides permit requirements so that the applicant/permittee is made aware of the requirements prior to, during and post burn activity. The regulated activity is then overseen by the town. The Town of Canaan is compliant with this new program and has a designated Burning Official.

Regulations regarding fire protection are outlined in the *Subdivision Regulation*s.

- ***Subdivision Regulations, Section 4.14*** for each subdivision, unless modified or waived by the Commission shall provide fire protection facilities, which include the construction of fire ponds, including dry hydrants; construction of underground fire tanks with dry hydrants; construction of approved residential sprinklers or providing a fee in lieu of constructing fire protection facilities. Fire protection facilities shall be constructed in accordance with the National Fire Protection Association standards. In general, such facilities shall contain at least 1,000 gallons of water supply per lot in the subdivision and no less than 10,000 gallons of capacity.

The local fire departments can utilize mutual aid agreements with surrounding towns and assemble up to 60 responders if needed.

There are ten hydrants in the town of Canaan available for firefighting support. There are also three fire ponds in town. Town officials have indicated that one of the ponds is in need of maintenance (dredging).

Unlike the west coast of the United States where the fires are allowed to burn toward development and then stopped, the Canaan Fire Department goes to the fires whenever possible. This proactive approach is believed to be effective for controlling wildfires. The Fire Department

has some water storage capability in its tanker trucks and storage tanks but primarily relies on the use of the municipal water system to fight fires throughout the town whenever possible.

Finally, the DEEP Forestry Division uses rainfall data from a variety of sources to compile forest fire probability forecasts. This allows the DEEP and the Town to monitor the drier areas of the state to be prepared for forest fire conditions.

Other capabilities for reducing wildfire risk include:

- Encouraging property owners to widen access roads such that fire trucks and other emergency vehicles can access remote locations.
- Continuing intermunicipal cooperation in firefighting efforts.
- Providing outreach programs on how to properly manage burning and campfires on private property.
- Patrolling Town-owned and State-owned open space and parks to prevent unauthorized campfires.
- Enforcing regulations and permits for open burning.

Canaan has the capacity to dredge and maintain fire ponds on its own, and has done so in the past. Kellog Pond near Kellog Road and Route 126 has a dry hydrant and is in need of dredging or other maintenance.

Canaan is pursuing acquisition of a new fire truck.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

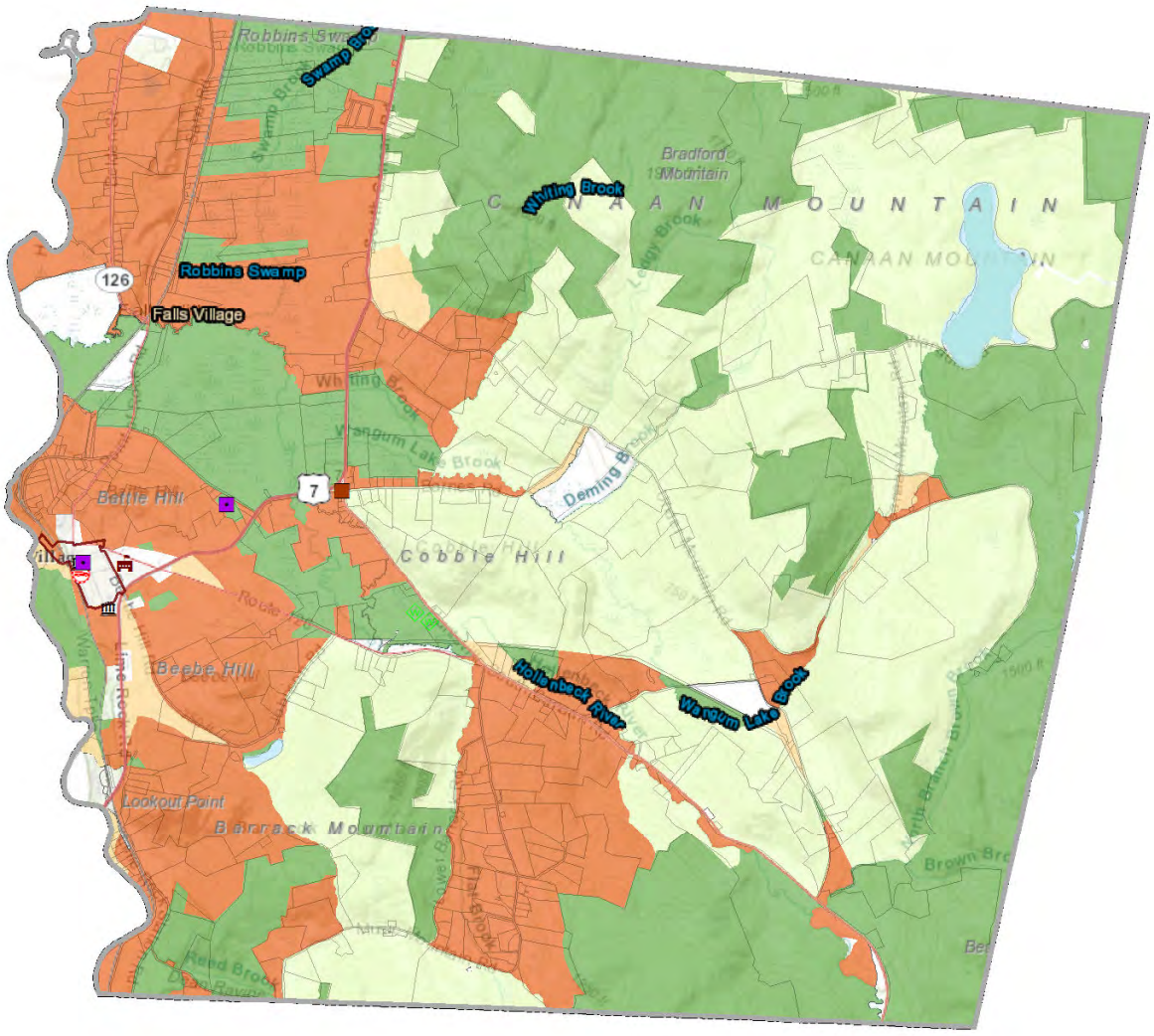
The extensive forests in Barkhamsted are prime locations for a wildfire. The many areas of Town where development has occurred adjacent to forestland are at an elevated risk of damage from wildfires. Such areas that are also located far from firefighting water sources are at highest risk.

Most wildfires in Connecticut are relatively small. In the drought year of 1999, the average wildfire burned five acres in comparison to the two most extreme wildfires recorded since 1986 that burned 300 acres each. Given the availability of firefighting water in the town, including the use of nearby water bodies, it is believed that this average value for a drought year and the extreme value are applicable to the town as well.

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Legend

- School
- Care Facility
- EMS
- Fire Station
- Municipal Facility
- Municipal Solid Waste
- National Register Building
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - CANAAN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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0 2,500 5,000
Feet

SCALE 1 " = 5,880 '
DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 9-1

Canaan considers the area along the Appalachian Trail to be an elevated wildfire risk area due to the number of hikers/campers that access the trail each year. In addition, approximately 55% of the town consists of managed or dedicated open space that is vulnerable to wildfires.

Canaan has not experienced any notable brush fire events in recent years; the last significant wildland fire occurred 15 to 20 years ago.

Drought Vulnerabilities and Risk

In addition, Canaan, and Litchfield County overall, has experienced drought challenges over recent years. The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted. Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

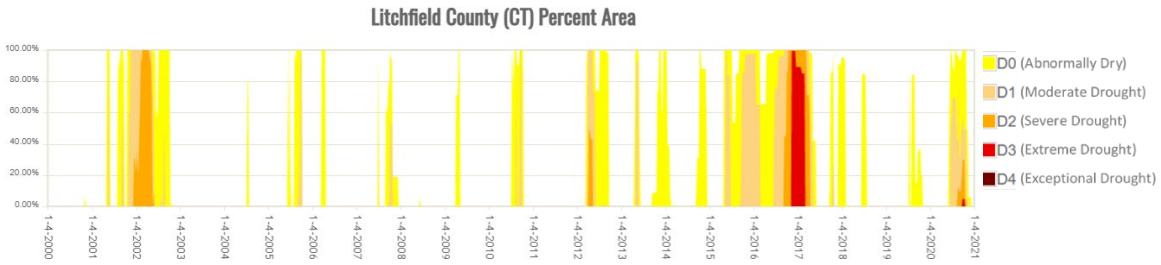


Figure 9-2: USDM Drought Time Series for Litchfield County

Extreme drought conditions occurred in the summer of 2020, prompting the Canaan First Selectman to warn residents about potential impacts and request voluntary water conservation measures.

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

Action	Responsible Party	Status	Notes
Acquire a local emergency notification system like CTAlert and utilize it to its fullest capabilities	EMD	Underway Carry Forward with Revisions	Town is currently (summer of 2020) conducting a campaign to collect emergency contact information (landlines, cell phones, and emails) from all residents to develop an emergency notification system. The system is intended to be operational in September. The town is using Mailchimp software because they have fewer than 1,000 homes. Revise action to address this specific project.
Encourage residents to purchase and use NOAA weather radios with alarm features	EMD	Capability	Town encourages residents to stay up to date on hazard information through any means available, which is typically internet and smart-phone applications. Town staff do not believe NOAA radios are necessary.
Obtain funding to acquire backup generators for the senior center and Falls Village Day Care Center	EMD	Carry Forward with Revisions	Town is converting the bottom floor of the Senior Center building into a public market. This action is revised to specifically call for installation of a generator as part of the Village Market development. Village Day Care Center does not serve as a shelter or emergency center, and does not need an emergency generator. That specific aspect of this action is dropped.
Ensure that emergency information is available through several different media, such as newspaper, radio, internet and phone.	EMD	Capability	Town announces emergency information through the Town Website & Social Media accounts. The emergency communication system being developed will also help accomplish this goal. Many property owners in Falls Village are second-home owners, and so spend much of the year out of town. Falls Village staff want to be able to warn those property owners about disasters, even if they aren't in town when the disaster happens, so that the property owners in turn can communicate with their property managers or other individuals to take any steps necessary to protect the property. A new action is added to create a contact list specific to second-home owners to enable targeted alerts to that population.

Action	Responsible Party	Status	Notes
Consider reviewing and updating the Town's Inland Wetland Regulations, which were last amended in 1975. Note that the "Flood Hazard Control Measures" section of the town ordinance is the appropriate location for incorporating the most recent DEEP Model Floodplain Management Regulations.	P&Z	Partially Completed	The Inland Wetlands Commission completed an update of the regulations in 2020. Floodplain development is regulated through the 2018 Zoning Regulations Section 4.2 (Floodplain Overlay Zone), which references "An Ordinance Concerning Flood Hazards" (p. 15 of the Town Ordinances). The Ordinance notes local adoption of Connecticut State Building Code. The Ordinances appear to have been last updated in 2007. Flooding is also regulated through the 2018 Zoning Regulations in Section 3.e. regulating development in the Inner Corridor of the Housatonic River Overlay Zone. Model Floodplain Management Regulations have not yet been incorporated into the Town's Zoning Regulations or Ordinances. This aspect of the action is carried forward as part of the following action
As recommended by the POCD, review the Flood Hazard Control Measures section of the town ordinance to incorporate the most recent DEEP Model Floodplain Management Regulations.	P&Z	Carry Forward	Action has not yet been completed due to lack of funding. The state of Connecticut has updated its state building code to require certain standards for buildings in flood zones statewide. This action is carried forward.
Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternative.	P&Z	Capability	The Town requires this of larger developments. This is a capability.
Encourage property owners to purchase flood insurance under the NFIP.	Building Official	Capability	Buyers of properties located in FEMA flood zones are required to purchase flood insurance by lending banks and property insurance companies if a mortgage is in place. Town staff believe this is sufficient and additional action by the Town is not necessary.

Action	Responsible Party	Status	Notes
Consider conducting a comprehensive evaluation of the Housatonic and Hollenbeck River watersheds study to determine appropriate flood mitigation and stabilization measures.	PW	Drop Carry Forward New Action	Numerous studies of the Housatonic River have been completed in the past, and the river's hydrology is well understood and managed by dams. Town staff do not believe a new study is needed. Town staff report that flooding along the Hollenbeck River is not a significant concern for the town, and believe a watershed study is not necessary. Falls Village manages flooding along these rivers by restricting development within those flood areas. There are a couple of buildings known to be impacted by Housatonic River flooding. The Town alerts the property owners ahead of predicted flood events and encourages them to temporarily evacuate. Historically, floodwaters impact the houses and then recede, and the property owners fix any damage and remain in the properties. A new action to work with those property owners to mitigate flooding or relocate is suggested.
Consider constructing a flood wall or berm around the side of the High School that is near the Housatonic River.	PW	Drop	Town staff report that the High School building itself is not at risk of flooding; rather, the school's sports fields are located within the Housatonic floodplain. Constructing a flood wall or berm would only protect those fields, would impact flood risks up- and down-stream, and likely would not meet permitting requirements. Maintaining the sports fields as floodplains will decrease flood risk up- and downstream. Action is dropped.
Compile a checklist that cross-references the bylaws, regulations, and codes related to flood damage prevention that may be applicable to a proposed project and make this list available to potential applicants.	P&Z	Complete	Planning and Zoning Department has a checklist to help walk developers through relevant bylaws, regulations, and codes.
Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	P&Z	Carry Forward	Town has not had the financial or staffing capacity to implement this action. Action is carried forward, with the specific suggestion that the Town send members of the Planning and Zoning staff to conferences and events put on by the Connecticut Association of Flood Managers.
Pursue acquisition of additional municipal open space in SHFAs and set it aside for greenways, parks, etc.	First Selectman	Capability	Approximately 2/3 of Town land is open space, and Town staff report that the Town has the highest percentage of protected open space of any town in Connecticut. Much of this land is state owned, and some is Federal land.
Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	PW	Carry Forward with Revisions	Town has not yet implemented this action due to funding limitations. The action is merged with the next action and carried forward.

Action	Responsible Party	Status	Notes
When replacing or upgrading culverts, work with CT DOT to incorporate findings of the climate change pilot study and work with HVA to incorporate findings of the stream crossing assessment training.	PW	Carry Forward with Revisions	Town has not yet implemented this action due to funding limitations. The action is merged with the previous action and carried forward.
Consider the use of beaver deterrent devices such as beaver stops, beaver bafflers or beaver deceivers.	PW	Capability	Town has sufficient capacity for controlling beaver activities. Primary approach is to trap and remove beavers as necessary.
Consider replacing culverts frequently impacted by beavers with free span bridges	PW	Drop	Town has not had significant challenges around beavers impacting culverts. Actions related to culverts and bridges moving forward will focus on upsizing based on updated hydrology figures (actions listed above). This specific action is dropped.
Ensure adequate barricades are available to block flooded streets in floodprone areas	PW	Capability	Town has adequate barricades.
Ensure the Emergency Management Services facility is sited outside the SFHA and 500-year flood zone as required by State law.	EMD	Completed	This is the case with the EOC
Consider conducting an ingress/egress evacuation routes analysis for the Housatonic Valley Regional High School.	EMD	Drop	Town staff report that there is no isolation risk at the High School, and there have not been any access issues in the past. This action is not considered necessary.
Develop a plan to prioritize snow removal from the roof of critical facilities and other municipal buildings each winter. Ensure adequate funding is available in the Town budget for this purpose.	PW	Capability	Town has had to clear roofs in the past and has this capability. They hire contractors as needed, or have town staff, including the Fire Department, assist. The Kellog School is one of the only buildings with a flat roof.
The town may consider utilizing snow fencing in areas prone to snow drift	PW	Drop	Town has not found it necessary to utilize snow fencing. There are few areas where snow drift is significant - near Wangum lake there are some drift areas. Town plows are able to handle drifts; fencing not needed.
Consider posting the snow plowing routes in Town buildings each winter to increase public awareness.	PW	Capability	Town posts the roads that will not be plowed.

Action	Responsible Party	Status	Notes
Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	EMD, PW	Capability	Lower Barrack Road and Yelping Hill Road off Music Mountain (dirt, state forest road) are the two known areas with accessibility issues during storm events.
The Building Department should provide literature regarding appropriate design standards for mitigating icing, insulating pipes, and retrofits for flat-roofed buildings such as heating coils.	Building Official	Capability	This information is available through the state building code, enforced locally. The Town installed heating coils in the Town Hall roof.
Consider preventing residential development in areas prone to collapse	P&Z	Capability	Zoning regulations and state building code are sufficient to mitigate this kind of risk. Town staff were not aware of any areas in Town prone to collapse.
Ensure that municipal departments have adequate backup facilities in case earthquake damage occurs to municipal buildings.	EMD, PW	Capability	EOC can operate out of the Fire House (primary) or the Town Hall (secondary).
Consider bracing vulnerable systems and assets inside critical facilities. This could help protect IT systems, important records and files.	EMD, PW	Capability	Town has backed-up all electronic records to the cloud. The Town is currently scanning all hardcopy records from the past 30 years and backing those up to the cloud as well.
Include dam failure inundation areas in the CT Alert emergency notification system contact database	EMD	Carry Forward with Revisions	The Town is aware of two areas with dam failure risk: downstream of Wangum Dam on the Hollenbeck River, and downstream of the First Light dam on the Housatonic River. The Housatonic dam is one of a series of dams on the river used for power generation; the dam and the river are heavily monitored by First Light, and the EAP in place includes alert protocols. The emergency notification system currently under development would be used to notify residents of a dam failure risk. Targeted alerts are possible through this system. Action is revised: create geographically-distinct groupings of residents within the new emergency notification system to allow for geographically-targeted alerts.
Collect EAP's for Class B and C dams and file them with the appropriate town departments and emergency personnel	EMD	Capability	Town has EAPs in EOC, and is aware of how to access.

Action	Responsible Party	Status	Notes
For the area of elevated wildfire risk located along the Appalachian Trail, consider a combination of all of the available methods of wildfire risk reduction.	Fire	Carry Forward	Town has not experienced any notable brush fire events in recent years; the last significant wildland fire occurred 15 to 20 years ago. This action has not been completed due to limited funding and the perceived low risk. Action is carried forward.
Evaluate the need for maintenance of the town fire ponds.	Fire	Carry Forward with Revisions	Town has the capacity to dredge and maintain fire ponds on its own, and has done so in the past. This is a capability. A new action is carried forward addressing maintenance needs of a specific pond: Kellog Pond near Kellog Road and Route 126. This pond has a dry hydrant and is in need of dredging or other maintenance.
Revise and enhance the town's website concerning the local regulatory requirements concerning Open Burning	Fire	Capability	Open Burning rules are posted on the website. Anybody who wants to open burn needs a burn permit and to call the Fire Marshal before burning on any given day
Continue to require the installation of fire protection water in new developments.	Fire	Capability	This is required as necessary for new developments

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action CNN-01	
Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	
Lead	Planning; EMD
Cost	$0 - $25,000
Funding	OB, CT DEMHS
Timeframe	2022
Priority	High

Action CNN-02	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action CNN-03	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action CNN-04	
As recommended by the POCD, review the Flood Hazard Control Measures section of the town ordinance to fully incorporate the provisions of the DEEP model flood regulations. Specifically, increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action CNN-05	
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, Sustainable CT
Timeframe	2022 – 2024
Priority	High

Action CNN-06	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action CNN-07	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action CNN-08	
Work with owners of properties known to be impacted by Housatonic River flooding to mitigate flooding or relocate.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action CNN-09	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action CNN-10	
When replacing or upgrading culverts, review culvert conveyances based on Northeast Regional Climate Center Guidance, in accordance with the findings of the CT DOT climate change pilot study. Additionally, work with HVA to incorporate findings of the stream crossing assessment training.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEEP
Timeframe	2023 – 2025
Priority	High

Action CNN-11	
Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action CNN-12	
Complete a comprehensive bridge study, involving inspection of every bridge in town to develop cost-estimates and prioritize repairs needed to extend their service lives. Many of the bridges were built in the 1930s and in 1955. Most bridges are believed to be in pretty good shape. Cobble Road Bridge is a specific bridge of concern.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action CNN-13	
For the area of elevated wildfire risk located along the Appalachian Trail, consider a combination of all of the available methods of wildfire risk reduction.	
Lead	EMD, Fire
Cost	$50,000 - $100,000
Funding	OB, FEMA Assistance to Firefighters Grant
Timeframe	2023 – 2025
Priority	Med

Action CNN-14	
Complete setup of Mailchimp-based public outreach and communication system by collecting emergency contact information from residents and utilizing the system to ensure its efficacy.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action CNN-15	
Create a database of contact information for second-home owners in Canaan, and develop a protocol for contacting those owners about natural disasters so they can take steps to protect their properties while they're out of town.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action CNN-16	
Create geographically-distinct groupings of residents within the new emergency notification system to allow for geographically-targeted alerts.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action CNN-17	
Install a generator as part of the Village Market development.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action CNN-18	
Address maintenance needs of the Kellog Pond near Kellog Road and Route 126. This pond has a dry hydrant and is in need of dredging or other maintenance.	
Lead	EMD, Fire
Cost	$50,000 - $100,000
Funding	OB, FEMA Assistance to Firefighters Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

APPENDIX A

STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
CNN-01	Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	Municipal Training	Planning; EMD	$0 - $25,000	OB, CT DEMHS	2022	1	1	1	1	1	1	0	0	0	0	0	0	0	0	8
CNN-02	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
CNN-03	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
CNN-04	As recommended by the POCD, review the Flood Hazard Control Measures section of the town ordinance to fully incorporate the provisions of the DEEP model flood regulations. Specifically, increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
CNN-05	Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	Sustainable CT	Planning	$25,000 - $50,000	OB, Sustainable CT	2022 – 2024	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
CNN-06	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
CNN-07	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
CNN-08	Work with owners of properties known to be impacted by Housatonic River flooding to mitigate flooding or relocate.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
CNN-09	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
CNN-10	When replacing or upgrading culverts, review culvert conveyances based on Northeast Regional Climate Center Guidance, in accordance with the findings of the CT DOT climate change pilot study. Additionally, work with HVA to incorporate findings of the stream crossing assessment training.	NRCC Guidance	DPW	$50,000 - $100,000	OB, CIP, CT DEEP	2023 – 2025	0	1	1	0	0	1	1	0	0	0	0	0	0	0	6
CNN-11	Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
CNN-12	Complete a comprehensive bridge study, involving inspection of every bridge in town to develop cost-estimates and prioritize repairs needed to extend their service lives. Many of the bridges were built in the 1930s and in 1955. Most bridges are believed to be in pretty good shape. Cobble Road Bridge is a specific bridge of concern.	Study	DPW	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
CNN-13	For the area of elevated wildfire risk located along the Appalachian Trail, consider a combination of all of the available methods of wildfire risk reduction.	Wildfire Risk Reduction	EMD, Fire	$50,000 - $100,000	OB, FEMA Assistance to Firefighters Grant	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	0	0	6
CNN-14	Complete setup of Mailchimp-based public outreach and communication system by collecting emergency contact information from residents and utilizing the system to ensure its efficacy.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
CNN-15	Create a database of contact information for second-home owners in Canaan, and develop a protocol for contacting those owners about natural disasters so they can take steps to protect their properties while they're out of town.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
CNN-16	Create geographically-distinct groupings of residents within the new emergency notification system to allow for geographically-targeted alerts.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
CNN-17	Install a generator as part of the Village Market development.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
CNN-18	Address maintenance needs of the Kellog Pond near Kellog Road and Route 126. This pond has a dry hydrant and is in need of dredging or other maintenance.	Wildfire Risk Reduction	EMD, Fire	$50,000 - $100,000	OB, FEMA Assistance to Firefighters Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	0	0	0	0	-1	0	0	-1	3.5

APPENDIX B

RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF CANAAN BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Canaan has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Canaan Board of Selectmen approved the previous version of the Plan in 2014; and

WHEREAS, the Town of Canaan and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Canaan; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Canaan, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Canaan eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Canaan;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Canaan, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Canaan this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

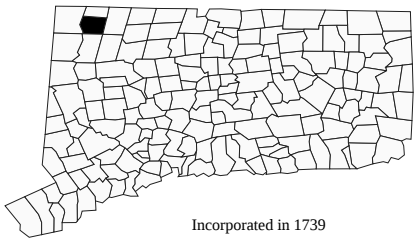
2019 CERC TOWN PROFILE

Canaan, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
P.O. Box 47, Falls Village
Canaan, CT 06031
(860) 824-0707

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1739

Demographics

Population

	Town	County	State
2000	1,081	182,193	3,405,565
2010	1,234	189,927	3,574,097
2013-2017	1,128	184,454	3,594,478
2020	1,333	193,116	3,604,591
'17 - '20 Growth / Yr	5.1%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	33	921	4,842
Pop./Sq. Mile (2013-2017)	34	200	742
Median Age (2013-2017)	53	47	41
Households (2013-2017)	510	74,605	1,361,755
Med. HH Inc. (2013-2017)	$77,417	$76,438	$73,781

	Town	State
Veterans (2013-2017)	78	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	60	5%	62	5%	115	10%	201	18%	416	37%	274	24%	1,128	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	1,067	164,992	2,446,049
Black Non-Hisp	35	2,843	350,820
Asian Non-Hisp	3	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	13	2,320	84,917
Hispanic or Latino	10	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	4.1%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	218	24%	673,582	27%
Associates Degree	102	11%	188,481	8%
Bachelors or Higher	361	41%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	122	956
23 - Construction	18	33
31-33 - Manufacturing	6	118
44-45 - Retail Trade	10	167
72 - Accommodation and Food Services	9	139
81 - Other Services (except Public Administration)	21	65
Total Government	6	191

Top Five Grand List (2018)

	Amount
Connecticut Light & Power 12,553,980	-$9,999
century aggregates, inc. 771,780	-$9,999
Aquarion Water Co. of CT 552,080	-$9,999
Edward R. Hamilton Bookseller Co. 525,280	-$9,999
First Light Hydro 516,890	-$9,999
Net Grand List (SFY 2016-2017)	$171,596,930

Major Employers (2018)

Housatonic Regional High School
Sand Road Animal Hospital
Lee H. Kellogg School
Hamilton Bookseller
Regional Services Center

Education

2018-2019 School Year

	Grades	Enrollment
Canaan School District	PK-8	63
Regional School District 01	9-12	391

Pre-K Enrollment (PSIS)

	2018-2019
Canaan School District	0

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 01	94.6%	100.0%	90.4%

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	*	53.8%	*	51.3%	*	43.0%
ELA	*	53.1%	*	54.9%	*	56.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Canaan School District	9.0%
Regional School District 01	11.9%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	87.4%	84.0%	86.8%
Private	12.6%	16.0%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Canaan, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$5,193,220	Total Expenditures (2017)	$4,806,217	Annual Debt Service (2017)	$298,825
Tax Revenue	$4,187,575	Education	$3,124,926	As % of Expenditures	6.2%
Non-tax Revenue	$1,005,645	Other	$1,681,291	Eq. Net Grand List (2017)	$227,108,759
Intergovernmental	$841,674	Total Indebtedness (2017)	$2,887,249	Per Capita	$213,850
Per Capita Tax (2017)	$3,879	As % of Expenditures	60.1%	As % of State Average	141.7%
As % of State Average	132.3%	Per Capita	$2,719	Moody's Bond Rating (2017)	-
		As % of State Average	108.2%	Actual Mill Rate (2017)	24.00
				Equalized Mill Rate (2017)	18.14
				% of Net Grand List Com/Ind (2017)	8.2%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	714	88,068	1,507,711
% Single Unit (2013-2017)	95.8%	73.6%	59.2%
New Permits Auth (2017)	0	142	4,547
As % Existing Units	0.0%	0.2%	0.3%
Demolitions (2017)	0	32	1,403
Home Sales	NA	1,753	21,880
Median Price	$334,100	$250,100	$270,100
Built Pre-1950 share	39.3%	31.2%	29.3%
Owner Occupied Dwellings	448	57,330	906,798
As % Total Dwellings	87.8%	76.8%	66.6%
Subsidized Housing (2018)	45	4,817	167,879

Distribution of House Sales

	Town	County	State
Less than $100,000	NA	57	536
$100,000-$199,999	NA	563	5,237
$200,000-$299,999	NA	538	6,681
$300,000-$399,999	NA	315	3,863
$400,000 or More	NA	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$983	$995	$1,123
Cost-burdened Renters	20.0%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	632	101,000	1,827,070
Residents Unemployed	19	4,014	78,242
Unemployment Rate	2.9%	3.8%	4.1%
Self-Employed Rate	28.1%	13.0%	10.0%
Total Employers	122	6,177	122,067
Total Employed	956	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Norfolk, CT	60	Canaan, CT	42
North Canaan, CT	44	Norfolk, CT	42
Canaan, CT	42	North Canaan, CT	40
Salisbury, CT	33	Torrington, CT	34
Torrington, CT	33	Salisbury, CT	30
Winchester, CT	30	Winchester, CT	21
Colebrook, CT	16	Hartford, CT	21

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	616	1,777
Violent	264	228

Disengaged Youth (2013-2017)

	Town	State
Female	0.0%	4.2%
Male	15.0%	5.6%

	Town
Library circulation per capita	11.52

Distance to Major Cities

	Miles
Hartford	35
New York City	95
Providence	98
Boston	120
Montreal	248

Residential Utilities

Electric Provider

Eversource Energy
(800) 286-2000

Cable Provider

Comcast Lakeville
(800) 266-2278

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

COLEBROOK, CT

August 2021

562 Colebrook Road
Colebrook, CT 06021
MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 Torrington Road
Goshen, CT 06756
(860) 491-9884
https://northwesthillscog.org

Prepared by:
SLR CONSULTING
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SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Colebrook and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Colebrook is a rural, residential town located along the northern border of the Litchfield Hills Region. It is bordered on the east by Hartland, on the south by Winchester, on the west by Norfolk, and on the north by Massachusetts.

Colebrook was incorporated in October of 1779 and has a total area of 32.9 square miles with a land area of 31.5 square miles. It has a population of 1,484 persons in 2019, and is run by a Selectman/Town Meeting form of government.

Notable characteristics of the municipality include a hilly and forested landscape, numerous brooks and streams, Colebrook River Reservoir, Goodwin Dam Reservoir, Algonquin State Forest, and the quintessential New England village of Colebrook Center.

Colebrook has a rich history of iron forges, lumbering, agriculture, and cotton mills during the 18th and 19th centuries. The floods of 1927, 1938, and 1955 impacted Colebrook as they did other towns in the Litchfield Hills Region. Town historian Robert Grigg has compiled vivid descriptions by residents of each of these storm events and their deadly and destructive impact on local residents.

The Metropolitan District Commission, established to provide water and other services to towns in the Greater Hartford area, began purchasing land in the eastern section of Colebrook in the 1930's. This ultimately led to the construction of the Goodwin Dam (originally known as the "Hogback Dam") in Hartland and the creation of the West Branch Reservoir in 1960 in order to augment the MDC's source of water supply.

Another major dam, the Colebrook River Dam, which is located about 2 miles upstream from the Goodwin Dam, was completed in 1969 by the U.S. Army Corps of Engineers. The Army Corps cited the damage caused by the 1938 and 1955 floods as the reason that this structure was necessary for flood control purposes. This Colebrook River Dam created the Colebrook River Reservoir, which is approximately double the size of the Goodwin Reservoir and has a maximum water surface area of 1,210 acres. The historic village of Colebrook River, with over 100 dwellings and commercial structures, was inundated with the creation of this new reservoir.

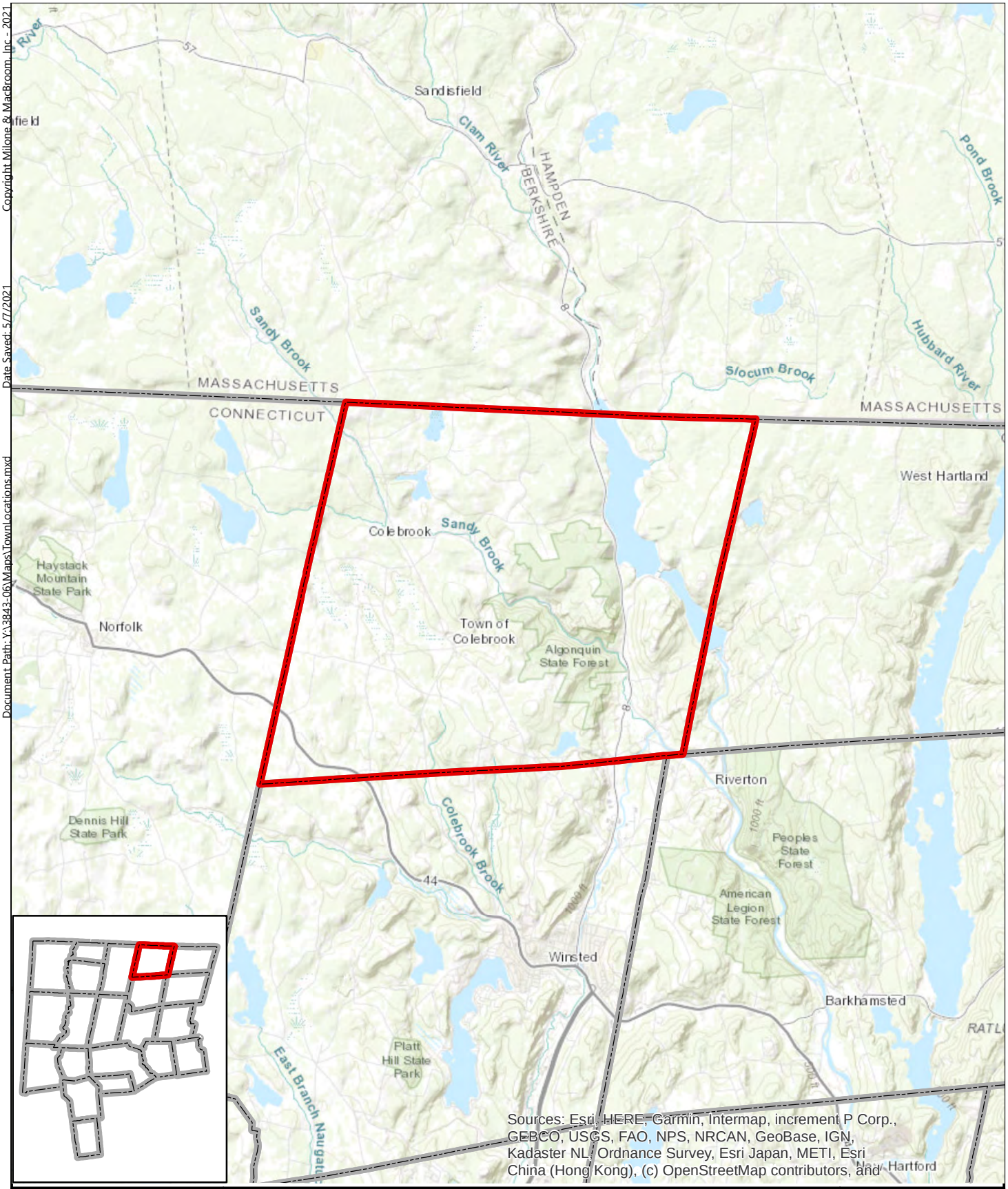
2.2 Existing Land Use

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 83% of Colebrook is forested and approximately 5% is developed.

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Date Saved: 5/7/2021

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MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

REGIONAL LOCATION: COLEBROOK

HAZARD MITIGATION PLAN UPDATE - COLEBROOK ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 5,000 10,000
Feet

SCALE	1 " = 10,378 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-1

Table 2-1: Land Cover by Area

	Area (Acres)	Percent of Community
Developed	1,090.5	5.18%
Turf & Grass	387.8	1.84%
Other Grass	153.5	0.73%
Ag Field	700.7	3.33%
Deciduous Forest	6,382.9	30.33%
Coniferous Forest	10,339.4	49.13%
Water	1,114.5	5.30%
Non-Forested Wetland	116.6	0.55%
Forested Wetland	715.4	3.40%
Tidal Wetland	0.0	0.00%
Barren	45.4	0.22%
Utility Row	0.0	0.00%
Total	21,047	100%

Source: UCONN Center for Land Use Education and Research (CLEAR)

2.3 Development Trends

The 2010 U.S. Census reported a population in Colebrook of 1,485 individuals. U.S. Census Bureau estimates for 2019 show a population around 1,484 individuals, a decrease from 2010 of 0.1%. The Connecticut State Data Center predicts that population will decrease by 11.2% through 2025 to an estimated population of 1,318 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Colebrook remained steady between 2013 and 2017. The number of permits issued in 2013 and 2014 was 1 and 2, respectively, while 0 permits were issued in 2016, and 0 permits were issued in 2017. On average, 1 housing permit was issued each year in Colebrook between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Colebrook rose by approximately 1.4-percent between 2010 and 2019, from 772 units in 2010 to 783 units in 2019. In 2019, the housing stock was made up of approximately 95% single-unit structures, 2% two-unit structures, 3% multi-unit structures, and 0% mobile-homes or other types of structures.

According to the Connecticut Office of Policy and Management, Colebrook's 2019 Total Equalized Net Grand List was valued at $187,947,722. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Colebrook, included as Appendix C.

Little to no new commercial development, and minimal residential development, has taken place in Colebrook over the past few years. Town staff report that roughly one new home is built in Town every year. Overall, development in Colebrook has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the future is not expected to increase exposure over the next five years.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Colebrook is considered to have a low level of social vulnerability, with a somewhat higher vulnerability score for the SVI category of Housing Type and Transportation. In other words, a particular challenge in Colebrook may include lower-quality housing and a lack of access to public transportation.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Colebrook.

The bedrock is primarily metamorphic and granite, and the surficial material consists predominantly of fertile, stony glacial till soils.

Colebrook is part of the Northeastern Highlands Ecoregion, which is characterized by "hills and mountains, a mostly forested land cover, nutrient-poor frigid and cryic soils (mostly Spodosols), and numerous high-gradient streams and glacial lakes" (as described on the map "Ecoregions of New England").

2.5 Climate and Climate Change

Over the course of the year, the temperature in Colebrook typically varies from 16°F to 81°F and is rarely below 0°F or above 88°F. The warm season lasts for 3.6 months, from May 28 to September 15, with an average daily high temperature above 71°F. The hottest day of the year is July 19, with an average high of 81°F and low of 61°F. The cold season lasts for 3.3 months, from December 1 to March 11, with an average daily high temperature below 41°F. The coldest day of the year is January 29, with an average low of 16°F and high of 32°F.

Precipitation falls throughout the year in Colebrook. The wetter season lasts 4.3 months, from April 10 to August 21, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on June 2. The drier season lasts 7.7 months, from August 21 to April 10. The smallest chance of a wet day is 21% on January 29.

The most rain falls during the 31 days centered around October 1, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts for 6.0 months, from October 23 to April 22, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 25, with an average total liquid-equivalent accumulation of 1.4 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Colebrook as 4.75 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Colebrook at 5.58 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.8	6.0	8.5

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
NOAA Atlas 14	5.6	7.0	9.1

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Colebrook can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.1 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

Sandy Brook flows southeast through the center of Colebrook before its confluence with the Farmington River in Barkhamsted. The Sandy Brook watershed drains most of the community.

The northeastern portion of Town is dominated by the Farmington River mainstem subregional watershed. Water in this portion of Town drains to the West Branch Reservoir and Colebrook River Lake. The very northeast corner of Town drains to Slocum Brook before it flows into West Branch Reservoir.

The southeast corner of Colebrook is within the Mad River subregional basin, with land draining to the Mad River by way of Mill Brook and Colebrook Brook.

2.7 Governmental Structure and Capabilities

The Town of Colebrook has a number of existing authorities, policies, programs and regulations that serve to mitigate the impact of natural hazards. Existing local authorities include the Colebrook Board of Selectmen, Planning and Zoning Commission, Inland Wetlands Commission, Emergency Management Director, Fire Department, and Department of Public Works.

Flood or other natural-hazard related complaints are reported to the First Selectman's office.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic resources in Colebrook are concentrated within the Colebrook Center Historic District and the Phelps Farm (also called Colebrook North) Historic District. Resources near flood sources may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

The primary transportation routes into and out of the town are Route 44 (passing through the southwest corner of Town), Route 182 and 182A (connecting Colebrook center to Norfolk to the west), Route 183 (running north-south through Colebrook center), and Route 8 (running north-south in the eastern part of Colebrook). Other key roads include Smith Hill Road, Old Colebrook Road, Old North Road, Deer Hill Road, and Sandy Brook Road). There is no local public transit system in Colebrook.

Utilities

There is no public water system in Colebrook; residents and businesses rely on private well water and a handful of Non-Community Public Water Systems.

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Colebrook.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

The major facilities at risk in the community in the event of a natural hazard include the Colebrook Town Hall, Colebrook Elementary School, the Town Garage, Center Fire House, Forge Fire House, Camp Jewell (back-up shelter), and Colebrook hydro facility retrofit. These are considered critical facilities in the event of a natural disaster because they might be at risk or needed for effective emergency response. All are potentially vulnerable to tornados, winter storms, wildfire, and earthquakes. None of the facilities are located within a floodplain.

Critical Facilities are summarized on Table 2-3 below.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Colebrook Volunteer Fire Department - Forge Station	300 Colebrook River Rd	Fire Station	✔		
Colebrook Volunteer Fire Department - Center Station	31 Bunnell Street	Fire Station	✔		
Town Hall	562 Colebrook Road		✔		
Colebrook Senior Center	2 School House Road	Primary Shelter	✔	✔	
Colebrook Elementary School	452 Smith Hill Road				
Town Garage	43 Sandy Brook Road	Public Works			
Camp Jewell	6 Prock Hill Road	Back-up Shelter	✔	✔	

The major natural hazards of concern in Colebrook are flooding, high winds, and severe winter storms. Forest fires, drought, and earthquakes occur much less frequently in the community, and are therefore of somewhat lesser concern.

Emergency Response Capabilities

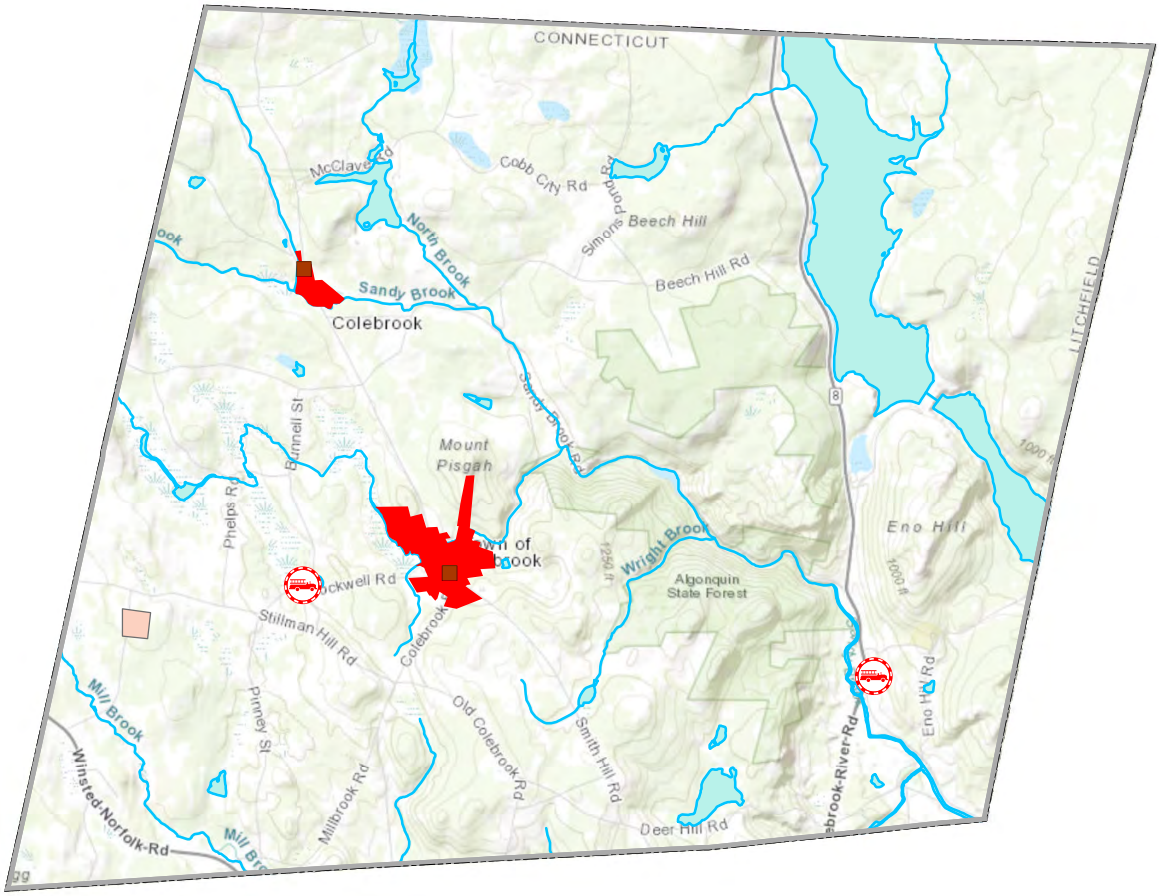
The Colebrook Volunteer Fire Department, Department of Public Works, and Emergency Management Director all possesses emergency equipment that can be deployed as needed in the event of an emergency. Procedures are also in place to open and maintain the Emergency Operations Center and emergency shelter in town.

The Town maintains a shared generator for the Town Hall and Senior Center for back-up power during an emergency.

Sheltering Capabilities

Colebrook's primary shelter is the Colebrook Senior Center. Camp Jewell is available as a backup shelter.

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Critical Facilities & Cultural Resources

- Fire Station
- National Register Building
- National Register
- National Register District

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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - COLEBROOK ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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SCALE 1 " = 6,487 '
DATE 5/7/2021
PROJ. NO. 3843-06

FIG. 2-2

Communications

Colebrook participates in a regional public notification system (Everbridge System) coordinated through Litchfield County Dispatch. The Town emergency email system works well and reaches many Colebrook residents. This system is tied into the Town website, and automatically sends email notifications when emergency alerts are posted to the website.

Colebrook has also been working with other towns in the Litchfield Hills Region through the Northwest Hills Public Safety Task Force to enhance communication and coordination. This has included efforts to standardize communication equipment and the equipment in local emergency operation centers, and also the upgrading of supplies at emergency shelters. Other activities that have been implemented include participation in a regionally coordinated public notification system, a badging registration system for emergency responders, and improved training opportunities.

3 FLOODING

3.1 Existing Capabilities

Ordinances, Regulations and Plans

Land use regulations exist to protect natural resources, including erosion and sediment control regulations for new development, stormwater control regulations to minimize drainage problems, and a flood hazard area overlay district to control development in flood prone areas.

The flood hazard area overlay district provides that any new construction or substantial improvement of any residential structure shall have the lowest floor, including the basement, elevated to at least one foot above the base flood elevation. Nonresidential construction is required to have the lowest floor, including basement, elevated to at least one foot above the base flood level or be flood-proofed to one foot above the base flood elevation. A registered professional engineer or architect is required to design and certify the construction of structures in the floodplain in order to minimize flood damage.

All attendant utilities or sanitary facilities should be located or designed to avoid infiltration or impairment by flood waters. Manufactured homes and recreational vehicles are prohibited or highly restricted within the flood hazard overlay district, respectively.

Colebrook's Subdivision regulations have detailed standards for the planning, design and construction of storm drainage systems in order to minimize adverse impacts with new construction activity.

The Colebrook Inland Wetlands and Watercourses Agency enforces regulations to direct development away from wetlands and floodplains. These regulations also encourage development and subdivision to implement low impact development strategies to manage stormwater and drainage.

Drainage and Street Flooding

The Colebrook Public Works Department routinely examines and clears public storm drains and catch basins of debris following periods of rainfall, snowfall, or windstorms.

Structural Projects

The hazard of flooding has been greatly reduced in the community through the construction of the Colebrook River Dam and the Goodwin Dam.

New Capabilities and Completed Actions

In recent years the Town has been regrading and repaving many Town roadways, in the process upgrading and repairing the roadway drainage systems.

There are a number of bridges in town that had in the past been identified by the state as needing repairs and upgrades; Town staff report that these have all either been addressed or are currently undergoing work.

Summary

Colebrook mitigates flood damages primarily through regulating development in floodprone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate.

3.2 Vulnerabilities and Risk Assessment

Flood prone areas in the community today, as mapped by FEMA, are presented in Figure 3-1. Town staff report that, in general, flooding is not a significant problem in the Town.

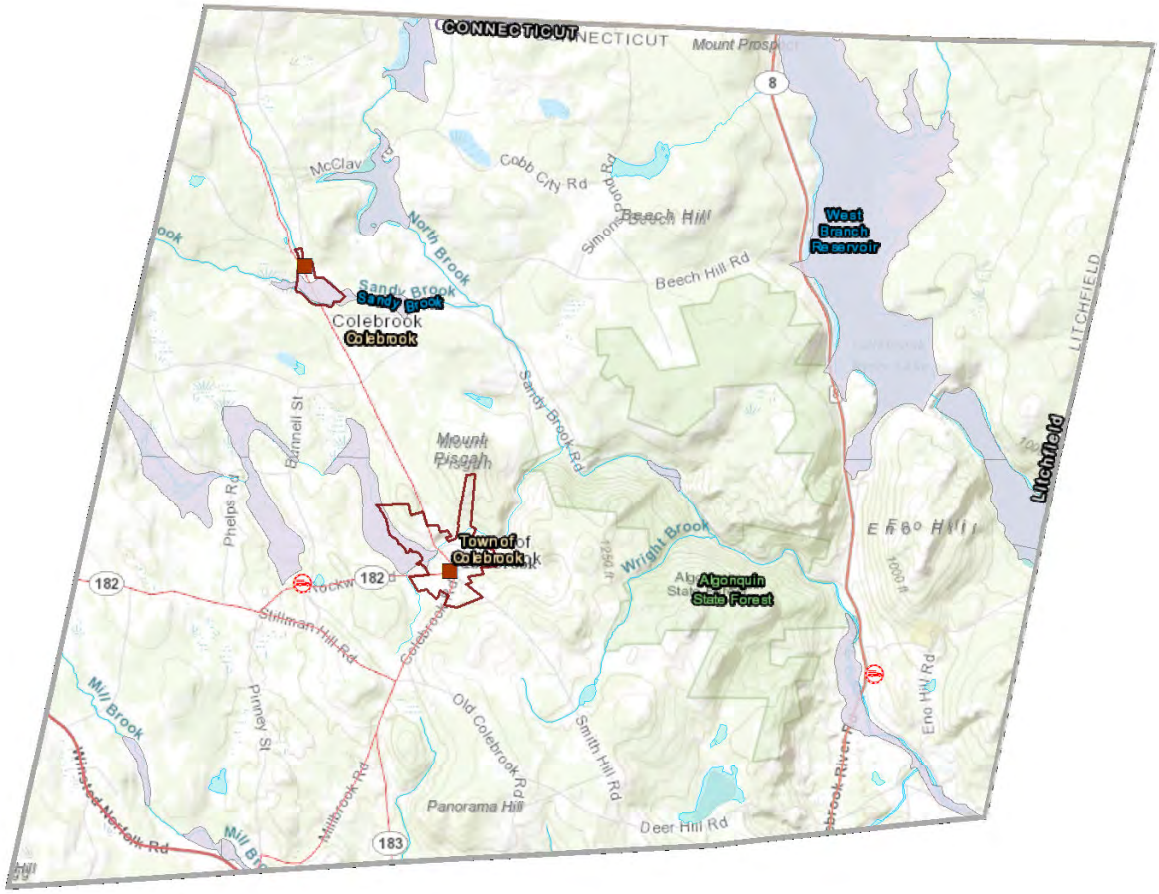
According to FEMA, there are 12 flood insurance policies in force in Colebrook as of 6/30/2019 with an insurance value of $2,802,900. The previous edition of this HMP noted 12 flood insurance policies are in force as of 8/31/2015 with an insurance value of $2,753,900.

Colebrook's First Selectman stated in a 2014 interview that the lower end of Sandy Brook near Riverton Road is the most flood prone area in town and that basement pump-outs are common during major storm events.

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Legend

- Fire Station
- National Register Building
- National Register District

Flood Zone

- A
- AE

Flood Zone

- A

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FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - COLEBROOK ANNEX
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GOSHEN, CT 06756

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Feet

SCALE 1 " = 6,487 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing capabilities appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Colebrook is 105 mph for a Category 1 event, 115 mph for a Category 2, and 125 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

The Town is responsible for clearing any debris caused by high winds from local roads. The Town has a Tree Warden, and budgets for the performance of tree work to mitigate damages.

Eversource, the local electric utility, provides tree maintenance near its power lines. The Town has provided support for an increased role by Eversource in tree trimming maintenance practices along roadsides.

New Capabilities and Completed Actions

Colebrook continues to maintain its strong tropical cyclone mitigation capabilities.

The Town reports that in the past few years Eversource has conducted a major tree trimming campaign; the Town believes this has helped minimize tree damage, including during Tropical Storm Isaias (see Section 4.2), as damage from recent storms has not been as bad as the Town experienced during past storms.

Summary

Colebrook mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

As with the rest of the Litchfield Hills region, Colebrook is vulnerable to high winds from a hurricane or tropical storm. As the Town is located far inland, coastal flooding is not a concern, but riverine flooding caused by heavy rain during a hurricane is. Due to the lack of coastal flooding vulnerability, the entire town is equally vulnerable to wind damage from hurricanes or other strong storms.

Tree damage from wind is the biggest natural hazard concern in Town, and Town staff report that many trees need to be trimmed and removed. As high winds often cause power outages, the greatest impacts are expected in areas with relatively high levels of development.

Tropical Storm Isaias

Tropical Storm Isaias in August 2020 resulted in Town-wide damage. Outages lasted for many days; the Town reports that Eversource didn't arrive in Town to begin restoration until approximately three days after the storm hit. The MDC property in Town was without power for ten days.

Town staff indicate that communication was a challenge during this Isaias.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Sharon as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

New Capabilities and Completed Actions

Colebrook continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

Colebrook mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Colebrook has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

The central and southern portions of the United States are at higher risk for lightning and thunderstorms than is the northeast. However, FEMA reports that more deaths from lightning occur on the East Coast than elsewhere. Lightning-related fatalities have declined in recent years due to increased education and awareness.

Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Colebrook area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Colebrook is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the Town is believed to be low for any given year. All areas of the Town are susceptible to damage from high winds.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Such fires can be extremely dangerous during the summer months during dry and drought conditions.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

6 WINTER STORMS

6.1 Existing Capabilities

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas.

The Town's DPW monitors weather reports and maintains loaded trucks in preparation of winter storm events. The DPW has very robust snow removal capabilities.

New Capabilities and Completed Actions

Colebrook continues to maintain its strong winter storm mitigation capabilities.

Summary

Colebrook mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

Snow storms generally impact the entire town, meaning all of Colebrook is vulnerable. Areas that are heavily developed are more vulnerable, however, as there are more buildings (which can collapse under the heavy load of snow and ice) and more roads (which need to be cleared). The town has 37 miles of local roads to maintain.

Town staff report that snowstorms do not typically present a major challenge for Colebrook. The Town appears to get heavier snowfall than other communities in the state due to its relatively high elevation.

7 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Colebrook. The Town has adopted these codes for new construction, and they are enforced by the Building Official.

New Capabilities and Completed Actions

Colebrook continues to maintain its earthquake and landslide mitigation capabilities.

Summary

Colebrook mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Earthquake Vulnerabilities

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Colebrook. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Colebrook

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

The Fire Department has participated with the MDC on exercises in the past. The MDC communicates when issues arise. There used to be an annual meeting with CEOs, but this has not occurred in a number of years.

Actions Completed and New Capabilities

Colebrook continues to maintain its capabilities for mitigating and responding to dam failure risks.

Summary

Colebrook mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 18 DEEP-inventoried dams within the Town of Colebrook. These dams are listed in Table 8-1 and shown in Figure 8-1.

Table 8-1: DEEP-Inventoried Dams in Colebrook

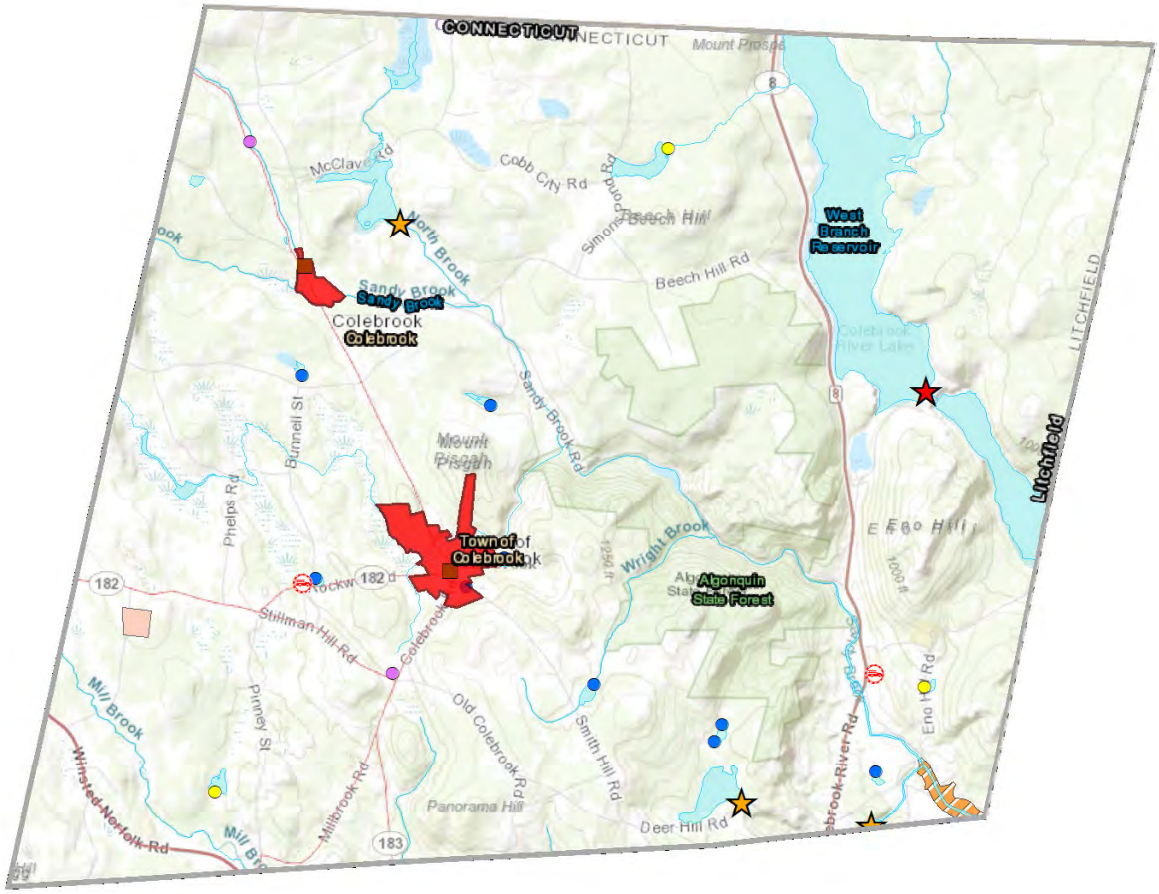
Number	Name	Class
2901	ROBERTSVILLE DAM	B
2902	GAYLORD POND DAM	B
2903	LAKE TRIANGLE DAM	B
2904	KLAHRE POND DAM	A
2905	BUNNELL POND DAM	BB
2906	LEMANQUAIS DAM	BB
2907	ONEGLIA POND DAM	A
2908	SCHWARTZ POND DAM	BB
2909	DEER HILL POND DAM	A
2910	LOWER TROUT POND DAM	A
2911	BLAKE POND DAM	A
2912	COLEBROOK RIVER DAM	C
2913	CURRIER POND DAM	A
2914	METRO DAM	A
2915	HALE POND DAM	AA
2916	OPATRNY DAM	AA
2918	THOMPSON POND DAM	A
2920	TERRY POND DAM	A

All of these dams are private dams with the exception of the Colebrook River Dam and the town-owned Metro Dam located at the Town Pond in Colebrook Center.

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Legend

- Fire Station
- National Register Building
- National Register Area
- National Register District

Dam Hazard Class

- C - High Hazard
- B - Significant Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

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0 3,000 6,000
Feet

SCALE 1 " = 6,487 '
DATE 5/10/2021
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FIG. 8-1

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Colebrook is compliant with this program and has a designated Burning Official.

Actions Completed and New Capabilities

Colebrook continues to maintain its capabilities for mitigating and responding to wildfire risks.

A new ATV was acquired in the past five years; the vehicle includes a water tank for fire suppression. The Emergency Response Trailer is also new.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

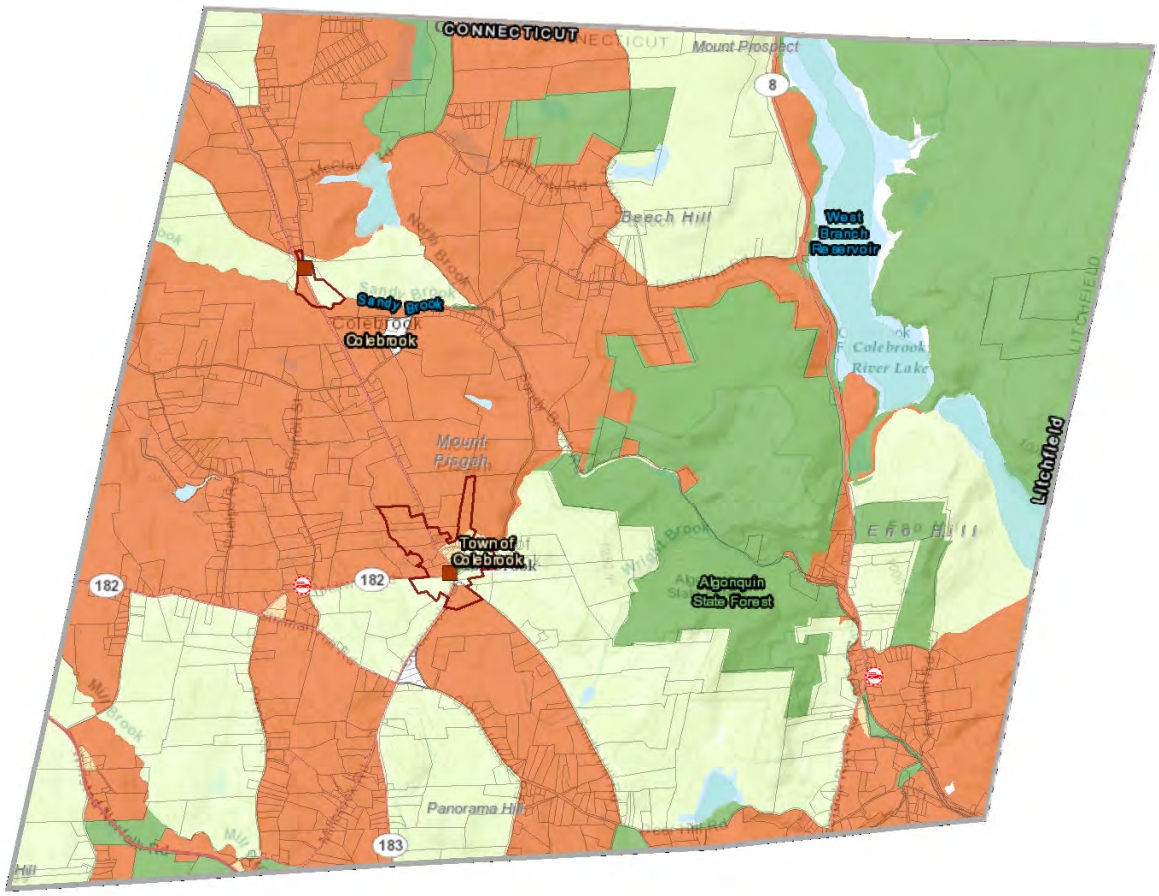
Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

The extensive forests in Colebrook are prime locations for a wildfire. The many areas of Town where development has occurred adjacent to forestland are at an elevated risk of damage from wildfires. Such areas that are also located far from firefighting water sources are at highest risk. Northeast of Colebrook River Lake may be a particular area of concern due to accessibility challenges.

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Date Saved: 5/9/2021

Document Path: Y:\3843-06\Maps\AnnexMaps.mxd



Legend

- Fire Station
- National Register Building
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - COLEBROOK ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,000 6,000
Feet

SCALE 1 " = 6,487 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

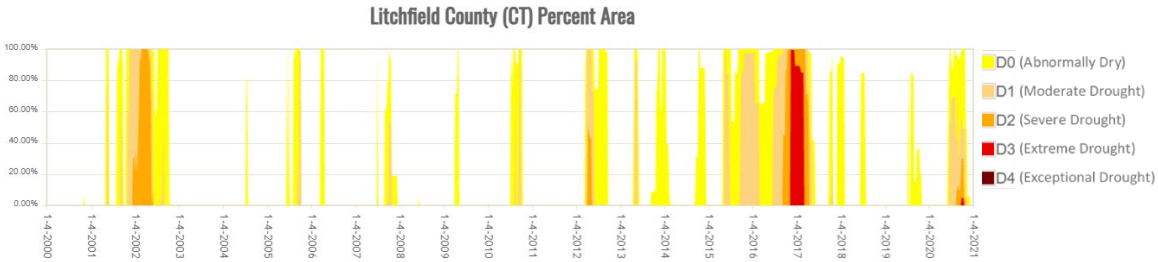


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Strategy	Who	Status	Notes
1.1	Continue to visit schools and educate children about natural hazards and how to prepare for them.	VFD, EMD	Carry Forward	This action has not been completed due to limited staff capabilities. The Town will pursue in coordination with the new superintendent.
1.2	Make literature available on natural hazards and preparedness at Colebrook Town Hall.	EMD, First Selectman	Carry Forward with Revision	The Town has had literature available in the past, but will review what type of literature should be placed now. Additionally, the Town wishes to update the natural hazard information available on the Town website. Revised to include website and carried forward.
1.3	Maintain local Emergency Operations Plan and continue to coordinate with the Regional Public Safety Task Force and Red Cross on community planning, preparedness, response, and training.	EMD, First Selectman	Capability	Town has recently worked with the Regional Red Cross to discuss response efforts, and the EOP was recently updated and submitted to the state.
1.4	Participate in regional Emergency Notification System coordinated through Litchfield County Dispatch (i.e., Everbridge system) to provide emergency information to residents in the entire town or in a specific geographic area. This notice can provide not only warning of an impending situation but also information regarding how to prepare for a particular event.	EMD, First Selectman	Capability	The Town has their own email system that they utilize during and prior to an event. Litchfield County Dispatch works with first responders but not residents directly.
2.1	Routinely inspect emergency response equipment, and train for response to natural disasters.	VFD, EMD	Capability	This is performed by the EMD and the Fire Department.
2.2	Cooperate with the Metropolitan District Commission in emergency response training exercises and updates of the Goodwin Dam Emergency Action Plan.	EMD, First Selectman	Capability	The Fire Department has participated with the MDC on exercises in the past. The MDC communicates when issues arise. There used to be an annual meeting with CEOs, but this has not occurred in a while. This action is considered to be a capability.

#	Strategy	Who	Status	Notes
2.3	Acquire additional emergency response equipment and supplies for the emergency shelter and emergency operations center.	EMD, Fire Chief	Capability	The EMD works to acquire equipment as needed, and the current status of equipment is sufficient.
2.4	Acquire replacement all-terrain vehicle and trailer to support emergency response services.	EMD, Fire Chief	Complete	A new ATV was acquired in the past 5 years. Includes a water tank for fire suppression. The Emergency Response Trailer is also new.
2.5	Promote the use of interoperable communication equipment, written mutual aid agreements, and the development of standard operating procedures for emergency response in the regional area.	EMD, Fire Chief, First Selectman	Capability	The EMD works closely with CT DEMHS Region 5. The Town has mutual aid agreements with neighboring towns. There is a radio system the town uses; however, there is an ongoing issue with contacting all towns, in particular Goshen. This is an ongoing challenge and various efforts have been made, including installing towers to improve service. This action is considered a capability. A new action will be added to this plan related to addressing ongoing radio reliability challenges.
2.6	Develop a Memorandum of Understanding with schools or bus companies to utilize school buses for mass transportation during an emergency.	EMD, First Selectman	Capability	This is a capability.
2.7	Develop basic GIS capabilities as needed for access to aerial photos showing the number and location of properties and structures that could be affected by a natural disaster.	EMD, Fire Chief, First Selectman	Carry Forward with Revisions	Town is working on its GIS capabilities right now and is part of the regional effort to improve data. Carry forward to complete current improvements and participate in regional efforts.
3.1	Pursue additional funding for control measures to mitigate the flooding created by beavers.	PWD	Drop	Town does not find this action to be necessary given limited beaver-related flooding in Town.
3.2	Develop clean-out schedules for all catch basins and drainage facilities and implement with region's catch basin cleaner	PWD	Capability	This is an ongoing effort.
3.3	Review floodplain regulations and ordinances and update as necessary based on DEEP's "Model Floodplain Management Regulations" and FEMA Guidelines	PWD	Carry Forward with Revisions	Zoning is currently undergoing an update of these regulations. Action is revised to refer to these specific updates and carried forward.
3.4	Pursue additional funding to supplement the municipal tree trimming program and support increased role by Eversource in tree trimming maintenance activities along roadsides.	First Selectman, PWD	Capability	Eversource has conducted major trimming in town over the last 2 years – approximately $500k worth. The town does as much maintenance as they can, including trimming and removals. There is a tree warden in town, and this activity is budgeted for.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. These include the following:

- Pursue regular natural hazard education in schools; work with the new school superintendent to coordinate this program.
- Maintain and upgrade the natural hazard materials on the Town website to ensure information is available to residents.
- While many attempts have been made to improve radio signals in town, there is still an issue that the town would like to see rectified.

Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions.

The full suite of actions to be pursued over the next five years are listed below.

Action CBK-01	
Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB, Sustainable CT
Timeframe	2022
Priority	High

Action CBK-02	
Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action CBK-03	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action CBK-04	
Pursue regular natural hazard education in schools; work with the new school superintendent to coordinate this program.	
Lead	EMD; School
Cost	$0 - $25,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2023
Priority	Low

Action CBK-05	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance). Specifically, increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action CBK-06	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action CBK-07	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action CBK-08	
Complete improvements to GIS capabilities and participate in regional efforts to improve GIS capacities.	
Lead	EMD; Fire; IT
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action CBK-09	
Make literature and information about natural hazards and preparedness available at Colebrook Town Hall and on the Colebrook Town website.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action CBK-10	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action CBK-11	
Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	High

Action CBK-12	
Explore alternatives for improving radio signals in town.	
Lead	EMD
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEMHS
Timeframe	2024 – 2026
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
CBK-01	Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	Sustainable CT	Planning	$0 - $25,000	OB, Sustainable CT	2022	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
CBK-02	Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
CBK-03	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
CBK-04	Pursue regular natural hazard education in schools; work with the new school superintendent to coordinate this program.	School Education	EMD; School	$0 - $25,000	OB, CT DEMHS	2022 – 2023	1	0	0	1	1	1	0	0	0	-1	0	0	0	0	4
CBK-05	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance). Specifically, increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
CBK-06	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
CBK-07	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
CBK-08	Complete improvements to GIS capabilities and participate in regional efforts to improve GIS capacities.	Other Emergency Response	EMD; Fire; IT	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	0	0	1	1	1	1	0	0	0	0	0	0	0	0	5
CBK-09	Make literature and information about natural hazards and preparedness available at Colebrook Town Hall and on the Colebrook Town website.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
CBK-10	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
CBK-11	Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
CBK-12	Explore alternatives for improving radio signals in town.	Emergency Communication	EMD	$50,000 - $100,000	OB, CIP, CT DEMHS	2024 – 2026	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3

APPENDIX B

RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF COLEBROOK BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Colebrook has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Colebrook Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Colebrook and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Colebrook; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Colebrook, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Colebrook eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Colebrook;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Colebrook, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Colebrook this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

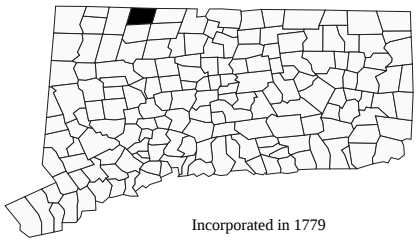
2019 CERC TOWN PROFILE

Colebrook, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
P.O. Box 5
Colebrook, CT 06021
(860) 379-3359

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1779

Demographics

Population

	Town	County	State
2000	1,471	182,193	3,405,565
2010	1,485	189,927	3,574,097
2013-2017	1,471	184,454	3,594,478
2020	1,386	193,116	3,604,591
'17 - '20 Growth / Yr	-2.0%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	32	921	4,842
Pop./Sq. Mile (2013-2017)	47	200	742
Median Age (2013-2017)	46	47	41
Households (2013-2017)	561	74,605	1,361,755
Med. HH Inc. (2013-2017)	$84,583	$76,438	$73,781

	Town	State
Veterans (2013-2017)	102	180,111

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	1,429	164,992	2,446,049
Black Non-Hisp	0	2,843	350,820
Asian Non-Hisp	12	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	0	2,320	84,917
Hispanic or Latino	30	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	4.6%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	317	30%	673,582	27%
Associates Degree	105	10%	188,481	8%
Bachelors or Higher	312	29%	953,199	38%

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	56	4%	136	9%	214	15%	304	21%	589	40%	172	12%	1,471	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	34	216
23 - Construction	7	18
31-33 - Manufacturing	NA	NA
44-45 - Retail Trade	NA	NA
62 - Health Care and Social Assistance	3	13
Total Government	8	55

Top Five Grand List (2018)

	Amount
Conn Light and Power Co. dba Eversource	$3,790,240
Metropolitan District Commission	$3,208,595
Auclair John and Auclair Randy	$759,280
Wind Colebrook South LLC	$620,570
Cellco Partnership	$191,295
Net Grand List (SFY 2016-2017)	$182,148,042

Major Employers (2016)

Colebrook Consolidated School
Town of Colebrook
YMCA Camp Jewell
New Beginnings Farm
Colebrook Store

Education

2018-2019 School Year

	Grades	Enrollment
Colebrook School District	PK-6	84
Regional School District 07	7-12	1075

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	*	53.8%	*	51.3%	NA	43.0%
ELA	*	53.1%	*	54.9%	NA	56.1%

Pre-K Enrollment (PSIS)

	2018-2019
Colebrook School District	0

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 07	98.2%	97.6%	98.8%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Colebrook School District	NaN%
Regional School District 07	5.3%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	87.6%	84.0%	86.8%
Private	12.4%	16.0%	13.2%

profiles.ctdata.org

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Colebrook, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$6,460,629	Total Expenditures (2017)	$5,770,445	Annual Debt Service (2017)	$67,000
Tax Revenue	$5,420,995	Education	$3,924,760	As % of Expenditures	1.2%
Non-tax Revenue	$1,039,634	Other	$1,845,685	Eq. Net Grand List (2017)	$260,426,299
Intergovernmental	$980,358	Total Indebtedness (2017)	$558,244	Per Capita	$184,307
Per Capita Tax (2017)	$3,650	As % of Expenditures	9.7%	As % of State Average	122.1%
As % of State Average	124.5%	Per Capita	$395	Moody's Bond Rating (2017)	-
		As % of State Average	15.7%	Actual Mill Rate (2017)	29.30
				Equalized Mill Rate (2017)	19.80
				% of Net Grand List Com/Ind (2017)	6.1%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	807	88,068	1,507,711
% Single Unit (2013-2017)	92.7%	73.6%	59.2%
New Permits Auth (2017)	0	142	4,547
As % Existing Units	0.0%	0.2%	0.3%
Demolitions (2017)	0	32	1,403
Home Sales (2017)	8	1,753	21,880
Median Price	$262,100	$250,100	$270,100
Built Pre-1950 share	35.5%	31.2%	29.3%
Owner Occupied Dwellings	493	57,330	906,798
As % Total Dwellings	87.9%	76.8%	66.6%
Subsidized Housing (2018)	7	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	0	57	536
$100,000-$199,999	2	563	5,237
$200,000-$299,999	4	538	6,681
$300,000-$399,999	0	315	3,863
$400,000 or More	2	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$1,306	$995	$1,123
Cost-burdened Renters	19.6%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	792	101,000	1,827,070
Residents Unemployed	40	4,014	78,242
Unemployment Rate	4.8%	3.8%	4.1%
Self-Employed Rate	16.5%	13.0%	10.0%
Total Employers	34	6,177	122,067
Total Employed	216	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Colebrook, CT	22	Torrington, CT	82
Torrington, CT	12	Winchester, CT	62
Winchester, CT	9	New Hartford, CT	45
Granby, CT	6	Hartford, CT	39
West Hartford, CT	5	Farmington, CT	36
New Hartford, CT	4	North Canaan, CT	32
Bristol, CT	3	Colebrook, CT	22

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	258	1,777
Violent	65	228

Disengaged Youth (2013-2017)

	Town	State
Female	9.1%	4.2%
Male	6.5%	5.6%

	Town
Library circulation per capita	NA

Distance to Major Cities

	Miles
Hartford	26
Providence	86
New York City	103
Boston	108
Montreal	246

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Municipal Provider
Local Contact

Cable Provider
Charter Communications of Western CT
(800) 827-8288

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for
CORNWALL, CT

26 Pine Street
Cornwall, CT 06753

MMI #3843-06

Prepared for:
NORTHWEST HILLS
COUNCIL OF
GOVERNMENTS
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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Cornwall and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Cornwall is a picturesque rural town of almost 1,500 situated along the east bank of the Housatonic River. The town is famous for the covered bridge that spans the Housatonic River. Villages in the town include Cornwall, West Cornwall, and Cornwall Bridge.

Cornwall is located in central Litchfield County and is home to a population of approximately 1,291. Cornwall is bordered by the municipalities of Warren to the south, Goshen to the east, Canaan to the north, Kent to the southwest, and Sharon to the west.

Cornwall is located in the northwest region of Connecticut in an area known as Litchfield Hills. The topography of the town is characterized by steep slopes, rocky hills, small hills and valleys, and generally rolling terrain. The Housatonic River, the Hollenbeck River, Mill Brook, Furnace Brook, and numerous other small rivers and streams course through the town. The varying terrain of Cornwall makes the town vulnerable to an array of natural hazards.

2.2 Existing Land Use

The land area of Cornwall is approximately 46.0 square miles with an additional 0.2 square miles of water. A large portion of Cornwell is occupied by the Mohawk Mountain State Park and open, natural spaces. The beautiful landscape, covered bridges and recreational opportunities in the town attract many visitors to Cornwall year-round.

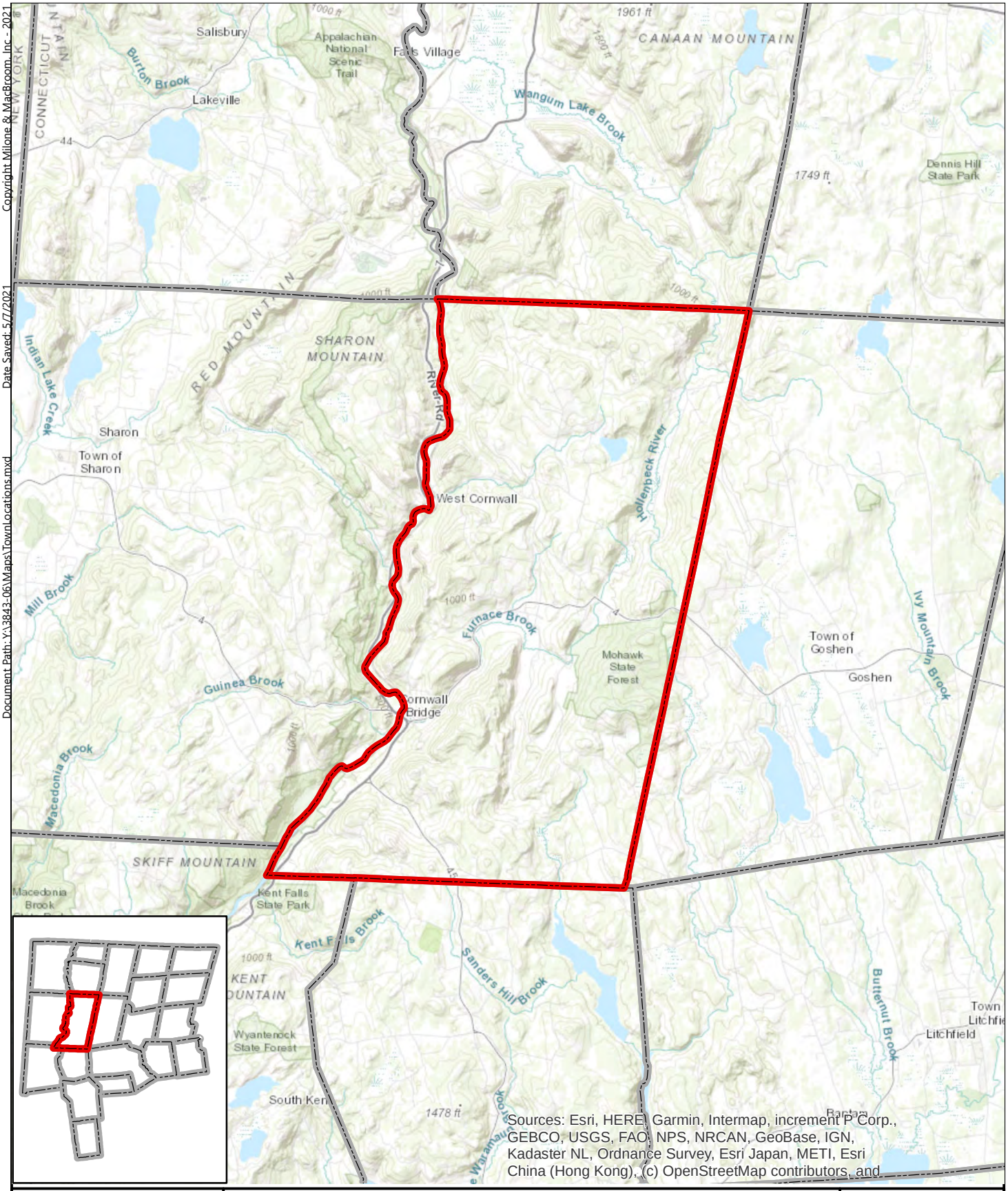
A small portion of the town consists of low-density residential and minor commercial uses. The majority of the businesses in the town are located within the village centers at Cornwall Bridge and West Cornwall.

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 83% of Cornwall is forested and approximately 5.6% is developed.

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REGIONAL LOCATION: CORNWALL

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GOSHEN, CT 06756

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0 5,500 11,000
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FIG. 2-1

Table 2-1: 2015 Land Cover by Area

Land Cover	Area (acres)	Percent of Community
Developed	1,657	5.58%
Turf & Grass	436	1.47%
Other Grass	293.5	0.99%
Agricultural Field	2,182	7.34%
Deciduous Forest	16,807	56.56%
Coniferous Forest	6,888	23.18%
Water	401.2	1.35%
Non-Forested Wetland	123.2	0%
Forested Wetland	890.5	3.00%
Tidal Wetland	0	0.00%
Barren	24.5	0%
Utility Row	14.4	0%
Total	**29,717**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

2.3 Development Trends

The 2010 U.S. Census reported a population in Cornwall of 1,420 individuals. U.S. Census Bureau estimates for 2019 show a population around 1,291 individuals, a decrease from 2010 of 9.1%. The Connecticut State Data Center predicts that population will decrease by 8.8% through 2025 to an estimated population of 1,178 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Cornwall remained steady between 2013 and 2017. The number of permits issued in 2013 and 2014 was 1 and 2, respectively, while 2 permits were issued in 2016, and 1 permits were issued in 2017. On average, 1 housing permits were issued each year in Cornwall between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Cornwall rose by approximately 2.1-percent between 2010 and 2019, from 1,007 units in 2010 to 1,029 units in 2019. In 2019, the housing stock was made up of approximately 94% single-unit structures, 2% two-unit structures, 4% multi-unit structures, and 0% mobile-homes or other types of structures. According the Town Plan of Conservation and Development adopted in 2020, there was a 44% vacancy rate in its housing units.

According to the Connecticut Office of Policy and Management, Cornwall's 2019 Total Equalized Net Grand List was valued at $397,174,336. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Cornwall, included as Appendix C.

Cornwall has experienced very little new construction in the last 5 years. The construction that has occurred has primarily been single-family homes. Development is mostly focused on renovation. There has been minimal development in floodplains, as the zoning regulations prevent most development in that overlay.

The Town believes that there will be increasing pressure and interest in multi-unit and senior housing in the coming years. If this type of development unfolds, the town should take care to ensure that vulnerable populations are sited in locations that are at low risk for natural hazards such as floods and wildfires.

A build-out analysis referenced in the 2010 Plan of Conservation and Development determined that under current zoning a maximum of 3,866 new housing units could be constructed if land were available, nearly four times the current housing stock. However, despite the available land, future development is unlikely in certain areas of town due to unsuitable building conditions such as wetlands, steep slopes and/or floodplains. The Plan of Conservation and Development also indicates that 11,147 acres of land in Cornwall is permanently protected (37.5% of the land area of Town). Approximately 2,125 of those acres have been protected by the Cornwall Conservation Trust.

Overall, development in Cornwall has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the future is not expected to increase exposure over the next five years.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

The Town of Cornwall is considered to have a moderate level of vulnerability, with higher vulnerability scores for the SVI category of "Household Composition & Disability." In other words, the presence of residents who may need additional assistance during a disaster event due to disabilities is a vulnerability of concern in Cornwall.

2.4 Geology

Cornwall is underlain by relatively hard metamorphic and igneous bedrock including a variety of gneiss, schist, and granite. The bedrock formations trend generally north to south.

Continental ice sheets moved across Connecticut at least twice in the late Pleistocene era. As a result, Cornwall's surficial geology is characteristic of the depositional environments that occurred during glacial and postglacial periods. Stratified glacial meltwater deposits are generally coincident with inland floodplains; the amount of stratified drift also has bearing on the relative intensity of earthquakes.

Cornwall is covered primarily (nearly 76%) by glacial till. Tills contain an unsorted mixture of clay, silt, sand, gravel, and boulders deposited by glaciers as a ground moraine. The deposits are generally less than 50 feet thick although deeper deposits of till are scattered across the hillier sections of the town. Stratified glacial meltwater deposits are related to the various water bodies in town, particularly the Housatonic River, Mill Brook and Hollenbeck River. These deposits primarily contain stratified sands and gravels.

2.5 Climate and Climate Change

Over the course of the year, the temperature in Cornwall typically varies from 17°F to 81°F and is rarely below 0°F or above 89°F. The warm season lasts from May 27 to September 15, with an average daily high temperature above 71°F. The cold season lasts from December 1 to March 10, with an average daily high temperature below 41°F.

Precipitation falls throughout the year in Cornwall. The wetter season lasts from April 9 to September 29, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on June 1. The drier season lasts from September 29 to April 9. The smallest chance of a wet day is 21% on January 29.

The most rain falls during the 31 days centered around September 30, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts from October 26 to April 20, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.3 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Cornwall as 4.66 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Cornwall at 5.32 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.7	5.9	8.3
NOAA Atlas 14	5.3	6.6	8.6

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Cornwall can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 5.8 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

Cornwall is divided among the following seven subregional drainage basins: Furnace Brook, Hollenbeck River, Housatonic River, Mill Brook, Shepaug River, West Branch Shepaug River and Marshepaug River. The watersheds are described in detail below.

The majority of the drainage basins have FEMA-defined Special Flood Hazard Areas (SFHAs) along the primary watercourses. Such areas consist of 1% annual chance storm floodplains without elevations, 1% annual chance storm floodplains with elevations, and 0.2% annual chance floodplains. Refer to Section 3 for more detail regarding SFHAs.

Furnace Brook

Draining a total of over thirteen square miles in central Cornwall, Furnace Brook drains a large network of streams. Valley Brook, Baldwin and Birdseye Brooks are of the larger streams that converge together at separate locations becoming Furnace Brook as the flow approaches Route 4. The main channel follows parallel to Route 4 until just before the mouth at the Housatonic River. Several low hazard dams are in place within the entire drainage but Nash Pond Dam is the only dam classified as significant hazard.

Hollenbeck River

Flowing with a northern orientation, the headwaters of the Hollenbeck River begin in Cornwall with the drainage basin making up northeast corner flowing into Canaan. Many tributaries enter into the main channel of the river including Brown Brook and Wangum Lake Brook both which make up sub drainage basins of their own. Swamp Brook comes down from the north just extending into North Canaan and enters Hollenbeck less than two miles east of the mouth. The river channel becomes highly sinuous with tight meanders in the lower stretch before draining into the Housatonic River. This pattern of flow has created extensive 100-year floodplains surrounding the last couple miles of river stretch before reaching the Housatonic. Two low hazard classified dams sit along the Hollenbeck River, one in Canaan holding back the

Hollenbeck Pond Dam and the other in Cornwall just off Bradford Brook called Van Doren Pond Dam.

Housatonic River

The Housatonic River drains an area of 1,948 square miles from Pittsfield, Massachusetts to Milford, Connecticut where it empties into Long Island Sound. The river flows a total of 134 miles from its upper reach to the sound with 1,234 square mile of the total drainage area existing in Connecticut. After crossing into Connecticut, the river creates the border for several towns including Salisbury, North Canaan, Canaan and just south, Sharon and Cornwall. Many of the sub regional drainages in these towns flow into the Housatonic River along with small tributaries that flow directly into the river, which make up the Housatonic sub regional drainage basin. The main channel of the Housatonic is lined with 100-year floodplains that extend on either side of the river with areas that further extend making up the 500-year floodplains.

Mill Brook

The Mill Brook watershed is approximately 2.5 miles long. The watershed begins above Cream Hill Lake and meanders through Western Cornwall before discharging to the Housatonic River at the covered bridge in West Cornwall.

Shepaug River

The part of Shepaug River in Cornwall is known locally as the East Branch Shepaug River. The East Branch and the West Branch (described below) together form the Shepaug River at the Shepaug Reservoir south of Cornwall. The Cornwall portion of the Shepaug River drainage basin is limited to the southeastern part of the town, consisting mainly of headwater streams that flow into the river across the town line in neighboring Goshen.

West Branch Shepaug River

The headwaters of the West Branch of Shepaug River begin in Cornwall joined by tributaries before and after the river enters Hawkins Pond. Spruce Brook flows into the pond adjacent to the outflow of the West Branch where the river continues south into the Upper Shepaug Reservoir. The West Branch of Shepaug River continues for a short stretch after the upper reservoir south into Shepaug Reservoir. The Upper Shepaug Reservoir is held back by a high hazard dam and below Hawkins Pond is classified as a low hazard dam. Out of approximately 10.5 square miles of total drainage area, approximately one quarter of the watershed is in Cornwall.

Marshepaug River

With headwaters originating in Goshen, Marshepaug River flows south to its convergence with the East Branch of Shepaug River where they form the Shepaug River. The majority of this sub-regional drainage basin lies in the town of Goshen with the mouth located in Litchfield. An area less than a couple hundred acres, located in Cornwall, is drained within this sub-basin.

Of the seven subregional basins, Mill Brook has the most influence on the town and its flood hazards. The majority of the Mill Brook watershed is located within the Town of Cornwall, and the brook has been the subject of intense interest in the town due to significant flooding that occurs in the watershed. The Brook flows westerly through the town, along State Road 128 and ultimately into the Housatonic River.

There are seven bridges along the brook that are at risk of damage from hazard events, such as flooding and wind damage.

The 1938 and 1955 hurricanes caused major damage along the Mill Brook corridor and the Lower River Road Bridge was damaged during hurricane Irene. Sections 3 and 4 of this plan will discuss these events and other events in more detail.

2.7 Governmental Structure and Capabilities

The Town of Cornwall is governed by a Selectman-Town Meeting form of government in which legislative responsibilities are shared by the Board of Selectmen and the Town Meeting. The First Selectman serves as the chief executive.

In addition to Board of Selectmen and the Town Meeting, there are boards, commissions and committees providing input and direction to Town administrators. Also, Town departments provide municipal services and day-to-day administration. Many of these commissions and departments play a role in hazard mitigation, including the Planning and Zoning Commission, Conservation Commission, Inland Wetland and Water Course Agency, the Building Official, the Land Use Office, the Fire Department, and the Highway Department. Cornwall also has an Emergency Management Director who coordinates emergency preparedness in the town.

Drainage complaints are routed through the First Selectman's office and the highway department. These complaints are usually received via phone, fax, mail, or email and are recorded in a logbook. The complaints are investigated as necessary until remediation surrounding the individual complaint is concluded.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Consideration of these resources in this HMP is critical.

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Cornwall include historic churches, homes, barns, cemeteries, and, of course, the West Cornwall Covered Bridge.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

2.9.1 Transportation

Route 7, Route 4, Route 43, Route 45, and Route 128 are the major transportation routes in Cornwall. Route 7 runs north-south along the Housatonic, and is west of Cornwall's borders north of Cornwall Bridge, and within its borders to the south. Route 4 runs east-west from Cornwall Bridge, through Cornwall Center, and east to Goshen. Route 43 runs north-south from Canaan to Cornwall Center, and Route 128 connects Cornwall Center to West Cornwall. College Street, Great Hill Road, and Great Hollow Road are important roads serving the southeast corner of Town.

There is no public transportation in Canaan.

2.9.2 Utilities

The Town of Cornwall has public water supply provided by Aquarion Water Company (in Cornwall Center / East Cornwall), the Cornwall Water Company (in Cornwall Bridge), Kugeman Village, and a number of Non-Community Public Water Systems.

There is no sanitary sewer collection system in Cornwall, with residents and businesses relying on septic systems.

Cornwall is exploring alternatives for improving wastewater collection and treatment practices in the village of West Cornwall. West Cornwall is comprised of primarily small lot residential properties, with a few small businesses and summer vacation homes. Due to the small parcel size, many property owners find it difficult to either install subsurface wastewater disposal systems or upgrade existing systems.
The lack of properly-functioning wastewater systems in the area presents both environmental and public health concerns that can be exacerbated during a natural hazard.

A West Cornwall Wastewater Management Study was completed in November of 2017. The Study identifies the need for system upgrades and outlines a management plan to mitigate any further contamination. Actions taken based on the Study results will decrease the risk of detrimental impacts to important local and regional drinking water sources. An alternative identified in the study is construction of a Community Wastewater Treatment System.

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Cornwall.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Cornwall has identified many critical facilities, such as emergency response, governmental buildings, and as utilities, which are necessary to ensuring that day-to-day management of the town continues. Facilities such as nursing homes, schools, and emergency supply storage areas are also considered critical facilities since these contain populations that are more susceptible in an emergency or house important supplies. Not all municipal buildings are critical facilities. Table 2-3 presents a list of critical facilities in Cornwall.

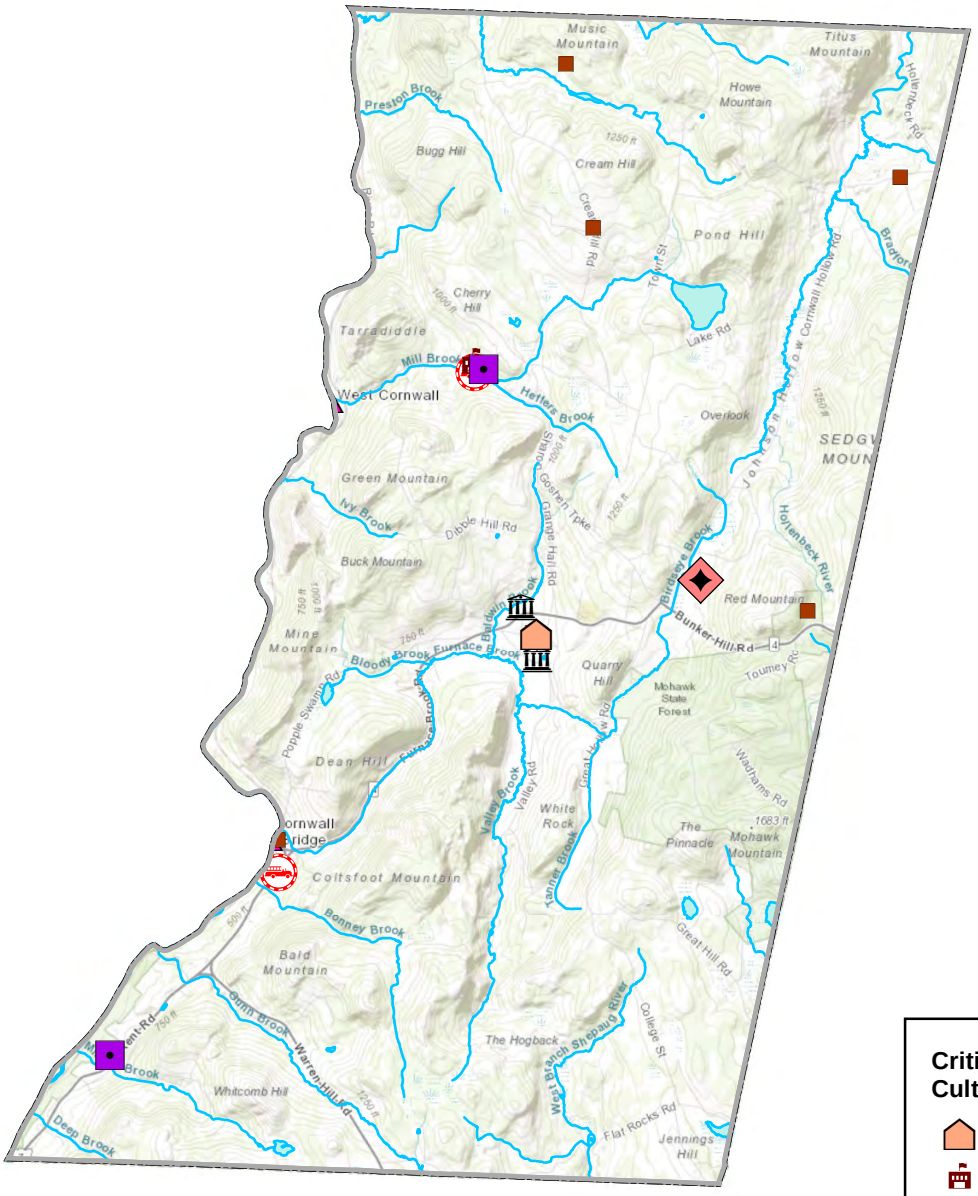
Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	In SFHA
West Cornwall Fire Station	289 Sharon Goshen Tpk	Emergency Operations Center	✓		✓
Town Hall Complex (two buildings)	183 Main Street	Critical Records Backup EOC	✓		
Cornwall Bridge Fire Station	35 Kent Road South	Emergency Response	✓		
Cornwall Consolidated School	5 Cream Hill Road	Primary Shelter	✓	✓	
United Congressional Church	8 Bolton Hill Road	Secondary Shelter		✓	
Cornwall Child Center	8 Cream Hill Road	Daycare			
Bonney Brook	Kent Road	Senior Housing			
Kugeman Village	256 Kent Road South	Housing			
Cornwall Highway Department	24 Furnace Brook Road	Regional Emergency Support	✓		
CT DOT Garage	24 Bunker Hill Road	Regional Emergency Support			
AT&T	9 Cemetery Hill Road	Phone Switching Station	✓		
Eversource Substation	104 Cemetery Hill Road	Power Substation			
The Cornwall Library	30 Pine Street	Comfort Station			
East Cornwall Village Water System Pump House	Valley Road	Serves East Cornwall Village, including Town Hall, Library, Congregational Church.	✓		

Emergency Response Capabilities

The Emergency Management Director and the Cornwall Fire Department coordinate emergency preparedness in the Town of Cornwall. That department develops plans, protocols, and procedures that assure the safety of Cornwall's citizens. It also provides training for emergency response personnel, supports state and local emergency response exercises, and provides technical assistance to state and local emergency response agencies and public officials. Its goal is to provide citizens with the highest level of emergency preparedness before, during, and after disasters or emergencies.

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Critical Facilities & Cultural Resources

- Shelter
- School
- Care Facility
- EMS
- Emergency Response
- Fire Station
- Municipal Facility
- National Register Building
- National Register Structure
- National Register

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CRITICAL FACILITIES AND CULTURAL RESOURCES

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FIG. 2-2

The Town's Emergency Operations Center (EOC), including its Emergency Communications Center, is located at the West Cornwall Fire Department. The EOC has a generator that can power the entire building. The Town received a $40,000 grant under HMGP in the last five years to install a new generator at the West Cornwall Fire House.

The Town has an EOP that guides its response to emergencies arising from both natural and anthropogenic hazards.

State and federal roads are the major transportation arteries (and therefore evacuation routes) into and out of the town. These include Route 7, and Route 4, which are integral in transporting patients to the hospital.

Emergency services can also be cut off by fallen trees or washed-out culverts during certain emergencies. The Town performs tree and shrub removal, with a focus on critical roadways. During emergencies and following storms, the highway garage responds to calls related to downed trees.

Civilian Emergency Response Team

Cornwall has established a Civilian Emergency Response Team (CERT) consisting of local volunteers. This team mobilizes when there is a town-wide disaster to help facilitate emergency response activities. The CERT is overseen by the EMD.

Sheltering Capabilities

Cornwall Consolidated School is the primary shelter. This facility has a back-up generator. The United Congregational Church is the secondary shelter, but this facility does not have backup power. The Town will pursue installation of an emergency generator at this site.

Cornwall has used the Cornwall Library, located next to Town Hall, as a comfort station during hazard events. During the power outages associated with Tropical Storm Isaias, the Town utilized the library as a cooling center and charging station. The facility does not have an emergency generator, but was able to retain power during that event.

The small commercial area in Cornwall Bridge includes Cornwall Country Market, which has a generator. This is not a critical facility, but is still an important asset for the Town with regards to resilience during power outages. The Cornwall Bridge Fire Station is also located in this area. The nearest gas station to town is also located in this vicinity, but is actually in the Town of Sharon. The Bonnie Brook confluence with the Housatonic is located here – this Brook presents flood risks.

In case of a sustained power outage, it is anticipated that 10 to 20% of the population (140 to 240 people) would relocate, although not all of those relocating would necessarily utilize the shelter facilities.

Emergency Alerts and Communication

The Town utilizes a program known as CTAlert to direct geographically specific emergency notification telephone calls into affected areas.

The Town is working on the following hazard mitigation efforts related to emergency alerts and communication:

- Through mailers, encouraging residents to build capacity to be self-reliant in case of outages, road blockages.
- Making local internet service more resilient to hazards.
- Updating its emergency communications system to utilize multiple forms of communication (landline, cell phone calls and texts, emails, etc.), as opposed to the current system that only uses landlines. The Town is currently working to get residents to provide contact information.

Critical Utilities

The Eversource Substation on Cemetery Hill Road is the main power distribution center for the Town, and is therefore a key facility with regards to power outages.

The East Cornwall Village Water System Pump House has an emergency generator, and is therefore able to maintain public water supply for that community during power outages. Outside of East Cornwall Village, most of the town is on private wells. These wells are susceptible to power outages. During the power outages following Tropical Storm Isaias, the Town created a public water-filling station at Foote Fields, which is served by the Cornwall Village Water System.

The cellular towers in Town are important for sustaining communication through hazard events, especially as more and more people transition away from landline phone and to cell-phones. The towers are under the control of the private companies that own them. They are not located in flood hazard zones. They are not listed as critical facilities.

3 FLOODING

3.1 Existing Capabilities

The Town discourages new construction and substantial reconstruction within the 1% annual chance floodplain by raising concerns during the floodplain permit process. The majority of floodplain property is owned by the State, or has conservation easements placed on it – there is not a lot of land for sale in hazard areas, so development potential is low. Additionally, The Housatonic River Overlay Zone delineated along the Housatonic River further limits development potential in that hazard zone.

Ordinances, Regulations, and Plans

Regulations, codes, and ordinances that apply to flood hazard mitigation in conjunction with and in addition to NFIP regulations include:

- ***Flood Insurance Program Regulations***: The Town's Flood Regulations were adopted in 1987 and deals with Floodplain Management, including establishing areas of special flood hazard, restrictions, development permit requirements, permitted uses, and standards for flood hazard reduction. The objectives of the regulations is to:

  > *Protect human life and health; minimize expenditure of public money for costly flood control projects; minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public; to help maintain a stable tax base by providing for the sound use and development of flood prone areas in such a manner as to minimize flood blight areas and to insure that potential home buyers are notified that property is in a flood area.*

  New residential and commercial buildings are required to be elevated to the base flood elevation plus two feet. These regulations were last updated in 1992 and do not include the State of Connecticut's most recent recommended language.

- ***Inland Wetlands and Watercourse Regulations***. These regulations were adopted in 1974 and were most recently amended in 1991. The purpose of the inland wetlands and watercourses regulations is to protect the quality of the inland wetlands and watercourses within the Town of Cornwall by making provisions for the protection, preservation, maintenance, and use of inland wetlands and watercourses, including deterring and inhibiting the danger of flood and pollution.

  - Section 2.1 defines "Regulated Activity" means any operation within or use of a wetland or watercourse involving removal or deposition of material, or any

obstruction, construction, alteration or pollution, of such wetlands or watercourse but shall not include the specified activities in Section 22a-40 of the Connecticut General Statutes. Furthermore, any clearing, grubbing, filling, grading, paving, excavating, constructing, depositing or removing of material and discharging of storm water on the land within 150 feet measured horizontally from the boundary of any wetland or watercourse is a regulated activity. The Agency may rule that any other activity located within such upland review area or in any other non-wetland or non-watercourse area is likely to impact or affect wetlands or watercourses and is a regulated activity.

- Section 4.1.b states that no residential homes will be permitted "as of right" in wetlands and watercourses after July 1, 1987.
- Section 6.1 states that no person may conduct or maintain a regulated activity without obtaining a permit. Section 7 outlines the permit application requirements.

- ***Plan of Conservation and Development.*** This document is the Town's vision statement for future development, and is updated every 10 years. The most recent edition has an effective date of January 2020.

  Goals and Actions relevant to flood mitigation include the following:
  - **Natural Resources and Conservation Section**
    - Goal: Protect priority forests, farmland, wetlands, and wildlife corridors.
      - Task: Create a methodology for evaluating and ranking the conservation value of properties that become available for sale.
    - Goal: Conserve and protect Cornwall's drinking water and recreational water bodies including wetlands with riparian buffers, streams, and the Housatonic River Watershed
      - Task: Compare existing floodplain regulations in Cornwall with DEEP's "Model Floodplain Management Regulations" and revise as appropriate.
      - Task: Amend the subdivision and zoning regulation requirements on storm water management to require, whenever feasible, the use of low-impact design (LID) techniques for the management of storm water runoff. Example: Morris, CT Low Impact Sustainable Development Design Manual
    - Goal: Address the proliferation of invasive species (may be relevant for mitigating drainage issues associated with clogging due to invasive species growth)
  - **Community, Cultural, & Youth Resources Section**
    - Goals in this section include meeting the needs of older residents, supporting and attracting volunteer firefighters and EMS personnel, and preserving historic resources.

- Zoning Regulations
  - The Housatonic River Overlay Zone was adopted in 2014 in Cornwall and in the other member towns of the Housatonic River Commission. The Inner Corridor is a relatively narrow, variable width band of land along the banks of the Housatonic River composed of 100 year flood hazard areas, soils generally not suited for development and a minimum continuous Inner Corridor width. The Inner Corridor includes limits to impervious surface extents, proximity to the river of new construction, drainage and erosion impacts, and other environmental impacts. The Outer Corridor consists of that portion of the immediate river watershed lying between the Inner Corridor and the top of the river valley ridge, and delineated by lines drawn from peak to peak along the ridge line. Low Impact Development and other runoff reduction measures are encouraged in the Outer Corridor.

- ***Subdivision Regulations.*** Adopted in 1987 and updated in 2009, the Town's Subdivision Regulations establish minimum acceptable standards of street construction; regulate the layout and development of lots and streets; and outline measures to prevent degradation of potable water sources, control erosion and siltation, preserve adequate and convenient open spaces, and retain the natural features of the land.

  - Article III requires a hydrologic report when an application involves storm drainage improvements or construction within or near the 100-year flood hazard area.
  - Article IV states that a development permit shall be obtained for any construction or development as required in accordance with the Zoning Regulations
  - Article VI, Section 6.8(d) states that storm drainage for streets shall be planned and designed to prevent flooding and soil erosion.
  - Article VI, Section 6.8(4) states that the discharge of all storm water that has been collected or otherwise artificially channeled shall be into suitable natural streams, wetlands or into Town or State drainage systems with adequate capacity to carry the discharge. Otherwise there shall be no discharge onto or over private property within or adjoining the street unless (a) proper easements and discharge rights have been secured by the applicant, (b) such easements and rights are transferable to the Town and (c) there will be adequate safeguards against soil erosion and flood danger.
  - Article VII, Section 7.0 states that drainage systems shall provide for the prevention of flooding and soil erosion and protect wetlands and watercourses.

    The intent of these regulations is to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions

in specific areas of the Town of Cornwall by the establishment of standards designed to:

- Protect human life and public health
- Minimize expenditure of money for costly flood control projects
- Minimize the need for rescue and relief efforts associated with flooding
- Minimize prolonged business interruptions
- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone, and sewer lines; and streets and bridges located in floodplains
- Maintain a stable tax base by providing for the sound use and development of floodprone areas in such a manner as to minimize flood blight areas
- Ensure that purchasers of property are notified of special flood hazards
- Ensure the continued eligibility of owners of property in Cornwall for participation in the NFIP

NFIP, Flood Insurance, and Community Rating System

The NFIP administrator for the Town oversees the enforcement of NFIP regulations. The degree of flood protection established by the variety of regulations in the Town meets the minimum reasonable for regulatory purposes under the NFIP. The Town is not enrolled in the Community Rating System program.

According to FEMA, there are 10 flood insurance policies in force in Cornwall as of 6/30/2019 with an insurance value of $2,445,000.

Drainage and Street Flooding

There are areas of minor street flooding throughout the town, and these are addressed by the Highway Department as necessary. These typically relate to small areas and result in limited, if any, property impacts.

The Highway Department is in charge of the maintenance of the town's drainage systems and performs clearing of bridges and culverts and other maintenance as needed. Drainage complaints are routed to the Office of the First Selectman and the Highway Department. The Town uses these reports to identify potential problems and plan for maintenance and upgrades.

Structural Projects

The town has completed structural projects for flood mitigation as needed.

Communications

The National Weather Service issues a flood watch or a flash flood watch for an area when conditions in or near the area are favorable for a flood or flash flood, respectively. A flash flood watch or flood watch does not necessarily mean that flooding will occur. The National Weather Service issues a flood warning or a flash flood warning for an area when parts of the area are either currently flooding, highly likely to flood, or when flooding is imminent.

The Town can access the National Weather Service website at www.weather.gov to obtain the latest flood watches and warnings before and during precipitation events.

The Town receives regular weather updates through Division of Emergency Management and Homeland Security (DEMHS) Region 5 email alerts as well as watches and warnings through the National Weather Service.

Public Information

The town actively participates in public information programs. For example, a number of publications that promote preparedness are available in public places such as the town hall annex. Furthermore, the town participates in public meetings about emergency management such as the meeting of October 23, 2013 that covered such topics as fire safety (refer to pictures to the right).





The Fire Department web site lists emergency information and the town maintains an advertised call list for emergencies.

A community newsletter entitled "Surviving the Next Big Storm" was prepared and made available to the public following Hurricane Isaias in August 2020.

Regional Studies

CT DOT Climate Change and Extreme Weather Pilot Project

The CT DOT completed a "Climate Change and Extreme Weather Pilot Project" in 2014 using a grant from the Federal Highway Administration. The project included vulnerability assessments of culverts and bridges in Litchfield County with regard to flooding caused by increasing precipitation and extreme rainfall events. The hydraulic capacity of structures was evaluated using existing storm event design standards (based on NOAA TP-40 precipitation figures), the recent (ten year) historic actual rainfall intensity and frequency, and the projected increases in rainfall based on best available

data and studies. The project also assigned a criticality value to each structure assessed to assist the Department in prioritizing replacement and reconstruction efforts.

The results of this project provide a model process for assessing the hydraulic capacity and criticality of culverts and bridges in the NHCOG region. Importantly, the project identified precipitation figures from the NRCC as a preferred alternative to the more obsolete TP-40 figures. These figures are provided in Table 2-2.

Housatonic River Valley Association Studies

The Housatonic River Valley Association has been conducting stream habitat continuity assessments in the Connecticut portion of the Housatonic River Watershed. The purpose of the assessment is to identify road crossings that may be barriers for fish and wildlife, public hazards or impediments to emergency services during flood events. Canaan can use the results of these assessments to identify structures in need of attention.

Natural Resource Protection

According to the POCD, the Town of Cornwall discusses the need to "pursue the preservation and protection of important open space land with a focus on the protection of scenic areas, wildlife corridors, farmland, water resources and land with opportunities for passive recreation." The POCD also recommends support for the Cornwall Conservation Trust who is focusing on land protection and management activities in the town.

New Capabilities and Completed Actions

Cornwall has replaced the culvert on Lake Road at the Hollenbeck River with a larger capacity structure. These types of structural improvements are continually made as needs are identified.

Summary

In summary, the Town primarily attempts to mitigate future flood damage and flood hazards by restricting building activities in floodprone areas. This process is carried out through both the Planning and Zoning and the Inland Wetlands Commissions. All watercourses are to be encroached minimally or not at all to maintain the existing flood-carrying capacity. These regulations rely primarily on the FEMA-defined 1% annual chance flood elevations to determine flood areas.

3.2 Vulnerabilities and Risk Assessment

Vulnerability Analysis of Critical Facilities

The list of critical facilities provided by the Town was used with the parcel data to accurately locate each critical facility throughout the town. One critical facility was found to lie within the 1% annual chance floodplains of a variety of watercourses in the town.

Table 3-1: Critical Facilities Located Within the 1% Annual Chance Floodplain

Name or Type	Address	Flooding Source
West Cornwall Fire Station	289 Sharon Goshen Turnpike	Mill Brook

The West Cornwall Fire Station is located on Sharon Goshen Turnpike. While this building is not known to have experienced serious flooding damage in recent years, its proximity to the Mill Brook makes it vulnerable to flooding. Town staff report that the facility was not impacted by flooding during Tropical Storm Irene in 2011; the Town reportedly experienced flooding at or near the 1% Annual-Chance Flood extent during that event.

Vulnerability Analysis of Areas Along Watercourses

The Housatonic River and Mill Brook pose the greatest flood risks to people, buildings and infrastructure. Floodplains with and without elevations are delineated for the majority of the floodprone brooks in the town. The majority of the brooks in the town pose a risk from flooding.

Mill Brook

The most frequently flooded areas in the town are adjacent to Mill Brook. Flooding along this watercourse dates back to the 1938 and 1955 hurricanes, which reportedly caused major damage. The Mill Brook drainage basin and stream corridor pose flood risks in the vicinity of Lower River Road in West Cornwall.

There are also seven bridges that span the length of the Brook that are highly susceptible to wind and flood damage. The bridges are historically significant to the Town and measures need to be developed to protect them from further damage.

It may be beneficial to conduct a study of the Mill Brook watershed to determine the best measure for protecting residents, property and structures form future flooding and storm damage.

Housatonic River

River Road floods near the Housatonic River and has been identified as an area of concern. Erosion of the retaining wall has occurred in some places and the Town has a pending HMGP application for riverbank stabilization. A comprehensive evaluation of this area may be needed to determine appropriate strategies to address flooding and stabilization along River Road.

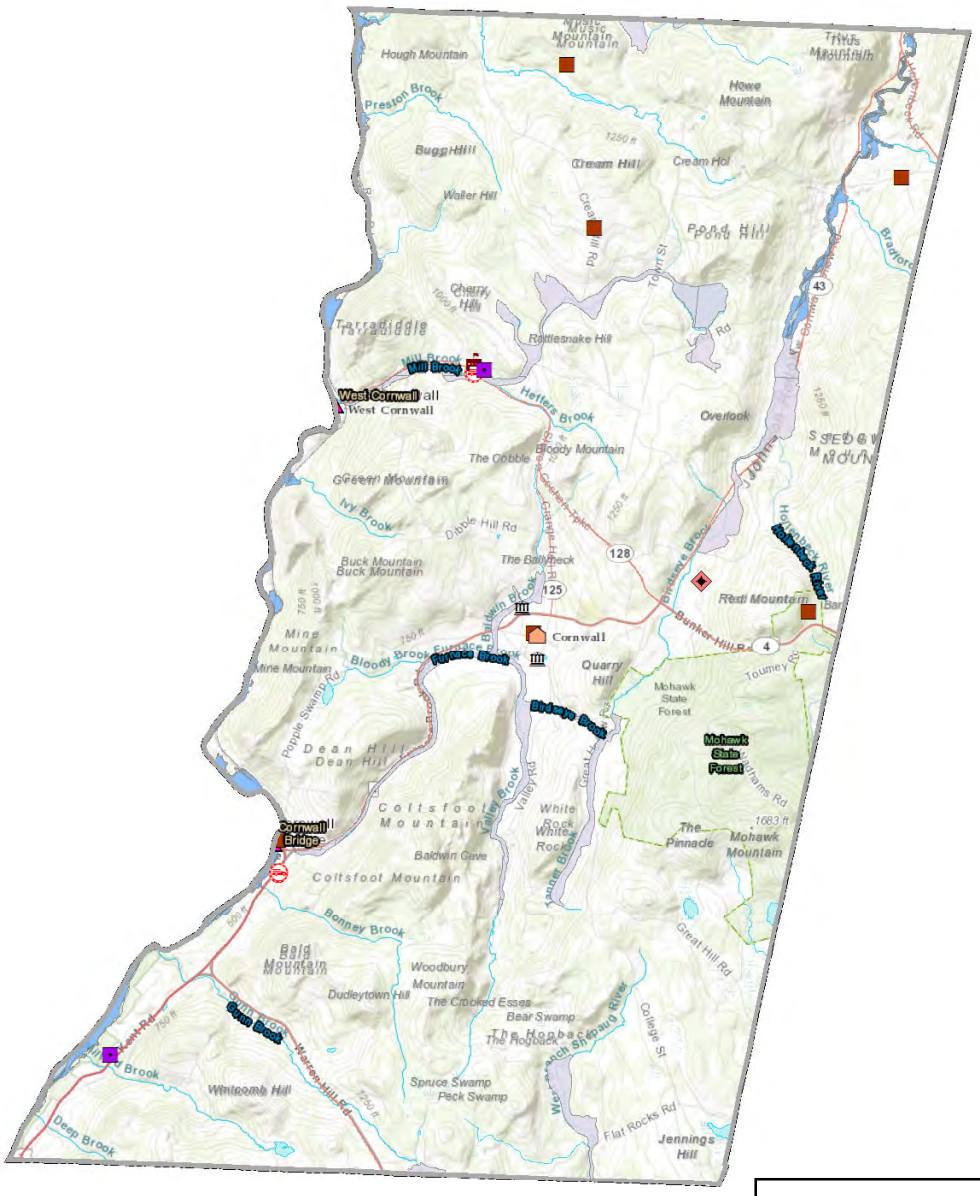
Furnace Brook

Significant flood problems are not typical along the Furnace Brook in Cornwall. However, a limited number of homes as well as portions of Route 4 are susceptible to flooding.

Hollenbeck River

A culvert is undersized and overtops at Lake Road. The town cleans and repairs the culvert as needed. This area flooded during Irene. In the long term, the town may need to address the problem, but the residents have alternate egress and therefore the work is not urgent.

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Legend

- Shelter
- School
- Care Facility
- EMS
- Emergency Response
- Fire Station
- Municipal Facility
- National Register Building
- National Register Structure

Flood Zone

- A
- AE
- FLOODWAY
- D
- X500

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - CORNWALL ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 4,000 8,000
Feet

SCALE 1 " = 8,294 '
DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing mitigation measures appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Cornwall is 105 mph for a Category 1 event, 115 mph for a Category 2, and 120 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Parts of tall and older trees may fall during heavy wind events, potentially damaging structures, utility lines, and vehicles. Eversource, the local electric utility, provides tree maintenance near its power lines. The town would like to work with Eversource to ensure that proactive maintenance is being conducted throughout the town.

The First Selectman of the Town is the tree warden and assists in managing all trees on Town-owned property, including within the street rights-of-way. With its limited budget, the town tends to focus on the most critical roadways. The Town does not have ordinances or regulations that require utilities to be placed underground, but it is encouraged whenever possible in order to mitigate storm-related damages.

During emergencies, the Town currently has two designated emergency shelters available for residents as discussed in Section 2.9.

During Tropical Storm Irene, the Town used the CTAlert system to notify all residents in the SFHA that they may evacuate and use one of the shelters. Prior to severe storm events, the Town ensures that warning/notification systems and communication equipment are working properly and prepares for the possible evacuation of impacted areas.

Ordinances, Regulations, and Plans

- ***Plan of Conservation and Development.*** This document includes Goals and Actions relevant to wind hazard mitigation, such as the following:
  - **Economic Development Section**
    - Economic development goals include making it easier for residents to work from home and improving high speed internet and cell coverage. Efforts to achieve this goal may improve the resiliency of the Town's landline, cellular, internet, and other communication utilities.
  - **Housing Section**
    - One of the Housing goals listed is to make the housing stock more energy efficient and accessible. More energy efficient homes may not be as significantly impacted during a power outage.
  - **Natural Resources and Conservation Section**
    - Goal: Promote sustainability efforts including SustainableCT participation and implementing further energy conservation measures (many of these would improve the resiliency of the Town's power system)
      - Task: Achieve and maintain SustainableCT certification. The SustainableCT.org Program, a voluntary certification program, is a master list of best practices, expertise, and funding to create strong, resilient towns.

4.1.1 New Capabilities and Completed Actions

Town staff report that the ability of residents to be self-reliant during service outages (specifically loss of power) has increase over the last five years, as more residents have acquired emergency generators (possibly in response to the extended outages of 2011). At the same time, an increased trend of remote work (especially during the COVID-19 pandemic) has generally cut down on the need for people to travel on roads following disasters, making it easier for the Town to clean up.

4.1.2 Summary

Cornwall mitigates Hurricane wind hazards through tree trimming and debris management, enforcement of the State Building Code, and utilization of emergency alert and warning systems. The Town's POCD includes goals and actions that, as they are pursued, will improve Cornwall's capabilities to mitigate wind hazards.

4.2 Vulnerabilities and Risk Assessment

Setting

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Vulnerabilities and Risk

In general, as the residents and businesses of the state of Connecticut become more dependent on the internet and mobile communications, the impact of hurricanes on commerce will continue to increase. A major hurricane has the potential of causing complete disruption of power and communications for up to several weeks, rendering electronic devices and those that rely on utility towers and lines inoperative.

Debris such as signs, roofing material, and small items left outside become flying missiles in hurricanes. Extensive damage to trees, towers, aboveground and underground utility lines (from uprooted trees or failed infrastructure), and fallen poles cause considerable

disruption for residents. Streets may be flooded or blocked by fallen branches, poles, or trees, preventing egress. Downed power lines from heavy winds can also start fires during hurricanes with limited rainfall.

A railroad track runs right along the residential area in West Cornwall. During Tropical Storm Isaias, trees and wires came down onto the railroad tracks; reportedly live wires may have temporarily energized the tracks themselves. This also creates a risk of derailment.

The Town of Cornwall is vulnerable to hurricane damage from wind and flooding and from any tornadoes accompanying the storm Wind damage from hurricanes and tropical storms has the ability to affect all areas of Cornwall while areas susceptible to flooding are even more vulnerable. Factors that influence vulnerability to tropical cyclones in the town include building codes currently in place, local zoning and development patterns, and the age and number of structures located in highly vulnerable areas of the community.

The Town is uncertain whether any Town-owned critical facilities have wind-mitigation measures installed to specifically reduce the effects of wind. Thus, it is believed that nearly all of the critical facilities in the town are as likely to be damaged by hurricane-force winds as any other. Many of the Town's older structures, such as the Town Hall, may not meet current building code with respect to wind.

Cornwall's housing stock consists of historic buildings greater than 50 and sometimes 100 years old, relatively younger buildings built before 1990 when the building code changed to address wind damage, and relatively recent buildings that utilize the new code changes. Since most of the existing housing stock in the town predates the recent code changes, many structures are highly susceptible to roof and window damage from high winds. Homes located within SFHAs are also at risk from flooding as a result of the heavy rainfall that typically occurs during tropical storms and hurricanes.

As the Town of Cornwall is not affected by storm surge, hurricane sheltering needs have not been calculated by the U.S. Army Corps of Engineers for the town. The Town determines sheltering need based upon areas damaged or needing to be evacuated within the town. Under limited emergency conditions, a high percentage of evacuees will seek shelter with friends or relatives rather than go to established shelters. During extended power outages, it is believed that only 10% to 20% of the affected population of the town will relocate while most will stay in their homes until power is restored. In the case of a major (Category Three or above) hurricane, it is likely that the Town will depend on state and federal aid to assist sheltering displaced populations until normalcy is restored.

Town staff report that residents have become more reliant on internet and cell phones in recent years (this is particularly true since the beginning of the COVID-19 pandemic, which vastly increased the number of people working remotely from home), leading to two challenges of concern:

- Power or internet outages have a greater economic impact in the form of lost work and productivity (after Isaias, some residents reportedly had to leave town and set up in hotels or other locations with internet in order to keep their businesses going).
- Fewer landlines make communication more challenging during power and internet outages.

Tropical Storm Isaias

Tropical Storm Isaias passed through Cornwall on August 4, 2020. This event manifested primarily as a high wind hazard in the Town, and led to many downed trees, limbs, and powerlines.

Cornwall lost power, internet, and cellphone service town wide. While cellphone service was restored relatively quickly, power restoration didn't begin until four days after the storm. Most residents had power restored by 7 days following the event. By August 27 the Town was still dealing with a couple of locations without internet. Town staff report that the response of Eversource was unsatisfactory, both because of a poor communication and because of the pace of the overall response.

During the power outages, private wells were not able to run, and many residents had no water. The Town opened a public water filling station in Cornwall Village. The Cornwall Library was opened as a cooling and charging center; the Town did not need to provide any overnight sheltering, primarily because the warm weather did not make it necessary.

Most roads in town were blocked by fallen branches and trees, though the Town was able to reopen most roads within 24 hours. Only a few small pockets around town remained isolated.

Damages from the storm were caused by lost food (because of loss of refrigeration), lost work (many people are working from home on the internet), around 5 trees that landed on houses, and other economic impacts. This event was particularly challenging for the community because it occurred on top of the COVID-19 epidemic; the Town had been in an emergency 6 months straight prior to the storm event.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Cornwall as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

Municipal responsibilities relative to summer storm and tornado mitigation and preparedness include:

- ❑ Developing and disseminating emergency public information and instructions concerning tornado, thunderstorm wind, lightning, and hail safety, especially guidance regarding in-home protection and evacuation procedures and locations of public shelters
- ❑ Designating appropriate shelter space in the community that could potentially withstand lightning and tornado impact
- ❑ Periodically testing and exercising tornado response plans
- ❑ Putting emergency personnel on standby at tornado "watch" stage
- ❑ Utilizing the CT Alert notification system to send warnings into potentially affected areas.

Although tornadoes pose a threat to all areas of the state, their occurrence is not considered frequent enough to justify the construction of tornado shelters. Instead, the state has provided NOAA weather radios to all public schools as well as many local governments for use in public buildings. The general public continues to rely on mass media for knowledge of weather warnings. Warning time for tornadoes is very short due to the nature of these types of events, so predisaster response time can be limited. However, the NOAA weather radios provide immediate notification of all types of weather warnings in addition to tornadoes, making them very popular with communities.

5.1.1 New Capabilities and Completed Actions

Cornwall continues to improve its emergency response and communication capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

5.1.2 Summary

Cornwall mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Cornwall has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

Thunderstorms are expected to impact Cornwall 20 to 30 days each year. The majority of these events do not cause any measurable damage. Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Cornwall area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Cornwall is considered moderate in any given year.

Vulnerabilities and Risk

An EF1 tornado struck neighboring Falls Village on August 2, 2020. The storm tracked for about 1.7 miles, was about 30 yards wide, had a maximum wind speed of 90 mph. The storm took down trees, closed roads, and damaged a business. A tornado in 1989 left a path of destruction from New York State through Cornwall to Bantam and into Watertown; it took almost ten years for Cornwall to completely recover from the extensive damage caused by this event.

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the town of Cornwall is believed to be low for any given year. All areas of the town are susceptible to damage from high winds although more building damage is expected in the town center while more tree damage is expected in the less densely populated areas.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Eversource trims trees along powers lines. The town tree warden can remove dead and diseased trees in rights-of-way or Town land. Town-owned equipment is used except for complex situations, which would call for the use of a contractor.

Town personnel note that strong thunderstorms will cause power lines to fall all over the town. Most downed power lines in Cornwall are detected quickly, and any associated fires are quickly extinguished. Such fires can be extremely dangerous during the summer months during dry and drought conditions. It is important to have adequate water supply for fire protection to ensure the necessary level of safety is maintained.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms. Such facilities susceptible to flooding damage were discussed in Section 3.5.

Summary

In summary, the entire Town of Cornwall is at relatively equal risk for experiencing damage from summer storms and tornadoes. Based on the historic record, at least one tornado has resulted in costly damage to the town. However, more frequent storm damages are relatively site specific and occur to private property (and therefore are paid for by private insurance). For municipal property, the Town budget for tree removal and minor repairs is generally adequate to handle summer storm damage.

6 WINTER STORMS

6.1 Existing Capabilities

Programs that are specific to winter storms are generally those related to preparing plows and sand and salt trucks, tree trimming to protect power lines, and other associated snow removal and response preparations.

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas.

CTDOT plows all State roads and Interstates. The Town primarily uses Town staff for plowing operations on the remaining miles of roadway. The Town has five trucks for plowing. Priority is given to plowing egresses to critical facilities. The First Selectman has noted that snow removal is a relatively fundamental capability in Cornwall.

Prior to a winter weather event, the Town ensures that all warning/notification and communications systems are ready and ensures that appropriate equipment and supplies, especially snow removal equipment, are in place and in good working order. In some known problem areas, prestorm treatment is applied to roadways to reduce the accumulation of snow. The town uses sand and salt for deicing. The Town also prepares for the possible evacuation and sheltering of some populations that could be impacted by the upcoming storm (especially the elderly and special needs persons).

For municipal property, the Town budget for tree removal and minor repairs is generally adequate to handle winter storm damage although the plowing budget is often depleted.

6.1.1 New Capabilities and Completed Actions

Cornwall continues to maintain its strong winter storm mitigation capabilities.

6.1.2 Summary

Cornwall mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events and snow events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

After a storm, snow piled on the sides of roadways can inhibit sight lines and reflect a blinding amount of sunlight. When coupled with slippery road conditions, poor sightlines and heavy glare create dangerous driving conditions. Stranded motorists, especially senior and/or handicapped citizens, are at particularly high risk of injury or death from exposure during a blizzard. The elderly population in Cornwall, in particular, is susceptible to the impacts created by winter storms due to resource needs (heat, electricity loss, safe access to food, etc.).

The structures and utilities in the Town of Cornwall are vulnerable to a variety of winter storm damage. Tree limbs and some building structures may not be suited to withstand high wind and snow loads. Ice can damage or collapse power lines, render steep gradients impassable for motorists, undermine foundations, and cause "flood" damage from freezing water pipes in basements. Drifting snow can occur after large storms, but the effects are generally mitigated through municipal plowing efforts.

Icing causes difficult driving conditions throughout the hillier sections of the town. Exposed hilltops are more at risk to high winds and snow drifts. Snowfall characteristics can vary widely between the valleys and the hilltops. The Town's standard of presalting has been helpful in controlling ice in these problem areas.

No critical facilities are believed to be more susceptible to winter storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to winter storms.

Summary

In summary, the entire Town of Cornwall is at relatively equal risk for experiencing damage from winter storms although some areas (such as icing trouble spots and neighborhoods with a high concentration of flat roofs) are more susceptible. Many damages are relatively site-specific and occur to private property, while repairs for power outages are often widespread and difficult to quantify to any one municipality.

7 EARTHQUAKES

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Cornwall. The Town has adopted these codes for new construction, and they are enforced by the Building Official. Due to the infrequent nature of damaging earthquakes, land use policies in the Town do not directly address earthquake hazards. However, various documents do indirectly discuss areas susceptible to earthquake damage and regulations that help to minimize potential earthquake damage:

- ***Subdivision Regulations***. The 2009 regulations do not explicitly address the issue of construction on steep slopes. The regulations do require that soil erosion and sediment control plans be developed for proposed projects.

7.2 Vulnerabilities and Risk Assessment

Surficial earth materials behave differently in response to seismic activity. Unconsolidated materials such as sand and artificial fill can amplify the shaking associated with an earthquake. In addition, artificial fill material has the potential for liquefaction. When liquefaction occurs, the strength of the soil decreases, and the ability of soil to support building foundations and bridges is reduced. Increased shaking and liquefaction can cause greater damage to buildings and structures and a greater loss of life.

Some areas in the Town of Cornwall are underlain by sand and gravel. Structures in these areas are at increased risk from earthquakes due to amplification of seismic energy and/or collapse. The best mitigation for future development in areas of sandy material may be application of the most stringent building codes or possibly the prohibition of new construction. However, many of these areas occur in floodplains associated with the various streams and rivers in Cornwall, so they are already regulated. The areas that are not at increased risk during an earthquake due to unstable soils are the areas underlain by glacial till, which includes most of the town.

Areas of steep slopes can collapse during an earthquake, creating landslides. Seismic activity can also break utility lines such as water mains, electric and telephone lines, and stormwater management systems. Damage to utility lines can lead to fires, especially in electric and gas mains. Dam failure can also pose a significant threat to developed areas during an earthquake.

According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut is at a low to moderate risk for experiencing an earthquake of a magnitude greater than 3.5 and at a moderate risk of experiencing an earthquake of a magnitude less than 3.0 in the future. No earthquake with a magnitude greater than 3.5 has occurred in Connecticut within the last 30 years, and the USGS currently ranks Connecticut 43rd out of the 50 states for overall earthquake activity.

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Cornwall. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Cornwall

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

Based on the historic record and the probability maps generated from the USGS database, the state of Connecticut possesses areas of seismic activity. It is likely that Connecticut will continue to experience minor earthquakes (magnitude less than 3.0) in the future. While the risk of an earthquake affecting Cornwall is relatively low over the short term, long-term probabilities suggest that a damaging earthquake (magnitude greater than 5.0) could occur within the vicinity of Cornwall.

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is charged with the responsibility for administration and enforcement of Connecticut's dam safety laws. The existing statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard to life, health, or property.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

The dam safety requirements are codified in Sections 22a-401 through 22a-411 inclusive of the Connecticut General Statutes. Sections 22a-409-1 and 22a-409-2 of the Regulations of Connecticut State Agencies have been enacted and set requirements for the registration, classification, and inspection of dams. Dams must be inventoried by the owner with the Connecticut DEEP according to Connecticut Public Act 83-38.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an EAP after the Commissioner of DEEP adopts regulations. The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. New regulations shall establish the requirements for such EAPs, including but not limited to (1) criteria and standards for inundation studies and inundation zone mapping; (2) procedures for monitoring the dam or structure during periods of heavy rainfall and runoff, including personnel assignments and features of the dam to be inspected at given intervals during such periods; and (3) a formal notification system to alert appropriate local officials who are responsible for the warning and evacuation of residents in the inundation zone in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board program, which can provide noncompetitive state funding for repair of municipality-owned dams. Funding is limited by the State Bond Commission. State statute Section 25-84 allows municipalities to form Flood and Erosion Control Boards, but municipalities must take action to create the board within the context of the local government such as by revising the municipal charter. The Town's Planning and Zoning Commission is responsible for reviewing all development activities that occur within flood hazard or flood-prone areas.

8.1.1 Actions Completed and New Capabilities

Cornwall continues to maintain its capabilities for mitigating and responding to dam failure risks. The Town installs beaver deterrent devices in select locations, such as Land Trust properties, as appropriate.

8.1.2 Summary

The Town mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 29 DEEP-inventoried dams within the Town of Cornwall. These dams are listed in Table 8-1 and shown in Figure 8-1. Note that the Thompson Dam, though listed, has been identified as a natural or dug pond without a dam structure.

Table 8-1: DEEP-Inventoried Dams in Canaan

Number	Name	Class
3101	Stony Batter Pond Dam	BB
3102	Cream Hill Lake Dam	A
3103	Lincoln Pond Dam	BB
3104	Nash Pond Dam	BB
3105	Lawrence Stevens Dam	A
3106	Van Doren Pond Dam	A
3107	Denenberg Pond Dam	A
3108	Scoville Pond Dam	A
3109	Hedden Pond Dam	A
3110	Cobble Pond Dam	A
3111	Thompson Dam	NO DAM
3112	Hare Dam	A
3113	Omsey Pond Dam	A
3114	Wilford Pond Dam	A
3115	Dudleytown Pond Dam	A
3116	Gunn Dam	A

Number	Name	Class
3117	Spruce Dam	A
3118	Hawkins Pond Dam	A
3119	Calhoun Dam	A
3120	Livingston Dam	A
3121	Jessuren Pond Dam #1	A
3122	Jessuren Pond Dam #2	A
3123	Smith Dam	A
3124	Clark Pond Dam	A
3125	Mt Titus Marsh	A
3126	Rosen Dam B	AA
3127	Rosen Dam A	AA
3128	Lovetere Pond Dam	AA
3129	Mill Pond Dam	Unclassified
3130	Fox Pond Dam	A

There are no high hazard (Class B and C) dams in Cornwall; however, failure of the Great Falls Dam upstream in Falls Village can impact Cornwall, and is discussed in detail below. Other dams of concern are also discussed further in this section.

Great Falls Hydroelectric Dam

The Great Falls Dam (aka Falls Village Dam) is a run-of-river dam located on the Housatonic River in Canaan. It is owned by First Light Power Resources and used to impound a reservoir for hydroelectric generation at the Falls Village Hydrostation. The dam impounds a reservoir with a surface area of 150 acres, and a storage volume of 1,135 acre-feet from a contributing watershed of 634 square miles. The reservoir is located on the southeast flank of Canaan Mountain.

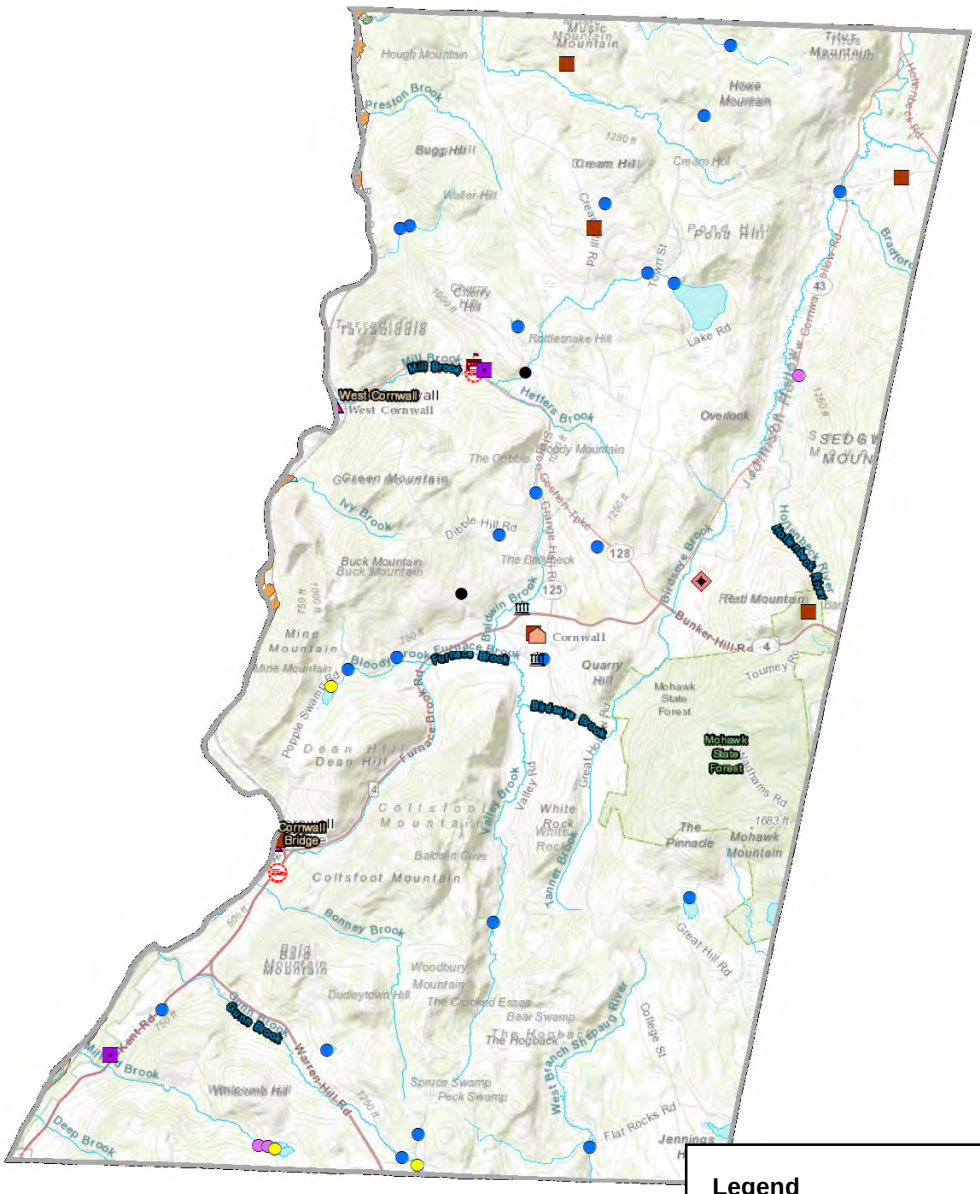
The concrete dam was constructed in 1913 and consists of a concrete ogee spillway that is 14 feet in height and 300 feet in length. The pumped-storage generation utilizes underground components connecting the upper and lower reservoirs. These components include a powerhouse, water tunnel, shafts, and access tunnel. In March 1987, CL&P (now Eversource) constructed a fourth hydroelectric generating unit at the dam.

The Inundation Map developed with the dam breach analysis indicates that the extent of impact in Cornwall includes a portion of River Road near the Canaan border, the end of Kirk Road, Lower River Road north of Route 128, Route 7, and the Cornwall covered bridge. The mapping notes that an incremental rise in water surface elevations of 2.04 feet extends 15.3 miles downstream of the Falls Village Dam.

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Legend

- Shelter
- School
- Care Facility
- EMS
- Emergency Response
- Fire Station
- Municipal Facility
- National Register Building
- National Register Structure
- National Register

Dam Hazard Class

- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - CORNWALL ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 4,000 8,000
Feet

SCALE 1 " = 8,293 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 8-1

In accordance with the EAP on file, a test message is sent to downstream residents regarding failure and flooding on the Housatonic River during drills. The Emergency Action Plan for the Housatonic Project/Falls Village Development is up-to-date.

The Great Falls Dam is inspected biennially by a licensed engineer and weekly by First Light Power Resources. The Connecticut DEEP routinely performs inspections and prepares summary reports. The operating owner (First Light Power Resources) is responsible for notifying emergency personnel of any potential or imminent failure of this dam.

Other Dams

The Town of Cornwall is concerned with the condition of Nash Pond along a Furnace Brook tributary. Nash Pond is a privately owned Class BB earthen dam used to impound a 20-acre reservoir (Popple Swamp) for recreation. It discharges to Bloody Brook and is 500 feet long and 13 feet high. The area downstream includes three residential structures located along the northeast face of the pond. A class A dam is located approximately 1,000 feet downstream of the Nash Pond Dam. Four additional residences are located along Bloody Brook downstream of the Omsey Pond dam. Failure of the Nash Pond Dam could affect the stability of the downstream dam.

Beaver Dams

Finally, the Town of Cornwall is concerned with potential failures of beaver dams. This is a typical concern in many Connecticut communities.

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Cornwall is compliant with this new program and has a designated Burning Official.

Cornwall Regulations regarding fire protection are outlined in the *Subdivision Regulation*s.

- ***Subdivision Regulations, Section 5.5*** for fire protection the Commission may require the construction of ponds, including dry hydrants, in any subdivision or resubdivision. Fire ponds shall be constructed in accordance with the standards and practices of the U.S.D.A. Soil Conservation Service and shall have a minimum capacity as determined by the Commission after consulting with the Volunteer Fire Department. Fire ponds shall be accessible from a street via a right-of-way in favor of the Town and said right-of-way shall have a width of 30 feet to allow emergency vehicles clear and safe entry, free of trees, brush and other objects.

The town responds to fires in the State Forest before the state responds, and the local departments can utilize mutual aid agreements with surrounding towns and assemble up to 60 responders if needed.

Cornwall has several dozen fire ponds with hydrants. The Town recently installed a cistern at Cornwall Bridge for general fire protection. Kugeman Village has a cistern and Bonnie Brook has a pressurized fire protection system.

The Cornwall Fire Department goes to the fires whenever possible. This proactive approach is believed to be effective for controlling wildfires. The Fire Department has some water storage capability in its tanker trucks and storage tanks but primarily relies on the use of the municipal water system to fight fires throughout the town whenever possible.

Other capabilities for reducing wildfire risk include:

- ❑ Encouraging property owners to widen access roads such that fire trucks and other emergency vehicles can access remote locations.
- ❑ Continuing intermunicipal cooperation in firefighting efforts.
- ❑ Providing outreach programs on how to properly manage burning and campfires on private property.
- ❑ Patrolling Town-owned and State-owned open space and parks to prevent unauthorized campfires.
- ❑ Enforcing regulations and permits for open burning.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

Large areas of State Forest are located in Cornwall. The town has several dozen fire ponds with hydrants, but many areas are still at risk from wildfires.

The area between West Cornwall and Cornwall bridge was damaged by the tornado of 1989, which created high levels of debris, dead trees, and other fire fuel. About 20 years ago, approximately 200 acres burned in this area. This area has since grown back into a healthy forest and does not have higher wildfire risk than anywhere else in town.

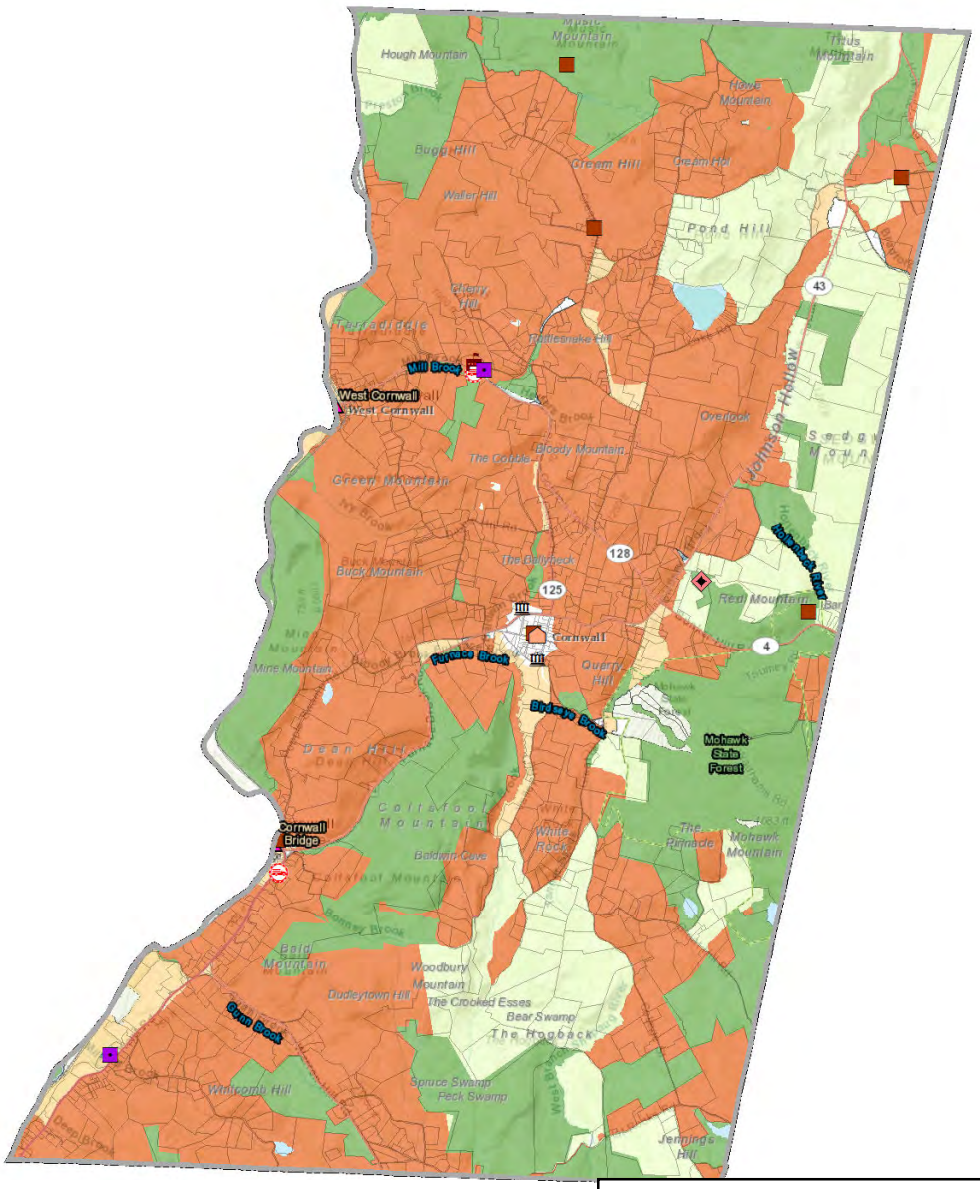
The largest recorded wildfire in CT history burned 400 acres in Cornwall in the 2016. The fire was sparked by a lightning strike during a drought, and by the time it was noticed it had begun to burn underground, making it much more difficult to put out. The fire occurred in the Wyantenock State Forest, was very difficult to access, and the state did not have the resources to put the fire out. The fire reportedly burned from September to December, at which point snow was able to put it out.

The town remains concerned about future fires and would like to find ways to reduce risks posed by forest fires.

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Legend

- Shelter
- School
- Care Facility
- EMS
- Emergency Response
- Fire Station
- Municipal Facility
- National Register Building
- National Register Structure
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - CORNWALL ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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0 4,000 8,000
Feet

SCALE 1 " = 8,294 '
DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 9-1

Drought Vulnerabilities and Risk

Town of Cornwall staff report that drought events have become more of a problem in recent years, including being the cause of elevated wildfire risk, especially since the drought and wildfire of 2016.

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted. This drought event coincided with the major Cornwall forest fire in 2016, which has made the Town more concerned about drought events.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

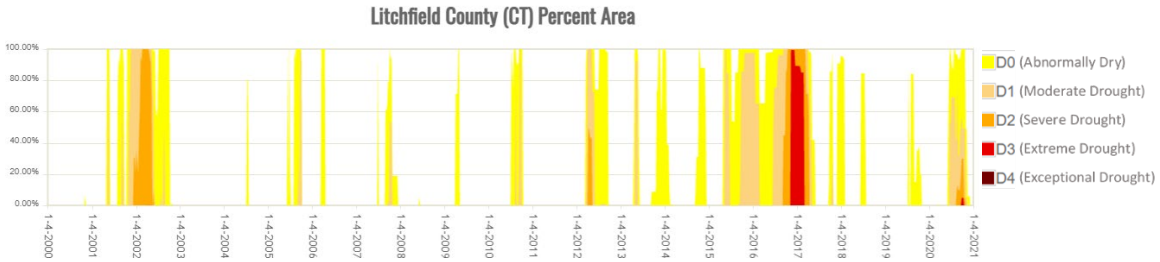


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

Action	Responsible Party	Status	Notes
Obtain HMGP grant to replace the generator at the West Cornwall Fire House.	PW	Completed	*Cornwall successfully secured a grant and replaced this generator (Town is not sure whether the grant was from HMGP or not)*
Pursue standby power supplies for shelters that do not have generators.	PW	Carry Forward	*West Cornwall Fire House generator has been replaced.* *Town also has a portable generator.* *Town will carry action forward to install standby power at other critical facilities.*
Take an active role in siting new housing for vulnerable populations such as seniors and the elderly. Encourage housing developers to discuss proposed actions with the town prior to submitting applications.	P&Z	Carry Forward with Revisions	*There is very limited development in Cornwall, and none has occurred in areas of elevated risk in recent years. The Town is currently rewriting its Zoning Regulations. This action will be carried forward with revisions to indicate that the new Zoning Regulations will consider hazard exposure of new housing for vulnerable populations.*

Action	Responsible Party	Status	Notes
Utilize the existing CT Alert emergency notification system to its fullest capabilities.	EM	Completed Carry Forward with Revisions	*Cornwall utilizes CT Alert. Town is currently working to upgrade its emergency contact service so it is able to contact residents by text message or email in addition to landlines. It is pushing hard in the month of August 2020 to get residents to provide contact information; they have sent out or posted on the website notes about the need for this information in the context of Storm Isaias and COVID-19. In addition to proactive emergency alert capabilities, the Town is interested in improving its capabilities to post information online (or otherwise) so that residents are able to find information even if power outages prevent the Town from proactively reaching out to them. Two new actions are added to this plan: Upgrade the Town's emergency notification system so that it is able to contact residents and other subscribers through multiple methods, including phone call, text message, and email. Develop the Town's capacity to post important information about hazard response and recovery prior to an event so that that this information will be accessible to members of the public who seek it out, even if the Town is not able to proactively contact those individuals.*
Encourage residents to purchase and use NOAA weather radios with alarm features	EM	Carry Forward	*The Town will add this action to its ongoing outreach efforts around improving its emergency notification capabilities.*
Update the Town's Floodplain Management Ordinance to reflect the most recent recommendations from the Connecticut DEEP.	P&Z	Carry Forward with Revisions	*The Town is currently updating its Zoning Regulations. It will update its Flood Hazard Area Overlay Zone regulations to reflect the standards in the most recent Connecticut State Building Code and the State model floodplain regulations.*
Consider requiring new buildings constructed in floodprone areas to be protected to the highest recorded flood level regardless of being within a defined SFHA.	P&Z	Drop	*This action is not being pursued; the Town will instead update its Zoning Regulations to be consistent with the most recent Connecticut State Building Code.*
Consider more stringently regulating or preventing certain types of landscaping and retaining walls located in SFHAs, because these can become debris during floods.	P&Z	Carry Forward with Revisions	*Cornwall is currently conducting a comprehensive update of its zoning regulations. This action will be considered and addressed in that rewrite. Action will be carried forward within a single action consolidating multiple zoning-related actions into one calling for incorporation of hazard mitigation priorities into the ongoing zoning rewrite.*

Action	Responsible Party	Status	Notes
Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternatives.	P&Z	Carry Forward with Revisions	*Cornwall is currently conducting a comprehensive update of its zoning regulations. This action will be considered and addressed in that rewrite. Action will be carried forward within a single action consolidating multiple zoning-related actions into one calling for incorporation of hazard mitigation priorities into the ongoing zoning rewrite.*
Consider conducting a Mill Brook watershed study to identify appropriate methods of reducing flood risks.	PW	Carry Forward with Revisions	*Mill Brook flows into the Housatonic at West Cornwall, and continues to be an area of concern for the Town. Given the large size of the watershed, the undeveloped nature of the watershed, and the steep and confined nature of the Brook as it flows through West Cornwall, Town staff do not believe a watershed scale study will provide actionable information. Instead, a smaller-scale analysis of mitigation options within the West Cornwall neighborhood is suggested. Mitigation actions may include upsizing bridges, acquisition of land in the floodway, or flood warning systems.*
Conduct a comprehensive evaluation of River Road at the Housatonic River to determine appropriate flood mitigation and stabilization measures.	PW	Carry Forward	*Progress has not yet been made on this action due to staffing and funding limitations. Bank stabilization continues to be an issue along River Road. Action is carried forward.*
Provide technical assistance regarding floodproofing measures to interested residents. Pursue funding for home elevations should any residents become interested.	PW	Drop	Town staff reportedly do not have the capacity to complete this action. Action is dropped and replaced with an action to provide information on the Town website and Town Hall about flood hazard and flood hazard mitigation options, including links to State and Federal resources
Encourage property owners to purchase flood insurance under the NFIP and to report claims when flooding damage occurs.	PW	Drop	Town staff reportedly do not have the capacity to complete this action. Action is dropped and replaced with an action to provide information on the Town website and Town Hall about flood hazard and flood hazard mitigation options, including acquisition of flood insurance
Evaluate floodprone properties on Furnace Brook to determine potential flood damage reduction methods.	PW	Carry Forward with Revisions	Town staff reportedly do not have the capacity to complete this action. Action is dropped and replaced with an action to identify floodprone properties on Furnace Brook and contact the property owners to offer information and assistance in pursuing flood damage reduction actions. *Gordon mentioned something about a 1-lane dirt road that provided alternative access north-south to Route 7. Can this be clarified?*

Action	Responsible Party	Status	Notes
Consider constructing a flood wall or berm around the side of the West Cornwall Fire Station that is near Mill Brook.	PW	Drop	*Construction of a protective berm along Mill Brook was determined to be not feasible given permitting and funding constraints. This action is replaced with two new actions:* *Develop a flood plan for the West Cornwall Fire Station that addresses the possible need for temporary staging areas outside of flood zones for firefighting apparatus, as well as other flood mitigation steps to be taken prior to a flood event.* *Add relocation of the West Cornwall Fire Station outside the flood zone to the Town's long-range plan (Capital Improvement Plan and/or POCD)*
Compile a checklist that cross-references the bylaws, regulations, and codes related to flood damage prevention that may be applicable to a proposed project and make this list available to potential applicants. The information in Section 3.4 provides a starting point for this list.	P&Z	Carry Forward with Revisions	*Cornwall is currently conducting a comprehensive update of its zoning regulations. This action will be considered and addressed in that rewrite. Action will be carried forward within a single action consolidating multiple zoning-related actions into one calling for incorporation of hazard mitigation priorities into the ongoing zoning rewrite.*
Provide outreach regarding home elevation and relocation, flood barriers, dry floodproofing, wet floodproofing, and other home improvement techniques (Section 3.6.2) to private homeowners and businesses with flooding problems.	P&Z	Drop	Town staff reportedly do not have the capacity to complete this action. Action is dropped and replaced with two actions previously identified: one to provide information on the Town website and Town Hall about flood hazard and flood hazard mitigation options, and the second to identify floodprone properties on Furnace Brook and contact the property owners to offer information and assistance in pursuing flood damage reduction actions.
Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	P&Z	Carry Forward with Revisions	*Town has not had the financial or staffing capacity to implement this action.* *Action is carried forward, with the specific suggestion that the Town send members of the Planning and Zoning staff to conferences and events put on by the Connecticut Association of Flood Managers.*
Pursue riverbank stabilization along River Road and the Housatonic River, potentially utilizing HMGP.	PW	Drop	*This action is redundant and/or conflicting with action #11, and is dropped.* *Gordon mentioned something about a 1-lane dirt road that provided alternative access north-south to Route 7. Can this be clarified?*
Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	PW	Carry Forward with Revisions	*Town has upsized a culvert in recent years. This action is carried forward to specifically encourage reviewing all culvert replacements based on existing hydrology and Northeast Regional Climate Center guidance*

Action	Responsible Party	Status	Notes
Increase the capacity of the Hollenbeck River culvert at Lake Road.	PW	Completed	*This culvert has been replaced with one with increased capacity.*
Ensure adequate barricades are available to block flooded streets in floodprone areas	EM	Completed	*Town has increased the number of barricades.*
Develop a town wide tree limb inspection and maintenance program to ensure that the potential for downed power lines is diminished.	PW	Capability	*Tree Warden is responsible for assessing and removing trees as needed. The Town wants to remove dead and diseased trees from ROWs as much as possible.*
Require the location of utilities underground in new developments or during redevelopment whenever possible.	P&Z	Carry Forward with Revisions	*Cornwall is currently conducting a comprehensive update of its zoning regulations. This action will be considered and addressed in that rewrite. Action will be carried forward within a single action consolidating multiple zoning-related actions into one calling for incorporation of hazard mitigation priorities into the ongoing zoning rewrite.*
Building Department to provide literature regarding appropriate design standards for wind.	Building Official	Capability	*Appropriate design standards are required by building code.*
Encourage the use of structural techniques related to mitigation of wind damage in new residential and commercial structures to protect new buildings to a standard greater than the minimum building code requirements. Require such improvements for new municipal critical facilities.	EM, PW	Drop	*The State Building Code is enforced locally and has recently been updated. This is considered to be sufficient.*
Provide information on the dangers of cold-related hazards to people and property.	PW	Capability	*The Town provides information about cold-related hazards annually when winter approaches.*
Consider posting the snow plowing routes in Town buildings each winter to increase public awareness.	EM	Drop	*Town does no longer believes this action is aligned with the need to reduce losses from hazards. The Town has an effective snow clearing program.*
Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	EM	Capability	*Town has identified such areas (primarily steeper hills), and addresses the challenge they present by increasing winter storm preparation measures on them (such as putting down more sand/salt before ice storms).*
Building Department to provide literature regarding appropriate design standards for mitigating icing, insulating pipes, and retrofits for flat-roofed buildings such as heating coils.	Building Official	Capability	*Appropriate design standards are required by the State building code.*

Action	Responsible Party	Status	Notes
Consider preventing residential development in areas prone to collapse	P&Z	Capability	*Steep slopes and flood areas are already protected in Zoning Regulations.*
Ensure that municipal departments have backup plans and adequate backup facilities such as portable generators in place in case damage occurs to critical facilities	EM	Capability	*Town has a portable generator in its CERT trailer, and is able to bring it to locations in need.*
Consider bracing systems and assets inside critical facilities. This could help protect IT systems, important records and files.	EM, PW	Carry Forward with Revisions	*Town will pursue cloud-backup of its IT systems rather than physical bracing.*
Include dam failure inundation areas in the CTAlert emergency contact database	EM	Carry Forward with Revisions	*The closest dam of concern is the Falls Village dam on the Housatonic. Failure of this dam would have minimal impact in Cornwall. Town will incorporate dam failure areas into the enhanced communication system it is developing.*
Develop a long term beaver dam management plan.	PW	Carry Forward	*Town traps beavers when necessary, but does not have a long-term beaver dam management plan.*
Consider replacing culverts frequently impacted by beavers with free span bridges.	PW	Drop	*Town has determined that the cost-benefit of this action does not warrant it.*
Consider the use of beaver deterrent devices such as beaver stops or beaver bafflers	PW	Capability	*Town implements beaver deterrents in select locations, such as on Land Trust properties.*
For the area of elevated wildfire risk located between West Cornwall and Cornwall Bridge, the town may consider a combination of all of the available methods of risk reduction described in the plan	EM, Fire Dept	Carry Forward with Revisions	*Town staff report that this area is no longer considered to be at a higher risk than any other forested area of Town. It had previously been impacted by a tornado, resulting in a high level of fuel, but now is just as healthy a forest as anywhere else. The Cornwall Fire Department trains in wildland firefighting. The Town used to have a stockpile of equipment for fighting forest fires, but that is no longer the case. This action is replaced with two new ones: Coordinate with DEEP to acquire forest-fire-fighting equipment to have on hand. Identify and implement methods of improving wildfire early warning systems, such as acquisition of drones or installation of wildfire detection sensors.*
The Town should continue to require the installation of fire protection water in new developments.	EM, Fire Dept	Capability	*This is a capability*

Action	Responsible Party	Status	Notes
Pursue the acquisition of additional municipal open space inside SFHAs and set it aside as greenways, parks, or other nonresidential, noncommercial, or nonindustrial use.	First Selectman, P&Z	Drop	*Approximately 50% of the Town is located within the State Forest or a Land Trust, or held in a conservation easement. Acquisition of municipal open space is not considered necessary at this time.*
Selectively pursue conservation recommendations listed in the Plan of Conservation and Development and other open space plans	First Selectman, P&Z	Capability	*This is a capability*
When replacing or upgrading culverts, work with CT DOT to incorporate findings of the climate change pilot study and work with HVA to incorporate findings of the stream crossing assessment training.	PW	Drop	*Town has recently upsized a culvert. Action is redundant with Action #20, above.*

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action CWL-01	
Incorporate hazard mitigation priorities into the ongoing zoning rewrite, including: **· Update the Flood Hazard Area Overlay Zone regulations to reflect the standards in the most recent Connecticut State Building Code and the State model floodplain regulations.** **· Explicitly consider hazard exposure of new housing for vulnerable populations during development of the updated Zoning Regulations.** **· More stringently prevent certain types of landscaping and retaining walls located in SFHAs, because these can become debris during floods.** **· Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternatives.** **· Require the location of utilities underground in new developments or during redevelopment whenever possible.** **· Compile a checklist that cross-references the bylaws, regulations, and codes related to flood damage prevention that may be applicable to a proposed project and make this list available to potential applicants.**	
Lead	P&Z
Cost	$0 - $25,000
Funding	OB
Timeframe	2022
Priority	High

Action CWL-02	
Send members of the Planning and Zoning staff to conferences and events put on by the Connecticut Association of Flood Managers.	
Lead	Planning; EMD
Cost	$0 - $25,000
Funding	OB, CT DEMHS
Timeframe	2022
Priority	High

Action CWL-03	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action CWL-04	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action CWL-05	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action CWL-06	
Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action CWL-07	
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, Sustainable CT
Timeframe	2022 – 2024
Priority	High

Action CWL-08	
Set up a system to regularly back up municipal IT systems and documents to the cloud, and enable these systems to be accessed remotely in case municipal facilities become inaccessible following a hazard event.	
Lead	EMD, IT
Cost	$25,000 - $50,000
Funding	OB
Timeframe	2022 – 2024
Priority	Med

Action CWL-09	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action CWL-10	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action CWL-11	
Identify floodprone properties on Furnace Brook and contact the property owners to offer information and assistance in pursuing flood damage reduction actions.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action CWL-12	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action CWL-13	
Develop a long term beaver dam management plan.	
Lead	DPW
Cost	$0 - $25,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action CWL-14	
When replacing or upgrading culverts, review culvert conveyances based on Northeast Regional Climate Center Guidance, in accordance with the findings of the CT DOT climate change pilot study. Additionally, work with HVA to incorporate findings of the stream crossing assessment training.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEEP
Timeframe	2023 – 2025
Priority	High

Action CWL-15	
Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action CWL-16	
Conduct a targeted analysis of mitigation options within the West Cornwall neighborhood. Mitigation actions may include upsizing bridges, acquisition of land in the floodway, or flood warning systems.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action CWL-17	
Conduct a comprehensive evaluation of River Road at the Housatonic River to determine appropriate flood mitigation and stabilization measures.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action CWL-18	
Identify and implement methods of improving wildfire early warning systems, such as acquisition of drones or installation of wildfire detection sensors.	
Lead	EMD, Fire
Cost	$50,000 - $100,000
Funding	OB, FEMA Assistance to Firefighters Grant
Timeframe	2023 – 2025
Priority	Med

Action CWL-19	
Upgrade the Town's emergency notification system so that it is able to contact residents and other subscribers through multiple methods, including phone call, text message, and email.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action CWL-20	
Develop the Town's capacity to post important information about hazard response and recovery prior to an event so that that this information will be accessible to members of the public who seek it out, even if the Town is not able to proactively contact those individuals.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action CWL-21	
Encourage residents to purchase and use NOAA weather radios with alarm features	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action CWL-22	
Include dam failure inundation areas into the enhanced public communication system being developed by the Town.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action CWL-23	
Pursue standby power supplies for critical facilities that do not have generators. Specifically, install an emergency generator at the United Congregational Church to improve its ability to serve as a secondary emergency shelter.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action CWL-24	
Coordinate with DEEP to acquire forest-fire-fighting equipment to have on hand.	
Lead	EMD; Fire
Cost	$100,000 - $500,000
Funding	OB, CIP, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

APPENDIX A

STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
CWL-01	Incorporate hazard mitigation priorities into the ongoing zoning rewrite, including: - Update the Flood Hazard Area Overlay Zone regulations to reflect the standards in the most recent Connecticut State Building Code and the State model floodplain regulations. - Explicitly consider hazard exposure of new housing for vulnerable populations during development of the updated Zoning Regulations. - More stringently prevent certain types of landscaping and retaining walls located in SFHAs, because these can become debris during floods. - Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternatives. - Require the location of utilities underground in new developments or during redevelopment whenever possible. - Compile a checklist that cross-references the bylaws, regulations, and codes related to flood damage prevention that may be applicable to a proposed project and make this list available to potential applicants.	HMP in Planning Docs	P&Z	$0 - $25,000	OB	2022	1	1	1	1	1	1	1	0	0	0	0	0	0	0	9
CWL-02	Send members of the Planning and Zoning staff to conferences and events put on by the Connecticut Association of Flood Managers.	Municipal Training	Planning; EMD	$0 - $25,000	OB, CT DEMHS	2022	1	1	1	1	1	1	0	0	0	0	0	0	0	0	8
CWL-03	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
CWL-04	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
CWL-05	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
CWL-06	Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
CWL-07	Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	Sustainable CT	Planning	$25,000 - $50,000	OB, Sustainable CT	2022 – 2024	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
CWL-08	Set up a system to regularly back up municipal IT systems and documents to the cloud, and enable these systems to be accessed remotely in case municipal facilities become inaccessible following a hazard event.	Data & IT Protection	EMD, IT	$25,000 - $50,000	OB	2022 – 2024	1	1	1	0	0	1	0	0	0	0	0	-1	0	0	5
CWL-09	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
CWL-10	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
CWL-11	Identify floodprone properties on Furnace Brook and contact the property owners to offer information and assistance in pursuing flood damage reduction actions.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
CWL-12	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
CWL-13	Develop a long term beaver dam management plan.	Beaver Management	DPW	$0 - $25,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	0	-1	0	0	0	0	0	-1	3
CWL-14	When replacing or upgrading culverts, review culvert conveyances based on Northeast Regional Climate Center Guidance, in accordance with the findings of the CT DOT climate change pilot study. Additionally, work with HVA to incorporate findings of the stream crossing assessment training.	NRCC Guidance	DPW	$50,000 - $100,000	OB, CIP, CT DEEP	2023 – 2025	0	1	1	0	0	1	1	0	0	0	0	0	0	0	6
CWL-15	Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
CWL-16	Conduct a targeted analysis of mitigation options within the West Cornwall neighborhood. Mitigation actions may include upsizing bridges, acquisition of land in the floodway, or flood warning systems.	Study	DPW	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
CWL-17	Conduct a comprehensive evaluation of River Road at the Housatonic River to determine appropriate flood mitigation and stabilization measures.	Study	DPW	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
CWL-18	Identify and implement methods of improving wildfire early warning systems, such as acquisition of drones or installation of wildfire detection sensors.	Wildfire Risk Reduction	EMD, Fire	$50,000 - $100,000	OB, FEMA Assistance to Firefighters Grant	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	0	0	6
CWL-19	Upgrade the Town's emergency notification system so that it is able to contact residents and other subscribers through multiple methods, including phone call, text message, and email.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
CWL-20	Develop the Town's capacity to post important information about hazard response and recovery prior to an event so that that this information will be accessible to members of the public who seek it out, even if the Town is not able to proactively contact those individuals.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
CWL-21	Encourage residents to purchase and use NOAA weather radios with alarm features	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
CWL-22	Include dam failure inundation areas into the enhanced public communication system being developed by the Town.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
CWL-23	Pursue standby power supplies for critical facilities that do not have generators. Specifically, install an emergency generator at the United Congregational Church to improve its ability to serve as a secondary emergency shelter.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
CWL-24	Coordinate with DEEP to acquire forest-fire-fighting equipment to have on hand.	Emergency Equipment	EMD; Fire	$100,000 - $500,000	OB, CIP, CT DEMHS	2025 – 2027	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3

APPENDIX B
RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF CORNWALL BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Cornwall has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Cornwall Board of Selectmen approved the previous version of the Plan in 2014; and

WHEREAS, the Town of Cornwall and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Cornwall; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Cornwall, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Cornwall eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Cornwall;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Cornwall, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Cornwall this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

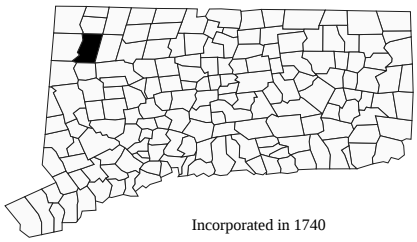
2019 CERC TOWN PROFILE

Cornwall, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
P.O. Box 97
Cornwall, CT 06753
(860) 672-4959

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1740

Demographics

Population

	Town	County	State
2000	1,434	182,193	3,405,565
2010	1,420	189,927	3,574,097
2013-2017	1,364	184,454	3,594,478
2020	1,266	193,116	3,604,591
'17 - '20 Growth / Yr	-2.6%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	46	921	4,842
Pop./Sq. Mile (2013-2017)	30	200	742
Median Age (2013-2017)	53	47	41
Households (2013-2017)	569	74,605	1,361,755
Med. HH Inc. (2013-2017)	$76,563	$76,438	$73,781

	Town	State
Veterans (2013-2017)	94	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	26	2%	215	16%	112	8%	185	14%	482	35%	344	25%	1,364	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	1,212	164,992	2,446,049
Black Non-Hisp	0	2,843	350,820
Asian Non-Hisp	24	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	34	2,320	84,917
Hispanic or Latino	94	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	5.7%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	169	17%	673,582	27%
Associates Degree	103	10%	188,481	8%
Bachelors or Higher	544	54%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	95	456
23 - Construction	7	15
31-33 - Manufacturing	5	13
44-45 - Retail Trade	12	50
56 - Administrative and Waste Services	11	25
81 - Other Services (except Public Administration)	16	60
Total Government	14	82

Top Five Grand List (2018)

	Amount
C & D Farms	$7,495,900
CL & P	$7,334,890
Lendel, Ivan & Samantha	$5,965,480
Walzer, Roy	$4,957,700
FCCP LLC	$3,879,600
Net Grand List (SFY 2016-2017)	$404,816,100

Major Employers (2018)

Mohawk Mountain Ski Area
Northeast Builders
Cornwall Electric
Town of Cornwall
National Iron Bank

Education

2018-2019 School Year

	Grades	Enrollment
Cornwall School District	PK-8	91
Regional School District 01	9-12	391

Pre-K Enrollment (PSIS)

	2018-2019
Cornwall School District	0

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 01	94.6%	100.0%	90.4%

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	*	53.8%	*	51.3%	*	43.0%
ELA	*	53.1%	*	54.9%	*	56.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Cornwall School District	NaN%
Regional School District 01	11.9%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	83.2%	84.0%	86.8%
Private	16.8%	16.0%	13.2%

profiles.ctdata.org

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Cornwall, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$7,193,223	Total Expenditures (2017)	$6,469,975	Annual Debt Service (2017)	$181,175
Tax Revenue	$6,324,020	Education	$4,425,840	As % of Expenditures	2.8%
Non-tax Revenue	$869,203	Other	$2,044,135	Eq. Net Grand List (2017)	$535,527,005
Intergovernmental	$695,223	Total Indebtedness (2017)	$2,954,318	Per Capita	$389,191
Per Capita Tax (2017)	$4,500	As % of Expenditures	45.7%	As % of State Average	257.8%
As % of State Average	153.5%	Per Capita	$2,147	Moody's Bond Rating (2017)	Aa2
		As % of State Average	85.4%	Actual Mill Rate (2017)	15.31
				Equalized Mill Rate (2017)	11.56
				% of Net Grand List Com/Ind (2017)	3.1%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	1,028	88,068	1,507,711
% Single Unit (2013-2017)	93.2%	73.6%	59.2%
New Permits Auth (2017)	1	142	4,547
As % Existing Units	0.1%	0.2%	0.3%
Demolitions (2017)	0	32	1,403
Home Sales (2017)	19	1,753	21,880
Median Price	$439,600	$250,100	$270,100
Built Pre-1950 share	47.9%	31.2%	29.3%
Owner Occupied Dwellings	461	57,330	906,798
As % Total Dwellings	81.0%	76.8%	66.6%
Subsidized Housing (2018)	33	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	0	57	536
$100,000-$199,999	4	563	5,237
$200,000-$299,999	3	538	6,681
$300,000-$399,999	4	315	3,863
$400,000 or More	8	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$986	$995	$1,123
Cost-burdened Renters	59.8%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	758	101,000	1,827,070
Residents Unemployed	22	4,014	78,242
Unemployment Rate	2.8%	3.8%	4.1%
Self-Employed Rate	41.3%	13.0%	10.0%
Total Employers	95	6,177	122,067
Total Employed	456	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Cornwall, CT	83	Cornwall, CT	83
Torrington, CT	43	Kent, CT	48
Litchfield, CT	25	Salisbury, CT	41
Goshen, CT	23	Torrington, CT	33
Sharon, CT	18	North Canaan, CT	27
North Canaan, CT	16	Waterbury, CT	17
Salisbury, CT	16	Sharon, CT	13

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	397	1,777
Violent	0	228

Disengaged Youth (2013-2017)

	Town	State
Female	0.0%	4.2%
Male	0.0%	5.6%

	Town
Library circulation per capita	9.77

Distance to Major Cities

	Miles
Hartford	34
New York City	88
Providence	98
Boston	123
Montreal	255

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Aquarion Water Company
(800) 732-9678

Cable Provider
Comcast
(800) 266-2278

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Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

GOSHEN, CT

42A North Street
Goshen, CT 06756
MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Goshen and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Goshen is a rural residential town in the Litchfield Hills Region bordered on the east by Torrington, on the south by Litchfield, on the west by Cornwall, and on the north by Norfolk.

Goshen was incorporated in October of 1739 and has a total area of 45.2 square miles with a land area of 43.7 square miles. It has an estimated population of 2,883 persons in 2019, and is run by a Selectman/Town Meeting form of government.

Notable characteristics of the municipality include farmland, rolling hills, numerous lakes, and State forestland. The many bodies of water in Goshen include 385-acre Woodridge Lake, Tyler Lake, Dog Pond, West Side Pond, North Pond, Whist Pond and Rueben Hart Reservoir. Ivy Mountain State Park and nearly 1400 acres of Mohawk State Forest are located in Goshen.

Major highways serving the town include State Routes 4 and 63.

Goshen's history is described in "Goshen Connecticut, a Town Above all Others" written by the Quadrimillennium Editorial Committee in 1990. The book describes the first settlers coming to Goshen in the 1700's, and a lively history of farms, water-powered mills, blacksmith shops, clockmakers, sawmills, gristmills, creameries, and cotton mills through the 18th and 19th century.

2.2 Existing Land Use

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 73% of Goshen is forested and approximately 6% is developed.

Table 2-1: 2015 Land Cover by Area

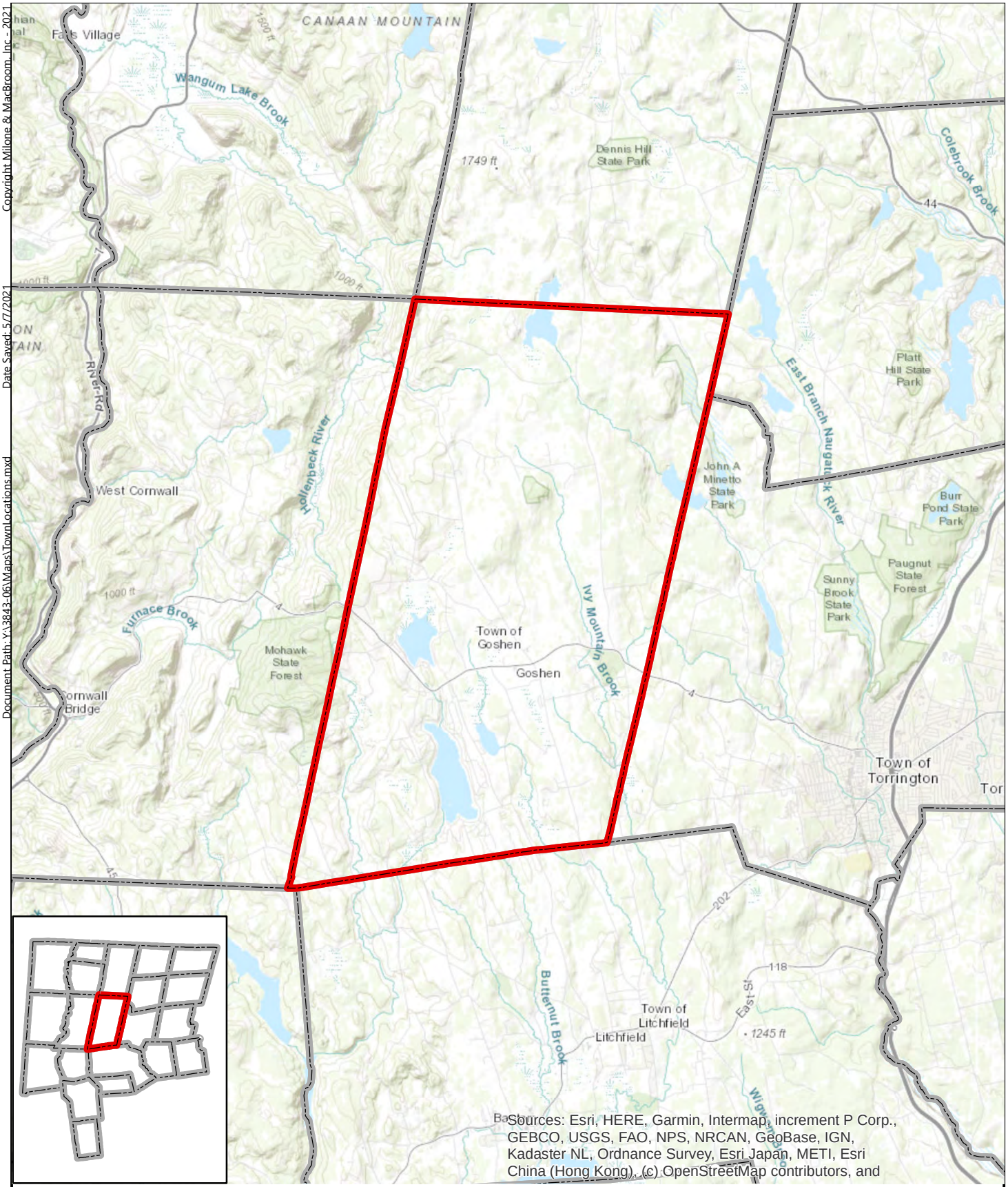
Land Cover	Area (acres)	Percent of Community
Developed	1,704.8	5.89%
Turf & Grass	713.8	2.47%
Other Grass	252.2	0.87%
Agricultural Field	3,652.9	12.62%
Deciduous Forest	11,729.6	40.54%
Coniferous Forest	7,606.0	26.29%
Water	1,231.5	4.26%
Non-Forested Wetland	250.6	0.87%
Forested Wetland	1,700.4	5.88%
Tidal Wetland	0.0	0.00%
Barren	23.2	0.08%
Utility Row	69.5	0.24%
Total	**28,935**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

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REGIONAL LOCATION: GOSHEN

HAZARD MITIGATION PLAN UPDATE - GOSHEN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 2-1

2.3 Development Trends

According to the US Census data, the population of Goshen increased an average of 34 persons per year from a population of 1288 people in 1960 to 2,976 in 2010. U.S. Census Bureau estimates for 2019 show a population around 2,883 individuals, a decrease from 2010 of 3.1%. The Connecticut State Data Center predicts that population will increase by 8.2% through 2025 to an estimated population of 3,120 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Goshen remained relatively steady between 2013 and 2017. The number of permits issued in 2013 and 2014 was 3 and 10, respectively, while 4 permits were issued in 2016, and 7 permits were issued in 2017. On average, 5 housing permits were issued each year in Goshen between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Goshen dropped by approximately 10.4-percent between 2010 and 2019, from 1,664 units in 2010 to 1,507 units in 2019. In 2019, the housing stock was made up of approximately 99% single-unit structures, 1% two-unit structures, 0% multi-unit structures, and 0% mobile-homes or other types of structures. Most housing is owner occupied, with about 23% of the housing stock held for seasonal, recreational or occasional use (second homes).

According to the Connecticut Office of Policy and Management, Goshen's 2019 Total Equalized Net Grand List was valued at $565,212,635. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Goshen, included as Appendix C.

Goshen staff report that development in town has been static in recent years, with few residential developments and no significant commercial or industrial development. Overall, development in Goshen has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the next five years is not expected to increase exposure.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Goshen is considered to have a low level of social vulnerability, with a higher vulnerability score for the SVI category of Socioeconomic Status. In other words, a particular challenge in Goshen may include the presence of residents with limited financial resources.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Goshen.

Goshen is part of the Northeastern Highlands Ecoregion, which is characterized by "hills and mountains, a mostly forested land cover, nutrient poor frigid and cryic soils (mostly Spodosols), and numerous high gradient streams and glacial lakes" (as described on the map "Ecoregions of New England").

The bedrock is primarily metamorphic and granite, and the surficial material consists predominantly of fertile, stony glacial till soils.

2.5 Climate and Climate Change

Over the course of the year, the temperature in Goshen typically varies from 17°F to 80°F and is rarely below 1°F or above 88°F. The warm season lasts for 3.6 months, from May 28 to September 15, with an average daily high temperature above 70°F. The hottest day of the year is July 20, with an average high of 80°F and low of 62°F. The cold season lasts for 3.3 months, from December 1 to March 11, with an average daily high temperature below 41°F. The coldest day of the year is January 29, with an average low of 17°F and high of 32°F.

Precipitation falls throughout the year in Goshen. The wetter season lasts 3.5 months, from May 4 to August 19, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 39% on May 29. The drier season lasts 8.5 months, from August 19 to May 4. The smallest chance of a wet day is 21% on January 29.

The most rain falls during the 31 days centered around September 30, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts for 6.0 months, from October 23 to April 22, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 23, with an average total liquid-equivalent accumulation of 1.4 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Goshen as 4.72 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Goshen at 5.63 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.7	5.9	8.3
NOAA Atlas 14	5.6	7.0	9.1

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Goshen can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.1 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

The majority of Goshen drains to the Shepaug River through the south-flowing East Branch Shepaug River, the Marshepaug River (flowing through Tyler lake and Woodbridge Lake), the West Branch Bantam River, and the Bantam River.

The northeastern quarter of Town falls within the Naugatuck Regional Basin and is drained by Hart Brook (flowing from North Pond into the Reuben Hart Reservoir) and Hall Meadow Brook (which flows into the Hall Meadow Brook Reservoir flood control system, with downstream dams located in Torrington).

The northwestern corner of Town drains to the northwest by way of Bradford Brook and Ocain Brook into the Hollenbeck River in Cornwall.

2.7 Governmental Structure and Capabilities

The Town of Goshen has a number of existing authorities, policies, programs and regulations that serve to mitigate the impact of natural hazards. Existing local authorities include the Goshen Board of Selectmen, Planning and Zoning Commission, Inland Wetlands Commission, Emergency Management Director, Fire Department, and Department of Public Works.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Goshen are concentrated in the Goshen Historic District and West Goshen Historic District, and include historic homes, churches, archaeological sites, and landscapes. Resources near flood sources, such as historic mill sites, may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

The primary transportation routes into and out of the town are Route 4 (running east-west) and Route 63 (running north-south). Other key roads include Milton Road, and East Street. There is no local public transit system in Goshen.

There are no designated evacuation routes in town because of its rural nature; however, Route 4 and Route 63, along with other main routes, allow for access and egress during a storm.

Utilities

Public water in Goshen is provided by two small Aquarion Community Water Systems (Tyler Lake Heights System and the Litchfield, Goshen, and Torrington System serving homes around Reservoir Road), the Village Marketplace Community Water System, and a handful of small Non-Community Public Water Systems. Most residents rely on private well water.

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Goshen.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Goshen has identified several critical facilities throughout the town, as summarized on Table 2-3 below.

Table 2-3: Critical Facilities

Facility	Address or Location	Emergency Power	Shelter	SFHA
Town Hall	42 North Street	✔	✔	
Public Works	38 Torrington Road	✔		
Woodridge Lake Sewer District Water Treatment Facility	Brush Hill Road	✔		
Goshen Fire Company	181 Sharon Turnpike	✔		
Goshen Center School	50 North Street	✔	✔	
Woodridge Lake Sewer District Water Treatment Facility	Brush Hill Road	✔		

The key facilities considered to be at risk in the event of a natural hazard include the Goshen Town Hall, Goshen Elementary School, the Town Garage (Public Works), and Goshen Fire Company. These are considered critical facilities in the event of a natural disaster because they might be needed for effective emergency response. Goshen also considers fuel storage tanks for Goshen Oil, and the Goshen Gas Station/Store, as important facilities in the context of natural hazards, though they are not listed as critical facilities. All are potentially vulnerable to tornados, winter storms, wildfire, and earthquakes. None of the facilities is located within a floodplain.

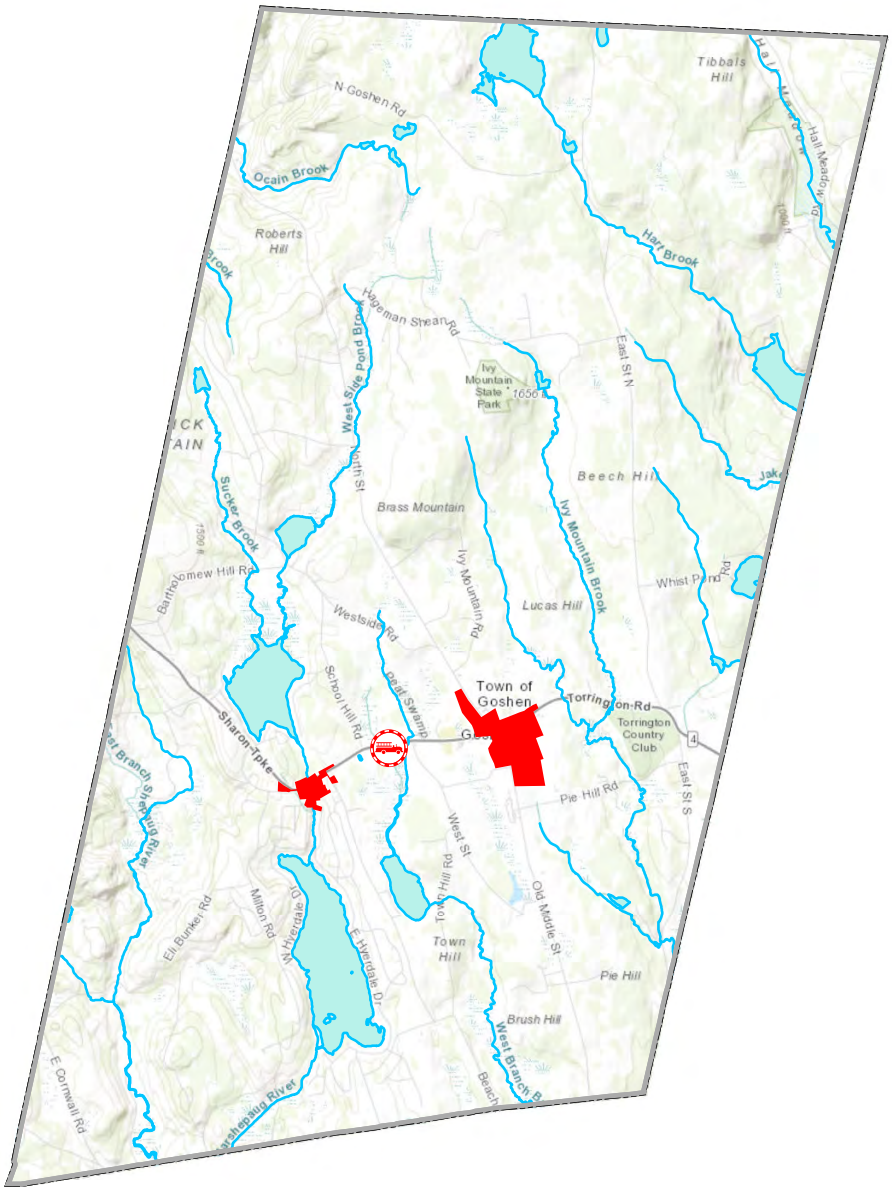
Since 2006, Goshen has established a new and more robust Emergency Operations Center at the Town Hall

Emergency Response Capabilities

The Goshen Volunteer Fire Department, Department of Public Works, and Emergency Management Director all possesses emergency equipment that can be deployed as needed in the event of an emergency. Goshen also has a local CERT Team to enhance emergency response. Other activities that have been implemented include a badging registration system for emergency responders, and improved training opportunities in emergency management.

In addition to these local and regional mitigation programs, the municipality also benefits from numerous federal and state mitigation programs such as the USGS WaterWatch, Report of the Two Storm Panel, CT DEEP Forest Fire Danger Report, the "Connecticut Drought Preparedness and Response Plan", the "National Weather Service Early Warning System," the University of Connecticut's Center for Land Use Education and Research (CLEAR), and the annual tree trimming maintenance program by Eversource.

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Critical Facilities & Cultural Resources

- EMS
- Fire Station
- National Register District

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CHESHIRE, CT 06410
203.271.1773
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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - GOSHEN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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SCALE	1 " = 8,131 '
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FIG. 2-2

The high percentage of seasonal homes in Goshen may pose a challenge for emergency response in the community. Specifically, the municipal monitoring of natural hazard impacts, and timely emergency response, may prove more problematic due to the periodic occupancy of the units. For example, flooding of a residence could go undetected and unreported for several days with no one living there. Lengthy power outages may leave homes with frozen, broken water pipes and interior flooding in severely cold weather.

Goshen has developed local GIS mapping capabilities, which can assist with emergency planning and response.

Sheltering Capabilities

Procedures are in place to open and maintain the Emergency Operations Center and emergency shelter in town.

Goshen has been working with other towns in the Region through the Northwest Hills Public Safety Task Force and Region 5 of the CT Department of Emergency Services and Public Protection to enhance emergency management, communication and coordination. This has included efforts to upgrade supplies at emergency shelters.

Communications

Goshen has implemented Blackboard Connect to communicate with residents during a hazard event.

With the Northwest Hills Public Safety Task Force and Region 5 of the CT Department of Emergency Services and Public Protection, Goshen has worked to standardize its internal communication equipment.

3 FLOODING

3.1 Existing Capabilities

Ordinances, Regulations and Plans

Land use regulations exist to protect natural resources, including erosion and sediment control regulations for new development, stormwater control regulations to minimize drainage problems, and a flood hazard area to control development in flood prone areas.

The flood hazard area provides that any new construction or substantial improvement of any residential structure shall have the lowest floor, including the basement, elevated to at least the base flood elevation. Nonresidential construction is required to have the lowest floor, including basement, elevated to at least the base flood elevation or be floodproofed to the base flood elevation. Additionally, all attendant utilities or sanitary facilities should be located or designed to avoid infiltration or impairment by flood waters.

Goshen's subdivision regulations have detailed standards for the planning, design and construction of storm drainage systems in order to minimize adverse impacts associated with new construction activity. The Goshen Inland Wetlands and Water Course Commission enforces regulations to direct development away from wetlands, watercourses and floodplains. In addition to these regulations, the Goshen Public Works Department routinely examines and clears public storm drains and catch basins of debris following periods of rainfall, snowfall, or windstorms.

NFIP, Flood Insurance, and Community Rating System

Goshen, through town ordinance, achieves compliance with NFIP requirements with the following ordinances: adoption of the Connecticut State Building code (Title 26), assurance of town compliance with the National Flood Insurance requirements and empower town and regional officials with appropriate duties (Title 30), Floodplain Management Ordinance (Title 52) and its amendment (Title 53). Goshen expects to continue participation in NFIP.

According to FEMA, there are 21 flood insurance policies in force in Goshen as of 6/30/2019 with an insurance value of $7,089,000. The previous edition of this HMP noted 26 flood insurance policies in force as of 8/31/2015 with an insurance value of $8,667,700.

Drainage and Street Flooding

In addition to subdivision regulations around the planning, design and construction of storm drainage systems, the Goshen Public Works Department routinely examines and clears public storm drains and catch basins of debris following periods of rainfall, snowfall, or windstorms.

Flooding and other complaints or filed either with public works or directly to the First Selectman and are typically addressed soon after being made.

Structural Projects

The town has a comprehensive road management plan, that includes drainage infrastructure. The town utilizes the *Roadsoft* asset management system to track roadway and drainage conditions. The town incorporates roadway maintenance into the budget and works hard to foresee necessary repairs and address them before they are a problem.

New Capabilities and Completed Actions

Goshen continues to maintain its strong flood mitigation capabilities.

The Town has performed a comprehensive stormwater drainage study of the Woodridge Lake area to better define drainage improvement needs. Goshen will continue to address the drainage projects outlined in the Woodridge Lake Drainage Study in the coming years.

Summary

Goshen mitigates flood damages primarily through regulating development in floodprone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate.

3.2 Vulnerabilities and Risk Assessment

Flooding in Goshen is a slightly lesser concern compared to other communities because there are no major rivers flowing through the community. Isolated flooding still occurs, however, due to inadequate drainage systems and beaver dams.

While flooding is not as common in Goshen as in other parts of the region, the Flood of 1955 did have a limited impact on Goshen. According to "Goshen Connecticut, a Town Above all Others," "When the disastrous flood of 1955 hit Torrington, Goshen too had some flooded roads and damp cellars, and the old Torrington creamery building in West Goshen was so damaged by water that the Grange could no longer use it for meetings." Hurricane Diane, which spawned the flood of 1955, brought fourteen and a half inches of rain on August 18 and 19.

Flood prone areas in the community today, as mapped by FEMA, are presented in Figure 3-1.

The drainage area at Woodridge Lake is particularly of concern due to the increased density of development in this area. This community was developed roughly 50 years ago, and much of the drainage system is beginning to deteriorate and needs repairs. Road flooding has occurred in this area in recent years.

Flooding from heavy precipitation is a challenge along certain roadways including:

- East Street South at the intersection of Reservoir Road.
- Bartholomew Hill Road between Sucker Brook and Westside Road.

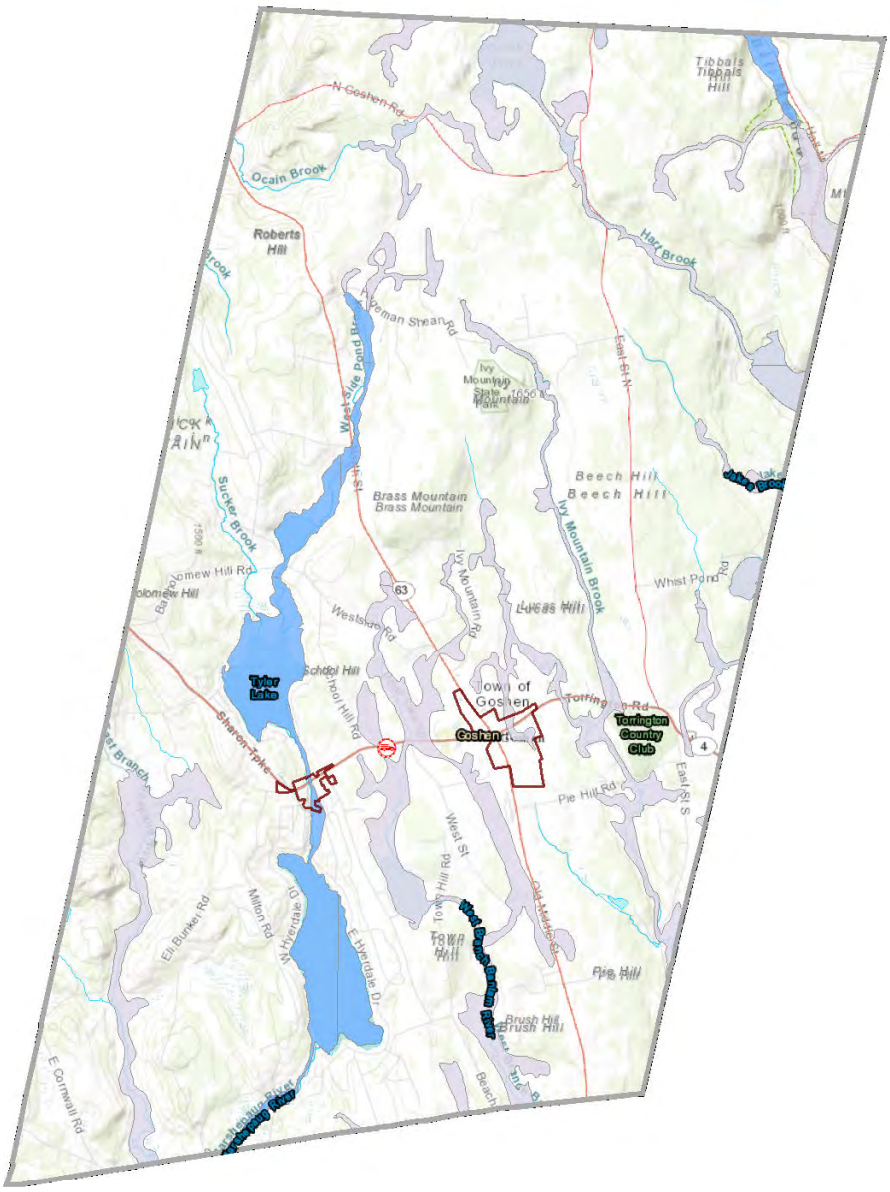
Town staff report that there are three pipes (over 70 feet long each) under West Hyerdale Drive that convey the Marshepaug River that need repairs, in part because the galvanized invert is beginning to rot. The town is in the beginning phase of upgrading the culvert linings to reduce the chance of collapse. The town has been in contact with a contract engineer who has done a brief preliminary evaluation, and the town has also contacted DEEP fisheries to begin the process.

Town staff report that inaccurate FEMA flood maps, and lack of flood zone delineation in some areas, has proven to be a significant challenge for residents.

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Legend

EMS	**Flood Zone**
Fire Station	A
National Register District	AE

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FLOOD RISK AREAS

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FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing capabilities appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Goshen is 105 mph for a Category 1 event, 115 mph for a Category 2, and 125 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Goshen has a tree warden, and budget is set aside for tree trimming and removal. This budget has doubled since adoption of the previous HMP.

Eversource, the local electric utility, provides tree maintenance near its power lines.

New Capabilities and Completed Actions

Goshen continues to maintain its strong tropical cyclone mitigation capabilities.

Summary

Goshen mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

Hurricanes have caused wide-spread power outages and could cause significant damage. Hurricane Irene left 46% of the town without power at its peak (879 households). Areas of with heavy development are more vulnerable as they are home to a greater number of buildings. These areas can be impacted by power outages and debris from trees.

Tropical Storm Isaias

Tropical Storm Isaias in August of 2020 resulted in power outages in over 99% of Goshen, with downed trees and lines blocking 32 roads in town. Many large, healthy trees were completely uprooted.

The storm also resulted in major communication challenges. Power outages across town, along with downed cable and internet services, hindered communication efforts. Leading up to and during the Isaias event, the First Selectman sent out multiple emergency notifications to residents to inform them of risks and emergency response needs. Post-event analysis estimated that only 43 to 48% of contacts received the notifications because of communication challenges.

Goshen's town's GIS mapping capabilities also went down because of Isaias, eliminating any capabilities related to storm response that the GIS system may otherwise have provided.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Sharon as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

New Capabilities and Completed Actions

Goshen continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

Goshen mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Goshen has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

The central and southern portions of the United States are at higher risk for lightning and thunderstorms than is the northeast. However, FEMA reports that more deaths from lightning occur on the East Coast than elsewhere. Lightning-related fatalities have declined in recent years due to increased education and awareness.

Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Goshen area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Goshen is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the Town is believed to be low for any given year. All areas of the Town are susceptible to damage from high winds.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Such fires can be extremely dangerous during the summer months during dry and drought conditions.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

While not frequently occurring, tornados are a concern in Goshen. Tornados have caused significant tree damage in the past, but had limited impacts on buildings. In 1979, a year after a major winter storm, a tornado touched down, causing substantial tree damage. Another tornado on July 10, 1989, caused limited damage in Goshen, but substantial damage in neighboring communities. Tornadoes and straight-line winds impacted the region in 2020, but Goshen municipal staff report that no significant damage occurred in Town. In the past, summer storms have not presented major concerns locally, although high winds do cause some disruption and more minor damage.

Areas of with heavy development are more vulnerable as they are home to a greater number of buildings. These areas can be impacted by power outages and debris from trees.

6 WINTER STORMS

6.1 Existing Capabilities

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas. As a result of the winter of 2010-2011, it is anticipated that many communities will develop and utilize programs for roof snow removal.

The Town's DPW also monitors weather reports and maintains loaded trucks in preparation for winter storm events.

New Capabilities and Completed Actions

Goshen continues to maintain its strong winter storm mitigation capabilities.

Summary

Goshen mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

Winter storms can impact the entire town and occur relatively frequently. A severe snowstorm occurred in March of 1978 that brought close to three feet of heavy snow, and Goshen was without power for five days. In 2002, Goshen suffered another major ice storm that resulted in downed power lines, extensive tree damage, and expensive clean-up costs. The period of 2011-2013 brought several severe storm events: Tropical Storm Irene, Hurricane Sandy, and a severe winter storm in 2013.

Areas with heavy development are more vulnerable due to the potential for roof collapses caused by heavy snow. Areas where local roads, which are maintained by the town, are located are also more vulnerable, as clearing the roads can cost the town a considerable amount of money. The town maintains 68 miles of local roads, or 8% of the regional total.

Snow drifting is a concern town-wide; however, the following locations are known to experience snow-drift related challenges:

- Bartholomew Hill Road
- The area near East Street South and Route 4
- The area near East Street North and Route 4
- 5 ½ Mile Road
- Sandy Beach Road

Icing can also be a concern across town. There are some shady areas in town that tend to ice over first, but public works is capable of treating these areas.

7 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Barkhamsted. The Town has adopted these codes for new construction, and they are enforced by the Building Official.

New Capabilities and Completed Actions

Goshen continues to maintain its earthquake and landslide mitigation capabilities.

Summary

Goshen mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Earthquake Vulnerabilities

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Goshen. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Goshen

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

> Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.
>
> Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

Actions Completed and New Capabilities

Goshen continues to maintain its capabilities for mitigating and responding to dam failure risks.

Summary

Goshen mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 22 DEEP-inventoried dams within the Town of Goshen. These dams are listed in Table 8-1 and shown in Figure 8-1.

Table 8-1: DEEP-Inventoried Dams in Goshen

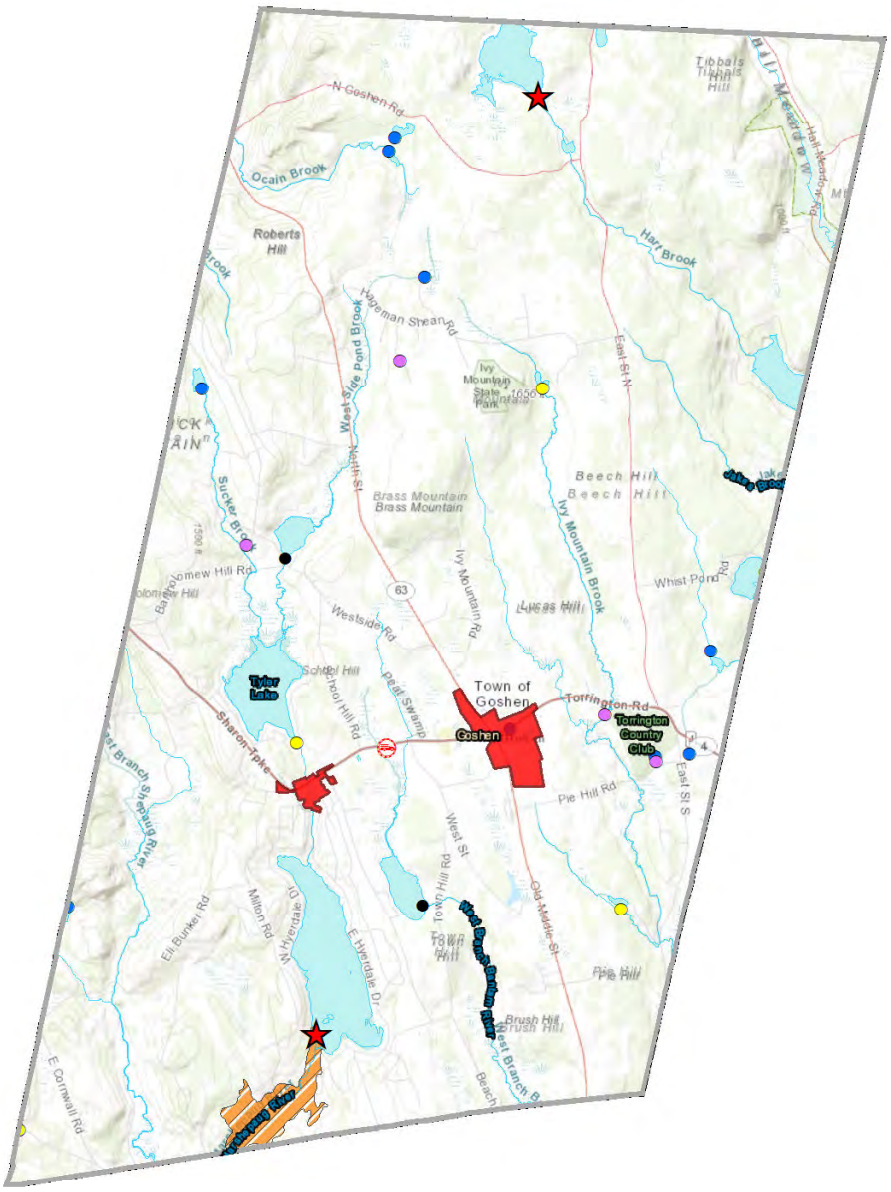
Number	Name	Class	Owner
5501	NORTH POND RESERVOIR DAM	C	Water Utility
5502	LITCHFIELD RESERVOIR DAM	BB	Private Corporation
5503	TYLER LAKE DAM	BB	Municipal
5504	WOODRIDGE LAKE DAM	C	Lake Association
5505	WEST SIDE POND DAM	AA	State Owned
5506	WILDCAT POND	A	State Owned
5507	OCAIN POND	A	State Owned
5508	CUNNINGHAM POND	A	Private Corporation
5509	HART POND DAM	BB	State Owned
5510	DOG POND		Private
5511	IVY MOUNTAIN DAM	BB	Private
5512	MOHAWK POND	A	State Owned
5513	UNNAMED	A	Water Utility
5514	UNNAMED	A	Private
5515	UNNAMED	A	Private
5516	O'LEARY POND DAM	A	Private
5517	ODENWAELDER POND DAM	AA	Private
5518	POND ON 2ND HOLE DAM	A	Private Club
5519	POND ON 3RD HOLE DAM	AA	Private Club
5520	POND ON 11TH/12TH HOLE DAM	AA	Private Club
5521	LAKE CECELIA POND DAM		Private
5522	UNNAMED	AA	Private

Of these dams, only the North Pond Reservoir Dam and the Woodridge Lake Dam are classified as high potential hazard; the other dams are classified as moderate hazard or lower. North Pond Reservoir is upstream of East Street North, and its failure would threaten roadways and some residential buildings. Woodridge Lake is upstream of Milton Road, numerous residential properties, and some farmland. Woodridge Lake is also used for recreation, and a significant drop in water level could damage boats and recreational structures.

Beaver Dams

Increased flooding as a result of beavers is of growing local concern due to increasing beaver population numbers. Beaver activity has been described by municipal staff as a persistent issue, causing problems with localized flooding, especially for private wells.

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Legend

- EMS
- Fire Station
- National Register District

Dam Hazard Class

- C - High Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

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Feet

SCALE 1 " = 8,127 '
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FIG. 8-1

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Goshen is compliant with this program and has a designated Burning Official.

Actions Completed and New Capabilities

Goshen continues to maintain its capabilities for mitigating and responding to wildfire risks.

The Town is interested in acquiring a portable water tank, and making an agreement with local water suppliers to fill the tank, to facilitate wildfire-fighting capabilities.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

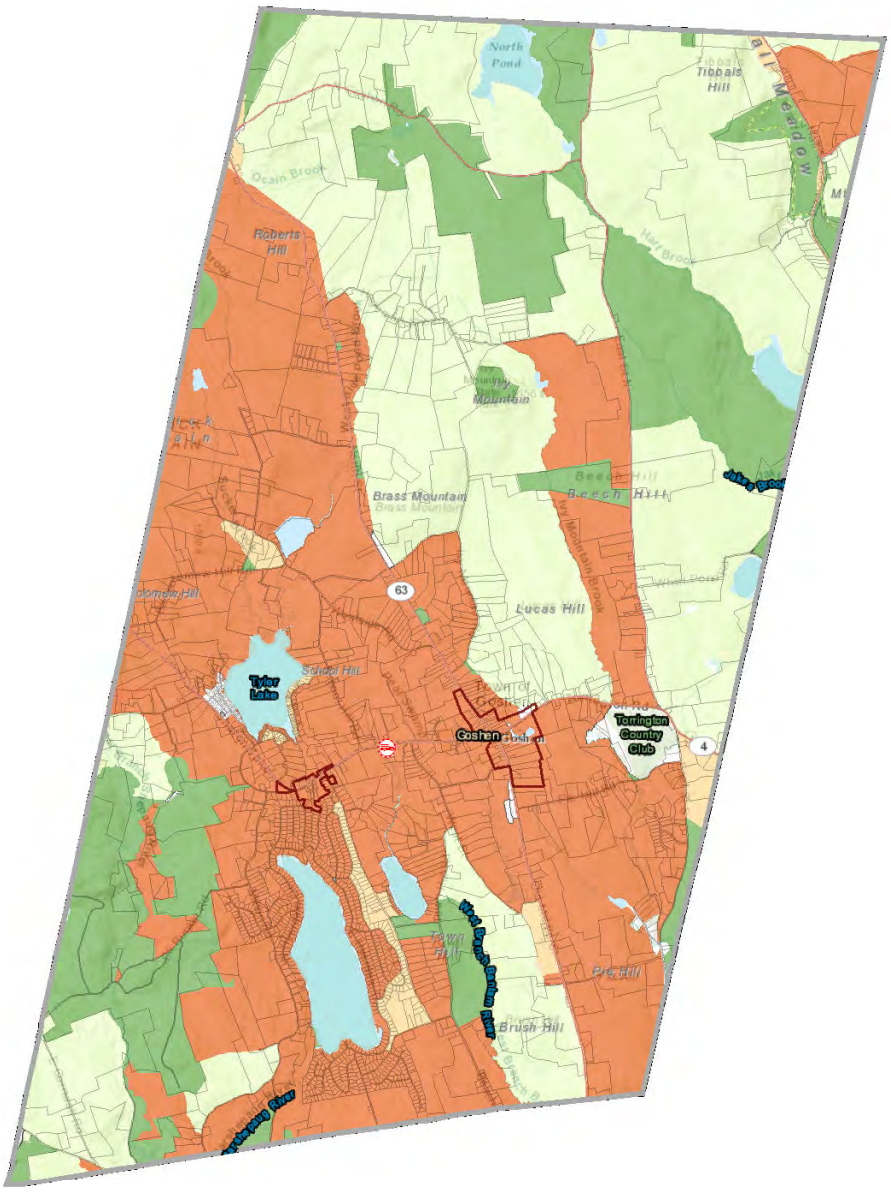
9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

Goshen has a significant amount of rural, forested land, which could be impacted by wildfire due to the presence of fuel, the remote nature of these areas, and hilliness that can hinder access. The northeast portion of town is particularly at risk, along with the southwest corner of Goshen.

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Legend

- EMS
- Fire Station
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

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FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

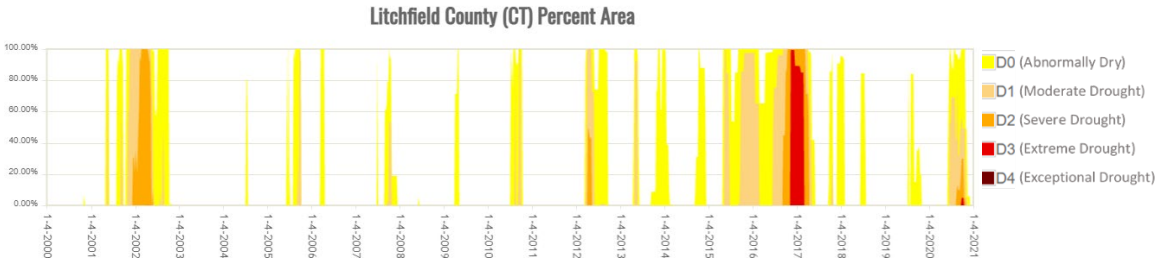


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Action	Dept.	Status	Notes
1.1	Visit schools & educate children about natural hazards & how to prepare for them.	FD, EMD	Capability	This is a capability.
1.2	Make literature available on natural hazards and preparedness at Goshen Town Hall.	EMD, FS	Complete	This has been completed and is now a capability.
1.3	Provide outreach to seasonal home-owners on how to protect against frozen pipes and water damage during the winter with the loss of electricity, including information on automatic shut-off switches or alarms.	EMD, FS	Carry Forward with Revision	Town provides such outreach; however, they would like to improve the level of engagement.
1.4	Maintain local Emergency Operations Plan and continue to coordinate with the Regional Public Safety Task Force and DEMHS Region 5 on planning, preparedness, response, recovery, and training.	EMD, FS	Capability	The town maintains an EOP and other emergency plans, and coordinated with DEMHS. Plans are reviewed regularly to ensure they are up to date. The Town also updates plans following events based on "lessons-learned".
1.5	Continue to provide an Emergency Notification System to provide emergency information to residents in the town or in a specific geographic area. This System can warn of an impending situation and also provide information regarding how to prepare or respond to a particular event.	EMD, FS	Complete	Town uses Blackboard Connect, and reports it is satisfactory. Town also uses social media to communicate. **New action**: explore communication options that can operate when power and internet is unavailable.
2.1	Routinely inspect emergency response equipment, & train for response to natural disasters.	FD, CERT, EMD	Capability	This is done on a regular basis.
2.2	Acquire additional emergency response equipment including a woodchipper and 500-gallon portable water tank to enhance response capabilities	EMD, FD	Carry Forward with Revision	Town has acquired woodchipper. Town has not yet acquired portable water tank, and is unsure where water to fill the tank would be sourced. **Revise:** Acquire portable tank and pursue an agreement for filling with local water suppliers.
2.3	Promote the use of interoperable communication equipment, and the development of standard operating guidelines for emergency response in the regional area.	EMD, FD, FS	Capability	This is a capability.

#	Action	Dept.	Status	Notes
2.4	Consider developing a Memorandum of Understanding with schools or school bus company to utilize school buses for mass transportation during an emergency.	EMD, FS	Carry Forward	Not yet complete due to limited staffing capabilities. Carry forward; however, note that bus company may change with shift to regional school system.
2.5	Develop basic GIS capabilities as needed for access to aerial photos showing the number and location of properties and structures that could be affected by a natural disaster.	EMD, FD, FS	Complete	Town has developed GIS capabilities. **New Action:** configure GIS licensing and data storage to enable operation during internet outage.
3.1	Pursue funding to implement control measures to mitigate the flooding created by beavers.	PWD	Carry Forward	Action has not yet been completed due to limited staff capacity.
3.2	Develop and implement clean-out schedules for all catch basins and drainage facilities	PWD	Complete	Goshen has implemented a robust clean-out program, and continues to improve its drainage systems with upgrades and repairs. One incentive is to keep phosphorous out of lakes. This is now a capability.
3.3	Review floodplain regulations and ordinances and update as necessary based on guidance from DEEP.	PZC	Capability	Goshen continuously monitors for guidance to incorporate into regulations.
3.4	Pursue improved floodplain mapping in cooperation with federal and state authorities in order to more accurately identify the location of structures that are susceptible to flooding.	FEMA, DEEP, FS, EMD	Capability	Goshen continuously monitors for map updates to incorporate into regulations. Current mapping poses a real challenge for property owners.
3.5	Pursue additional funding to supplement the municipal tree trimming program.	FS, PWD	Capability	Town has a tree warden and budget. Being heavily vegetated, tree maintenance is often a challenge.
3.6	Pursue the purchase and placement of standardized house number signs to facilitate effective emergency response to 911 calls.	EMD, FD, FS	Carry Forward	Action has not yet been completed due to lack of funding. The Woodridge Lake area has a number mailbox post regulation; however, there is no town-wide standard.
3.7	Undertake comprehensive stormwater drainage study at Woodridge Lake to address localized flooding problems.	FS, PWD	Complete	The study has been completed. The town has completed a number of recommended projects, and continues to address 1 to 2 projects a year. **New Action:** pursue actions outlined in the drainage study.

Acronym Key

CERT	Community Emergency Response Team
DEEP	Connecticut Department of Energy and Environmental Protection
EMD	Emergency Management Director
FD	Fire Department
FEMA	Federal Emergency Management Agency
FS	First Selectman
PWD	Public Works Department
PZC	Planning & Zoning Commission

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. Improvements to hazard mitigation capabilities desired by Goshen include:

- Improved communication with seasonal home-owners.
- Emergency notification systems that are more resilient to extensive power and utility outages.
- Continue to address the drainage projects outlined in the Woodridge Lake Drainage Study.
- Upgrade the Marshepaug River culverts under West Hyerdale Drive.

Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action GSH-01	
Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB, Sustainable CT
Timeframe	2022
Priority	High

Action GSH-02	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action GSH-03	
Develop a Memorandum of Understanding with schools or school bus company to utilize school buses for mass transportation during an emergency.	
Lead	EMD, FS
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action GSH-04	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action GSH-05	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action GSH-06	
Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action GSH-07	
Pursue the purchase and placement of standardized house number signs to facilitate effective emergency response to 911 calls.	
Lead	EMD; Fire; IT
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Med

Action GSH-08	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action GSH-09	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action GSH-10	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action GSH-11	
Pursue funding to implement control measures to mitigate the flooding created by beavers.	
Lead	DPW
Cost	$0 - $25,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action GSH-12	
Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action GSH-13	
Acquire portable water tank to transport firefighting water, and pursue an agreement for filling with local water suppliers.	
Lead	EMD, Fire
Cost	$50,000 - $100,000
Funding	OB, FEMA Assistance to Firefighters Grant
Timeframe	2023 – 2025
Priority	Med

Action GSH-14	
Compile a database of seasonal homeowner contact information and implement a natural hazard education and communication plan with those homeowners to improve mitigation capabilities while they are out of Town. Education and communication should include information on how to protect against frozen pipes and water damage during winter power losses, and protocols for preparing homes ahead of forecast storms.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action GSH-15	
Explore emergency notification systems that are more resilient to extensive power and utility outages.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action GSH-16	
Address the outstanding drainage projects outlined in the Woodridge Lake Drainage Study.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	Med

Action GSH-17	
Upgrade the Marshepaug River culverts under West Hyerdale Drive.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
GSH-01	Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	Sustainable CT	Planning	$0 - $25,000	OB, Sustainable CT	2022	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
GSH-02	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
GSH-03	Develop a Memorandum of Understanding with schools or school bus company to utilize school buses for mass transportation during an emergency.	Evacuation Bus	EMD, FS	$0 - $25,000	OB	2022 – 2023	1	0.5	1	0	1	0	0	0	0	0	0	0	0	0	4
GSH-04	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
GSH-05	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
GSH-06	Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
GSH-07	Pursue the purchase and placement of standardized house number signs to facilitate effective emergency response to 911 calls.	Other Emergency Response	EMD; Fire; IT	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	0	0	1	1	1	1	0	0	0	0	0	0	0	0	5
GSH-08	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
GSH-09	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
GSH-10	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
GSH-11	Pursue funding to implement control measures to mitigate the flooding created by beavers.	Beaver Management	DPW	$0 - $25,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	0	-1	0	0	0	0	0	-1	3
GSH-12	Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
GSH-13	Acquire portable water tank to transport firefighting water, and pursue an agreement for filling with local water suppliers.	Wildfire Risk Reduction	EMD, Fire	$50,000 - $100,000	OB, FEMA Assistance to Firefighters Grant	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	0	0	6
GSH-14	Compile a database of seasonal homeowner contact information and implement a natural hazard education and communication plan with those homeowners to improve mitigation capabilities while they are out of Town. Education and communication should include information on how to protect against frozen pipes and water damage during winter power losses, and protocols for preparing homes ahead of forecast storms.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
GSH-15	Explore emergency notification systems that are more resilient to extensive power and utility outages.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
GSH-16	Address the outstanding drainage projects outlined in the Woodridge Lake Drainage Study.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6
GSH-17	Upgrade the Marshepaug River culverts under West Hyerdale Drive.	Culvert & Bridge Upgrades	DPW	$100,000 - $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5

APPENDIX B
RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF GOSHEN BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Goshen has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Goshen Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Goshen and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Goshen; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Goshen, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Goshen eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Goshen;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Goshen, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Goshen this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

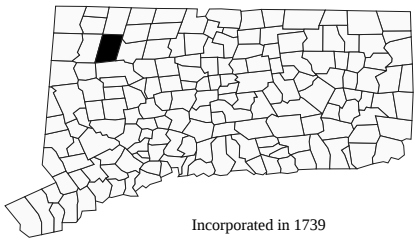
2019 CERC TOWN PROFILE

Goshen, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
42 North Street
Goshen, CT 06756
(860) 491-2308

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1739

Demographics

Population

	Town	County	State
2000	2,697	182,193	3,405,565
2010	2,976	189,927	3,574,097
2013-2017	2,914	184,454	3,594,478
2020	3,095	193,116	3,604,591
'17 - '20 Growth / Yr	1.9%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	44	921	4,842
Pop./Sq. Mile (2013-2017)	67	200	742
Median Age (2013-2017)	51	47	41
Households (2013-2017)	1,086	74,605	1,361,755
Med. HH Inc. (2013-2017)	$96,026	$76,438	$73,781

	Town	State
Veterans (2013-2017)	254	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	101	3%	297	10%	341	12%	472	16%	1,139	39%	564	19%	2,914	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	2,652	164,992	2,446,049
Black Non-Hisp	23	2,843	350,820
Asian Non-Hisp	11	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	47	2,320	84,917
Hispanic or Latino	181	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	9.6%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	526	24%	673,582	27%
Associates Degree	262	12%	188,481	8%
Bachelors or Higher	823	38%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	94	399
23 - Construction	20	50
31-33 - Manufacturing	6	32
44-45 - Retail Trade	7	30
54 - Professional, Scientific, and Technical Services	9	22
56 - Administrative and Waste Services	5	12
Total Government	11	60

Top Five Grand List (2018)

	Amount
Connecticut Light & Power Co.	$7,414,810
Torrington Country Club	$3,649,390
Woodridge Lake Property Owners Assoc.	$3,121,880
RW Commerford & Sons	$868,550
Aquarion Water Company of CT	$671,980
Net Grand List (SFY 2016-2017)	$524,683,410

Major Employers (2018)

Torrington Country Club
Goshen Center School
Fay & Wright Excavating Inc.
Town of Goshen
AJ's Restaurant

Education

2018-2019 School Year

	Grades	Enrollment
Regional School District 06	PK-12	912

Pre-K Enrollment (PSIS)

	2018-2019
Regional School District 06	58

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 06	97.2%	100.0%	94.1%

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	77.8%	53.8%	75.0%	51.3%	58.7%	43.0%
ELA	75.9%	53.1%	81.8%	54.9%	68.1%	56.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Regional School District 06	9.9%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	85.3%	84.0%	86.8%
Private	14.7%	16.0%	13.2%

profiles.ctdata.org

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Goshen, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$10,313,550	Total Expenditures (2017)	$9,798,803	Annual Debt Service (2017)	$0
Tax Revenue	$9,901,288	Education	$7,082,341	As % of Expenditures	0.0%
Non-tax Revenue	$412,262	Other	$2,716,462	Eq. Net Grand List (2017)	$747,908,439
Intergovernmental	$171,037	Total Indebtedness (2017)	$2,059,111	Per Capita	$258,971
Per Capita Tax (2017)	$3,417	As % of Expenditures	21.0%	As % of State Average	171.6%
As % of State Average	116.6%	Per Capita	$713	Moody's Bond Rating (2017)	-
		As % of State Average	28.4%	Actual Mill Rate (2017)	18.70
				Equalized Mill Rate (2017)	13.19
				% of Net Grand List Com/Ind (2017)	3.3%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	1,652	88,068	1,507,711
% Single Unit (2013-2017)	95.9%	73.6%	59.2%
New Permits Auth (2017)	7	142	4,547
As % Existing Units	0.4%	0.2%	0.3%
Demolitions (2017)	0	32	1,403
Home Sales	NA	1,753	21,880
Median Price	$350,800	$250,100	$270,100
Built Pre-1950 share	12.9%	31.2%	29.3%
Owner Occupied Dwellings	1,025	57,330	906,798
As % Total Dwellings	94.4%	76.8%	66.6%
Subsidized Housing (2018)	4	4,817	167,879

Distribution of House Sales

	Town	County	State
Less than $100,000	NA	57	536
$100,000-$199,999	NA	563	5,237
$200,000-$299,999	NA	538	6,681
$300,000-$399,999	NA	315	3,863
$400,000 or More	NA	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	-$6,666	$995	$1,123
Cost-burdened Renters	29.3%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	1,612	101,000	1,827,070
Residents Unemployed	49	4,014	78,242
Unemployment Rate	3.0%	3.8%	4.1%
Self-Employed Rate	17.8%	13.0%	10.0%
Total Employers	94	6,177	122,067
Total Employed	399	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Goshen, CT	87	Torrington, CT	234
Torrington, CT	86	Litchfield, CT	120
Winchester, CT	17	Goshen, CT	87
Harwinton, CT	14	Waterbury, CT	80
Litchfield, CT	9	Hartford, CT	67
Thomaston, CT	8	Farmington, CT	45
Cornwall, CT	7	New Milford, CT	44

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	493	1,777
Violent	71	228

Disengaged Youth (2013-2017)

	Town	State
Female	17.9%	4.2%
Male	22.2%	5.6%

	Town
Library circulation per capita	7.89

Distance to Major Cities

	Miles
Hartford	29
New York City	90
Providence	94
Boston	119
Montreal	256

Residential Utilities

Electric Provider

Eversource Energy
(800) 286-2000

Cable Provider

Cablevision of Litchfield, Inc.
(860) 567-3103

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

HARTLAND, CT

22 South Rd
East Hartland, CT 06027
MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 Torrington Road
Goshen, CT 06756
(860) 491-9884
https://northwesthillscog.org

Prepared by:
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Cheshire, Connecticut 06410
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global **environmental** and **advisory** solutions

SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Hartland and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Hartland is a lightly developed, rural town at the western edge of Hartford County. The town is bordered on the east by Granby, on the south by Barkhamsted, on the west by Colebrook, and on the north by Massachusetts.

Hartland was incorporated in May of 1761 and has a total area of 34.6 square miles and a land area of 33.0 square miles. It had a population of 1,982 persons in 2019, and is run by a Selectman/Town Meeting form of government.

The Barkhamsted Reservoir divides the town into East Hartland and West Hartland. The Tunxis State Forest Reserve, with 8,638 acres, and Water Company owned land (Metropolitan District Commission) around Barkhamsted Reservoir comprise about two-thirds of the land area of Hartland. A portion of People's State Forest is also located in Hartland.

Notable characteristics of the municipality include moderately to steeply sloping wooded land, scattered wetlands and ponds, Barkhamsted Reservoir, and the West Branch of the Farmington River. Major highways serving the town include State Routes 20, 179 and 181.

A publication entitled "History of Hartland" was compiled by Stanley A. Ransom in 1961. According to this book, "Agriculture has been the dominant occupation of Hartland's inhabitants especially during the first 150 years" (p. 120). Farms were supplemented with various industries in the 1800's including a calico factory (the largest industry ever to operate in Hartland with nearly 50 employees), coach and wagon factories, a tannery, boot manufacturer, lumber yard, and numerous sawmills, cider mills, and grist mills.

As stated on page 136 of the "History of Hartland", "The need for an additional water supply by Hartford and the towns which later joined in the formation of the Metropolitan District was first voiced in the mid 1920's. The MDC formally proposed legislation to construct a dam and reservoir in 1929, and legislation was ultimately approved in 1931 to enable construction of the Barkhamsted Reservoir and the Saville Dam. By this time, much of the land in "Hartland Hollow" had been purchased by the MDC. As stated by Mr. Ransom, "The ultimate result was the town being split into two separate communities having a reservoir occupying the entire breadth of the town and lying between the two sections called the East and the West Mountains" (p. 138).

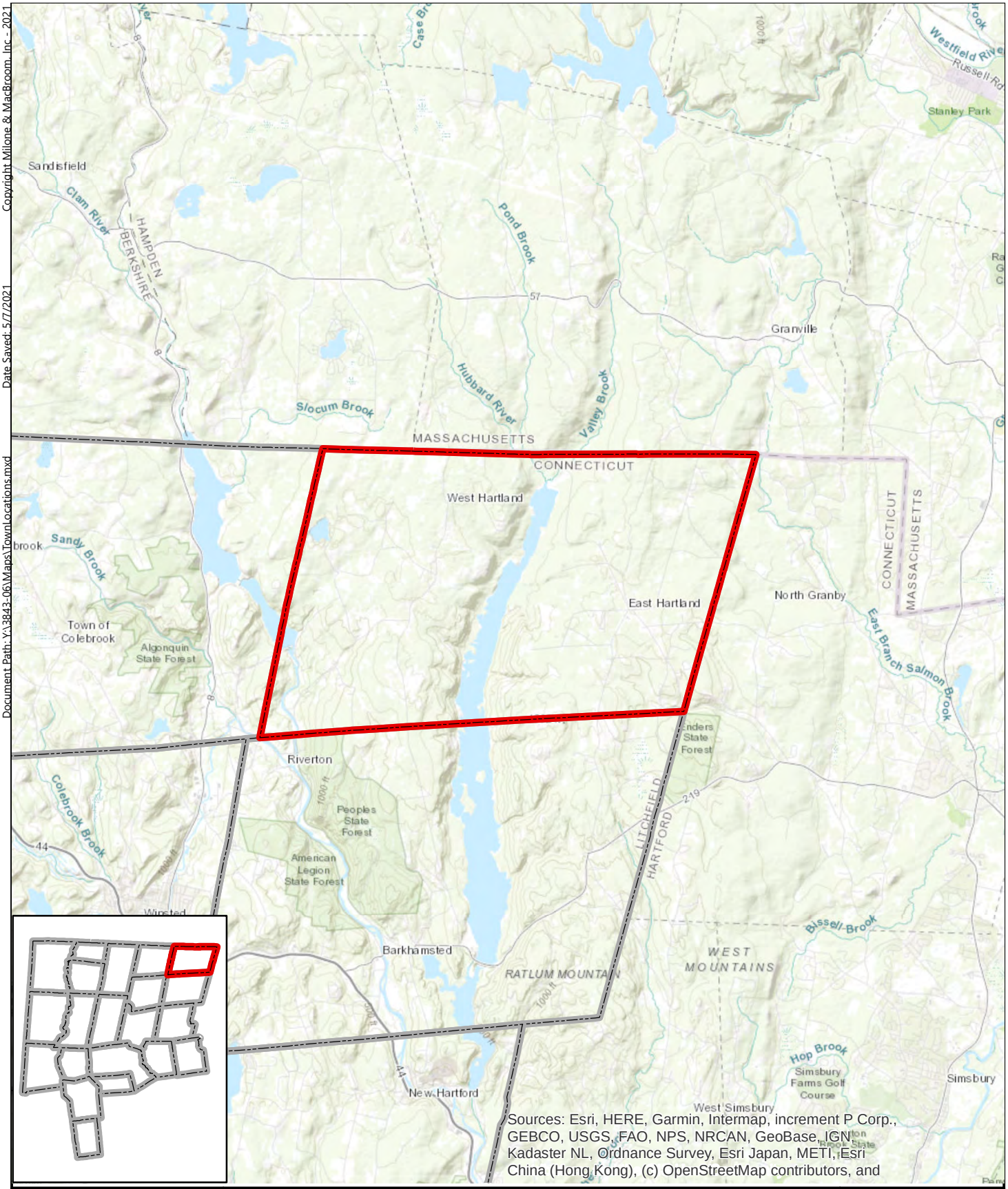
2.2 Existing Land Use

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 86% of Hartland is forested and approximately 5.8% is developed.

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MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

REGIONAL LOCATION: HARTLAND

HAZARD MITIGATION PLAN UPDATE - HARTLAND ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 5,500 11,000
Feet

SCALE 1 " = 12,032 '
DATE 5/7/2021
PROJ. NO. 3843-06

FIG. 2-1

Table 2-1: 2015 Land Cover by Area

Land Cover	Area (acres)	Percent of Community
Developed	1,271.1	5.79%
Turf & Grass	313.5	1.43%
Other Grass	124.0	0.57%
Agricultural Field	239.0	1.09%
Deciduous Forest	5,442.8	24.81%
Coniferous Forest	12,808.9	58.39%
Water	1,079.4	4.92%
Non-Forested Wetland	44.3	0.20%
Forested Wetland	525.9	2.40%
Tidal Wetland	0.0	0.00%
Barren	29.6	0.13%
Utility Row	56.8	0.26%
Total	**21,935**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

2.3 Development Trends

According to the US Census data, the population of Hartland has increased an average of 21 persons per year over the past 50 years, from a population of 1,040 people in 1960 to 2,009 in 2010. U.S. Census Bureau estimates for 2019 show a population around 1,982 individuals, a decrease from 2010 of 6.2%. The Connecticut State Data Center predicts that population will decrease by 1.1% through 2025 to an estimated population of 1,960 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Hartland increased between 2013 and 2017. The number of permits issued in 2013 and 2014 was 1 and 2, respectively, while 1 permits were issued in 2016, and 7 permits were issued in 2017. On average, 2 housing permits were issued each year in Hartland between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Hartland dropped by approximately 0.1-percent between 2010 and 2019, from 856 units in 2010 to 855 units in 2019. In 2019, the housing stock was made up of approximately 98% single-unit structures, 0% two-unit structures, 2% multi-unit structures, and 0% mobile-homes or other types of structures. The vast majority of housing is owner occupied, with about 8% of the housing stock renter occupied, and 4% held for seasonal, recreational or occasional use (second homes).

According to the Connecticut Office of Policy and Management, Hartland's 2019 Total Equalized Net Grand List was valued at $202,045,426. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Hartland, included as Appendix C.

Overall, development in Hartland has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the next five years is not expected to increase exposure.

2.4 Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Hartland is considered to have a Moderate level of social vulnerability, with a higher vulnerability score for the SVI category of Socioeconomic Status. In other words, a particular challenge in Hartland may include the presence of residents with limited financial resources.

2.5 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Hartland.

Hartland is part of the Northeastern Highlands Ecoregion, which is characterized by "hills and mountains, a mostly forested land cover, nutrient-poor frigid and cryic soils (mostly Spodosols), and numerous high-gradient streams and glacial lakes" (as described on the map "Ecoregions of New England"). The bedrock is primarily metamorphic and granite, and the surficial material consists predominantly of fertile, stony glacial till soils.

2.6 Climate and Climate Change

Over the course of the year, the temperature in Hartland typically varies from 16°F to 81°F and is rarely below 0°F or above 88°F. The warm season lasts for 3.6 months, from May 28 to September 15, with an average daily high temperature above 71°F. The hottest day of the year is July 19, with an average high of 81°F and low of 61°F. The cold season lasts for 3.3 months, from December 1 to March 11, with an average daily high temperature below 41°F. The coldest day of the year is January 29, with an average low of 16°F and high of 32°F.

Precipitation falls throughout the year in Hartland. The wetter season lasts 4.3 months, from April 10 to August 21, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on June 2. The drier season lasts 7.7 months, from August 21 to April 10. The smallest chance of a wet day is 21% on January 29.

The most rain falls during the 31 days centered around October 1, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts for 6.0 months, from October 23 to April 22, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 25, with an average total liquid-equivalent accumulation of 1.4 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Hartford County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Hartland as 4.84 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Hartland at 5.56 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	6.9
NRCC	4.8	6.1	8.6
NOAA Atlas 14	5.6	6.9	9.0

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Hartland can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.0 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.7 Governmental Structure and Capabilities

The Town of Hartland has a number of existing authorities, policies, programs and regulations that serve to mitigate the impact of natural hazards. Existing local authorities include the Hartland Board of Selectmen, Planning and Zoning Commission, Inland Wetlands Commission, Emergency Management Director, Fire Department, and Department of Public Works.

Hartland shares a building inspector with the Town of Granby. Hartland is therefore able to leverage Granby's capabilities through this arrangement, as sometimes updates to building codes or building inspector practices will come to Hartland through Granby.

The Town Highway Crew consists of 4 people, two located in the east part of town, and two in the west. The small size of this staff limits the Town's capacity to implement some hazard mitigation practices.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Sharon are concentrated within the Sharon Historic District (including the Calkinstown extension and Oblong Valley extension). Resources near flood sources may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

The primary transportation routes into and out of the town are Route 20 (running east to west over the north end of the Barkhamsted Reservoir), Route 179 (running from Barkhamsted north to Hartland center), Route 539 (running east from Hartland center to North Granby), and Route 181 (running from Barkhamsted north to West Hartland). Other key roads include Granville Road. Route 20 is the only route connecting East Hartland to West Hartland.

There is no local public transit system in Hartland.

Utilities

Public water in Hartland is provided by three small Non-Community Public Water Systems. Residents and businesses rely primarily on private well water.

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Hartland.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Hartland has identified several critical facilities throughout the town, as summarized on Table 2-3 below.

Table 2-3: Critical Facilities

Facility	Location	Type	Emergency Power	Shelter	SFHA
Hartland Town Hall	22 South Road	Municipal			
Hartland School	30 South Road	School	✓	✓	
Hartland PW Garage & Transfer Station	Welsh Road	Municipal	✓		
East Hartland Volunteer Fire Department	34 South Road	Emergency Services	✓		
West Hartland Volunteer Fire Department	152 Center Street	Emergency Services	✓		
Bethany Lutheran Church	Walnut Hill road	Primary Shelter	✓	✓	
West Hartland Community Center	Center Street	West Hartland Shelter	✓	✓	
Nellie B. West Building at Camp Alice Merritt	Hartland Blvd	Secondary shelter		✓	
First Church of Hartland	Hartland Blvd	Secondary Shelter	✓	✓	

The major facilities at risk in the community in the event of a natural hazard include the Hartland Town Hall, The Hartland School, the Town Garage, the East Hartland Fire Station, and the West Hartland Fire Station. These are considered critical facilities in the event of a natural disaster because they might be needed for effective emergency response. All are potentially vulnerable to tornados, winter storms, wildfire, and earthquakes. None of the facilities are located within a floodplain.

The Hartland Town hall is a robust Emergency Operations Center with a generator and enhanced radio communication equipment.

The West Hartland Volunteer Fire Department has a small generator.

Emergency Response Capabilities

The Hartland Volunteer Fire Departments and Department of Public Works all possesses emergency equipment that can be deployed as needed in the event of an emergency.

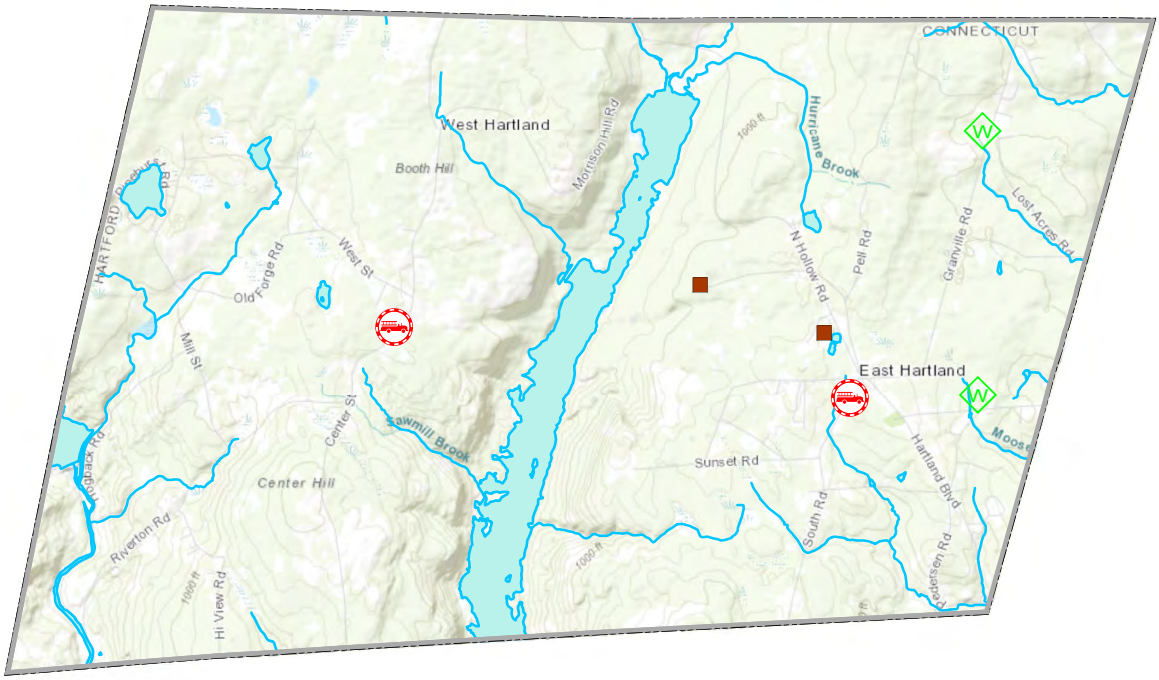
Another activity being pursued is a regionally coordinated public notification system, a badging registration system for emergency responders, improved training opportunities, and the development of written mutual aid agreements.

In addition to these local and regional mitigation programs, the municipality also benefits from numerous federal and state mitigation programs such as the USGS WaterWatch, Report of the Two Storm Panel, CT DEEP Forest Fire Danger Report, the "Connecticut Drought Preparedness and Response Plan", the "National Weather Service Early Warning System", the University of Connecticut's Center for Land Use Education and Research (CLEAR), and the annual tree trimming maintenance program by Eversource.

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Critical Facilities & Cultural Resources

- EMS
- Fire Station
- Municipal Solid Waste
- National Register Building
- National Register District

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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - HARTLAND ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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Feet

SCALE 1 " = 7,520 '
DATE 5/7/2021
PROJ. NO. 3843-06

FIG. 2-2

In general, Hartland staff report that the community is capable of withstanding natural hazard events. Because the community is rural, remote, and often one of the later communities to be served by State or service-providers after storm events, Town staff and local residents have learned to be self-reliant, and are able to resume operations quickly following a natural hazard.

Sheltering Capabilities

Bethany Lutheran Church is the primary shelter of Hartland, and the West Hartland Community Center is the shelter for the West Hartland area.

The First Church of Hartland is a backup shelter. The Nellie B. West Building at Camp Alice Merritt can also be used for temporary sheltering, but does not have a backup generator.

The Hartland School (an Elementary School) can also be used as a shelter, and does have backup power; however, Town officials are concerned that using it as a shelter would require cancelling school while sheltering is underway, as well as for some time afterward during shelter breakdown and cleanup.

Procedures are in place to open and maintain the Emergency Operations Center and emergency shelters in town.

Hartland has been working with other towns in the Region through the Northwest Hills Public Safety Task Force and Region 5 of the CT Department of Emergency Services and Public Protection to enhance emergency management, communication and coordination. This has included efforts to upgrade supplies at emergency shelters.

Communications

Hartland participates in an effort by the Northwest Hills Public Safety Task Force and Region 5 of the CT Department of Emergency Services and Public Protection to develop a regionally coordinated public notification system.

3 FLOODING

3.1 Existing Capabilities

Ordinances, Regulations and Plans

Land use regulations exist to protect natural resources, including erosion and sediment control regulations for new development, stormwater control regulations to minimize drainage problems, and a floodplain district to control development in flood prone areas.

New construction or substantial improvement of any structure shall be prohibited within the floodplain district without special exception from the Planning and Zoning Commission. Where exceptions are granted, the lowest floor, including the basement, a structure shall be elevated at or above the base flood elevation.

Hartland's subdivision regulations have detailed standards for the planning, design and construction of storm drainage systems in order to minimize adverse impacts associated with new construction activity. The Hartland Wetlands Commission enforces regulations to direct development away from wetlands, watercourses and floodplains.

NFIP and Flood Insurance

Hartland participates in the NFIP program, and intends to continue doing so.

According to FEMA, there are zero flood insurance policies in force in Hartland as of 6/30/2019 with an insurance value of $0.

Drainage and Street Flooding

The Hartland Public Works Department routinely examines and clears public storm drains and catch basins of debris following periods of rainfall, snowfall, or windstorms.

New Capabilities and Completed Actions

Hartland continues to maintain its strong flood mitigation capabilities.

The State is reviewing scour at Dalene Bridge over West Branch Salmon Brook on the east side of Town. This may lead to bridge repairs or rehabilitation.

Summary

Hartland mitigates flood damages primarily through regulating development in floodprone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate.

3.2 Vulnerabilities and Risk Assessment

Flooding: flooding is not a significant concern for Hartland. The Town is located in a relatively high-elevation are with small floodplains and limited development. Dam failure is the Town's primary flood-related concern.

Some impacts from floods have been recorded. For example, one eyewitness, Alfred T. Lilliendahl, recounted that all roads out of town were effectively blocked by the Flood of 1955 and that the flood washed out several roads and dams in town.

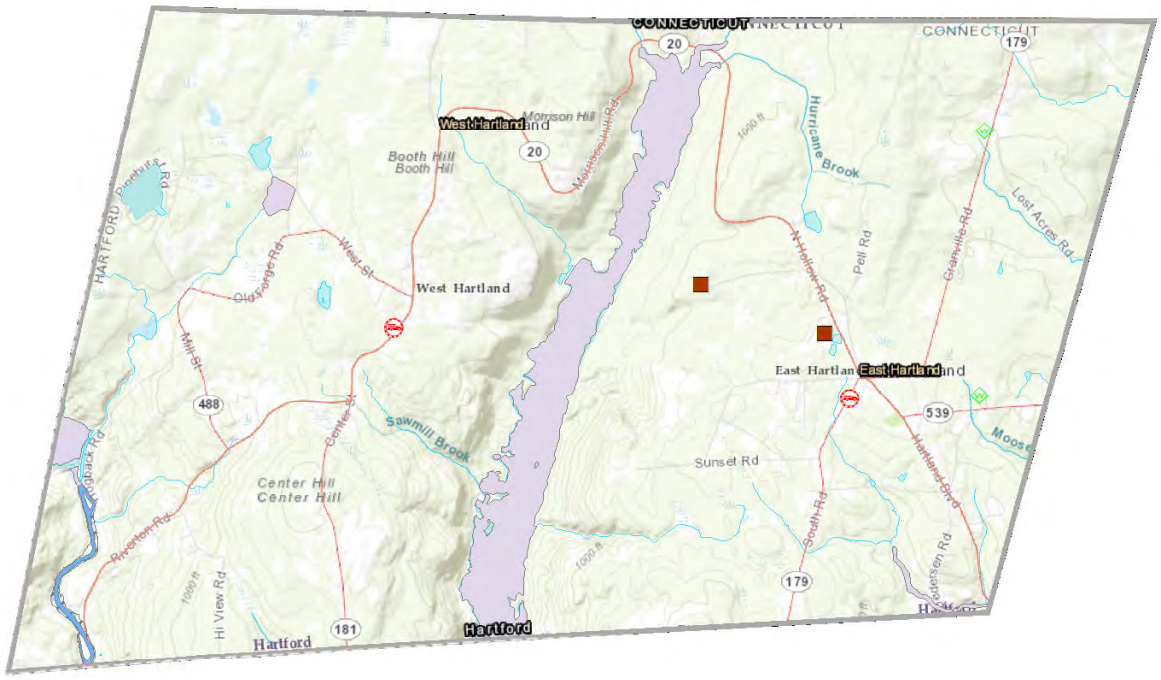
Municipal staff are concerned about one large drainage culvert located on Hogback Road. Repairing or upgrading this culvert is needed, but cost of the repairs will be beyond the Town's capacity. Hartland will require a grant to address this issue.

Flood prone areas in the community today, as mapped by FEMA, are presented in Figure 3-1.

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Legend

- EMS
- Fire Station
- Municipal Solid Waste
- National Register Building
- National Register District

Flood Zone

- A
- AE
- X500

Flood Zone

- A
- AE
- 0.2 PCT ANNUAL CHANCE

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FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - HARTLAND ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
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SCALE 1 " = 7,520 '
DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing capabilities appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Hartland is 110 mph for a Category 1 event, 120 mph for a Category 2, and 125 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Eversource, the local electric utility, provides tree maintenance near its power lines.

New Capabilities and Completed Actions

Hartland continues to maintain its strong tropical cyclone mitigation capabilities.

Summary

Hartland mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category

hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike western Connecticut to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

Hurricane force winds are a concern with regards to power outages. Hartland suffered hurricane related damage from Storm Irene in August 2011 and Storm Sandy in October 2012. Both of these events caused significant power outages and the storms received Presidential Disaster Declarations. Hurricane Irene left 26% of the town without power at its peak (224 households).

Tropical Storm Isaias in August of 2020 reportedly knocked out 100% of power service in Hartland for about a week. Town staff report that significant outages due to high wind events are relatively common.

High wind events can lead to downed trees and blocked roads, which can severely limit travel along Hartland's rural roads. This hampered travel can isolate the Town from surrounding communities, and can fragment East Hartland and West Hartland. Route 20 is the only east-west route in Hartland around the Barkhamsted Reservoir, and is winding and precarious; if Route 20 is blocked, the only other ways to get to East Hartland to West Hartland are to double the distance by traveling through Barkhamsted or Granville, MA. Hartland staff report that the State is sometimes delayed in clearing Route 20. Loss of access to food, medication, and other essential services due to blocked roads is a major concern for Hartland.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Sharon as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

New Capabilities and Completed Actions

Hartland continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

Hartland mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Hartford County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Hartford County, the Town of Hartland has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

The central and southern portions of the United States are at higher risk for lightning and thunderstorms than is the northeast. However, FEMA reports that more deaths from lightning occur on the East Coast than elsewhere. Lightning-related fatalities have declined in recent years due to increased education and awareness.

Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Hartland area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Hartland is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the Town is believed to be low for any given year. All areas of the Town are susceptible to damage from high winds. In 2001 the Town experienced a microburst of wind that destroyed a number of trees in town.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Such fires can be extremely dangerous during the summer months during dry and drought conditions.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

Tornados, though rare, are a concern in Hartland.

6 WINTER STORMS

6.1 Existing Capabilities

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas.

The DPW monitors weather reports and maintains loaded trucks in preparation of winter storm events.

New Capabilities and Completed Actions

Hartland continues to maintain its strong winter storm mitigation capabilities.

Summary

Hartland mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

A severe snowstorm occurred in March of 1978 that brought close to three feet of heavy snow, and Hartland was without power for several days. In 2002, Hartland suffered another major ice storm that resulted in downed power lines, extensive tree damage, and expensive clean-up costs.

During the snow storm of 2011, at the peak of electrical outages, all but one customer was without power in Hartland. At least half the town was without power for six days during that storm.

Hartland staff report experiencing relatively mild winters in recent years; therefore, winter weather challenges have been limited. Nevertheless, the Town reportedly experiences more cold-weather hazards than other communities in Connecticut because of its high elevation. According to one municipal official, "when it's raining everywhere else, it's snowing here."

Areas with heavy development are more vulnerable due to the potential for roof collapses caused by heavy snow. Areas where local roads, which are maintained by the town, are located are also more vulnerable, as clearing the roads can cost the town a considerable amount of money. The town maintains 44 miles of local roads.

Hartland is particularly concerned about the potential for winter storms to close roads, making travel difficult for residents and commuters.

One winter-related concern identified by Town staff is the impact of road treatment materials on local water resources. As of 2020, Town staff reported that it was having to mitigate problems related to road salt impacting shallow drinking wells, as well as wetlands and wildlife. The Town believes the primary source of salt is from State roads, which are reportedly treated with salt that is not mixed with sand or other materials. The Town reports that at least four private shallow wells located close to state roads are no longer usable, and more wells are at risk. The Town treats its roads with a sand-salt mix and is not seeing salinity problems from that. High salt and low sand road treatment mixes are often used to minimize maintenance requirements for drainage infrastructure that can be clogged with sediment; however, Hartland does not believe this is a concern locally, and is more concerned with loss of groundwater resources due to salinization.

7 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Hartland. The Town has adopted these codes for new construction, and they are enforced by the Building Official.

New Capabilities and Completed Actions

Hartland continues to maintain its earthquake and landslide mitigation capabilities.

Summary

Hartland mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Earthquake Vulnerabilities

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Hartland. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Hartland

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

The Town participates in annual emergency response exercises for Goodwin Dam, and every 5 years it participates in a full-day, more comprehensive emergency planning exercise.

Actions Completed and New Capabilities

Hartland continues to maintain its capabilities for mitigating and responding to dam failure risks.

Hartland has secured funding to complete a rehabilitation project for the Camp Alice Merritt Dam. The Town intends to pursue this project in 2021.

Summary

Hartland mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 22 DEEP-inventoried dams within the Town of Hartland; many of these dams are unclassified and therefore expected to pose negligible hazard potential. Dams in Hartland are listed in Table 8-1 and shown in Figure 8-1.

Table 8-1: DEEP-Inventoried Dams in Hartland

Number	Name	Class	
6501	GOODWIN DAM / HOGBACK DAM	C	Water Utility
6502	FOSTERS POND	A	State Owned
6503	HAYES ROAD POND BERG POND)	BB	Municipal
6504	HOWELLS POND DAM	BB	State Owned
6505	TUNXIS STATE FOREST POND	A	State Owned
6506	HARTLAND POND	A	Private Corporation
6507	MILLER POND	A	Private
6508	CAMP ALICE MERRITT DAM	BB	Municipal
6509	EMMONS POND	A	State Owned
6511	STILLMAN ROAD POND	AA	State Owned
6512	NIELSON POND	Unclassified	Private
6513	DALENE POND	Unclassified	Private
6514	HAAG POND	Unclassified	Private
6515	WHITE ROCK POND	Unclassified	Private
6516	GOWER POND	Unclassified	Private
6517	SHEW POND	Unclassified	Private
6518	COLE POND	Unclassified	Private
6519	BOULDER POND	Unclassified	Private
6520	CYPRESS POND	Unclassified	Private
6521	YANCHAK POND	Unclassified	Private
6522	BABBITT POND DAM	AA	Private
6523	AVON FISH AND GAME CLUB POND DAM	A	Private Club

The only high hazard potential dam in Hartland is the Goodwin Dam; all other dams have a moderate or lower hazard potential. The Goodwin Dam is upstream of residential buildings and Route 20 in Hartland. The risk of failure of Goodwin Dam is one of the top concerns of the Town, although the dam is in good shape and the Town participates in preparedness trainings and activities. West Hartland is the area of Town at risk; residents within the dam failure area will have a 3-minute warning in the event that the dam were to fail.

The Camp Alice Merritt Dam (Dam #6508) is in need of rehabilitation.

Beaver Dams

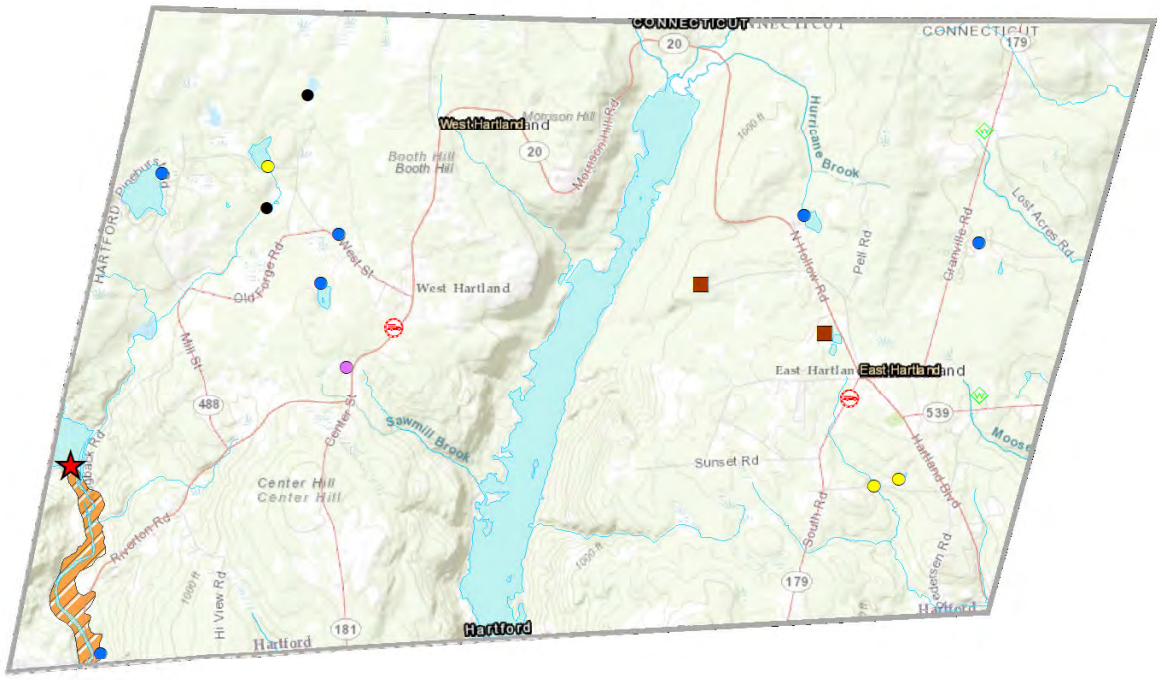
Beaver activity is a problem in the western part of Hartland. Town staff report that beavers clog drainage and create flood risks in various locations, requiring municipal intervention

approximately once a year. The Town calls the State hazardous animal number to have them deal with the beavers. Despite this inconvenience, beaver impacts are always relatively minor, and never cause significant damage or disruption.

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Legend

- EMS
- Fire Station
- Municipal Solid Waste
- National Register Building
- National Register District

Dam Hazard Class

- C - High Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - HARTLAND ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,500 7,000
Feet

SCALE 1 " = 7,520 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 8-1

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Hartland is compliant with this program and has a designated Burning Official.

Actions Completed and New Capabilities

Hartland continues to maintain its capabilities for mitigating and responding to wildfire risks.

The Town has identified a town-owned pond that it intends to "reclaim" in order to improve reliability and accessibility of a dry-hydrant at the site.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

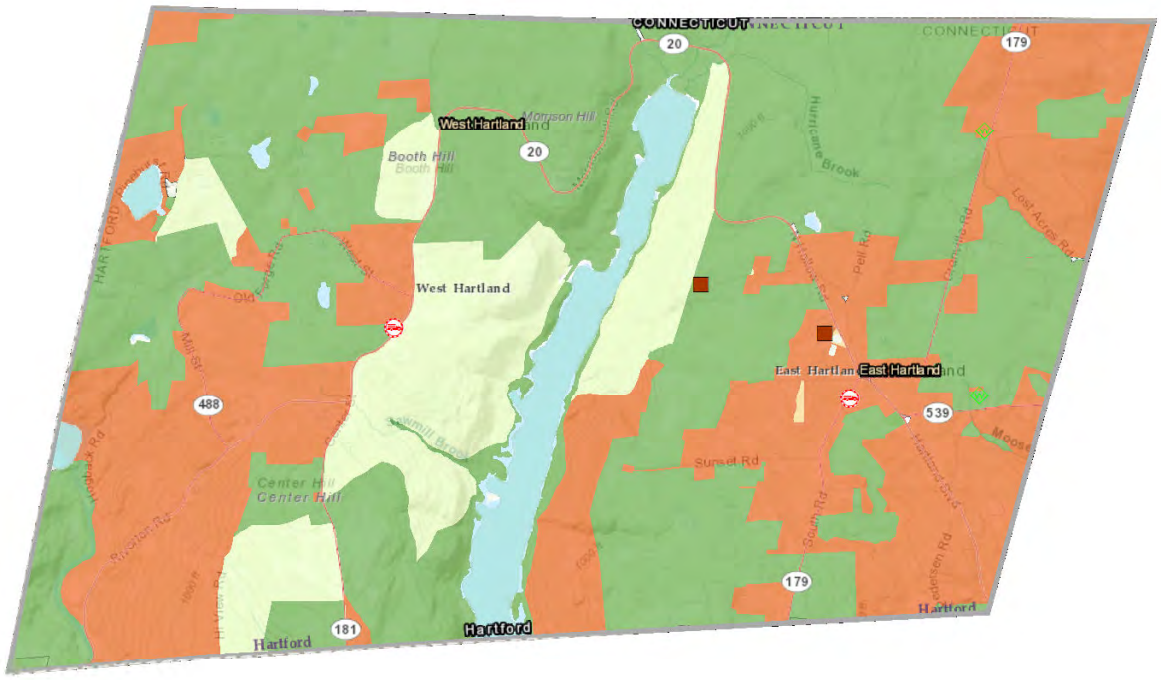
Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

Wildfires have reportedly not caused notable damage in Hartland. While there is a large amount of forest land, it is largely owned by the State and by MDC, and those institutions are responsible for stewardship, including firefighting. Wildfires have not caused problems here in the past.

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Legend

- EMS
- Fire Station
- Municipal Solid Waste
- National Register Building
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - HARTLAND ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,500 7,000
Feet

SCALE 1 " = 7,520 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Hartford County since 2000, where the warmer colors represent more advanced drought stages.

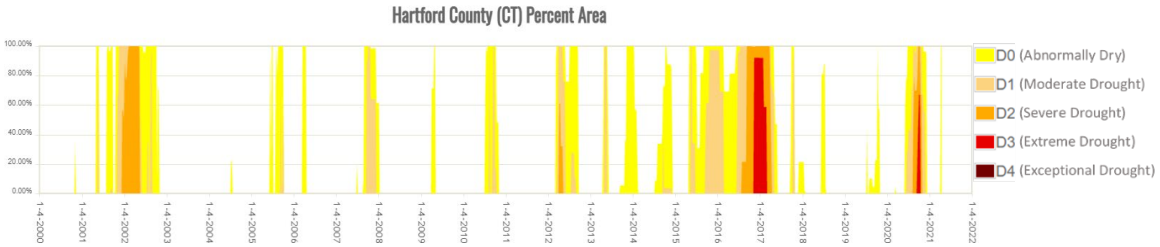


Figure 9-2: USDM Drought Time Series for Hartford County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Hartford County accounts for roughly 15% of the state's total number of farms, with a market value of nearly $114 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

Action	Responsible Party	Status	Notes
Make literature available on natural hazards and preparedness at Hartland Town Hall.	EMD, OFS	Carry Forward	*Town publishes a list of shelters, emergency contacts, to-do lists, etc., multiple times per year in concert with other public outreach. The Town does not have literature available at town hall.* *Action is Carried Forward*
Maintain local Emergency Operations Plan and continue to coordinate with the Regional Public Safety Task Force on community planning, preparedness, response, and training.	EMD, OFS	Capability	*This is a Capability. Town has a board of three people for Emergency Management.*
Routinely inspect emergency response equipment, and train for response to natural disasters.	VFD, EMD	Capability	*Emergency response equipment is routinely inspected.* *Emergency response trainings are performed through MDC (for dam failure).* *Due to recent turnover in the Highway Department, the Town believes that it is now an appropriate time for emergency response training.*
Cooperate with the Metropolitan District Commission (MDC) in emergency response training exercises and updates of the Goodwin Dam Emergency Action Plan.	EMD, OFS	Capability	*This is a capability. Town participates in annual exercises and a larger every-five-year exercise.*
Acquire additional emergency response equipment such as needed communication equipment. Also acquire additional sleeping cots for use at the EOC and at the Fire Stations.	EMD, Fire	Carry Forward with Revisions	*Equipment is old and in need of updating.* *Town has a store of emergency food, but it is out of date.* *Carry forward with a focus on updating existing equipment, especially expired items.*

Action	Responsible Party	Status	Notes
Promote the use of interoperable communication equipment, and the development of standard operating procedures for emergency response in the regional area.	EMD, Fire, OFS	Capability	*This is a capability – Town has communication equipment and operating procedures, and reviews them regularly.* *Nevertheless, the Town would like to pursue acquisition of new hand-held radio equipment to improve communications with staff who are in the field, away from the radios in their trucks, in areas without cellphone reception. Cellphone service is inconsistent in Town.*
Develop a Memorandum of Understanding with schools or bus companies to utilize school buses for mass transportation during an emergency.	EMD, OFS	Carry Forward	*This action has not yet been pursued due to staffing changes and limitations. Carry forward.*
Implement control measures to mitigate the flooding created by beavers.	PWD	Capability	*Beavers are a problem in the western part of Town; approximately once a year beavers cause an issue, but it is always minor and never a real problem. The Town calls the State hazardous animal number to have them deal with the beavers.*
Develop and implement clean-out schedules for all catch basins and drainage facilities.	PWD	Capability	*The Town cleans out basins twice per year.* *There is one large drainage culvert that the Town is concerned about, located on Hogback Road. Repairing or upgrading this culvert is included as a new action. The Town will not be able to raise sufficient funding to repair the culvert locally, and will require a grant to act.*
Review floodplain regulations and ordinances and update as necessary based on DEEP's "Model Floodplain Management Regulations" and FEMA Guidelines.	PZC	Carry Forward	*Town has not made such changes, but does not believe this action to be a high priority; they have very few floodplains in Town, and not much development within those. Additionally, the State Building Code, implemented locally, includes flood mitigation measures.* *Town staff attends floodplain management meetings.*

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. These include the following:

- Hartland historically operated a public recreational pond, but stopped using it for public recreation years ago due to maintenance challenges. The Town would like to "reclaim" the pond. The pond serves a dry-hydrant, and reclaiming the pond will improve reliability and accessibility of this firefighting water source.
- The Town may wish to pursue a grant to perform a comprehensive bridge analysis.
- Hartland may work with the State DOT to minimize salt use on roads in Hartland, instead using a sand-salt mix, to minimize impacts of salinization on groundwater and habitats.
- Reach out to the school and have them send information about hazard preparedness home to parents.
- Carry out an emergency response training program with Highway Department staff within the next 3 years.
- Acquire new hand-held radio equipment to improve communications with staff who are in the field, away from the radios in their trucks, in areas without cellphone reception.

Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action HRT-01	
Carry out an emergency response training program with Highway Department staff within the next 3 years.	
Lead	EMD; DPW
Cost	$0 - $25,000
Funding	OB, CT DEMHS
Timeframe	2022
Priority	High

Action HRT-02	
Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB, Sustainable CT
Timeframe	2022
Priority	High

Action HRT-03	
Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action HRT-04	
Develop a Memorandum of Understanding with schools or bus companies to utilize school buses for mass transportation during an emergency.	
Lead	EMD, OFS
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action HRT-05	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action HRT-06	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems. Additionally, increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	Med

Action HRT-07	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action HRT-08

Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action HRT-09	
Make literature available on natural hazards and preparedness at Hartland Town Hall.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action HRT-10	
Reach out to the school and have them send information about hazard preparedness home to parents.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action HRT-11	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action HRT-12	
Hartland may work with the State DOT to minimize salt use on roads in Hartland, instead using a sand-salt mix, to minimize impacts of salinization on groundwater and habitats.	
Lead	DPW; ConCom
Cost	$0 - $25,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action HRT-13	
Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action HRT-14	
The Town may wish to pursue a grant to perform a comprehensive bridge analysis.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action HRT-15	
Hartland historically operated a public recreational pond, but stopped using it for public recreation years ago due to maintenance challenges. The Town would like to "reclaim" the pond. The pond serves a dry-hydrant, and reclaiming the pond will improve reliability and accessibility of this firefighting water source.	
Lead	EMD, Fire
Cost	$50,000 - $100,000
Funding	OB, FEMA Assistance to Firefighters Grant
Timeframe	2023 – 2025
Priority	Med

Action HRT-16	
Acquire new hand-held radio equipment to improve communications with staff who are in the field, away from the radios in their trucks, in areas without cellphone reception.	
Lead	EMD
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEMHS
Timeframe	2024 – 2026
Priority	Low

Action HRT-17	
Update emergency response and sheltering equipment, specifically focusing on expired items.	
Lead	EMD
Cost	$100,000 - $500,000
Funding	OB, CIP, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

Action HRT-18	
Upgrade the culvert on Hogback Road, using the most up-to-date precipitation figures from NOAA or the NRCC.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, CT DEEP
Timeframe	2024 – 2026
Priority	Med

Action HRT-19	
Complete the rehabilitation project for the Camp Alice Merritt Dam.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	FEMA Grant, CT DEEP
Timeframe	2023 – 2025
Priority	High

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
HRT-01	Carry out an emergency response training program with Highway Department staff within the next 3 years.	Municipal Training	EMD; DPW	$0 - $25,000	OB, CT DEMHS	2022	1	1	1	1	1	1	0	0	0	0	0	0	0	0	8
HRT-02	Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	Sustainable CT	Planning	$0 - $25,000	OB, Sustainable CT	2022	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
HRT-03	Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
HRT-04	Develop a Memorandum of Understanding with schools or bus companies to utilize school buses for mass transportation during an emergency.	Evacuation Bus	EMD, OFS	$0 - $25,000	OB	2022 – 2023	1	0.5	1	0	1	0	0	0	0	0	0	0	0	0	4
HRT-05	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
HRT-06	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems. Additionally, increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
HRT-07	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
HRT-08	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
HRT-09	Make literature available on natural hazards and preparedness at Hartland Town Hall.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
HRT-10	Reach out to the school and have them send information about hazard preparedness home to parents.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
HRT-11	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
HRT-12	Hartland may work with the State DOT to minimize salt use on roads in Hartland, instead using a sand-salt mix, to minimize impacts of salinization on groundwater and habitats.	Habitat Conservation	DPW; ConCom	$0 - $25,000	OB, CT DEEP	2022 – 2024	0	1	0	1	0	1	1	0	-1	0	0	-1	0	0	3
HRT-13	Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
HRT-14	The Town may wish to pursue a grant to perform a comprehensive bridge analysis.	Study	DPW	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
HRT-15	Hartland historically operated a public recreational pond, but stopped using it for public recreation years ago due to maintenance challenges. The Town would like to "reclaim" the pond. The pond serves a dry-hydrant, and reclaiming the pond will improve reliability and accessibility of this firefighting water source.	Wildfire Risk Reduction	EMD, Fire	$50,000 - $100,000	OB, FEMA Assistance to Firefighters Grant	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	0	0	6
HRT-16	Acquire new hand-held radio equipment to improve communications with staff who are in the field, away from the radios in their trucks, in areas without cellphone reception.	Emergency Communication	EMD	$50,000 - $100,000	OB, CIP, CT DEMHS	2024 – 2026	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3
HRT-17	Update emergency response and sheltering equipment, specifically focusing on expired items.	Emergency Equipment	EMD	$100,000 - $500,000	OB, CIP, CT DEMHS	2025 – 2027	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3
HRT-18	Upgrade the culvert on Hogback Road, using the most up-to-date precipitation figures from NOAA or the NRCC.	Culvert & Bridge Upgrades	DPW	$100,000 - $500,000	CIP, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	0	0	6
HRT-19	Complete the rehabilitation project for the Camp Alice Merritt Dam.	Mitigation Structure	DPW	$100,000 - $500,000	FEMA Grant, CT DEEP	2023 – 2025	0	1	1	0	1	1	1	0	0	0	0	0	0	0	7

APPENDIX B
RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF HARTLAND BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Hartland has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Hartland Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Hartland and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Hartland; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Hartland, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Hartland eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Hartland;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Hartland, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Hartland this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

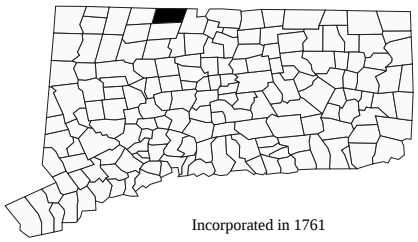
2019 CERC TOWN PROFILE

Hartland, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
22 South Road
East Hartland, CT 06027
(860) 653-6800

Belongs To
Hartford County
LMA Hartford
Northwest Hills Planning Area



Incorporated in 1761

Demographics

Population

	Town	County	State
2000	2,012	857,183	3,405,565
2010	2,114	894,014	3,574,097
2013-2017	2,083	897,417	3,594,478
2020	2,035	925,492	3,604,591
'17 - '20 Growth / Yr	-0.8%	1.0%	0.1%

	Town	County	State
Land Area (sq. miles)	33	735	4,842
Pop./Sq. Mile (2013-2017)	63	1,221	742
Median Age (2013-2017)	47	40	41
Households (2013-2017)	756	348,871	1,361,755
Med. HH Inc. (2013-2017)	$94,569	$69,936	$73,781

	Town	State
Veterans (2013-2017)	149	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	105	5%	280	13%	224	11%	387	19%	743	36%	344	17%	2,083	100%
County	47,813	5%	108,578	12%	118,163	13%	226,627	25%	251,235	28%	145,001	16%	897,417	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	1,913	560,997	2,446,049
Black Non-Hisp	7	114,711	350,820
Asian Non-Hisp	18	45,178	154,910
Native American Non-Hisp	87	1,338	5,201
Other/Multi-Race Non-Hisp	14	20,021	84,917
Hispanic or Latino	44	154,977	551,916

	Town	County	State
Poverty Rate (2013-2017)	3.0%	11.2%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	467	32%	673,582	27%
Associates Degree	176	12%	188,481	8%
Bachelors or Higher	473	32%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	34	129
23 - Construction	14	22
31-33 - Manufacturing	NA	NA
44-45 - Retail Trade	NA	NA
81 - Other Services (except Public Administration)	5	3
Total Government	4	74

Top Five Grand List (2014)

	Amount
Metropolitian District	$20,091,649
Connecticut Light & Power	$2,068,200
Dalene Thelma	$752,690
Jung Marlene D	$523,790
Psutka Leopold J. & Annette J.	$499,950
Net Grand List (SFY 2016-2017)	$198,192,769

Major Employers (2014)

Hartland School
Prudential Connecticut Realty
West Hartland Firehouse
Hartland Fire Dept
R M Industries

Education

2018-2019 School Year

	Grades	Enrollment
Hartland School District	PK-12	162

Pre-K Enrollment (PSIS)

	2018-2019
Hartland School District	13

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Hartland School District	NA	NA	NA

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	*	53.8%	*	51.3%	*	43.0%
ELA	*	53.1%	*	54.9%	77.4%	56.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Hartland School District	NaN%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	73.1%	89.4%	86.8%
Private	26.9%	10.6%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Hartland, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$7,217,096	Total Expenditures (2017)	$6,988,601	Annual Debt Service (2017)	$115,495
Tax Revenue	$5,155,252	Education	$5,405,040	As % of Expenditures	1.7%
Non-tax Revenue	$2,061,844	Other	$1,583,561	Eq. Net Grand List (2017)	$283,255,541
Intergovernmental	$1,973,011	Total Indebtedness (2017)	$370,000	Per Capita	$134,117
Per Capita Tax (2017)	$2,405	As % of Expenditures	5.3%	As % of State Average	88.8%
As % of State Average	82.0%	Per Capita	$175	Moody's Bond Rating (2017)	A1
		As % of State Average	7.0%	Actual Mill Rate (2017)	25.50
				Equalized Mill Rate (2017)	17.93
				% of Net Grand List Com/Ind (2017)	1.3%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	822	377,840	1,507,711
% Single Unit (2013-2017)	97.2%	55.6%	59.2%
New Permits Auth (2017)	7	957	4,547
As % Existing Units	0.9%	0.3%	0.3%
Demolitions (2017)	0	509	1,403
Home Sales (2017)	21	4,581	21,880
Median Price	$264,200	$235,300	$270,100
Built Pre-1950 share	26.7%	27.8%	29.3%
Owner Occupied Dwellings	693	225,378	906,798
As % Total Dwellings	91.7%	64.6%	66.6%
Subsidized Housing (2018)	6	52,368	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	0	59	536
$100,000-$199,999	4	1,524	5,237
$200,000-$299,999	10	1,642	6,681
$300,000-$399,999	5	721	3,863
$400,000 or More	2	635	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$900	$1,044	$1,123
Cost-burdened Renters	43.3%	50.1%	52.3%

Labor Force

	Town	County	State
Residents Employed	1,114	459,939	1,827,070
Residents Unemployed	40	20,380	78,242
Unemployment Rate	3.5%	4.2%	4.1%
Self-Employed Rate	10.2%	7.7%	10.0%
Total Employers	34	28,871	122,067
Total Employed	129	510,814	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Hartland, CT	45	Hartford, CT	103
Winchester, CT	10	Simsbury, CT	87
Windsor, CT	5	Bloomfield, CT	60
Granby, CT	4	Windsor, CT	54
Torrington, CT	4	Granby, CT	46
Plymouth, CT	3	Hartland, CT	45
Simsbury, CT	3	Farmington, CT	37

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	236	1,777
Violent	47	228

Disengaged Youth (2013-2017)

	Town	State
Female	0.0%	4.2%
Male	0.0%	5.6%

	Town
Library circulation per capita	0.71

Distance to Major Cities

	Miles
Hartford	21
Providence	80
Boston	102
New York City	106
Montreal	247

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Municipal Provider
Local Contact

Cable Provider
Cox Communications, Enfield
(800) 955-9515

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

HARWINTON, CT

100 Bentley Drive, PO Box 66
Harwinton CT, 06791
MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 Torrington Road
Goshen, CT 06756
(860) 491-9884
https://northwesthillscog.org

Prepared by:
SLR CONSULTING
99 Realty Drive
Cheshire, Connecticut 06410
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www.slrconsulting.com

global **environmental** and **advisory** solutions

SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Harwinton and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Harwinton is a mostly rural town in the Litchfield Hills Region bordered on the east by Burlington, on the south by Plymouth and Thomaston, on the west by Litchfield and Torrington, and on the north by New Hartford and Torrington

31.1 square miles with a land area of 30.8 square miles. It had a population estimate of 5,456 people in 2019, and is run by a Selectman/Town Meeting form of government.

Notable characteristics of the municipality include y rolling hills, forested land, patches of wetlands, scattered ponds, Lake Harwinton, and the Naugatuck River on the western border of the town. The DEEP's Roraback Wildlife Area covers a large area (2200 acres) in the south-central part of Harwinton, and the Bristol Water Company owns three reservoirs in the southeastern portion of town. Major highways serving the town include State Routes 4, 8, 72, 118, and 222.

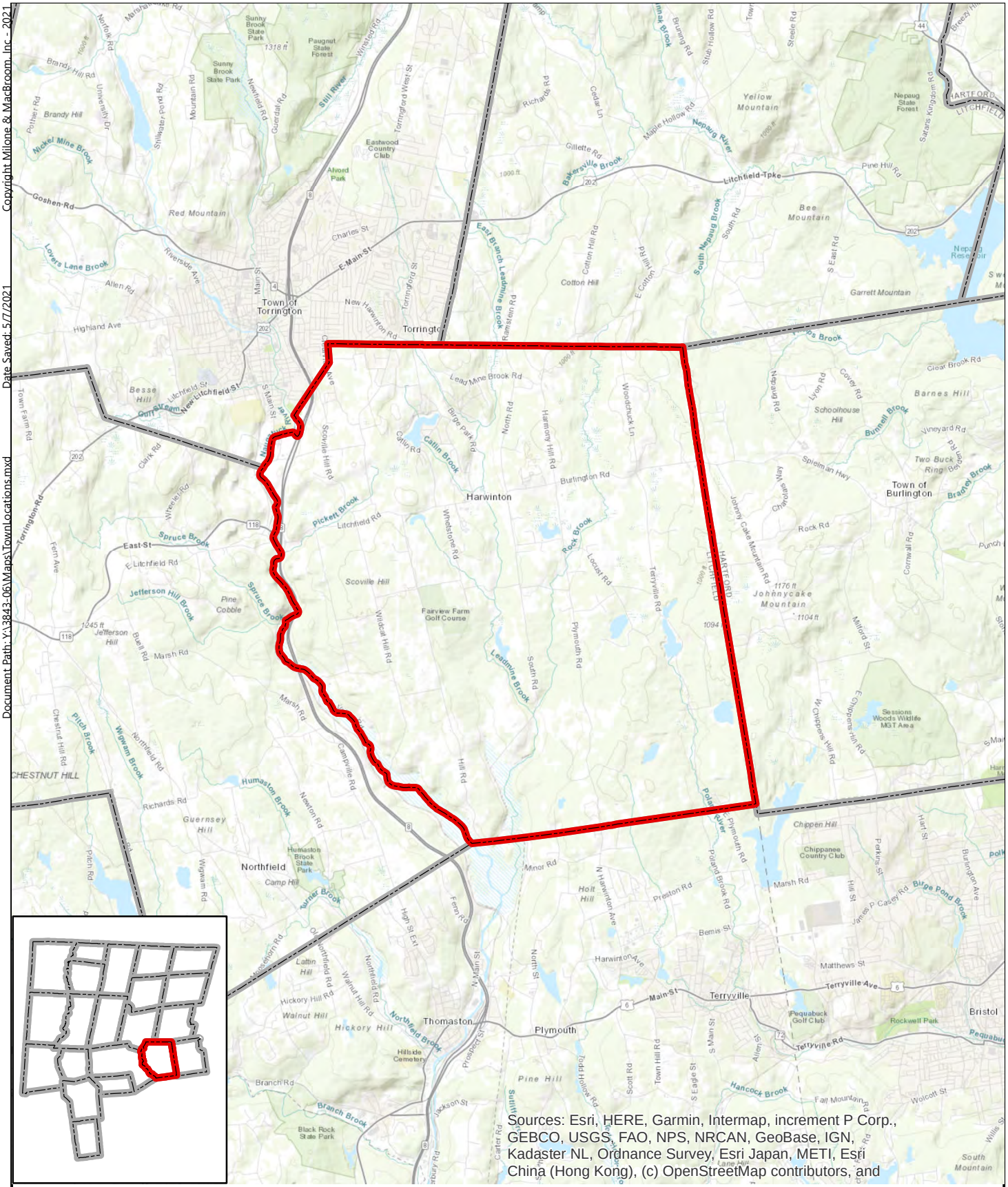
According to the "History of Harwinton" written by Raymond George Bentley in 1970, "Agriculture was probably the most important activity during the first one hundred years" of the town's history. According to Mr. Bentley, "It is probable that, when the town was settled, it was covered with forests and the first task must have been the clearing of land so that they could raise food for their own use. As the years passed and more land was cleared they eventually produced more than was needed and it was sold to people living in cities (p. 108)". Mr. Bentley continues "This continued until the building of improved highways and the development of the automobiles and trucks brought the farmers in competition with the large market garden, dairy, and poultry farms. Then it was found that only the larger, more efficient farms could survive, and Harwinton became what it is today, a place where people live but earn their living in the surrounding cities (p. 110)".

Although Harwinton was primarily an agricultural community, there were also a considerable number of industries, including six mills on the Naugatuck River, a clock shop, hat shop, tanners and shoemakers, tin shops, wagon shops, blacksmiths, coopers, cutlery shops, creameries, and other supportive businesses during the 1800's according to the "History of Harwinton".

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Date Saved: 5/7/2021

Document Path: Y:\3843-06\Maps\TownLocations.mxd



MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

REGIONAL LOCATION: HARWINTON

HAZARD MITIGATION PLAN UPDATE - HARWINTON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 4,000 8,000
Feet

SCALE	1 " = 8,842 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-1

2.2 Existing Land Use

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 75% of Harwinton is forested and approximately 9% is developed.

Table 2-1: 2015 Land Cover by Area

Land Cover	Area (acres)	Percent of Community
Developed	1,857.3	9.33%
Turf & Grass	1,009.7	5.07%
Other Grass	199.9	1.00%
Agricultural Field	1,432.9	7.20%
Deciduous Forest	11,890.6	59.73%
Coniferous Forest	2,281.3	11.46%
Water	324.4	1.63%
Non-Forested Wetland	57.1	0.29%
Forested Wetland	673.7	3.38%
Tidal Wetland	0.0	0.00%
Barren	94.6	0.48%
Utility Row	86.1	0.43%
Total	**19,908**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

2.3 Development Trends

According to the US Census data, the population of Harwinton has increased an average of 46 persons per year over 50 years, from a population of 3,344 people in 1960 to 5,642 in 2010. U.S. Census Bureau estimates for 2019 show a population around 5,456 individuals, a decrease from 2010 of 3.3%. The Connecticut State Data Center predicts that population will decrease by 0.4% through 2025 to an estimated population of 5,432 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Harwinton increased between 2013 and 2017. The number of permits issued in 2013 and 2014 was 1 and 5, respectively, while 5 permits were issued in 2016, and 7 permits were issued in 2017. On average, 5 housing permits were issued each year in Harwinton between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Harwinton dropped by approximately 2.7-percent between 2010 and 2019, from 2,282 units in 2010 to 2,223 units in 2019. In 2019, the housing stock was made up of approximately 98% single-unit structures, 0% two-unit structures, 1% multi-unit structures, and 0% mobile-homes or other types of structures. Over 90% of the housing is owner occupied, with about 8% of the housing stock occupied by renters and 1% held for seasonal, recreational or occasional use (second homes).

According to the Connecticut Office of Policy and Management, Harwinton's 2019 Total Equalized Net Grand List was valued at $578,540,031. The equalized net grand list is an estimate of the

market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Harwinton, included as Appendix C.

The municipality has experienced limited development in recent years. Overall, development in Harwinton has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the next five years is not expected to increase exposure.

2.4 Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Northwest Harwinton and the rest of the Town of Harwinton are analyzed separately. Northwest Harwinton is considered to have a Medium level of social vulnerability, with a higher vulnerability score for the SVI categories of Household Composition and Socioeconomic Status. In other words, a particular challenge in Northwest Harwinton may include the presence of residents who need additional assistance during a disaster event due to disabilities, as well as residents with limited financial resources.

The rest of the Town of Harwinton is considered to have a Low level of social vulnerability, with relatively higher vulnerability for the SVI category of Household Composition.

2.5 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Harwinton.

Harwinton is part of the Northeastern Highlands Ecoregion, which is characterized by "hills and mountains, a mostly forested land cover, nutrient- poor frigid and cryic soils (mostly Spodosols), and numerous highgradient streams and glacial lakes" (as described on the map "Ecoregions of New England").

2.6 Climate and Climate Change

Over the course of the year, the temperature in Harwinton typically varies from 18°F to 81°F and is rarely below 2°F or above 88°F. The warm season lasts for 3.6 months, from May 28 to September 15, with an average daily high temperature above 71°F. The hottest day of the year is July 19, with an average high of 81°F and low of 62°F. The cold season lasts for 3.3 months, from December 1 to March 11, with an average daily high temperature below 42°F. The coldest day of the year is January 29, with an average low of 18°F and high of 32°F.

The wetter season lasts 3.5 months, from May 4 to August 18, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on May 29. The drier season lasts 8.5 months, from August 18 to May 4. The smallest chance of a wet day is 22% on January 29.

The most rain falls during the 31 days centered around June 4, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.4 inches.

The snowy period of the year lasts for 5.9 months, from October 24 to April 20, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 23, with an average total liquid-equivalent accumulation of 1.4 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature
Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation
Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Harwinton as 4.92 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Harwinton at 5.77 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.9	6.2	8.8
NOAA Atlas 14	5.8	7.1	9.2

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Harwinton can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.3 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.7 Drainage Basins and Hydrology

Leadmine Brook flows southward through the center of Harwinton, fed by tributaries including Kelly Pond Brook and Catlin Brook. At the north end of Town, Leadmine Brook is split into a West Branch, bringing water from Torrington, and an East Branch, flowing south from New Hartford. Lake Harwinton is within the Leadmine Brook Subregional Watershed, drained by Catlin Brook. Leadmine Brook flows into the Naugatuck River in Thomaston to the south.

Areas in Harwinton to the west of the Leadmine Brook Subregional Watershed drain to the Naugatuck River, which forms the western border of Town. Tributaries include Pitch Brook, Pickett Brook, and Pudding Brook.

The northeastern portion of Harwinton drains to Leadmine Brook by way of Rock Brook, fed in turn by Wilson Pond Brook.

The southeastern part of Harwinton is in the Farmington River Regional Basin, with most of the area falling within the Poland River Subregional Basin, except for a small sliver that drains to the Pequabuck. The Poland River watershed includes Bristol Reservoirs Number 2, 4, and 5; upstream of Bristol Reservoir Number 4, the Poland River changes to Powder Brook.

2.8 Governmental Structure and Capabilities

The Town of Harwinton has a number of existing authorities, policies, programs and regulations that serve to mitigate the impact of natural hazards. Existing local authorities include the Harwinton Board of Selectmen, Planning and Zoning Commission, Inland Wetlands Commission, Emergency Management Director, Fire Department, and Department of Public Works.

2.9 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic resources in Harwinton are concentrated within Harwinton Historic Districts A and B, but are also distributed throughout Town. Resources near flood sources may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.10 Infrastructure

Transportation

The primary transportation routes into and out of the town are Route 118 running east toward Harwinton center from Litchfield, Route 4 running west from Burlington and then north to Torrington, Route 222 and Route 72 running north from Plymouth, and Route 8 running north-south on the western border of Town.

There is no local public transit system in Harwinton.

Utilities

Public water in Harwinton is provided by the Torrington Water Company (mostly along Route 4), as well as a handful of small Non-Community Public Water Systems. Many residents and businesses rely on private well water.

Eversource is the primary provider in Town for electricity and natural gas.

According to geoISP (geoISP.com), there are 2 DSL Providers (at&t, Connecticut Education Network), 2 Cable Internet providers (Charter Spectrum, CSC Holdings), and 2 Fiber Internet (Fibertech Networks, LLC; Connecticut Education Network) providers in Harwinton, CT. There are also 4 Mobile Broadband (cellular) providers with service available in Harwinton..

2.11 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Harwinton has identified several critical facilities throughout the town, as summarized on Table 2-3 below.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Harwinton Town Hall	100 Bentley Drive	Municipal Facility	✓		
Connecticut State Police Troop L - Harwinton Resident State Trooper	100 Bentley Drive	Law Enforcement			
Harwinton Public Works Facility	104 Locust Road	Municipal Facility			✓
Harwinton Ambulance Association	158 Burlington Road	EMS/EOC			
Harwinton Volunteer Fire Department	158 Burlington Road	Fire Station			

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Harwinton Westside Volunteer Fire Department	199 Scoville Hill Road	Fire Station			
Harwinton Consolidated School	115 Litchfield Road	Primary Shelter	✓	✓	
Harwinton Senior Center	209 Weingart Road	Back-up Shelter	✓	✓	
Wintergreen Housing	21 Wintergreen Circle	Elderly Housing			
Harwinton Leaf Composting Facility	-	Municipal Solid Waste			
Cell phone tower	Weingart Road	Utility	✓		
Cell phone tower	Hungerford Lane	Utility	✓		
Torrington WPCA	Torrington	Utility	✓		

The major facilities at risk in the community in the event of a natural hazard include the Harwinton Town Hall, Harwinton Consolidated School, the Town Garage, Harwinton Fire House, Harwinton Westside Fire House, Torrington Water Pollution Control Plant (which is located in Harwinton), Harwinton Ambulance Association, and the Harwinton Senior Center.
These are considered critical facilities in the event of a natural disaster because they might be needed for effective emergency response. All are potentially vulnerable to tornados, winter storms, wildfire, and earthquakes. None of the facilities are located within a floodplain.

Harwinton has a stand-alone Emergency Operations Center.

The Town Garage is particularly important, as it is available to serve as a regional drop-off point for emergency equipment and supplies. There is off-loading capability and storage space available at the site, and air drop-off is possible at the adjacent Harwinton Fairgrounds.

Emergency Response Capabilities

The Harwinton Volunteer Fire Department, Department of Public Works, and Emergency Management Director all possesses emergency equipment that can be deployed as needed in the event of an emergency. Procedures are also in place to open and maintain the Emergency Operations Center and emergency shelter in town.

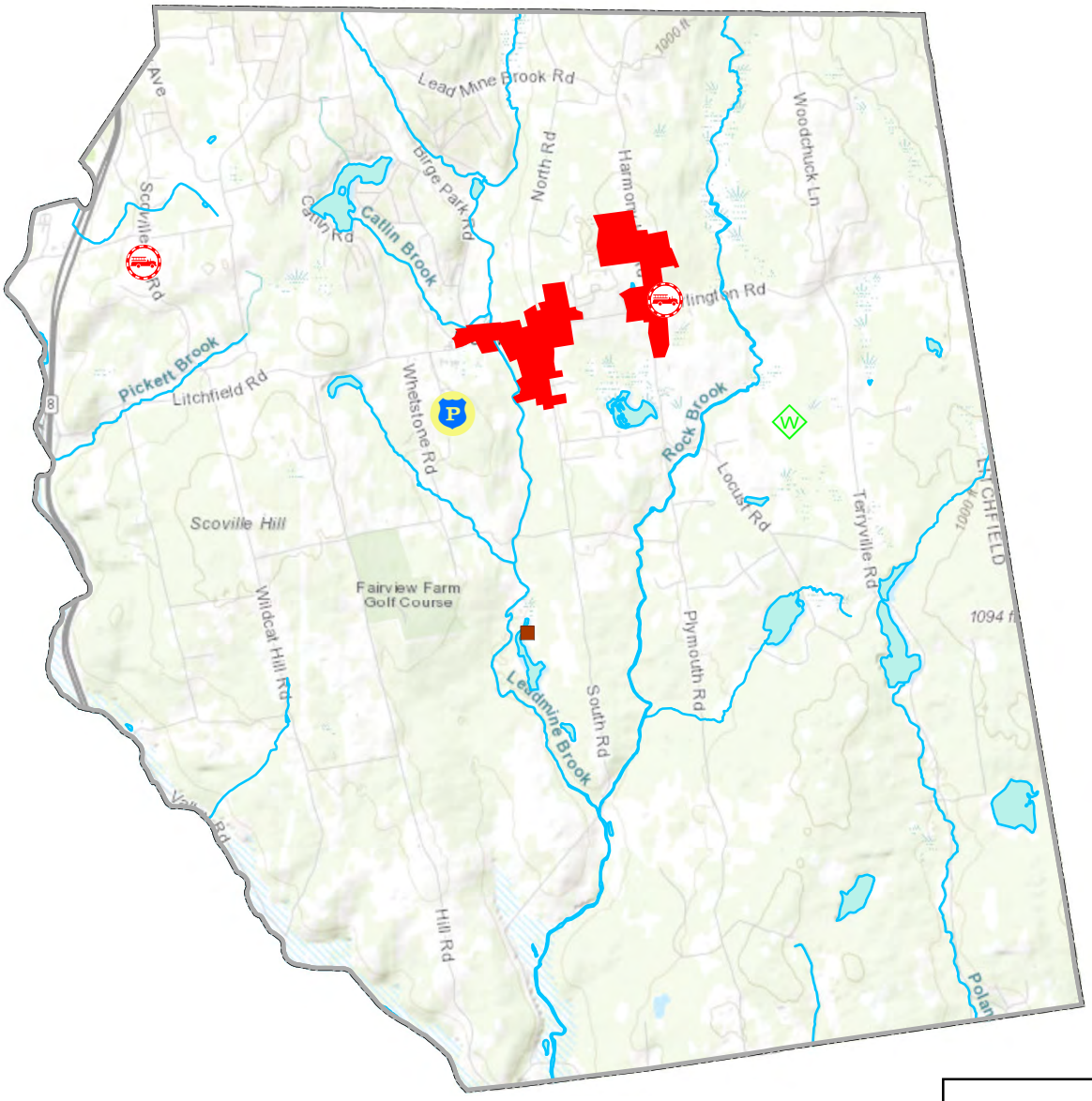
Sheltering Capabilities

Harwinton Consolidated School serves as the town's emergency shelter. the Harwinton Senior Center serves as a secondary emergency shelter facility for the town.

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Critical Facilities & Cultural Resources

- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District

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CRITICAL FACILITIES AND CULTURAL RESOURCES

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FIG. 2-2

Communications

he Town of Harwinton has implemented the Everbridge public notification system.

Harwinton has also been working with other towns in the Litchfield Hills Region through the Northwest Hills Public Safety Task Force to enhance communication and coordination. This has included efforts to standardize communication equipment and the equipment in local emergency operation centers, and also the upgrading of supplies at emergency shelters. Other activities being pursued are a regionally coordinated public notification system, a badging registration system for emergency responders, improved training opportunities, and the development of written mutual aid agreements.

Despite these efforts, Town officials report that current radio communication system is outdated and need to be upgraded and replaced. This system is used by fire, police, EMS and emergency management. It is critical to upgrade this system because currently responders cannot be reached in all parts of the Town. In the event of radios being out of range, responders rely on cell phones. In past events, cell phone towers have gone down, resulting in impaired communication capabilities with emergency responders.

3 FLOODING

3.1 Existing Capabilities

Ordinances, Regulations and Plans

Land use regulations exist to protect natural resources, including erosion and sediment control regulations for new development, stormwater control regulations to minimize drainage problems, and a flood hazard overlay zone to control development in flood prone areas.

The flood hazard overlay zone provides that any new construction or substantial improvement of any residential structure shall have the lowest floor, including the basement, elevated to at least the base flood elevation. Nonresidential construction is required to have the lowest floor, including basement, elevated to at least the base flood level and all construction below base flood elevation shall be flood-proofed. A registered professional engineer or architect is required to design and certify the construction of structures in the floodplain in order to minimize flood damage. Additionally all attendant utilities or sanitary facilities should be located or designed to avoid infiltration or impairment by flood waters.

Harwinton's subdivision regulations have detailed standards for the planning, design and construction of storm drainage systems in order to minimize adverse impacts associated with new construction activity. The Harwinton Inland Wetlands and Watercourses Commission enforces regulations to direct development away from wetlands and watercourses.

NFIP, Flood Insurance, and Community Rating System

Harwinton maintains compliance with NFIP through its use of the Connecticut State Building Code and its zoning regulations. Harwinton expects to continue participation in NFIP.

According to FEMA, 7 flood insurance policies are in force as of 6/30/2019 with an insurance value of $1,769,600. The previous edition of this HMP noted 11 flood insurance policies in force as of 8/31/2015 with an insurance value of $2,286,700.

Drainage and Street Flooding

The Harwinton Public Works Department routinely examines and clears public storm drains and catch basins of debris following periods of rainfall, snowfall, or windstorms. The town's DPW also monitors weather reports and maintains loaded trucks in preparation of winter storm events.

Structural Projects

Harwinton replaces and upgrades culverts and drainage structures as needed. The Town recently replaced a culvert in the Shingle Mill area.

New Capabilities and Completed Actions

Harwinton continues to maintain its strong flood mitigation capabilities.

Summary

Harwinton mitigates flood damages primarily through regulating development in floodprone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate.

3.2 Vulnerabilities and Risk Assessment

While there is no extensive discussion of natural disasters in the "History of Harwinton", there is a description of the Flood of 1867 that flooded Birge Park Road (Rte 4) when the West Branch of Lead Mine Brook overflowed its banks. There were also a number of roads washed out by the Naugatuck River and Leadmine Brook in the Flood of 1955.

Flood prone areas in the community today, as mapped by FEMA, are presented in Figure 3-1.

3.2.1 Vulnerability Analysis of Critical Facilities

The Harwinton Public Works Facility lies partially within the 1% annual chance floodplain. The Town is aware of flood concerns at the site, and is pursuing needs drainage improvements to mitigate the risk.

3.2.2 Vulnerability Analysis of Areas Along Watercourses

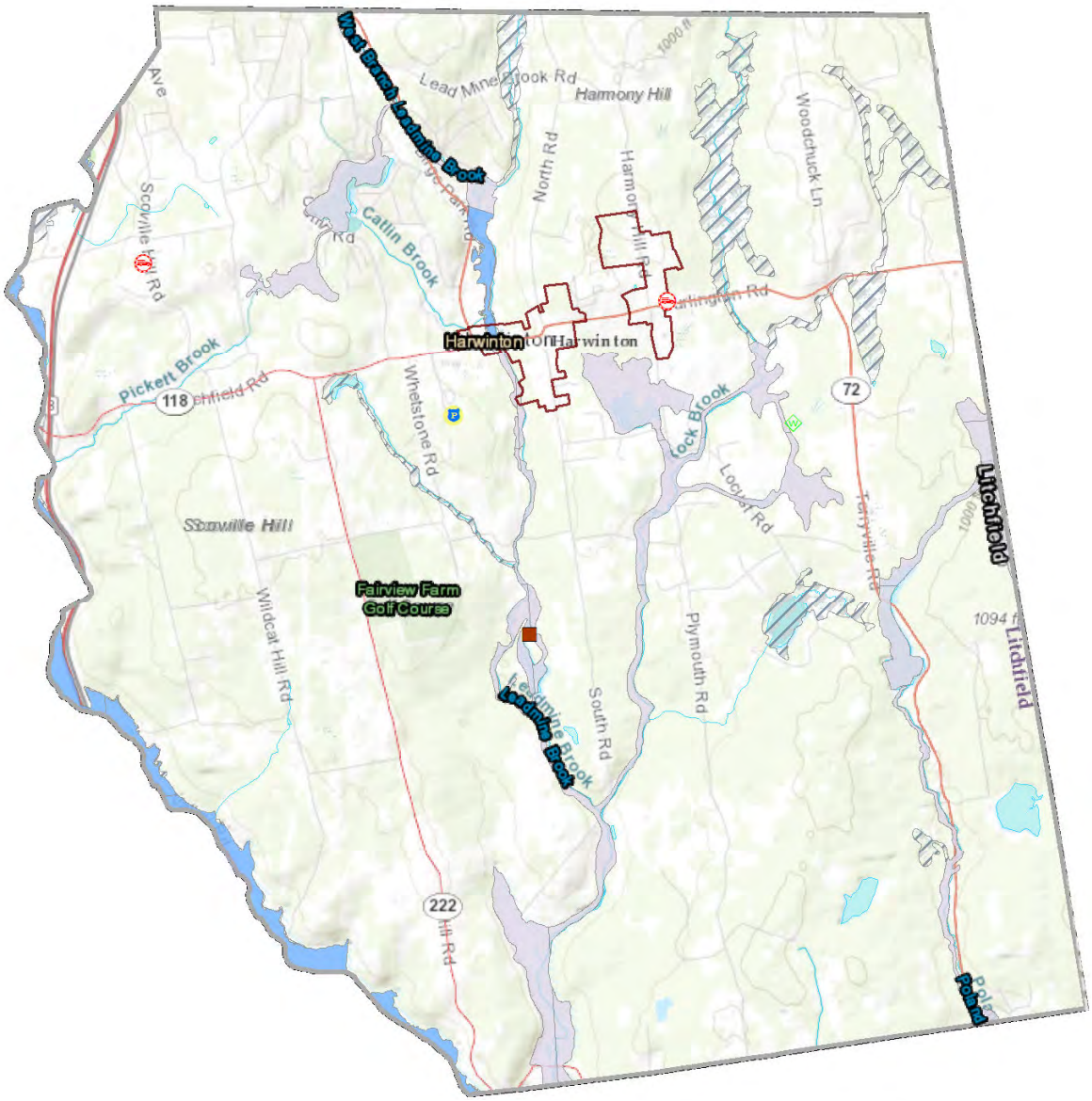
The area of greatest concern locally is Leadmine Brook, which continues to flood periodically resulting in the closing of Lead Mine Brook Road. Flooding of the Naugatuck River is not of significant local concern at the present time due to the flood control projects constructed upstream after the Flood of 1955. The Army Corps of Engineers also now owns much of the land, or has flood control easements, along the flood prone areas of the Naugatuck River in Harwinton.

The Valley Road area reportedly sometimes floods because of the Army Corps releasing water nearby. There are no structures in the area at risk.

3.2.3 Vulnerability of Other Areas

Beaver contribute to localized flooding problems in the town periodically with the construction of dams on private property that are difficult to remove. Beaver have also plugged culverts on local streets such as South Road, which require routine maintenance by town forces to remove.

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Legend

- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District

Flood Zone

- A
- AE
- X500

Flood Zone

- A

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FLOOD RISK AREAS

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FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing capabilities appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Harwinton is 110 mph for a Category 1 event, 120 mph for a Category 2, and 130 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Harwinton has a Tree Warden, with a minimal budget for tree maintenance. The Town also shifts funds between departments when necessary; for example, if snow removal costs are low one season, this remaining budget is shifted to tree maintenance and removal.

Eversource, the local electric utility, provides tree maintenance near its power lines.

New Capabilities and Completed Actions

Harwinton continues to maintain its strong tropical cyclone mitigation capabilities.

Summary

Harwinton mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

Strong wind events are the biggest concern for Harwinton.

The hurricanes of 1955 caused extensive flooding in town, as did the 1938 hurricane. Hurricanes have caused wide-spread power outages and could cause significant damage. Hurricane Irene left 58% of the town without power at its peak (1455 households).

Tropical Storm Isaias in August 2020 resulted in widespread power outages due to downed trees and power lines.

Areas that are most vulnerable are those with greater levels of development. Harwinton has found that windstorms, even with relatively low-grad winds, often result in power outages throughout town.

Harwinton officials note that Emerald Ash Borer has severely impacted the Town, leaving many dead trees that are a risk during wind events. Certain areas have bee identified as being of particular concern:

- Plymouth Road
- Clearview Avenue
- Harmony Hills,
- North road
- South Road

Town staff also report experiencing challenges along State-managed roads that have not had trees properly maintained, ultimately increasing the risk of outages to residents along these roads.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Harwinton as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

New Capabilities and Completed Actions

Harwinton continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

Harwinton mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Harwinton has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

The central and southern portions of the United States are at higher risk for lightning and thunderstorms than is the northeast. However, FEMA reports that more deaths from lightning occur on the East Coast than elsewhere. Lightning-related fatalities have declined in recent years due to increased education and awareness.

Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Harwinton area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Harwinton is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the Town is believed to be low for any given year. All areas of the Town are susceptible to damage from high winds.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Such fires can be extremely dangerous during the summer months during dry and drought conditions.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

6 WINTER STORMS

6.1 Existing Capabilities

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas.

New Capabilities and Completed Actions

Harwinton continues to maintain its strong winter storm mitigation capabilities.

Summary

Harwinton mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

Winter ice storms with power outages are a major concern for Harwinton. A severe snowstorm occurred in March of 1978 that brought close to three feet of heavy snow, and Harwinton was without power for five days. The town suffered another major ice storm in 2002 that resulted in downed power lines, extensive tree damage, and expensive clean-up costs. The October 2011 snow storm caused extensive power outages and tree damage. The storm left 99% of the town without power at its peak. At least half the town had no power for six days.

Winter storms are a perennial concern with wide-ranging impacts. Snow covered roads take time and money to clear. Heavy snow, especially when accompanied by ice can cause roofs to collapse. The most vulnerable parts of town, therefore, are those with dense development and lots of roads. From the town's perspective, the greatest vulnerability is town-maintained roads. In total, Harwinton maintains 69 miles of local roads.

Harwinton officials report that snow and ice events are a town-wide concern, with no specific areas that more prone to drifting or icing.

7 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Harwinton. The Town has adopted these codes for new construction, and they are enforced by the Building Official.

New Capabilities and Completed Actions

Harwinton continues to maintain its earthquake and landslide mitigation capabilities.

Summary

Harwinton mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Earthquake Vulnerabilities

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Harwinton. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Harwinton

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

Actions Completed and New Capabilities

Harwinton continues to maintain its capabilities for mitigating and responding to dam failure risks.

Summary

Harwinton mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential

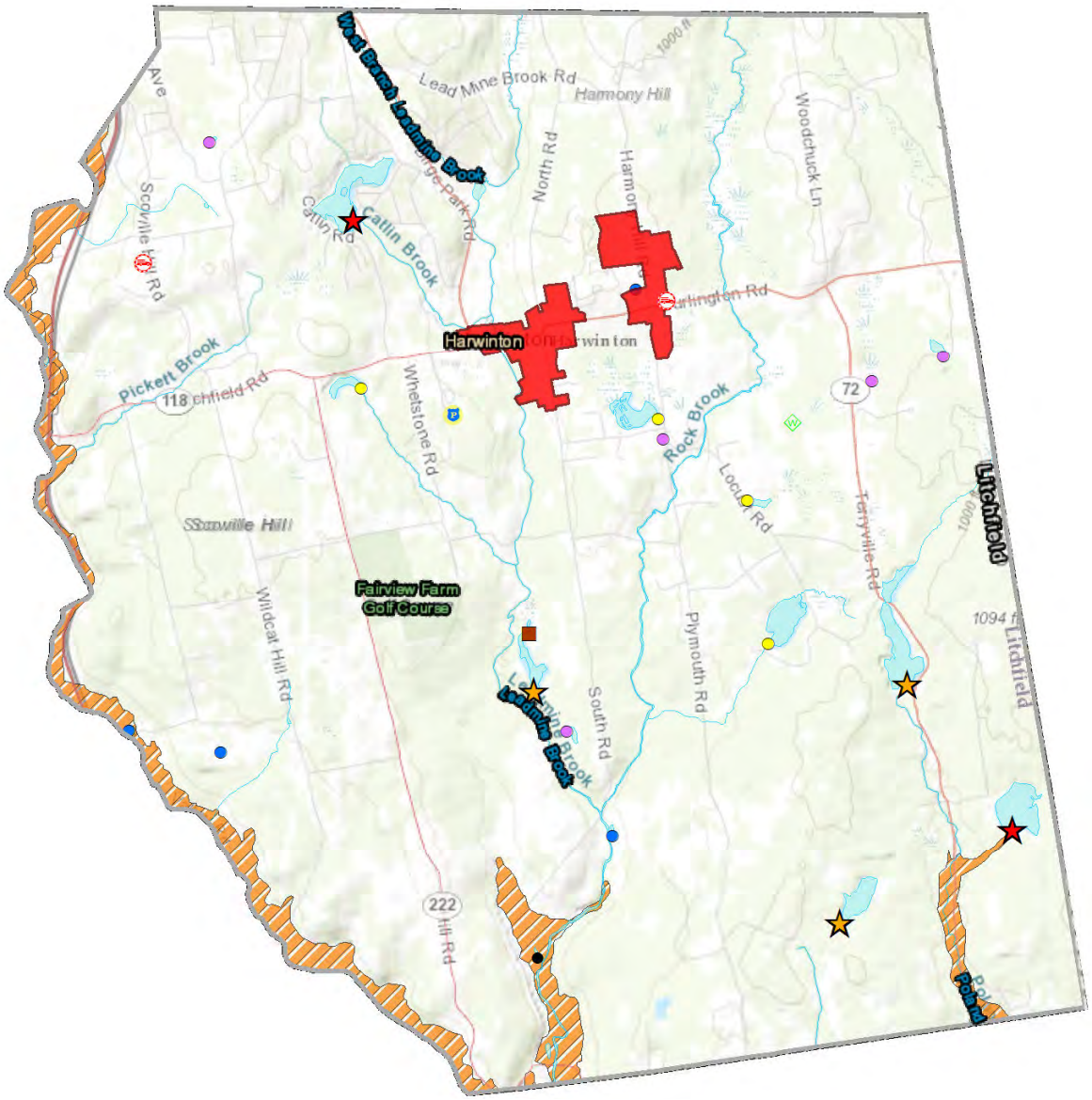
- *Class C*: high potential hazard

As of 2020, there were 35 DEEP-inventoried dams within the Town of Harwinton. These dams are listed in Table 8-1 and shown in Figure 8-1.

Table 8-1: DEEP-Inventoried Dams in Harwinton

Dam#	Dam Name	Class	Owner Type
6601	BRISTOL RESERVOIR #4 DAM	B	Municipal
6602	BRISTOL RESERVOIR #2 DAM	B	Municipal
6603	BRISTOL RESERVOIR #5 DAM	C	Municipal
6604	LAKE HARWINTON DAM	C	Lake Association
6605	WILSON POND DAM	BB	Private
6606	KELLY POND DAM	BB	Private
6607	BIONDE POND DAM	AA	Private
6608	PLACID POND DAM	A	Private
6609	RORABACK POND DAM	A	State Owned
6610	WEISS POND DAM	BB	Private
6611	ESTATE POND DAM	AA	State Owned
6612	HALLERAN POND DAM	AA	Private
6613	BULL POND DAM	BB	Multiple
6614	KISSH POND DAM	AA	Private
6615	MENDICINO DAM		Private
6616	VALLEY POND DAM	B	State Owned
6617	JOYCE WILSON POND	A	Private
6618	HARWINTON ROD & GUN	A	Private Club
6619	ROBERTSON DAM		Private
6620	NO NAME		Private
6621	NO NAME		Private
6622	NO NAME		Private
6623	KRAJEWSKI POND	A	Private Corporation
6624	FARM POND DAM (AKA HOGAN BROTHERS POND)	AA	Private Corporation
6625	BUSH POND	AA	Private
6626	BIGOS POND	AA	Private
6627	OLD ICE POND DAM		Private
6628	HINES POND	AA	Private
6629	PESCE POND DAM		Private
6630	FARBER POND	AA	Private
6631	BROOKFIELD POND	AA	Private
6632	GANGELL POND	AA	Private
6633	HENRY CAMP POND	AA	Private
6634	BULL POND SPILLWAY		Land Trust
6635	TORRINGTON STP RING LEVEE	B	Municipal

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Legend

- EMS
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- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District

Dam Hazard Class

- C - High Hazard
- B - Significant Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

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FIG. 8-1

Significant and High Hazard dams in Harwinton include:

- Bristol Reservoir #4 Dam
- Bristol Reservoir #2 Dam
- Bristol Reservoir #5 Dam
- Lake Harwinton Dam
- Valley Pond Dam
- Torrington Stp Ring Levee

Lake Harwinton Dam is the facility of greatest concern to local officials. As of 2016 this dam was scheduled to be improved in the near future. Most of the other dams in town are small and do not pose a significant threat in the event of failure.

There is a concern regarding the current state of Bull Pond Dam (CT Dam #6613). This dam is privately owned, and the Town is concerned that the owners may be unable to fund the necessary upgrades.

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Harwinton is compliant with this program and has a designated Burning Official.

Actions Completed and New Capabilities

Harwinton continues to maintain its capabilities for mitigating and responding to wildfire risks.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

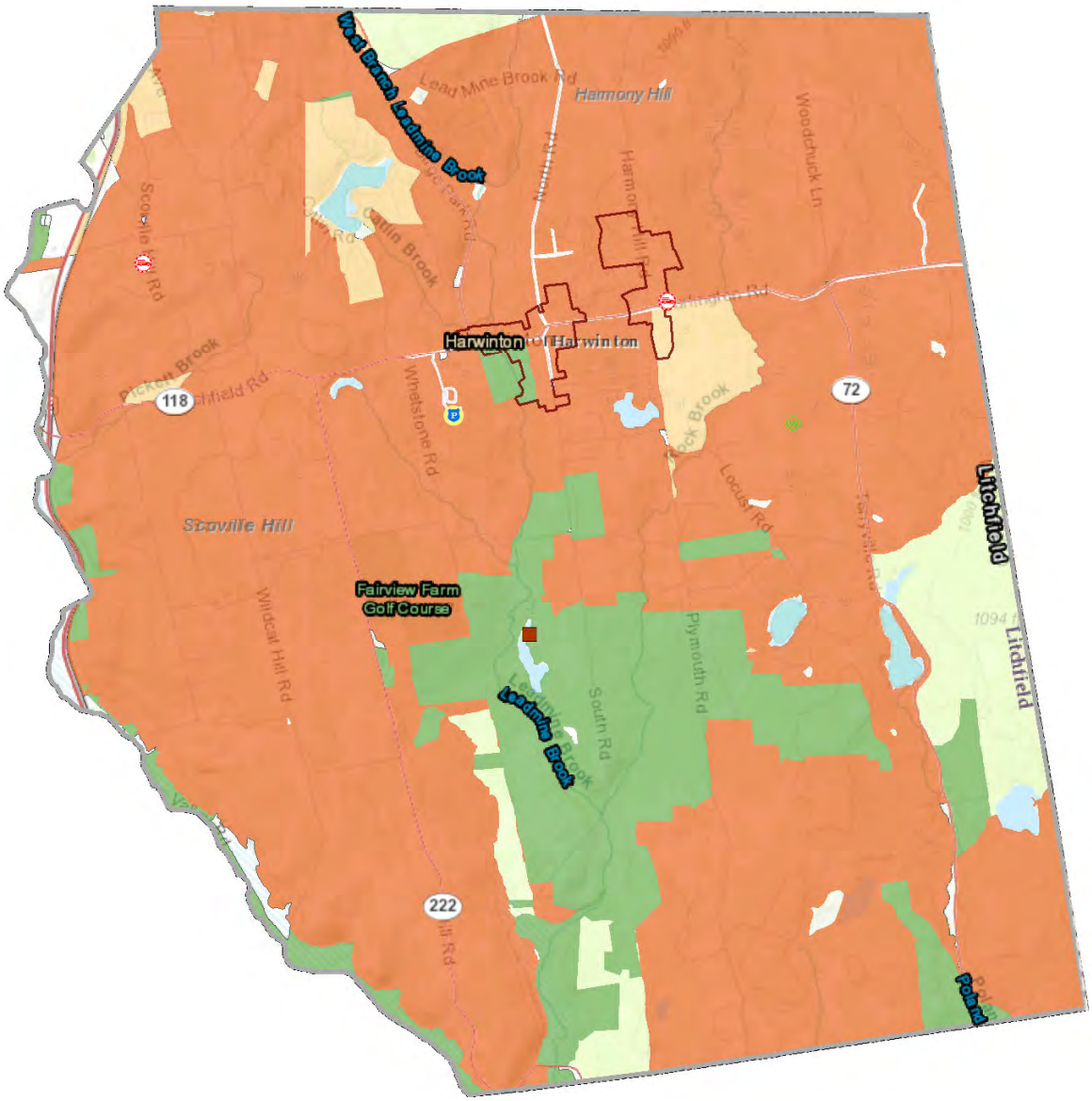
9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

The extensive forests in Harwinton, particularly to the southeast, are prime locations for a wildfire. The many areas of Town where development has occurred adjacent to forestland are at an elevated risk of damage from wildfires. Such areas that are also located far from firefighting water sources are at highest risk. Areas to the northwest near Torrington are likely at lower risk.

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- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

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FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

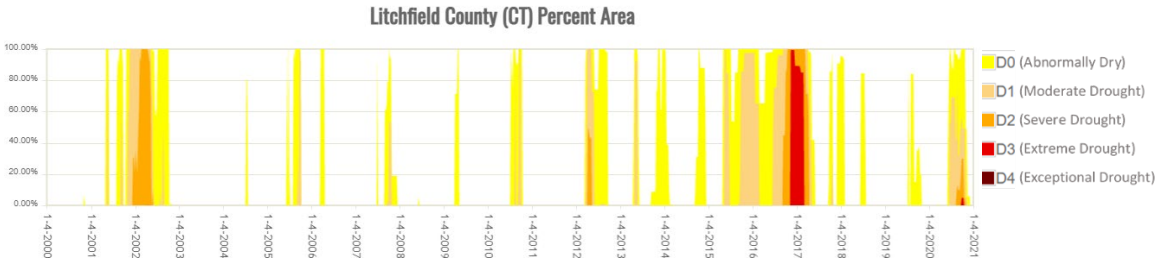


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Strategy	Responsible Party	Status	Notes
1.1	Visit schools and educate children about natural hazards and how to prepare for them.	Fire, EMD	Carry Forward with Revision	Fire Department does fire prevention education, but the Town would like to be more involved in natural hazard education. Efforts need to increase communication with both students and parents.
1.2	Make literature available on natural hazards and preparedness at Harwinton Town Hall. Provide email notifications/links on town website.	EMD, First Selectman	Carry Forward with Revision	The town has explored various methods for public outreach, but would like to create a more robust program overall. Action carried forward to call for website improvements and ongoing maintenance, including posting the link for signing up for emergency alerts.
1.3	Maintain local Emergency Operations Plan and continue to coordinate with the Regional Public Safety Task Force and Red Cross on community planning, preparedness, response, and training.	EMD, First Selectman	Capability	This is done regularly.
1.4	Maintain a Public Notification System (i.e. Everbridge system) to provide emergency information to residents in the entire town or in a specific geographic area. This notice can provide not only warning of an impending situation but also information regarding how to prepare for a particular event.	EMD, First Selectman	Capability	Town uses Everbridge, but would like more flexibility; for example, it would like to be able to send pre-storm communications to help people prepare, in addition to emergency notifications. Everbridge has 2 databases: a reverse 911 linked to the State only for emergency, and a second from voluntary sign-up. A new action is added, to explore Everbridge capabilities, and evaluate alternative systems if necessary.
2.1	Routinely inspect emergency response equipment, and train for response to natural disasters.	Fire, EMD	Capability	Gear and equipment are inspected and maintained continuously.

#	Strategy	Responsible Party	Status	Notes
2.2	Augment establishment of the stand-alone Emergency Operations Center in cooperation with the Harwinton Ambulance Association by acquiring additional emergency response equipment, including a generator.	EMD, Fire, First Selectman	Complete	Generator has been purchased and installed at this location. Town will add new action to acquire additional emergency response equipment.
2.3	Promote the use of interoperable communication equipment, written mutual aid agreements, and the development of standard operating procedures for emergency response in the regional area.	EMD, Fire, First Selectman	Capability	Town participates in DEMHS regional communications and emergency management program. Town would like to increase communication with neighboring towns.
2.4	Develop a Memorandum of Understanding with schools or bus companies to utilize school buses for mass transportation during an emergency.	EMD, First Selectman	Carry Forward	Town has not yet completed this action due to limited staff capabilities.
2.5	Consider developing basic GIS capabilities for access to aerial photos showing the number and location of properties and structures that could be affected by a natural disaster.	EMD, Fire, First Selectman	Complete	Town was in the process of completing this action, working with the assessor's office and NHCOG, at the time this plan was being written.
3.1	Implement control measures to mitigate the flooding created by beavers.	PWD	Capability	Beaver dams have been removed, but the beavers remain in-place and active dues to state prohibitions against beaver relocation.
3.2	Continue to implement established clean- out schedule for all catch basins and drainage facilities.	PWD	Capability	This is a capability.
3.3	Review floodplain regulations and ordinances and update as necessary based on DEEP's "Model Floodplain Management Regulations".	PZC	Carry Forward	This action has not yet been completed due to limited staff capabilities.
3.4	Identify the location of structures that are susceptible to flooding to facilitate risk assessment and potential control measures.	DEMHS or DEEP	Drop	The breadth of the action as listed is not considered necessary. The town has identified municipal structures susceptible to flooding. The Town is exploring options for mitigating flooding at the highway department, located in a flood hazard zone. Mitigation will likely include increasing drainage capacity surrounding the facility, although this will not address the facility's location in the flood zone.
3.5	Pursue funding to enhance the municipal tree trimming program and support expansion of the Eversource tree trimming program.	First Selectman, Public Works Dept.	Capability	The Town is continuously looking for funding. A private arborist in Town is the Tree Warden, with the PW supervisor as the deputy tree warden. There is a minimal tree maintenance budget.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. These include the following:

- Assist the owners of Bull Pond Dam (CT Dam #6613) to secure funding to make necessary upgrades to the structure. The town expects that repairs may also contribute to mitigation of flooding in the Locust Road area.
- The Town would like to improve coordination with the State on tree and limb maintenance along State roadways.
- The town would like to pursue upgrades of their municipal radio and communication system. This would help with communications within town, and with neighboring communities.
- The town would like to invest in an emergency response trailer and acquire additional emergency response equipment.
- Wintergreen elderly housing needs a back-up power source, along with the library. The two buildings are adjacent to each other, so the town would like to explore an option that feeds both buildings.

Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions.

All the actions for this plan are listed below.

Action HWN-01	
Improve level of engagement of municipal staff with public natural hazard education, connecting with both adult residents and students.	
Lead	EMD; DPW
Cost	$0 - $25,000
Funding	OB, CT DEMHS
Timeframe	2022
Priority	High

Action HWN-02	
Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action HWN-03	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action HWN-04	
The Town would like to improve coordination with the State on tree and limb maintenance along State roadways.	
Lead	DPW
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action HWN-05	
Develop a Memorandum of Understanding with schools or bus companies to utilize school buses for mass transportation during an emergency.	
Lead	EMD, First Selectman
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action HWN-06	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action HWN-07	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems. Additionally, increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action HWN-08	
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, Sustainable CT
Timeframe	2022 – 2024
Priority	High

Action HWN-09	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action HWN-10	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action HWN-11	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action HWN-12	
Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action HWN-13	
Improve and perform ongoing maintenance of the Town website to increase natural hazard information; post the link for signing up for emergency alerts.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action HWN-14	
Wintergreen elderly housing needs a back-up power source, along with the library. The two buildings are adjacent to each other, so the town would like to explore an option that feeds both buildings.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action HWN-15	
Assist the owners of Bull Pond Dam (CT Dam #6613) to secure funding to make necessary upgrades to the structure. The town expects that repairs may also contribute to mitigation of flooding in the Locust Road area.	
Lead	EMD
Cost	$100,000 - $500,000
Funding	CT DEEP
Timeframe	2024 – 2026
Priority	Med

Action HWN-16	
The town would like to pursue upgrades of their municipal radio and communication system. This would help with communications within town, and with neighboring communities.	
Lead	EMD
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEMHS
Timeframe	2024 – 2026
Priority	Low

Action HWN-17	
Augment establishment of the stand-alone Emergency Operations Center in cooperation with the Harwinton Ambulance Association by acquiring additional emergency response equipment, including an emergency response trailer.	
Lead	EMD
Cost	$100,000 - $500,000
Funding	OB, CIP, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
HWN-01	Improve level of engagement of municipal staff with public natural hazard education, connecting with both adult residents and students.	Municipal Training	EMD; DPW	$0 - $25,000	OB, CT DEMHS	2022	1	1	1	1	1	1	0	0	0	0	0	0	0	0	8
HWN-02	Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
HWN-03	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
HWN-04	The Town would like to improve coordination with the State on tree and limb maintenance along State roadways.	Tree and Debris Management	DPW	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	0	1	0	0	0	0	0	0	0	5
HWN-05	Develop a Memorandum of Understanding with schools or bus companies to utilize school buses for mass transportation during an emergency.	Evacuation Bus	EMD, First Selectman	$0 - $25,000	OB	2022 – 2023	1	0.5	1	0	1	0	0	0	0	0	0	0	0	0	4
HWN-06	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
HWN-07	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems. Additionally, increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
HWN-08	Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	Sustainable CT	Planning	$25,000 - $50,000	OB, Sustainable CT	2022 – 2024	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
HWN-09	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
HWN-10	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
HWN-11	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
HWN-12	Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
HWN-13	Improve and perform ongoing maintenance of the Town website to increase natural hazard information; post the link for signing up for emergency alerts.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
HWN-14	Wintergreen elderly housing needs a back-up power source, along with the library. The two buildings are adjacent to each other, so the town would like to explore an option that feeds both buildings.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
HWN-15	Assist the owners of Bull Pond Dam (CT Dam #6613) to secure funding to make necessary upgrades to the structure. The town expects that repairs may also contribute to mitigation of flooding in the Locust Road area.	Mitigation Structure	EMD	$100,000 - $500,000	CT DEEP	2024 – 2026	1	1	0	1	1	1	0	0	0	0	-1	0	0	0	6
HWN-16	The town would like to pursue upgrades of their municipal radio and communication system. This would help with communications within town, and with neighboring communities.	Emergency Communication	EMD	$50,000 - $100,000	OB, CIP, CT DEMHS	2024 – 2026	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3
HWN-17	Augment establishment of the stand-alone Emergency Operations Center in cooperation with the Harwinton Ambulance Association by acquiring additional emergency response equipment, including an emergency response trailer.	Emergency Equipment	EMD	$100,000 - $500,000	OB, CIP, CT DEMHS	2025 – 2027	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3

APPENDIX B

RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF HARWINTON BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Harwinton has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Harwinton Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Harwinton and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Harwinton; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Harwinton, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Harwinton eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Harwinton;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Harwinton, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Harwinton this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

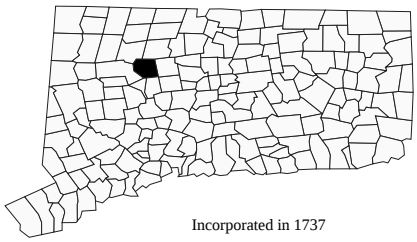
2019 CERC TOWN PROFILE

Harwinton, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
100 Bentley Drive
Harwinton, CT 06791
(860) 485-9051

Belongs To
Litchfield County
LMA Hartford
Northwest Hills Planning Area



Incorporated in 1737

Demographics

Population

	Town	County	State
2000	5,283	182,193	3,405,565
2010	5,642	189,927	3,574,097
2013-2017	5,526	184,454	3,594,478
2020	5,526	193,116	3,604,591
'17 - '20 Growth / Yr	0.0%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	31	921	4,842
Pop./Sq. Mile (2013-2017)	179	200	742
Median Age (2013-2017)	48	47	41
Households (2013-2017)	1,990	74,605	1,361,755
Med. HH Inc. (2013-2017)	$104,205	$76,438	$73,781

	Town	State
Veterans (2013-2017)	338	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	185	3%	739	13%	593	11%	949	17%	2,020	37%	1,040	19%	5,526	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	5,316	164,992	2,446,049
Black Non-Hisp	23	2,843	350,820
Asian Non-Hisp	107	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	27	2,320	84,917
Hispanic or Latino	53	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	4.7%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	994	25%	673,582	27%
Associates Degree	501	13%	188,481	8%
Bachelors or Higher	1,430	36%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	114	773
23 - Construction	22	226
31-33 - Manufacturing	NA	NA
42 - Wholesale Trade	12	78
44-45 - Retail Trade	8	15
54 - Professional, Scientific, and Technical Services	14	68
Total Government	10	127

Top Five Grand List (2016)

	Amount
CT Light & Power	$14,780,850
City of Bristol	$10,940,370
Supreme Industries Inc	$7,871,930
Pickett Brook Properties	$2,694,190
AJT LLC	$1,916,500
Net Grand List (SFY 2016-2017)	$543,039,129

Major Employers (2014)

Harwinton Consolidated School
WSNG
Terminix
Supreme Industries Inc
Fairview Farm Golf Course

Education

2018-2019 School Year

	Grades	Enrollment
Regional School District 10	PK-12	2273

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	77.1%	53.8%	80.1%	51.3%	58.9%	43.0%
ELA	70.1%	53.1%	78.5%	54.9%	75.6%	56.1%

Pre-K Enrollment (PSIS)

	2018-2019
Regional School District 10	45

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 10	95.5%	97.0%	94.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Regional School District 10	6.9%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	91.8%	84.0%	86.8%
Private	8.2%	16.0%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Harwinton, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$18,970,886	Total Expenditures (2017)	$18,141,736	Annual Debt Service (2017)	$0
Tax Revenue	$15,490,423	Education	$13,109,530	As % of Expenditures	0.0%
Non-tax Revenue	$3,480,463	Other	$5,032,206	Eq. Net Grand List (2017)	$746,402,313
Intergovernmental	$3,129,946	Total Indebtedness (2017)	$5,400,392	Per Capita	$136,904
Per Capita Tax (2017)	$2,803	As % of Expenditures	29.8%	As % of State Average	90.7%
As % of State Average	95.6%	Per Capita	$991	Moody's Bond Rating (2017)	-
		As % of State Average	39.4%	Actual Mill Rate (2017)	27.80
				Equalized Mill Rate (2017)	20.48
				% of Net Grand List Com/Ind (2017)	2.4%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	2,186	88,068	1,507,711
% Single Unit (2013-2017)	97.3%	73.6%	59.2%
New Permits Auth (2017)	7	142	4,547
As % Existing Units	0.3%	0.2%	0.3%
Demolitions (2017)	0	32	1,403
Home Sales (2017)	40	1,753	21,880
Median Price	$287,900	$250,100	$270,100
Built Pre-1950 share	19.3%	31.2%	29.3%
Owner Occupied Dwellings	1,945	57,330	906,798
As % Total Dwellings	97.7%	76.8%	66.6%
Subsidized Housing (2018)	51	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	1	57	536
$100,000-$199,999	7	563	5,237
$200,000-$299,999	19	538	6,681
$300,000-$399,999	11	315	3,863
$400,000 or More	2	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$719	$995	$1,123
Cost-burdened Renters	77.8%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	3,126	101,000	1,827,070
Residents Unemployed	117	4,014	78,242
Unemployment Rate	3.6%	3.8%	4.1%
Self-Employed Rate	13.6%	13.0%	10.0%
Total Employers	114	6,177	122,067
Total Employed	773	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Torrington, CT	113	Torrington, CT	457
Harwinton, CT	92	Hartford, CT	187
New Hartford, CT	32	Bristol, CT	170
Bristol, CT	31	Farmington, CT	166
Burlington, CT	29	Waterbury, CT	166
Waterbury, CT	20	Burlington, CT	94
Winchester, CT	19	Harwinton, CT	92

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	414	1,777
Violent	36	228

Disengaged Youth (2013-2017)

	Town	State
Female	0.0%	4.2%
Male	11.0%	5.6%

	Town
Library circulation per capita	6.70

Distance to Major Cities

	Miles
Hartford	20
Providence	85
New York City	88
Boston	113
Montreal	263

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Municipal Provider
Local Contact

Cable Provider
Charter Communications of Western CT
(800) 827-8288

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

KENT, CT

41 Kent Green Blvd
Kent, CT 06757

MMI #3843-06

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Kent and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

> "…the shape of the land does indeed affect the course of human events played out in its midst. Kent's expanse of rugged up and down terrain, naturally terraced flood plains, rock strewn soils, and the roiling waters of the Housatonic River that cleave lengthwise through town prove the rule."
>
> *- Kent 2012 Plan of Conservation and Development*

The town of Kent is a rural town of 2,799 that is bisected by the Housatonic River. The town is well known for its bustling village center and three prestigious boarding schools (Kent School, South Kent School, and Marvelwood School). The downtown area is a mix of residential homes, shops, art galleries, and restaurants.

Kent is located in the northwest region of Connecticut in an area known as Litchfield Hills. It is located in western Litchfield County along the New York border and is bordered by the municipalities of New Milford to the south, Sherman to the southwest, Duchess County, New York to the west, Washington to the southeast, Warren to the east, Cornwall to the northeast and Sharon to the north.

The topography of the town is characterized by steep slopes, rocky hills, small hills and valleys, and generally rolling terrain. The varying terrain of Kent makes the town vulnerable to an array of natural hazards.

2.2 Existing Land Use

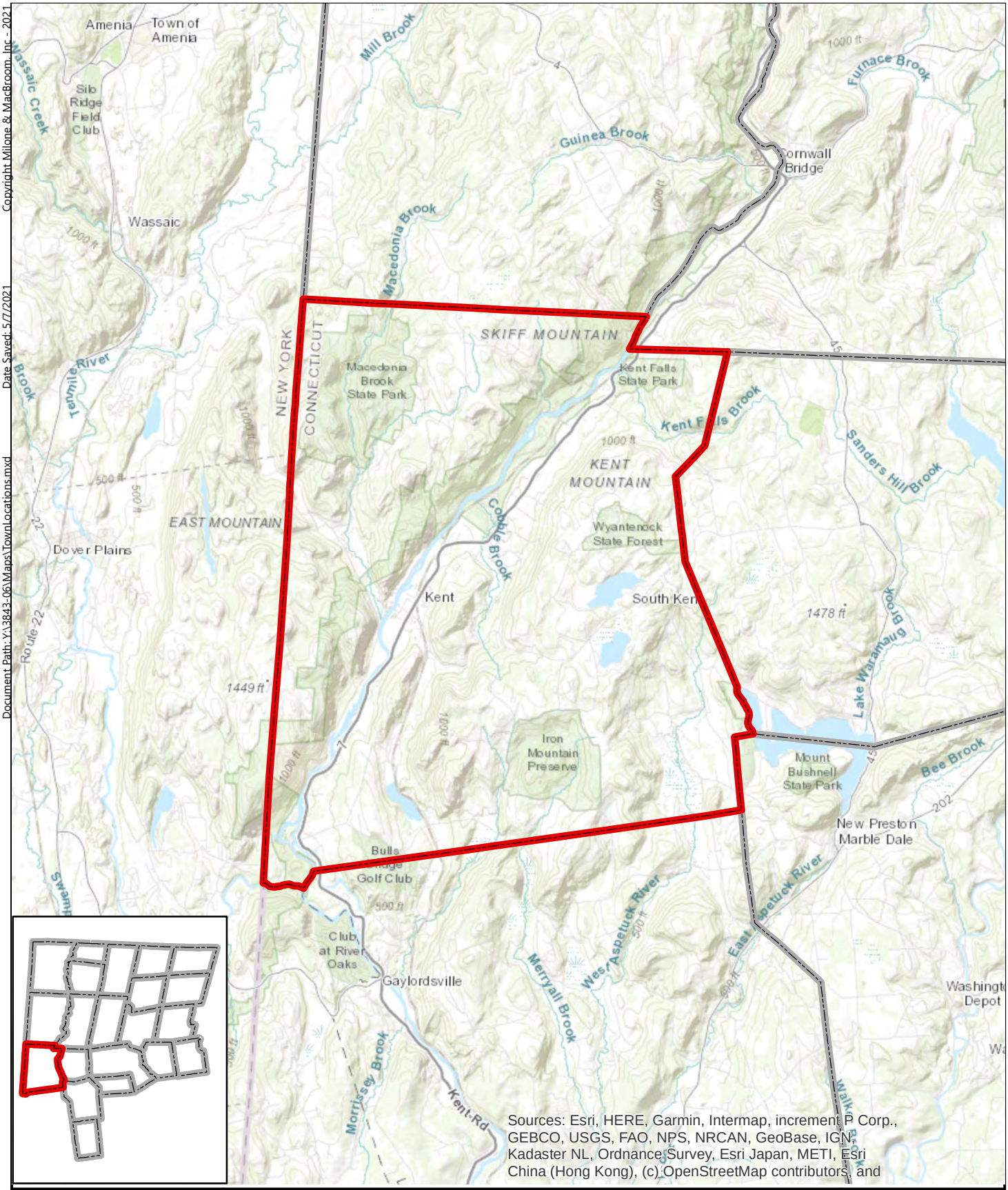
The land area of Kent is approximately 49 square miles with an additional 1 square mile of water. A large portion of Kent is occupied by the forestland including: the Appalachian Trail, Kent Falls State Park, Lake Waramaug State Park, Macedonia Brook State Park, and Wyantenock State Forest.

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 78% of Kent is forested and approximately 5.8% is developed.

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Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and

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FIG. 2-1

Table 2-1: 2015 Land Cover by Area

Land Cover	Area (acres)	Percent of Community
Developed	1,837	5.77%
Turf & Grass	779	2.45%
Other Grass	250.7	0.79%
Agricultural Field	3,161	9.94%
Deciduous Forest	21,170	66.55%
Coniferous Forest	2,700	8.49%
Water	900.7	2.83%
Non-Forested Wetland	174.8	1%
Forested Wetland	802.9	2.52%
Tidal Wetland	0	0.00%
Barren	26	0%
Utility Row	7.9	0%
Total	**31,809**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

2.3 Development Trends

The 2010 U.S. Census reported a population in Kent of 2,979 individuals. U.S. Census Bureau estimates for 2019 show a population around 2,799 individuals, a decrease from 2010 of 6.0%. The Connecticut State Data Center predicts that population will decrease by 2.6% through 2025 to an estimated population of 2,725 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Kent remained relatively steady between 2013 and 2017. The number of permits issued in 2013 and 2014 was 5 and 1, respectively, while 7 permits were issued in 2016, and 3 permits were issued in 2017. On average, 3 housing permits were issued each year in Kent between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Kent dropped by approximately 10.7-percent between 2010 and 2019, from 1,665 units in 2010 to 1,504 units in 2019. In 2019, the housing stock was made up of approximately 88% single-unit structures, 5% two-unit structures, 8% multi-unit structures, and 0% mobile-homes or other types of structures.

According to the Connecticut Office of Policy and Management, Kent's 2019 Total Equalized Net Grand List was valued at $594,799,624. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Kent, included as Appendix C.

Residential development pressures are minimal in Kent, as the town strives to maintain a rural character with a busy village center. The town has three shopping areas. The newest area is about ten years old.

An existing subdivision located outside of the floodplain has seen an increase of proposed new building. A new subdivision is being proposed, located outside of the floodplain. No further development in the floodplain is anticipated by the Town.

The three private schools (Kent School, South Kent School, and Marvelwood School) are constantly expanding and redeveloping. South Kent School recently rebuilt its ice rink, and built a new campus in South Kent. Marvelwood built a new performing arts center. Kent School is putting an addition on their existing Admissions Building; this building is within the floodplain, and the designs put first floor elevations of the building above the base food elevation. Kent School has also added two additional faculty houses which are outside of but immediately adjacent to the currently mapped floodplain.

In general, Kent encourages future residential and non-residential development that can be supported by existing infrastructure. The 2012 Kent Plan of Conservation and Development (POCD) indicates that "Kent will promote sustainable economic health, encourage diversity of available housing throughout the community, and successfully integrate future development into existing neighborhoods and the community at large."

Overall, development in Kent has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the next five years is not expected to increase exposure.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Kent is considered to have a moderate level of vulnerability, with higher vulnerability scores for the SVI categories of "Socioeconomic Status, Household Composition & Disability, and Housing Type & Transportation." "Household Composition & Disability" is the top contributor to the community's "moderate" SVI ranking; in other words, the presence of residents who may need additional assistance during a disaster event due to disabilities is a vulnerability of concern in Kent.

2.4 Geology

Kent is underlain by relatively hard metamorphic and igneous bedrock including a variety of gneiss, schist, and granite. The bedrock formations trend generally north to south.

Continental ice sheets moved across Connecticut at least twice in the late Pleistocene era. As a result, Kent's surficial geology is characteristic of the depositional environments that occurred during glacial and postglacial periods. Stratified glacial meltwater deposits are generally coincident with inland floodplains; the amount of stratified drift also has bearing on the relative intensity of earthquakes.

Kent is covered primarily by glacial till. Tills contain an unsorted mixture of clay, silt, sand, gravel, and boulders deposited by glaciers as a ground moraine. The deposits are generally less than 50 feet thick although deeper deposits of till are scattered across the hillier sections of the town. Stratified glacial meltwater deposits are related to the various water bodies in town, particularly the Housatonic River. These deposits primarily contain stratified sands and gravels.

2.5 Climate and Climate Change

Over the course of the year, the temperature in Kent typically varies from 17°F to 81°F and is rarely below 1°F or above 88°F. The warm season lasts from May 28 to September 15, with an average daily high temperature above 71°F. The cold season lasts from December 1 to March 10, with an average daily high temperature below 42°F.

Precipitation falls throughout the year in Kent. The wetter season lasts 4.4 months, from April 9 to August 21, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on May 29.

The drier season lasts 7.6 months, from August 21 to April 9. The smallest chance of a wet day is 22% on January 29.

The most rain falls during the 31 days centered around September 30, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts for 5.9 months, from October 23 to April 20, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.4 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Kent as 4.72 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Kent at 5.30 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.7	5.9	8.3
NOAA Atlas 14	5.3	6.6	8.5

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Kent can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 5.8 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

Kent is divided among the following 11 subregional drainage basins: Bog Hollow Brook, Cobble Brook, East Aspetuck River, Housatonic River, Kent Falls Brook, Macedonia Brook, Merryall Brook, Tenmile River, Webatuck Creek, West Aspetuck River and Womenshenuk Brook. The majority of the drainage basins have FEMA-defined Special Flood Hazard Areas (SFHAs) along the primary watercourses. Such areas consist of 1% annual chance storm floodplains without elevations, 1% annual chance storm floodplains with elevations, and 0.2% annual chance floodplains.

Bog Hollow Brook

The sub drainage basin of Bog Hollow Brook has an area of 6.5 square miles with only about a quarter of the area in Kent and the rest in New York. Bog Hollow Brook starts along the edge of the Connecticut-New York border and runs south on the New York side passing through two unnamed ponds and eventually directs southeast across into Kent. Two input tributaries come in on the New York side and one on the Connecticut side originating in New York. The brook follows along Route 341 and passes underneath before converging with Macedonia Brook.

Macedonia Brook

The headwaters of Macedonia Brook make up the section of sub regional drainage basin located Sharon. Only about one third of the basin is in the town of Sharon with the rest extending south into Kent, draining several tributaries into the main stem of Macedonia Brook. Peck and Hilltop Ponds are of the standing bodies of water in Sharon drained within this basin. Just over the border in Kent, the brook proceeds through Macedonia Brook State Park where some small tributaries converge. Further downstream, Pond Mountain Brook enters in flowing from the north out of Fuller Pond proceeded by the Bog Hollow Brook convergence. After a few more minor tributaries, Macedonia flows into the Housatonic River. The lower stretch of Macedonia Brook after Bog Hollow and above the mouth is bordered by sections of 100-year floodplain. Many dams are located within this drainage and are either unclassified or have low hazard classification. Although two dams of interest are Jordan Pond Dam and Hilltop Pond Dam, Jordan classified as a moderate hazard and Hilltop classified as significant hazard.

Cobble Brook

The entire Cobble Brook watershed is located in Kent. Cobble Brook starts off as a small first order stream with several tributaries converging in the headwaters along Route 341 in Kent. The main stream channel of Cobble Brook follows along Cobble Road and eventually crosses Route 7 where two more tributaries converge and then flows into the Housatonic River. The majority Cobble Brook's main channel is bordered by narrow sections of 100-year floodplain up to the mouth at the Housatonic.

East Aspetuck River

The East Aspetuck River begins in Lake Waramaug and the portion of the drainage basin that extends into Kent is very small, consisting of only land that drains toward the lake.

Housatonic River

The Housatonic River drains an area of 1,948 square miles from Pittsfield, Massachusetts to Milford, Connecticut where it empties into Long Island Sound. The river flows a total of 134 miles

from its upper reach to the sound with 1,234 square mile of the total drainage area existing in Connecticut. After crossing into Connecticut, the river creates the border for several towns including Salisbury, North Canaan, Canaan and just south, Sharon and Cornwall. Many of the sub regional drainages in these towns flow into the Housatonic River along with small tributaries that flow directly into the river, which make up the Housatonic sub regional drainage basin. The main channel of the Housatonic is lined with 100-year floodplains that extend on either side of the river with areas that further extend making up the 500-year floodplains.

Kent Falls Brook

Kent Falls Brook originates in Warren at Gritman Pond, where downstream it merges with other tributaries to flow southwest. More than halfway through the river course, Kent Falls Brook converges with a branch of several small unnamed tributaries and the main channel then orientates the flow northwest into the Housatonic River. Some of the tributaries in the headwaters are bordered by 100-year floodplains but the primary channel of Kent Falls Brook does not contain 100-year floodplains.

Merryall Brook

The headwaters of Merryall Brook begin in Kent with the river flowing south into New Milford where it converges with West Aspetuck River. Only less than a quarter of the sub regional drainage basin resides in the town of Kent with the rest in New Milford. One hundred year floodplains begin just below the southern Kent line and extend down river adjacent to most of Merryall Brook but sections of the brook in Kent do not have SFHA's.

Tenmile River

Consisting of 72 square miles, the sub regional drainage basin of the Ten Mile River resides primarily in New York with drainage flowing into Connecticut and into the Housatonic River. The river crosses the state line forming the south west corner of Kent before converging into the Housatonic. A very small section of land located in Kent, bordering the Ten Mile River, is contained within the drainage of the large sub basin.

Webatuck Creek

The sub regional drainage basin of Webatuck Creek resides primarily in New York but skirts in and out along the western border of Salisbury and Sharon. The main creek channel flows through a small section of both towns but the majority of the drainage area collects water from the furthest extents of a few small tributary streams that flow west into New York.

West Aspetuck River

The headwaters of the West Aspetuck River begin just before North and South Spectacle Ponds located in eastern Kent. The outflow of North Spectacle Pond flows east into Beaman Pond and then south with several merging tributaries including a stem joining just below Beaman that drains a section of Warren. Denman and Merryall Brook merge with West Aspetuck River in New Milford and just before pouring into the Housatonic, the East Aspetuck River merges into the West Aspetuck. Much of the West Aspetuck River is surrounded by 100-year floodplains with the widest extents of floodplain around the southern Kent line where several tributaries merge and

also where Denman Brook converges. Many 500-year floodplains exist beyond the boundaries of the 100-year zones following most of the main river channel. The entire sub regional watershed drains an area of approximately 25 square miles.

Womenshenuk Brook

Originating at Leonard Brook, Womenshenuk Brook flows south into Hatch Pond continuing out and into Mill Pond. Downstream, Womenshenuk Brook and Bull Mountain Brook converge followed by the input of a couple small tributaries before the confluence with the Housatonic River. In the upstream sections of Bull Mountain Brook are Irvings and Mud Pond, along with other minor tributary inputs. The upper half of Womenshenuk Brook is bordered by 100-year floodplains and the lower half is surrounded by areas of 500-year floodplain. Bull Mountain Brook is bordered by 100-year floodplain beginning just above Mud Pond continuing all the way to the mouth at the Housatonic River. Of the many dams in Kent along the two main rivers, the two of interest based on their hazard classification are Hatch Pond Dam and Irving Pond Dam both classified as moderate hazard.

Of the 11 subregional basins referenced above, the Housatonic River has the most influence on the town and its flood hazards. The majority of the town of Kent is located within the Housatonic River watershed. In Kent, the Housatonic River begins in the northeast corner and bisects the town diagonally. The river runs along Route 7 and exits the town in the northwest corner before continuing on into New Milford.

The river has been the subject of intense interest in the town due to significant flooding that occurs in the watershed. Many strategies within this plan will specifically address flooding concerns along the Housatonic.

2.7 Governmental Structure and Capabilities

The Town of Kent is governed by a Selectman-Town Meeting form of government in which legislative responsibilities are shared by the Board of Selectmen and the Town Meeting. The First Selectman serves as the chief executive.

In addition to Board of Selectmen and the Town Meeting, there are boards, commissions and committees providing input and direction to Town administrators. Also, Town departments provide municipal services and day-to-day administration. Many of these commissions and departments play a role in hazard mitigation, including the Planning and Zoning, Inland Wetland and Conservation Commission, the Building Official, the Fire Department, Emergency Medical Services, and the Highway Department/Public Works.

Drainage complaints are routed through the Public Works Department. These complaints are usually received via phone, fax, mail, or email and are recorded in a logbook. The complaints are investigated as necessary until remediation surrounding the individual complaint is concluded.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

> **Historic preservation planning** helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
> *- Paraphrased from FEMA Report 386-6*

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Kent include historic churches, homes, and schools, archaeological resources, and the Flanders Historic District. The Schaghticoke Indian Reservation is another important cultural resource.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

Route 7, and Route 341 are the major transportation routes in Cornwall. Route 7 runs north-south along the Housatonic, while Route 341 runs east-west from Warren to the New York border. Other important roadways include South Kent Road connecting South Kent to Kent Center, and Bulls Bridge Road and Camps Flat Road running east-west along the southern edge of Town.

South Kent Road is a State Road that is the detour to and from downtown when Route 7 is closed due to flooding, downed power lines, or accidents. The road is not maintained to the standard

that the town would prefer and therefore makes access during these situations difficult. The town would like to work with the Department of Transportation to ensure that improvements are made.

There is no public transportation in Canaan.

Utilities

The Town of Kent has public water supply provided by Aquarion Water Company (in Kent Center), a number of Community Water Systems serving primarily the schools in Town (South Kent School, Kent School, and the Marvelwood School), and a number of Non-Community Public Water Systems.

Kent is served by the Kent Sewer Treatment Plant located on Schaghticoke Road on land owned by Kent School and leased to the Town of Kent. The plant is also a regional septage receiving facility. Kent's sewer system extends for the most part over the area zoned as Village Center, including Kent School.

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Kent.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Kent has identified fourteen critical facilities. Many critical facilities, such as police, fire, and governmental buildings as well as utilities are required to ensure that day-to-day management of the town continues. Other facilities such as nursing homes, schools, and emergency supply storage areas are also considered critical facilities since these contain populations that are more susceptible in an emergency or house important supplies. Not all municipal buildings are critical facilities. Table 2-3 presents a list of critical facilities in Kent.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Kent Town Hall	41 Kent Green Boulevard	Emergency Operations Center Primary Shelter	✓	✓	
Kent Fire Department	28 Maple Street	Emergency Response	✓		
Community House	92 North Main St	Backup Shelter		✓	
Templeton Farms (senior center)	16 Swifts Lane	Senior Housing/Shelter for heating and food service	✓		
Morning Star	38 Elizabeth St	Senior Housing	✓		
Kent Center School	9 Judd Avenue	Public School			✓

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Kent School	1 Macedonia Rd	Private School	✓		*
South Kent School	40 Bulls Bridge Road	Private School	✓		*
Marvelwood School	476 Skiff Mountain Rd	Private School	✓		*
High Watch Drug & Alcohol Rehab Center	62 Carter Road		✓		
Bulls Bridge Cell Tower	136 Bulls Bridge	DPS/DPW Communication Tower	✓		
Town Garage	38 Maple Street	Emergency Response	✓		
Kent Sewer Treatment Plant	125 Schaghticoke Rd	Public Utility	✓		✓

*These three schools span many acres and portions of the campuses may be located within the 1% annual chance floodplain.

Emergency Response Capabilities

The Town has an EOP that guides its response to emergencies arising from both natural and anthropogenic hazards. The Kent Emergency Management Department coordinates emergency preparedness in the town of Kent. That department develops plans, protocols, and procedures that assure the safety of Kent's citizens. It also provides training for emergency response personnel, supports state and local emergency response exercises, and provides technical assistance to state and local emergency response agencies and public officials. Its goal is to provide citizens with the highest level of emergency preparedness before, during, and after disasters or emergencies.

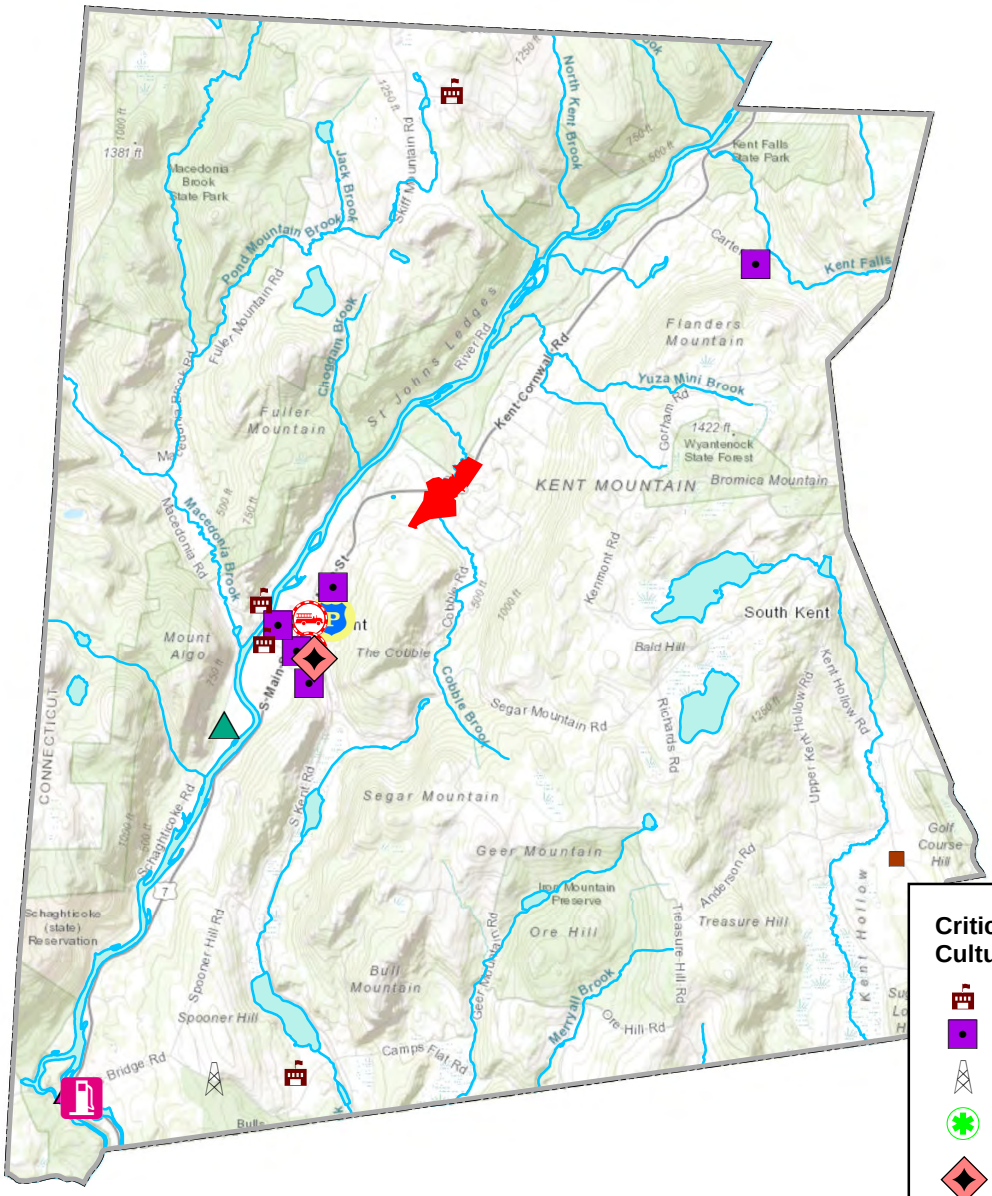
The Town's Emergency Operations Center (EOC), including its Emergency Communications Center, has been relocated to the Kent Town Hall from the Kent Fire Department over the past five years. The Town Hall has a generator that can power the entire building, and also serves as an emergency shelter.

Kent has a local Community Emergency Response Team (CERT), made up of resident volunteers and Town staff, that can assist with emergency preparation and response activities.

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Critical Facilities & Cultural Resources

- School
- Care Facility
- Communication Tower
- EMS
- Emergency Response
- Fire Station
- Gas Station with Generator
- Law Enforcement
- Public Utility
- National Register Building
- National Register Structure
- National Register District

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CRITICAL FACILITIES AND CULTURAL RESOURCES

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FIG. 2-2

State and federal roads are the major transportation arteries (and therefore evacuation routes) into and out of the town. The main road into Kent is Route 7, which connects to Interstate 84, which is integral in transporting patients to the hospital. The Town communicates with CTDOT about alternative access needs in case Route 7 is closed, and performs upgrades to South Kent Road as needed.

Emergency services can also be cut off by fallen trees or washed out culverts during certain emergencies. The Town contracts a tree company to perform tree and shrub removal. During emergencies and following storms, the highway department responds to calls related to downed trees.

Sheltering Capabilities

Emergency shelters are an important subset of critical facilities, as they are needed in many emergency situations. Kent has two shelters that provide various levels of support. The Town Hall has sheltering capabilities and provides cots. The Community House provides cots and food service.

Kent has in the past used the Templeton Farms Senior Center as a backup shelter. The Town is moving away from sheltering people at this site to focus on running emergency food services for the Primary Shelter (Town Hall) from this site.

The Community House does not have an emergency generator. The Town has submitted an HMGP application for a generator at this facility in the past, but it was not advanced by the State to FEMA for consideration. The Town has also identified accessibility challenges at this facility, and is no longer pursuing conversion of the Community House into the Town's primary shelter. Nevertheless, the Town is interested in expanding its sheltering capabilities, including heating and cooling centers, and so wishes to continue pursuing installation of a generator at this site. The Town will pursue generator installation options, including a generator that may only power a section of the building. In addition to installing a generator, the Town will have to consider personnel needs for managing the shelter. This may involve increasing the capabilities of the local CERT.

In case of a sustained power outage, it is anticipated that 10 to 20% of the population (300 to 600 people) would relocate, although not all of those relocating would necessarily utilize the shelter facilities.

As noted above, Kent is exploring expanding its emergency sheltering capabilities. Town staff want the Town to have sufficient capabilities to respond to hazards and potential displacement of residents on their own, in case outside help is not available following a disaster. The COVID-19 epidemic has shown how important it can be to have sufficient sheltering space, given social-distancing requirements.

Communications

The Town subscribes to the statewide CTAlert to direct geographically specific emergency notification telephone calls into affected areas. The Town has also instituted a local Everbridge emergency notification system, and as of the summer of 2020 had just begun the process of rebuilding a database of resident contact information.

The Bulls Bridge Communications Tower is listed as a critical facility; the tower holds equipment for cellular telecommunications, as well as Litchfield County Dispatch. The tower has a backup generator.

3 FLOODING

3.1 Existing Capabilities

Kent discourages new construction and substantial reconstruction within the 1% annual chance floodplain by raising concerns during the floodplain permit process. New development is strictly managed through the Town's land use process and Floodplain Management Regulations.

In addition, Kent has Zoning Regulations and Subdivision Regulations that regulate development, and Inland Wetland Regulations that regulate activities near wetlands.

Ordinances, Regulations, and Plans

Regulations, codes, and ordinances that apply to flood hazard mitigation in conjunction with and in addition to NFIP regulations include:

- ***Floodplain Management Regulations***: The Town's Flood Management Regulations were adopted in 2001 and are essentially the town's local version of the NFIP regulations. FEMA is currently updating Flood Insurance Rate Maps (FIRMS) in the region; upon completion of the update, the Town will be required to update its Zoning Regulations to incorporate the new maps. The Town will use that opportunity to ensure that the Floodplain Management Regulations reflect the most recent recommendations from the Connecticut DEEP. The regulations deal with Floodplain Management, including establishing areas of special flood hazard, restrictions, development permit requirements, permitted uses, and standards for flood hazard reduction. The objectives of the regulations is to:

    - Protect human life and health; minimize expenditure of public money for costly flood control projects; minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public; to help maintain a stable tax base by providing for the sound use and development of flood prone areas in such a manner as to minimize flood blight areas and to insure that potential home buyers are notified that property is in a flood area.

    - Article IV outlines the standards required in SFHA's. Specifically, the regulations require that new construction and substantial improvements of any residential or non-residential structure shall have the lowest floor, including the basement, elevated to or above base flood elevation. Substantial improvement is defined as being cumulative over a ten year period.

    - Article IV(G) states that the following provisions apply within floodways: (1) All encroachments are prohibited, including fill, new construction, substantial improvements and other development, unless certification (with supporting technical data) by a registered professional engineer is provided demonstrating that encroachment shall not result in any (0.00) increase in flood levels during occurrence of the base flood discharge and (2) If Section g(1) is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reductions provisions of this Article.

- ***Zoning Regulations*** – The Zoning Regulations were adopted in 1965 and last revised in 2020.

  - Section 11 outlines the requirements of the Housatonic River District (HRD) which is an important aspect of the zoning regulations. "The purpose of the HRD is to protect, in a cooperative effort with neighboring towns, with appropriate uniform standards, the Kent segment of a carefully defined area of land designated as the Housatonic River Corridor, which is deemed to be flood prone, environmentally sensitive and to possess many valuable natural resources and historic sites."

  - Section 11.4 outlines requirements associated with the submittal of an Inner Corridor HRD Special Permit application.

  - Section 11.4.2 requires the submittal of a Soil Erosion and Sedimentation Control Plan.

  - Section 11.4.3 discusses flood control and states that "no use shall be permitted which would create a danger of flood damage or obstruct flood flows. The 100 year flood area shall be as shown on the applicable Federal Flood Insurance Rate 49 Map. Within this area all new construction or substantial improvement of residential structures shall be elevated to or above the level of the 100 year flood; all new construction or substantial improvements to non-residential structures shall be elevated to or above the level of the 100 year flood or together with attendant utility and sanitary facilities, shall be flood-proofed up to the level of the 100 year flood. All such activities are to be in accordance with the Federal Flood Insurance Regulations as administered by the Commission."

  - Section 11.4.8 states that all possible care shall be taken to protect scenic vistas, scenic roads, and unique aesthetic features such as prominent ridgelines, large trees and stone walls from damage, obstruction or other degradation. (See Kent Land Trust Southern Gateway Resource Map.)

  - Section 11.6 outlines requirements associated with the submittal of an Outer Corridor HRD Special Permit application.

  - Section 11.6.1 states that Activities involving construction or earth moving, shall be reviewed with regard to soil types in exposed areas to determine whether provisions shall be made for special erosion and sediment control in accordance with current guidelines available from the U.S. Department of Agriculture Soil Conservation Service.

  - Section 11.6.2 requires that all permits involving installation of subsurface sewage disposal systems be reviewed using the Soil Conservation Service interpretation of the soils and slopes involved in order to identify those specific areas where existing minimum lot sizes are most likely to be inadequate to support a permanent subsoil sewage system or where special design engineering of the system may be required by the State Health Code.

  One aspect of the 2020 update was inclusion of elements supporting the use of Low Impact Development (LID) measures; these practices mitigate stormwater generation and flooding.

- ***Inland Wetlands and Watercourse Regulations***. These regulations were adopted in 1988 and revised in 2010. The purpose of the inland wetlands and watercourses regulations is to protect the quality of the inland wetlands and watercourses within the town of Kent by making provisions for the protection, preservation, maintenance, and use of inland wetlands and watercourses, including deterring and inhibiting the danger of flood and pollution.

    - Section 2.1 defines "Regulated activity" means any operation within, or use of, a wetland or watercourse involving removal or deposition of material, or an obstruction, construction, alteration or pollution of such wetlands or watercourses and any earth moving filling construction, or clear-cutting of trees within one hundred (100) feet of wetlands and within two hundred (200) feet of watercourses, but shall not include the specified activities in Section 4 of these regulations. The agency may rule that any other activity in an upland review area or any other non-wetland or non-watercourse area is likely to impact or effect wetlands or watercourses and is a regulated activity.

    - Section 4.1.b states that no residential homes will be permitted "as of right" in wetlands and watercourses after July 1, 1987.

    - Section 6.1 states that no person may conduct or maintain a regulated activity without obtaining a permit. Section 7 outlines the permit application requirements.

- ***Plan of Conservation and Development.*** This 2012 document is the Town's vision statement for future development. The PoCD outlines the following goals:

    - Natural Resources (Page 17) review the Town zoning and wetlands regulations to identify and implement improvements to protect water quality, address development impacts, and address other ecological and environmental threats.

    - Natural Resources (Page 17) Update Flood Plain standards to incorporate the latest technical standards.

    - Natural Resources (Page 17) update the Town regulations to integrate low impact development standards as outlined in the State of Connecticut DEEP Stormwater Quality Manual and DEP Guidelines for Soil Erosion and Sedimentation Control.

- ***Subdivision Regulations.*** Adopted in 1969 and updated in 1995, the Town's Subdivision Regulations establish minimum acceptable standards of street construction; regulate the layout and development of lots and streets; and outline measures to prevent degradation of potable water sources, control erosion and siltation, preserve adequate and convenient open spaces, and retain the natural features of the land.

    - Section 3.4 (page 9) requires that land to be subdivided be "of such character that it can be used for building purposes without danger to health or the public safety: proper provision shall be made for water, drainage and sewerage, and in areas contiguous to brooks, rivers or other bodies of water subject to flooding, proper provisions shall be made for protective flood control measures."

- Section 3.8.2(c) (page 10) states that in determining whether or not to require public open space and the size and location of such areas, the Commission shall consider but not be limited to the recommendations of the town's Plan of Development and/or Open Space Plan as well as the following criteria: floodplains, legally defined wetlands, streambelts and prime important farmland soils as defined by the Soil Conservation Service.

- Section 8.5.5 (page 31) requires the preparation of a sanitary report when on-site sewage systems are proposed. The report shall discuss among other things; flood heights of any streams, brooks, rivers, lakes or ponds on or near the subdivision, based upon the 100-year frequency storm.

Overall, the intent of these regulations is to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas of the town of Kent by the establishment of standards designed to:

- Protect human life and public health
- Minimize expenditure of money for costly flood control projects
- Minimize the need for rescue and relief efforts associated with flooding
- Minimize prolonged business interruptions
- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone, and sewer lines; and streets and bridges located in floodplains
- Maintain a stable tax base by providing for the sound use and development of floodprone areas in such a manner as to minimize flood blight areas
- Ensure that purchasers of property are notified of special flood hazards
- Ensure the continued eligibility of owners of property in Kent for participation in the NFIP.

NFIP, Flood Insurance, and Community Rating System

Mr. Bruce Adams, the Town First Selectman is currently the NFIP administrator for the Town and oversees the enforcement of NFIP regulations. The degree of flood protection established by the variety of regulations in the Town meets the minimum reasonable for regulatory purposes under the NFIP. The Town is not enrolled in the Community Rating System program.

According to FEMA, there are 22 flood insurance policies in force in Kent as of 6/30/2019 with an insurance value of $6,609,400.

Drainage and Street Flooding

There are areas of minor street flooding throughout the town, and these are addressed by the Public Works Departments as necessary. These typically relate to small areas and result in limited, if any, property impacts.

The Public Works Department is in charge of the maintenance of the town's drainage systems and performs clearing of bridges and culverts and other maintenance as needed. Drainage

complaints are routed to the Public Works Department. The Town uses these reports to identify potential problems and plan for maintenance and upgrades.

The Town has a beaver management plan. Beaver management requires an Inland Wetlands Permit. In most cases the Inland Wetlands Commission recommends the hiring of a private contractor called Beaver Solutions. The Town traps and removes beavers on occasion; removal of the beaver itself requires a DEEP permit through a licensed trapper. During beaver-related flooding, the Town closes roads and temporarily reroutes traffic. The Town does not believe this intermittent flooding warrants major capital expenditure.

Structural Projects

The town has completed structural projects for flood mitigation mainly as needed. The Town is actively addressing flooding issues at various locations throughout Kent. Specifically, the bridge at Straight Road/Kent Hollow Road and the Aspetuck River will be replaced with a longer and higher bridge and two culverts along Tanguay Road at the West Aspetuck River and a tributary are being replaced with box culverts. In addition, culverts under Schaghticoke were replaced in October 2013.

Communications

The Town can access the National Weather Service website at http://www.weather.gov/ to obtain the latest flood watches and warnings before and during precipitation events.

The National Weather Service issues a flood watch or a flash flood watch for an area when conditions in or near the area are favorable for a flood or flash flood, respectively. A flash flood watch or flood watch does not necessarily mean that flooding will occur. The National Weather Service issues a flood warning or a flash flood warning for an area when parts of the area are either currently flooding, highly likely to flood, or when flooding is imminent.

The Town receives regular weather updates through Division of Emergency Management and Homeland Security (DEMHS) Region 5 email alerts as well as watches and warnings through the National Weather Service. Kent reportedly uses the CT Alert system for notifications, and the town can send email blasts before storms.

Preparedness information from FEMA is kept in the town hall and posted on bulletin boards. Finally, the First Selectman publishes a monthly internet newsletter that reaches 1,200 people. Preparedness information is often provided via this newsletter.

3.1.1 New Capabilities and Completed Actions

An RLP in Kent, located on Johnson Road, is putting up a deck on the back of the house. The Building Department has worked with the property owners on the design to ensure there will be no increased flood risk.

The Town has completed an evaluation of flooding along Kent Hollow Road and the West Aspetuck River, and identified the cause to be related to beaver activity. The Town traps and removes beavers as needed.

Kent Hollow Road Bridge was replaced with a box culvert in 2017. The new culvert was rated for a 100-year storm. This is a low velocity section of the Aspetuck River and the culvert design was determined to be sufficient.

3.1.2 Summary

In summary, the Town primarily attempts to mitigate future flood damage and flood hazards by restricting building activities in floodprone areas. This process is carried out through both the Planning and Zoning and the Inland Wetlands Commissions. All watercourses are to be encroached minimally or not at all to maintain the existing flood-carrying capacity. These regulations rely primarily on the FEMA-defined 1% annual chance flood elevations to determine flood areas.

3.2 Vulnerabilities and Risk Assessment

Vulnerability Analysis of Areas Along Watercourses

The most frequently flooded areas in the town are adjacent to the Housatonic River. This includes the repetitive loss properties in Town. A section of Route 7, east of the river and south of downtown has routinely flooded for decades. The Town has also noted that side streets along Kent Hollow Road experience flooding along the West Aspetuck River.

The Housatonic River is also the cause of flooding along Schaghitcoke Road on the west side of the river. In addition, ice jams have occurred in the past where slackwater conditions prevail downstream of downtown. In the past 20 years ice jams have caused flooding at least four times, with the most recent event occurring in January of 2018.

January 2018 Ice Jam

During the 2018 event, a buildup of ice occurred on the both sides of the Route 341 Bridge. Flooding occurred upstream of the bridge because of this ice jam. Residences, parts of the Kent School, and critical facilities were impacted. Sections of Route 7 were flooded. One RLP was secondarily damaged during the ice jam when power was shut off and water froze in the home's plumbing. The National Weather Service Albany office sent personnel to work with Town and brief them regularly on river levels.

The ice jam itself posed a significant hazard. The Town had to monitor ice regularly to determine stability. The ice jam became a curiosity and drew visitors. Town had to worry about safety of these visitors, including people who would go out on the ice. Connecticut State Police were involved.

Some properties were evacuated. Some residents refused to leave; the Town had to expend personnel-hours and resources managing these residents. Route 7 was closed for multiple weeks.

After the first week of closure, the road was briefly reopened, but was flooded again and had to reclose.

Beaver Dams

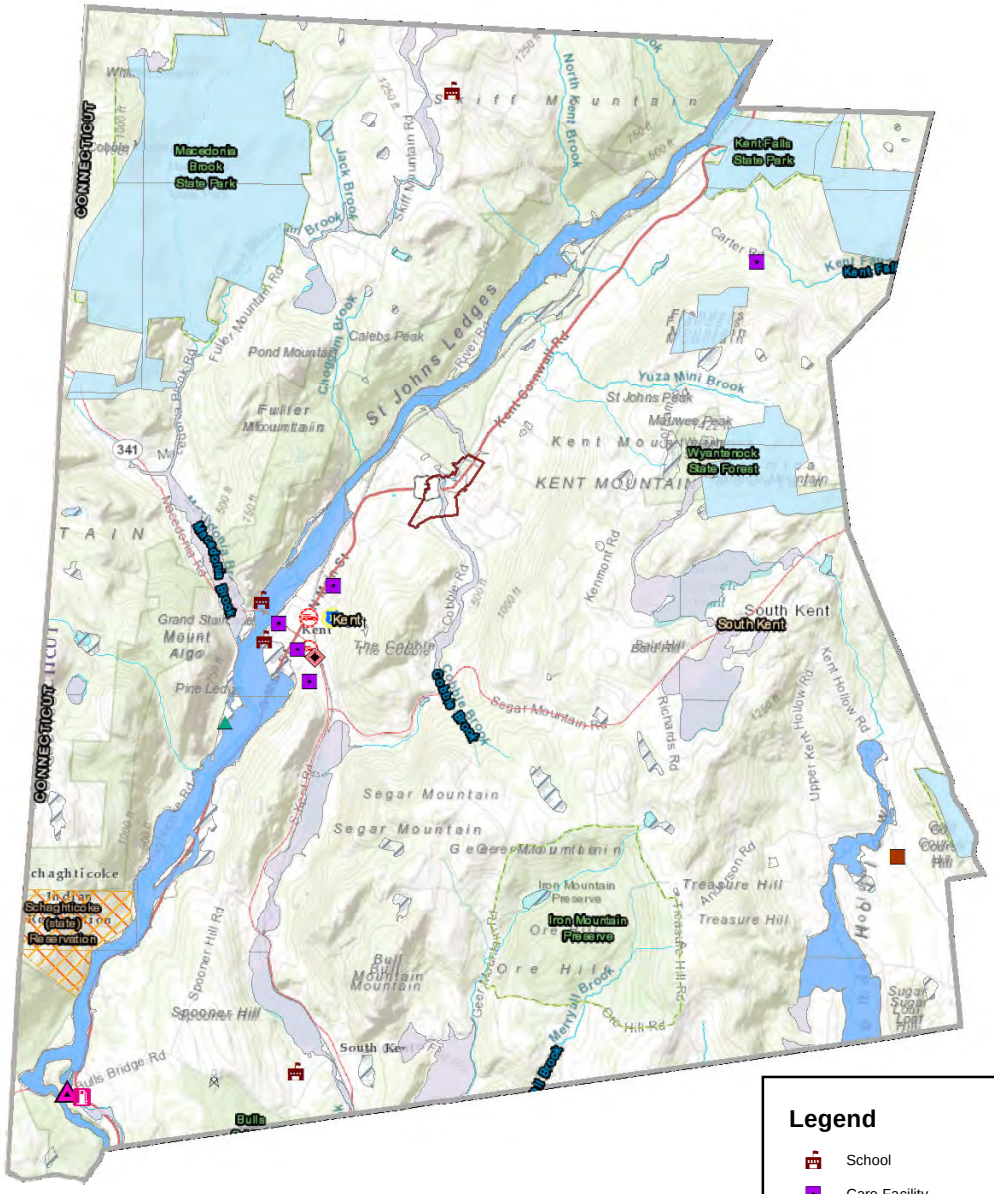
Beaver activity is known to intermittently cause flooding along Kent Hollow Road and the West Aspetuck River. Flooding can happen during storms because beavers keep water high. Town staff report that flooding is usually relatively minor, only temporarily causing road closures, and not causing damages.

Repetitive Loss Properties

There are two Repetitive Loss Properties (RLP) in Kent, as well as one property that has been an RLP in the past but has since been mitigated, according to FEMA records. All of the properties are residential.

Town staff report that while these RLPs are repetitively flooded, they have not experienced significant economic losses or notable damages during flooding; residents temporarily evacuate and then move back. This has made incentivizing mitigation a challenge for the Town. Despite this, Town staff report that one homeowner has elevated utilities above flood grade.

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Legend

- School
- Care Facility
- Communication Tower
- EMS
- Emergency Response
- Fire Station
- Gas Station with Generator
- Law Enforcement
- Public Utility
- National Register Building
- National Register Structure
- National Register District

Flood Zone

- A
- AE
- FLOODWAY
- ANI
- D
- X500

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - KENT ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,500 7,000
Feet

SCALE 1 " = 7,457 '
DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing mitigation measures appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Kent is 105 mph for a Category 1 event, 115 mph for a Category 2, and 120 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Parts of tall and older trees may fall during heavy wind events, potentially damaging structures, utility lines, and vehicles. Eversource the local electric utility, provides tree maintenance near its power lines. The town believes that Eversource did the best they could in 2011 and that the crews from other states were very helpful when they arrived. The town also noted that more maintenance and major trimming was conducted in 2013, which should reduce outages.

The Town has a tree warden, and a tree maintenance budget of $18,000 per year. The Town and contracts a tree company with a bucket truck. The town prioritizes trimming and conducts the larger projects one time a year.

During emergencies, the Town currently has three designated emergency shelters available for residents as discussed in Section 2.9. During Tropical Storm Irene, the Town used the CTAlert system to notify all residents in the SFHA that they may evacuate and use one of the shelters. Prior to severe storm events, the Town ensures that warning/notification systems and communication equipment are working properly and prepares for the possible evacuation of impacted areas.

4.1.1 New Capabilities and Completed Actions

Kent continues to maintain its strong tropical cyclone mitigation capabilities. Kent is considering pursuing an MOU with Verizon/ATT to install a temporary cellphone tower during outages to allow for cell service. Many residents no longer have landlines, so cellphone outages can severely impact communication capabilities.

4.1.2 Summary

Kent mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

Setting

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

On August 4th, Tropical Storm Isaias passed through Kent. Town staff reported significant loss of power and communication during the storm.

Vulnerabilities and Risk

In general, as the residents and businesses of the state of Connecticut become more dependent on the internet and mobile communications, the impact of hurricanes on commerce will continue to increase. A major hurricane has the potential of causing complete disruption of power and communications for up to several weeks, rendering electronic devices and those that rely on utility towers and lines inoperative.

Debris such as signs, roofing material, and small items left outside become flying missiles in hurricanes. Extensive damage to trees, towers, aboveground and underground utility lines (from uprooted trees or failed infrastructure), and fallen poles cause considerable disruption for residents. Streets may be flooded or blocked by fallen branches, poles, or trees, preventing egress. Downed power lines from heavy winds can also start fires during hurricanes with limited rainfall.

The town of Kent is vulnerable to hurricane damage from wind and flooding and from any tornadoes accompanying the storm. Factors that influence vulnerability to tropical cyclones in the town include building codes currently in place, local zoning and development patterns, and the age and number of structures located in highly vulnerable areas of the community.

Wind damage from hurricanes and tropical storms has the ability to affect all areas of Kent while areas susceptible to flooding are even more vulnerable. Some critical facilities are more susceptible than others to flooding damage associated with hurricane rainfall. The Town is uncertain whether any Town-owned critical facilities have wind-mitigation measures installed to specifically reduce the effects of wind. Thus, it is believed that nearly all of the critical facilities in the town are as likely to be damaged by hurricane-force winds as any other.

Kent's housing stock consists of historic buildings greater than 50 and sometimes 100 years old, relatively younger buildings built before 1990 when the building code changed to address wind damage, and relatively recent buildings that utilize the new code changes. Since most of the existing housing stock in the town predates the recent code changes, many structures are highly susceptible to roof and window damage from high winds. Homes located within SFHAs are also at risk from flooding as a result of the heavy rainfall that typically occurs during tropical storms and hurricanes.

Under limited emergency conditions, a high percentage of evacuees are expected to seek shelter with friends or relatives rather than go to established shelters. During extended power outages, it is believed that only 10% to 20% of the affected population of the town will relocate while most will stay in their homes until power is restored. In the case of a major (Category Three or above) hurricane, it is likely that the Town will depend on state and federal aid to assist sheltering displaced populations until normalcy is restored.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Kent as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

Municipal responsibilities relative to summer storm and tornado mitigation and preparedness include:

- Developing and disseminating emergency public information and instructions concerning tornado, thunderstorm wind, lightning, and hail safety, especially guidance regarding in-home protection and evacuation procedures and locations of public shelters
- Designating appropriate shelter space in the community that could potentially withstand lightning and tornado impact
- Periodically testing and exercising tornado response plans
- Putting emergency personnel on standby at tornado "watch" stage
- Utilizing the CT Alert notification system to send warnings into potentially affected areas.

Although tornadoes pose a threat to all areas of the state, their occurrence is not considered frequent enough to justify the construction of tornado shelters. Instead, the state has provided NOAA weather radios to all public schools as well as many local governments for use in public buildings. The general public continues to rely on mass media for knowledge of weather warnings. Warning time for tornadoes is very short due to the nature of these types of events, so predisaster response time can be limited. However, the NOAA weather radios provide immediate notification of all types of weather warnings in addition to tornadoes, making them very popular with communities.

5.1.1 New Capabilities and Completed Actions

Kent continues to improve its emergency response and communication capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

5.1.2 Summary

Kent mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

Thunderstorms occur annually, and occasionally knock power out for some parts of Town for a few days. Outages are caused by downed trees and limbs landing on power lines, and it takes the power company time to respond. The Town did not experience much damage from the 2018 tornadoes/macrobursts.

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Kent has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

The central and southern portions of the United States are at higher risk for lightning and thunderstorms than is the northeast. However, FEMA reports that more deaths from lightning occur on the East Coast than elsewhere. Lightning-related fatalities have declined in recent years due to increased education and awareness.

Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Kent area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Kent is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the Town of Kent is believed to be low for any given year. All areas of the Town are susceptible to damage from high winds although more building damage is expected in the town center while more tree damage is expected in the less densely populated areas.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Eversource trims trees along powers lines. Complex situations would be contracted out.

Town personnel note that strong thunderstorms will cause power lines to fall all over the town. Most downed power lines in Kent are detected quickly, and any associated fires are quickly extinguished. Such fires can be extremely dangerous during the summer months during dry and drought conditions. It is important to have adequate water supply for fire protection to ensure the necessary level of safety is maintained.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

The Town of Kent reports that the typical cost for the town to respond to downed branches and wires from a localized severe thunderstorm is $500 (equipment and labor).

On April 22, 2021, an EF-0 tornado with winds as high as 85 mph struck Kent, touching down in Bulls Bridge and moving east into south Kent. The storm took down many tree limbs and some trees, with power knocked out to numerous customers and damage reported along the Route 7 corridor.

Summary – The entire town of Kent is at relatively equal risk for experiencing damage from summer storms and tornadoes. However, more frequent storm damages are relatively site specific and occur to private property (and therefore are paid for by private insurance). For municipal property, the Town budget for tree removal and minor repairs is generally adequate to handle summer storm damage.

6 WINTER STORMS

6.1 Existing Capabilities

Programs that are specific to winter storms are generally those related to preparing plows and sand and salt trucks, tree trimming to protect power lines, and other associated snow removal and response preparations.

For municipal property, the Town budget for tree removal and minor repairs is generally adequate to handle winter storm damage although the plowing budget is often depleted. In particular, the heavy snowfalls associated with the winter of 2010-2011 drained the Town's plowing budget and raised a high level of awareness of the danger that heavy snow poses to roofs.

CTDOT plows all State roads and Interstates. The Town primarily uses Town staff for plowing operations on the remaining roadways. The Town has six trucks for plowing and priority is given to plowing egresses to critical facilities.

Prior to a winter weather event, the Town ensures that all warning/notification and communications systems are ready and ensures that appropriate equipment and supplies, especially snow removal equipment, are in place and in good working order. In some known problem areas, prestorm treatment is applied to roadways to reduce the accumulation of snow. The town uses sand and salt for deicing. The Town also prepares for the possible evacuation and sheltering of some populations that could be impacted by the upcoming storm (especially the elderly and special needs persons).

6.1.1 New Capabilities and Completed Actions

Kent continues to maintain its strong winter storm mitigation capabilities.

6.1.2 Summary

Kent mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events and snow events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Kent staff note that snow events that occur in the late spring or early fall are the most damaging. Wet snow is heavy and sticks to things, and can take out trees and power.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

After a storm, snow piled on the sides of roadways can inhibit sight lines and reflect a blinding amount of sunlight. When coupled with slippery road conditions, poor sightlines and heavy glare create dangerous driving conditions. Stranded motorists, especially senior and/or handicapped citizens, are at particularly high risk of injury or death from exposure during a blizzard. The elderly population in Kent, in particular, is susceptible to the impacts created by winter storms due to resource needs (heat, electricity loss, safe access to food, etc.).

The structures and utilities in the town of Kent are vulnerable to a variety of winter storm damage. Tree limbs and some building structures may not be suited to withstand high wind and snow loads. Ice can damage or collapse power lines, render steep gradients impassable for motorists, undermine foundations, and cause "flood" damage from freezing water pipes in basements.

Drifting snow can occur after large storms, but the effects in most areas are generally mitigated through municipal plowing efforts. However, the Town has indicated that snow drift is a problem on Skiff Mountain, especially near the Marvelwood School and Skiff Mountain Road. The school loses power frequently because the snow line comes up along North Kent Road, which is unpaved and difficult to access.

Icing causes difficult driving conditions throughout the hillier sections of the town. The Town's standard of presalting has been helpful in controlling ice in these problem areas.

No critical facilities are believed to be more susceptible to winter storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to winter storms.

Summary – The entire town of Kent is at relatively equal risk for experiencing damage from winter storms although some areas (such as icing trouble spots and neighborhoods with a high concentration of flat roofs) are more susceptible. Based on the historic record, it is likely that some winter storm events have costly consequences for the town. Nevertheless, many damages are relatively site specific and occur to private property (and therefore are paid for by private insurance) while repairs for power outages are often widespread and difficult to quantify to any one municipality.

7 EARTHQUAKES

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the town of Kent. The Town has adopted these codes for new construction, and they are enforced by the Building Official. Due to the infrequent nature of damaging earthquakes, land use policies in the Town do not directly address earthquake hazards. However, various documents do indirectly discuss areas susceptible to earthquake damage and regulations that help to minimize potential earthquake damage:

- ***Subdivision Regulations***. The 1995 regulations do not explicitly address the issue of construction on steep slopes. The regulations do require that soil erosion and sediment control plans be developed for proposed projects.

- ***Zoning Regulations***. Section 13(A) (4.3) of the 2013 regulations requires the applicant to minimize the use, disturbance and grading of steep slopes, as well as potential erosion and sedimentation.

7.2 Vulnerabilities and Risk Assessment

Surficial earth materials behave differently in response to seismic activity. Unconsolidated materials such as sand and artificial fill can amplify the shaking associated with an earthquake. In addition, artificial fill material has the potential for liquefaction. When liquefaction occurs, the strength of the soil decreases, and the ability of soil to support building foundations and bridges is reduced. Increased shaking and liquefaction can cause greater damage to buildings and structures and a greater loss of life.

Some areas in the town of Kent are underlain by sand and gravel. Structures in these areas are at increased risk from earthquakes due to amplification of seismic energy and/or collapse. The best mitigation for future development in areas of sandy material may be application of the most stringent building codes or possibly the prohibition of new construction. However, many of these areas occur in floodplains associated with the various streams and rivers in Kent, so they are already regulated. The areas that are not at increased risk during an earthquake due to unstable soils are the areas underlain by glacial till, which includes most of the town.

Areas of steep slopes can collapse during an earthquake, creating landslides. Seismic activity can also break utility lines such as water mains, electric and telephone lines, and stormwater management systems. Damage to utility lines can lead to fires, especially in electric and gas mains. Dam failure can also pose a significant threat to developed areas during an earthquake.

According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut is at a low to moderate risk for experiencing an earthquake of a magnitude greater than 3.5 and at a moderate risk of experiencing an earthquake of a magnitude less than 3.0 in the future. No earthquake with a magnitude greater than 3.5 has occurred in Connecticut within the last 30

years, and the USGS currently ranks Connecticut 43rd out of the 50 states for overall earthquake activity.

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the town of Kent. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Kent

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

Based on the historic record and the probability maps generated from the USGS database, the state of Connecticut possesses areas of seismic activity. It is likely that Connecticut will continue to experience minor earthquakes (magnitude less than 3.0) in the future. While the risk of an earthquake affecting Kent is relatively low over the short term, long-term probabilities suggest that a damaging earthquake (magnitude greater than 5.0) could occur within the vicinity of Kent.

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is charged with the responsibility for administration and enforcement of Connecticut's dam safety laws. The existing statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard to life, health, or property.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

The dam safety requirements are codified in Sections 22a-401 through 22a-411 inclusive of the Connecticut General Statutes. Sections 22a-409-1 and 22a-409-2 of the Regulations of Connecticut State Agencies have been enacted and set requirements for the registration, classification, and inspection of dams. Dams must be inventoried by the owner with the Connecticut DEEP according to Connecticut Public Act 83-38.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an EAP after the Commissioner of DEEP adopts regulations. The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. New regulations shall establish the requirements for such EAPs, including but not limited to (1) criteria and standards for inundation studies and inundation zone mapping; (2) procedures for monitoring the dam or structure during periods of heavy rainfall and runoff, including personnel assignments and features of the dam to be inspected at given intervals during such periods; and (3) a formal notification system to alert appropriate local officials who are responsible for the warning and evacuation of residents in the inundation zone in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board program, which can provide noncompetitive state funding for repair of municipality-owned dams. Funding is limited by the State Bond Commission. State statute Section 25-84 allows municipalities to form Flood and Erosion Control Boards, but municipalities must take action to create the board within the context of the local government such as by revising the municipal charter. The Town's Planning and Zoning Commission is responsible for reviewing all development activities that occur within flood hazard or flood-prone areas.

8.1.1 Actions Completed and New Capabilities

Kent continues to maintain its capabilities for mitigating and responding to dam failure risks. The Town installs beaver deterrent devices in select locations, such as Land Trust properties, as appropriate.

8.1.2 Summary

The Town mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 29 DEEP-inventoried dams within the Town of Kent. These dams are listed in Table 8-1 and shown in Figure 8-1. Note that the Thompson Dam, though listed, has been identified as a natural or dug pond without a dam structure.

Table 8-1: DEEP-Inventoried Dams in Canaan

Number	Name	Class
6801	Hilltop Pond Dam	BB
6802	Hatch Pond Dam	BB
6803	Wyantenock Wildlife Marsh #3 Dam	BB
6804	Julius Waller Dam	AA
6805	Beaman Pond Dam	A
6806	Fuller Pond Dam	A
6807	Wolzles Pond Dam	A
6808	Zebro Dam	A
6809	Case Pond Dam	A
6810	Kent Pond Dam	A
6811	Blatz Pond Dam	BB
6812	Richard Pond Dam	A
6813	Segar Dam	BREACHED
6814	Mill Pond Dam	A
6815	Irving Pond Dam	BB
6816	Bulls Bridge Dam	BB
6817	Bulls Bridge Spooner Dam	BB
6818	Mountain Club Pond Dam	AA
6819	Camp Pond Dam	A
6822	FRIEDMAN POND / JORDAN POND DAM (formerly KINNEY POND DAM)	BB
6823	Gear Mountain Pond Dam	A
6828	Taylor Pond Dam	A
6830	Beaver Pond Dam	A
6831	Beebe Pond Dam	A

Number	Name	Class
6833	Combs Pond Dam	A
6834	Aiken Pond Dam	A
6835	Gate House Pond Dam	AA
6836	Lawrence Pond Dam	AA
6837	Fuller Mt Pond Dam	A
6839	Davis Pond Dam	A
6840	Bilby Pond Dam	AA
6841	Wyantenock Wildlife Marsh #4 Dam	BB

Although Class B and C dams are not located within Kent, the Housatonic River flows through Kent and the inundation area of the upstream Great Falls Dam in Canaan extends far enough downstream to affect Kent.

Great Falls Dam

The Great Falls Dam is a run-of-river dam located on the Housatonic River. It is owned by First Light Power Resources and used to impound a reservoir for hydroelectric generation at the Falls Village Hydrostation. The Housatonic River forms the boundary between Canaan and Salisbury at this location. The dam impounds a reservoir with a surface area of 150 acres, and a storage volume of 1,135 acre-feet from a contributing watershed of 634 square miles.

The concrete dam was constructed in 1913 and consists of a concrete ogee spillway that is 14 feet in height and 300 feet in length. The pumped-storage generation utilizes underground components connecting the upper and lower reservoirs. These components include a powerhouse, water tunnel, shafts, and access tunnel. In March 1987, CL&P constructed a fourth hydroelectric generating unit at the dam.

The dam was designed to pass all flows except the PMF (113,000 cfs), and a Phase II report notes that failure would not cause significant incremental downstream damage. The structure was not designed to have any freeboard during the design flood event.

There was in incident on May 24, 1989 that resulted in 386 feet of canal being washed out and undermined, and a 400-foot section was unstable under railroad loading conditions. Earth backfill on the river side of canal washed out, consisting of 30% of the area between the failure and the bend upstream in the canal.

In accordance with the EAP on file, test messages are sent to downstream residents regarding failure and flooding on the Housatonic River during emergency drills. The inundation map developed with the dam breach analysis indicates that the extent of impact includes the Warren Turnpike, high school athletic fields, Route 7, Route 112, the Lime Rock Race Track (adjacent to Salmon Creek), and a covered bridge. The mapping notes that an incremental rise in water surface elevations of 2.04 feet extends 15.3 miles downstream of the dam (into Kent).

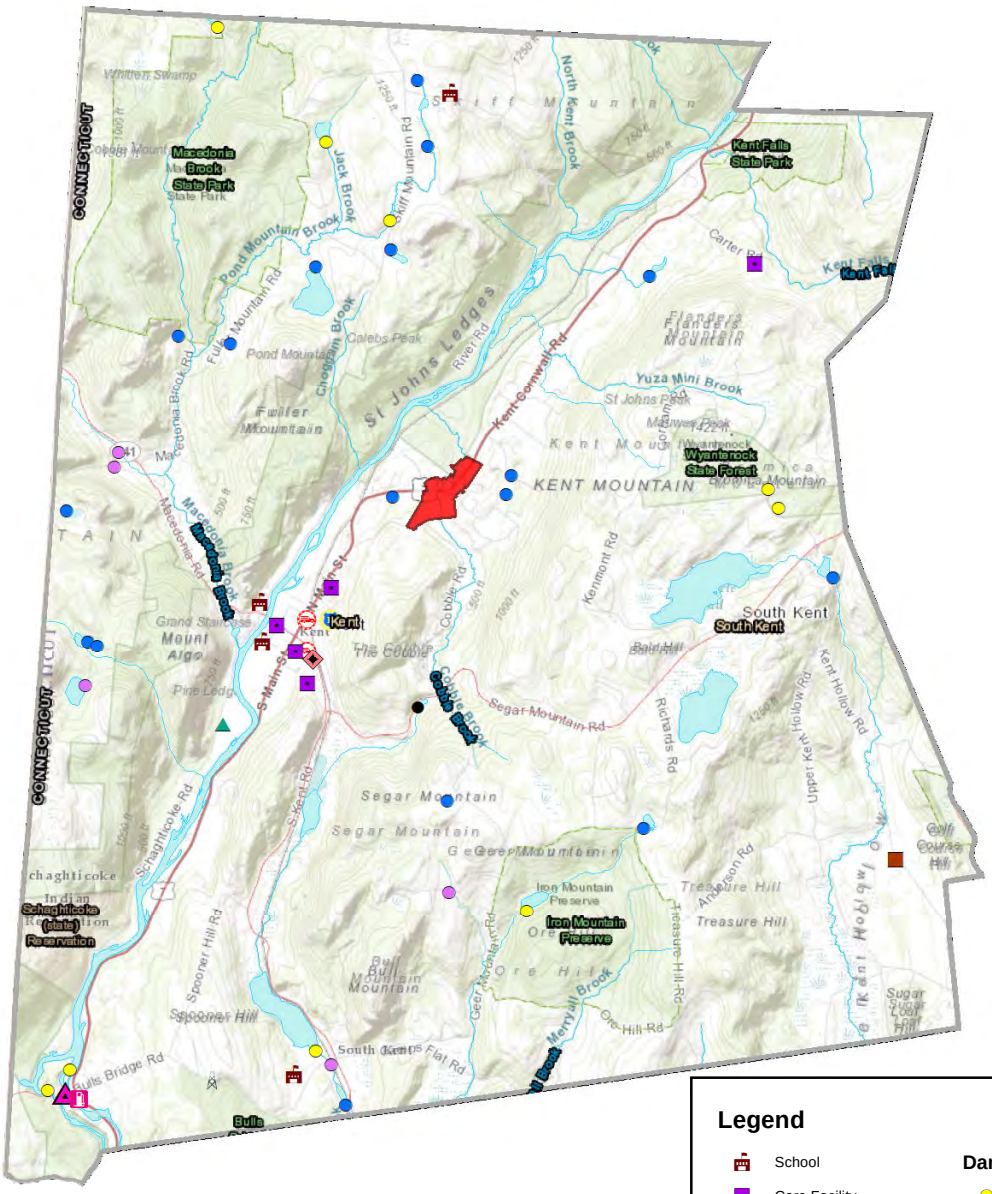
Other Registered Dams

Hilltop Pond Dam is a relatively new, Class BB dam located at the southern end of Hilltop Pond, a recreational reservoir. The dam is privately owned and discharges to Macedonia Brook. The pond is located approximately 400 feet north of Macedonia Brook State Park, and as such, failure of the structure poses little hazard to downstream development.

Beaver Dams

Town officials did indicate that nuisance flooding has occurred as a result of beaver dams. This is a typical concern in many Connecticut communities.

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Legend

- School
- Care Facility
- Communication Tower
- EMS
- Emergency Response
- Fire Station
- Gas Station with Generator
- Law Enforcement
- Public Utility
- National Register Building
- National Register Structure
- National Register District

Dam Hazard Class

- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - KENT ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,500 7,000
Feet

SCALE 1 " = 7,455 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 8-1

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Kent is compliant with this new program and has a designated Burning Official.

Regulations regarding fire protection are outlined in the *Zoning Regulations*:

- ***Zoning Regulations, Section 4.15.1(c)*** upon review of a special permit application, fire ponds may be required when deemed necessary by the Commission or fire department. The location of the pond shall be approved by the commission and based on the following criteria (1) closest location in relation to proposed development (2) on poorly or very poorly drained soil areas within approximately 175 feet of paved road (3) the site shall be such that the pond can provide a minimum of 60,000 gallons available storage with an adequate and reliable recharge (4) the location design and construction of a fire pond shall be completed in reference to Fire Hydrant (non-pressure) Detail and Design Sheet (USDA Conservation Service) and accomplished with the advisory assistance of the USDA Soil Conservation Service and the Litchfield County Conservation 25 District and the Town Fire Department and subject to approval of the Conservation-Inland Wetlands Commission.

The Aquarian public water system in downtown Kent offers fire protection, whereas dry hydrants and fire ponds are used in the outlying parts of Kent. The Town also has mutual aid agreements with surrounding towns for supplemental firefighting support.

The Kent Fire Department goes to the fires whenever possible. This proactive approach is believed to be effective for controlling wildfires. The Fire Department has some water storage capability in its tanker trucks and storage tanks but primarily relies on the use of the municipal water system to fight fires throughout the town whenever possible.

Other capabilities for reducing wildfire risk include:

- ❑ Encouraging property owners to widen access roads such that fire trucks and other emergency vehicles can access remote locations.
- ❑ Continuing intermunicipal cooperation in firefighting efforts.
- ❑ Providing outreach programs on how to properly manage burning and campfires on private property.
- ❑ Patrolling Town-owned and State-owned open space and parks to prevent unauthorized campfires.
- ❑ Enforcing regulations and permits for open burning.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

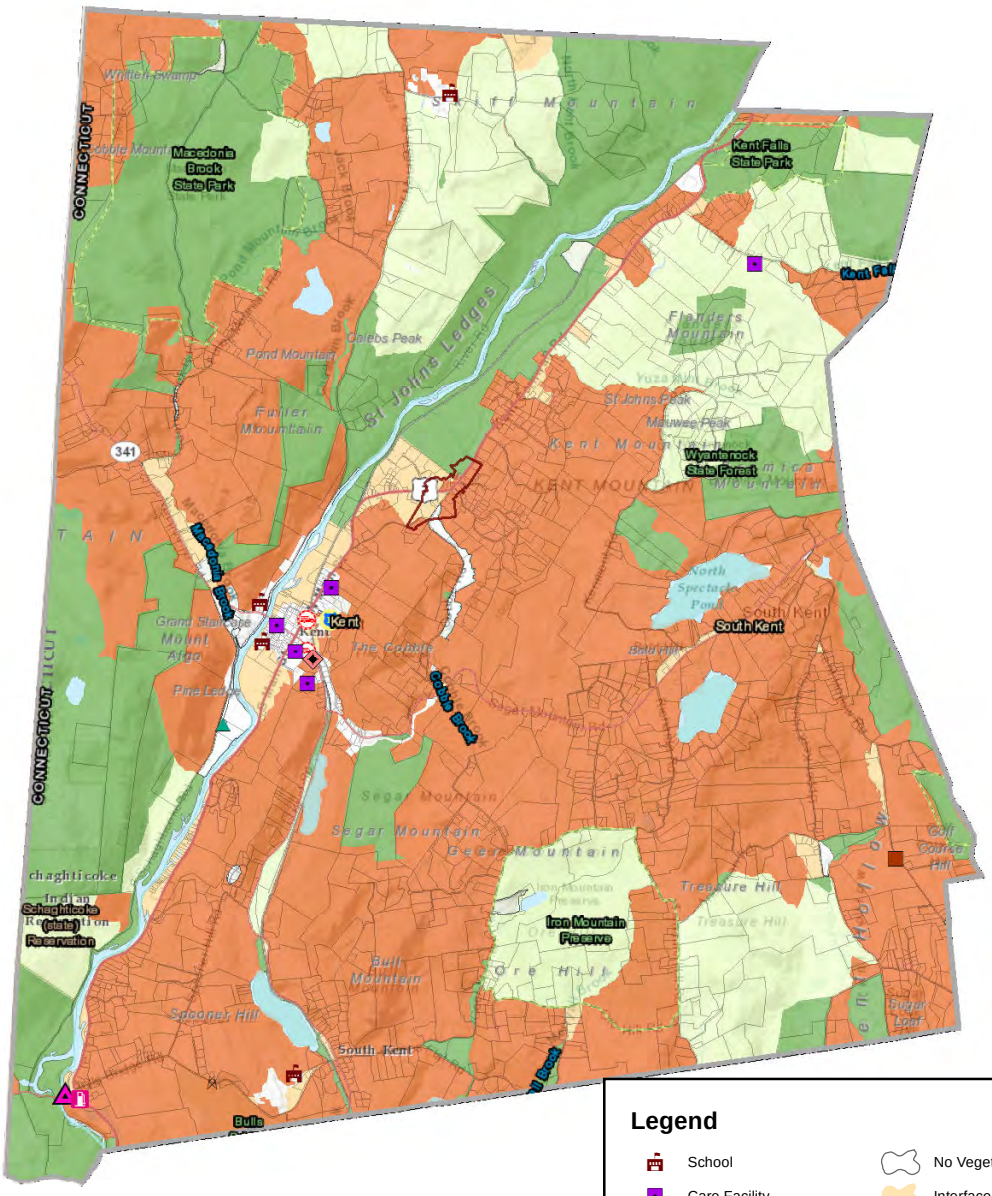
Town staff report that significant wildfire events occur every few years. Fires are typically started by lightning or accidentally by Appalachian Trail hikers. Wildfire risk areas also have very difficult terrain, hindering response.

Kent experienced a significant brush fire on Schaghticoke Mountain in the southwestern corner of town in May 2017. The fire occurred in an area with a large rattlesnake population, leading to complications in the firefighting effort. A larger wildfire event occurred in Town in March of 2011. The Town lost a fire truck to that event.

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Legend

- School
- Care Facility
- Communication Tower
- EMS
- Emergency Response
- Fire Station
- Gas Station with Generator
- Law Enforcement
- Public Utility
- National Register Building
- National Register Structure
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - KENT ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,500 7,000
Feet

SCALE 1 " = 7,457 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

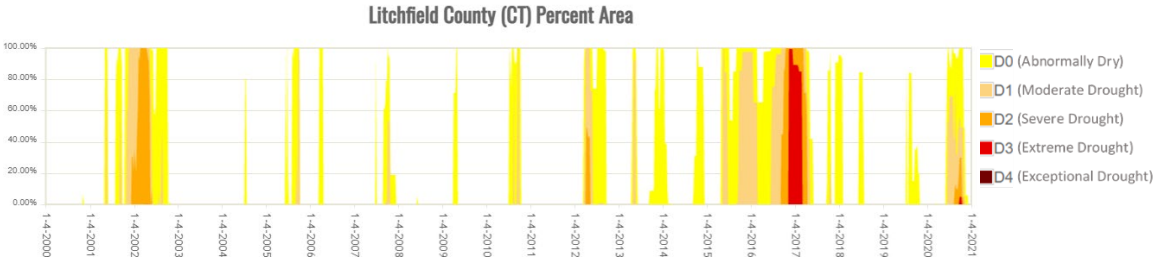


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Action	Status	Notes
1	Utilize the existing CTAlert emergency notification system to its fullest capabilities and subscribe as many residents as possible.	Complete / Carry Forward with Revision	Town has instituted the Everbridge alert system. The Town has just begun a process to rebuild the database. A revised action to complete the database rebuilding is carried forward.
2	Encourage residents to purchase and use NOAA weather radio with an alarm feature	Drop	Town does not believe this action is necessary given the many other technologies for weather alerts.
3	Pursue standby power supplies for critical facilities that do not have generators.	Completed	Most critical facilities have generators. The Community House is in need of a generator; this is addressed in the next action.
4	Obtain funding for a generator at the Community House.	Carry Forward	The Town explored grant opportunities, but was not able to find grants for a generator that would be big enough for the entire building. This building also has accessibility issues, and so is not ideal as a primary shelter. Nevertheless, the Town is interested in expanding its sheltering capabilities, including heating and cooling centers, and so wishes to continue pursuing installation of a generator at this site. The Town will pursue generator installation options, including a generator that may only power a section of the building. In addition to installing a generator, the Town will have to consider personnel needs for managing the shelter. This may involve increasing the capabilities of the local CERT. This action is carried forward. A new action to increase the capabilities of the local CERT team to enable staffing of a secondary shelter is added to this plan.
5	Update the Town's Floodplain Management Regulations to reflect the recent recommendations from CT DEEP	Carry Forward	This action has not yet been pursued due to staffing limitations. Floodplain Management Regulations haven't been updated since 2001

#	Action	Status	Notes
6	Consider incorporating elements of Low Impact Development into the Subdivision and Zoning Regulations.	Partially Completed Carry Forward with Revisions	Zoning Regulations were updated in 2020 and includes LID elements. Subdivision Regulations update is underway. Action is carried forward, revised to refer only to Subdivision Regulations.
7	Consider prohibiting new residential construction in SFHAs, or require freeboard of at least one foot.	Capability	All new construction must adhere to the State Building Code, which requires one foot of freeboard.
8	Encourage FEMA to update the Flood Insurance Study and SFHA mapping to reflect revised hydrology.	Carry Forward	Town staff attended a meeting in the past five years where they were told that the flood maps would be updated by 2020. Town does not expect this schedule to be kept. FEMA has not communicated with anybody from the Town about map updates. The current FEMA maps are dated 1980. Town staff report that this area of the state has the most out-of-date mapping. They observed that coastal areas have seen multiple updates over recent years, but despite multiple significant flood events in inland areas, no update has occurred. Town would like FEMA to prioritize this corner of the state
9	Require developers to demonstrate whether detention or retention of storm water is the best option for reducing peak flows downstream	Capability	This is a capability.
10	Evaluate the critical facilities along the Housatonic River to determine potential flood damage reduction methods.	Carry Forward	This action has not yet been completed due to funding and staffing limitations. Action is carried forward. Two new actions addressing specific facilities are added to this plan: - Complete an analysis of flood mitigation options at the Sewer Treatment Plant. This facility was at risk of failure during the 2018 ice jams event. - Work with the Kent School to address floodwater and groundwater issues. Currently the school regularly has to pump out water into the Town sewer system, which stresses the system. Explore options for circumventing the system for this pumping.
11	Evaluate RLPs mapped in the 100-year floodplain to identify appropriate methods of reducing flood risks.	Carry Forward with Revisions	Town reports that RLPs are repetitively flooded, but do not experience economic losses or notable damages during flooding; residents temporarily evacuate and then move back. This makes incentivizing mitigation challenging. Despite this, Town staff report that one homeowner has elevated utilities above flood grade. Town does not feel that identifying flood reduction methods is an appropriate action for these properties. A new RLP action, encouraging sending letters to RLP property owners to raise awareness of hazard and mitigation options, will be added to the plan.

#	Action	Status	Notes
12	Determine the address of the unidentified repetitive loss property.	Completed	This property is a residence located at the end of Johnson Road. The actual address and owner's name are known to the Land Use Office. A new action is added to the plan to validate/correct the RL list for the town and fill out the AW-501 forms.
13	Evaluate the side street flooding concerns along Kent Hollow Road and the West Aspetuck River to identify appropriate methods of reducing flood risks.	Completed	Town reports that flooding in this area is caused by beaver activities. Flooding can happen during storms because beavers keep water high. Flooding is usually relatively minor, only temporarily causing road closures. Town traps and removes beavers on occasion. During flooding, the Town closes roads and temporarily reroutes traffic. Town does not believe this intermittent flooding warrants major capital expenditure.
14	Provide technical assistance regarding floodproofing measures to interested residents.	Capability	Town is able to assist residents as needed. No residents have requested information.
15	Conduct a comprehensive evaluation of flood prone areas along Route 7 at the Housatonic River to determine appropriate flood mitigation measures.	Carry Forward	Action has not yet been pursued due to funding limitations.
16	Compile a checklist cross referencing ordinances and regulations and make this available to development applicants	Completed	Town has a regulations checklist that is provided to developers along with permit applications. A Floodplain Application is available on the Town's website.
17	Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	Carry Forward	Land Use Administrator completed a flood-related training when she started her job. Town would like to have land use and road crew staff complete flood mitigation training.
18	Provide outreach regarding home elevation, relocation, flood barriers, dry and wet floodproofing, and other home and business improvement techniques	Carry Forward with Revisions	Town has not yet pursued this action due to staff limitations. Carry forward revised to specifically call for providing informational pamphlets at the Town Hall, and including hazard mitigation information on the Town website.
19	Selectively pursue conservation recommendations listed in the Plan of Conservation and Development	Capability	This is a capability
20	Pursue acquisition of additional municipal open space in SHFAs and set it aside for greenways, parks, etc.	Drop	Town has a high percentage of open space land in town, and active land conservation organizations. Development within the floodplain is already limited. Town does not believe acquisition of open space by the Town is necessary.
21	Replace two culverts along Tanguay Road and the Aspetuck River	Carry Forward	Action has not yet been pursued due to funding limitations and the low priority of this action with regards to hazard mitigation. Action is carried forward.

#	Action	Status	Notes
22	Replace the bridge at Straight Road/Kent Hollow Road and the Aspetuck River	Completed	Kent Hollow Road Bridge was replaced with a box culvert in 2017. The new culvert was rated for a 100-year storm. This is a low velocity section of the Aspetuck River and the culvert design was determined to be sufficient.
23	Develop a plan for continued culvert maintenance.	Capability	Town has a culvert maintenance regime in place.
24	When replacing or upgrading culverts, work with CT DOT to incorporate findings of the climate change pilot study and work with HVA to incorporate stream crossing policies	Carry Forward	Action has not yet been completed due to funding and staffing limitations. Action is carried forward
25	Ensure adequate barricades are available to block flooded areas in flood prone areas of the town.	Capability	Town has adequate barricades.
26	Work with CTDOT to upgrade sections of South Kent Road in order to accommodate increased traffic when Route 7 is closed due to flooding.	Capability	Town communicates with CTDOT about alternative access needs in case Route 7 is closed, and performs upgrades to South Kent Road as needed.
27	Develop a town wide tree limb inspection and maintenance programs to ensure that the potential for downed power lines is diminished.	Capability	Town has a tree maintenance program.
28	Work with CL&P to determine the feasibility of placing non-conducting steel cables above the power lines to protect them from falling branches and trees.	Completed	Eversource has increased efforts to improve power delivery reliability.
29	Continue to require the location of utilities underground in new developments or during redevelopment whenever possible.	Capability	Underground utilities are required, when feasible, in new developments.
30	The Building Department shall provide literature regarding appropriate design standards for wind.	Capability	Wind standards are provided through State Building Code
31	Encourage the use of structural techniques related to mitigation of wind damage in new residential and commercial structures	Capability	Wind standards are provided through State Building Code

#	Action	Status	Notes
32	Coordinate with the three private schools in town during expansion and renovation to ensure that buildings are designed to be resilient to wind damage.	Capability	State building codes are enforced for municipal buildings.
33	Develop a plan to prioritize snow removal from the roof of municipal buildings (especially critical facilities) and have funding available for clearing	Capability	Town has sufficient capabilities for clearing snow from municipal building roofs.
34	Consider posting the snow plowing routes in municipal buildings and the town web site	Drop	Town does not believe this action will improve hazard mitigation capabilities
35	Identify areas that are difficult to access during winter storm events and develop contingency plans	Capability	Town is aware of difficult-to access areas and takes special precautions to maintain access during emergency events.
36	Provide information for mitigating icing, insulating pipes, and retrofits for flat roofed buildings	Capability	Mitigation guidelines provided in State Building Code.
37	Consider the hardening of utilities along North Kent Road to minimize power outages during storm events	Capability	Town works closely with Eversource to ensure appropriate power hardening and redundancy measures are taken.
38	Consider preventing residential development in areas prone to collapse such as below steep slopes, or in areas prone to liquefaction	Completed	Steep slopes have been addressed in the updated zoning regulations.
39	Ensure that municipal departments and critical facilities have adequate backup facilities in case damage occurs	Carry Forward with Revisions	Previous action is vague. Carried forward to call for enabling remote-access to essential operational systems in case municipal facilities cannot be accessed.
40	Consider bracing systems and assets inside critical facilities	Carry Forward with Revisions	Replace action with one calling for backing-up of data and systems on the cloud (merge with new action above)
41	Include dam failure areas in the CTAlert emergency contact database	Capability	Dam failure areas are included in CTAlert system
42	Develop a long term beaver dam management plan.	Capability	Beaver management requires an Inland Wetlands Permit. In most cases the IWC recommends the hiring of Beaver Solutions. Removal of the beaver itself requires a DEEP permit through a licensed trapper.
43	Consider replacing culverts frequently impacted by beavers with free span bridges.	Drop	Town feels its beaver management activities are sufficient. Specific culvert and bridge replacement projects will be identified as actions moving forward.

#	Action	Status	Notes
44	Consider the use of beaver deterrent devices such as beaver stops, beaver bafflers or beaver deceivers.	Capability	See action 42
45	Require installation of fire ponds and dry hydrants in areas not served by public water, and sprinkler systems in buildings where access is limited	Capability	This is a capability
46	Coordinate between the Fire Department and Aquarion Water Company to identify areas of low pressure or limited fire fighting capacity	Carry Forward	Action not yet completed due to staffing limitations. Carry forward.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. Some of the new actions discussed include:

- During the 2018 ice jam there was a concern about not having flat-bottomed boats. The Town has therefore secured a grant for the Fire Department to purchase a new flat-bottomed boat.
- The Town has updated its Zoning Regulations, and is beginning the process of updating its Subdivision Regulations
- Town staff report that the Red Cross is exploring developing a regional shelter that would serve Kent residents.
- Town will replacing the bridge at Anderson Acres Road and Kent Hollow Road over the West Aspetuck River with an aluminum bridge.

Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action KNT-01	
Update the Town's Subdivision Regulations, explicitly incorporating natural hazard concerns.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022
Priority	High

Action KNT-02	
Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	
Lead	Planning; EMD
Cost	$0 - $25,000
Funding	OB, CT DEMHS
Timeframe	2022
Priority	High

Action KNT-03	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action KNT-04	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the Subdivision Regulations.	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action KNT-05	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action KNT-06	
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, Sustainable CT
Timeframe	2022 – 2024
Priority	High

Action KNT-07	
Contact the owners of Repetitive Loss Properties and nearby properties at risk to raise awareness about hazards, inquire about mitigation undertaken, and suggest options for mitigating flooding in those areas. This should be accomplished by annually sending letters to RLP property owners and owners of nearby properties at risk.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Med

Action KNT-08	
Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Med

Action KNT-09	
Establish a protocol for backing up municipal data and IT systems on the cloud. Enable remote-access to essential operational systems in case municipal facilities cannot be accessed following hazard event.	
Lead	EMD, IT
Cost	$25,000 - $50,000
Funding	OB
Timeframe	2022 – 2024
Priority	Med

Action KNT-10	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action KNT-11	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action KNT-12	
Provide at the Town Hall informational pamphlets about property elevation, relocation, and other risk reduction measures, and include hazard mitigation information on the Town website.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action KNT-13	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action KNT-14	
When replacing or upgrading culverts, review culvert conveyances based on Northeast Regional Climate Center Guidance, in accordance with the findings of the CT DOT climate change pilot study. Additionally, work with HVA to incorporate findings of the stream crossing assessment training.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEEP
Timeframe	2023 – 2025
Priority	High

Action KNT-15	
Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action KNT-16	
Evaluate the critical facilities along the Housatonic River to determine potential flood damage reduction methods.	
Lead	DPW; EMD
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action KNT-17	
Conduct a comprehensive evaluation of flood prone areas along Route 7 at the Housatonic River to determine appropriate flood mitigation measures.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action KNT-18	
Coordinate between the Fire Department and Aquarion Water Company to identify areas of low pressure or limited fire fighting capacity	
Lead	EMD, Fire
Cost	$50,000 - $100,000
Funding	OB, FEMA Assistance to Firefighters Grant
Timeframe	2023 – 2025
Priority	Med

Action KNT-19	
Complete rebuild of the Everbridge Alert system contact database.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action KNT-20	
Obtain funding for a generator at the Community House to help increase the Town's capacity to provide emergency sheltering or comfort stations.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action KNT-21	
Replace two culverts along Tanguay Road and the Aspetuck River	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action KNT-22	
Replace the bridge at Anderson Acres Road and Kent Hollow Road over the West Aspetuck River with an aluminum bridge.	
Lead	DPW
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action KNT-23	
Work with the Red Cross on development of a regional shelter that would serve Kent residents.	
Lead	EMD
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Low

Action KNT-24	
During the 2018 ice jam there was a concern about not having flat-bottomed boats. The Town has therefore secured a grant for the Fire Department to purchase a new flat-bottomed boat.	
Lead	EMD; Fire
Cost	$100,000 - $500,000
Funding	OB, CIP, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

APPENDIX A

STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
KNT-01	Update the Town's Subdivision Regulations, explicitly incorporating natural hazard concerns.	HMP in Planning Docs	Planning	$0 - $25,000	OB	2022	1	1	1	1	1	1	1	0	0	0	0	0	0	0	9
KNT-02	Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	Municipal Training	Planning; EMD	$0 - $25,000	OB, CT DEMHS	2022	1	1	1	1	1	1	0	0	0	0	0	0	0	0	8
KNT-03	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
KNT-04	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the Subdivision Regulations.	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
KNT-05	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
KNT-06	Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	Sustainable CT	Planning	$25,000 - $50,000	OB, Sustainable CT	2022 – 2024	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
KNT-07	Contact the owners of Repetitive Loss Properties and nearby properties at risk to raise awareness about hazards, inquire about mitigation undertaken, and suggest options for mitigating flooding in those areas. This should be accomplished by annually sending letters to RLP property owners and owners of nearby properties at risk.	RLP	Planning	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
KNT-08	Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	RLP	Planning	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
KNT-09	Establish a protocol for backing up municipal data and IT systems on the cloud. Enable remote-access to essential operational systems in case municipal facilities cannot be accessed following hazard event.	Data & IT Protection	EMD, IT	$25,000 - $50,000	OB	2022 – 2024	1	1	1	0	0	1	0	0	0	0	0	-1	0	0	5
KNT-10	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
KNT-11	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
KNT-12	Provide at the Town Hall informational pamphlets about property elevation, relocation, and other risk reduction measures, and include hazard mitigation information on the Town website.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
KNT-13	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
KNT-14	When replacing or upgrading culverts, review culvert conveyances based on Northeast Regional Climate Center Guidance, in accordance with the findings of the CT DOT climate change pilot study. Additionally, work with HVA to incorporate findings of the stream crossing assessment training.	NRCC Guidance	DPW	$50,000 - $100,000	OB, CIP, CT DEEP	2023 – 2025	0	1	1	0	0	1	1	0	0	0	0	0	0	0	6
KNT-15	Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
KNT-16	Evaluate the critical facilities along the Housatonic River to determine potential flood damage reduction methods.	Study	DPW; EMD	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
KNT-17	Conduct a comprehensive evaluation of flood prone areas along Route 7 at the Housatonic River to determine appropriate flood mitigation measures.	Study	DPW	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
KNT-18	Coordinate between the Fire Department and Aquarion Water Company to identify areas of low pressure or limited fire fighting capacity	Wildfire Risk Reduction	EMD, Fire	$50,000 - $100,000	OB, FEMA Assistance to Firefighters Grant	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	0	0	6
KNT-19	Complete rebuild of the Everbridge Alert system contact database.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
KNT-20	Obtain funding for a generator at the Community House to help increase the Town's capacity to provide emergency sheltering or comfort stations.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
KNT-21	Replace two culverts along Tanguay Road and the Aspetuck River	Culvert & Bridge Upgrades	DPW	$100,000 - $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
KNT-22	Replace the bridge at Anderson Acres Road and Kent Hollow Road over the West Aspetuck River with an aluminum bridge.	Culvert & Bridge Upgrades	DPW	More than $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
KNT-23	Work with the Red Cross on development of a regional shelter that would serve Kent residents.	Sheltering Capabilities	EMD	$100,000 - $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0	1	1	1	0	0	0	0	0	0	0	0	0	4
KNT-24	During the 2018 ice jam there was a concern about not having flat-bottomed boats. The Town has therefore secured a grant for the Fire Department to purchase a new flat-bottomed boat.	Emergency Equipment	EMD; Fire	$100,000 - $500,000	OB, CIP, CT DEMHS	2025 – 2027	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3

APPENDIX B

RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF KENT BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Kent has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Kent Board of Selectmen approved the previous version of the Plan in 2014; and

WHEREAS, the Town of Kent and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Kent; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Kent, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Kent eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Kent;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Kent, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Kent this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

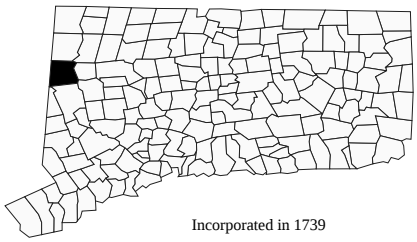
2019 CERC TOWN PROFILE

Kent, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
P.O. Box 678
Kent, CT 06757
(860) 927-4627

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1739

Demographics

Population

	Town	County	State
2000	2,858	182,193	3,405,565
2010	2,979	189,927	3,574,097
2013-2017	2,853	184,454	3,594,478
2020	2,843	193,116	3,604,591
'17 - '20 Growth / Yr	-0.1%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	49	921	4,842
Pop./Sq. Mile (2013-2017)	59	200	742
Median Age (2013-2017)	53	47	41
Households (2013-2017)	1,121	74,605	1,361,755
Med. HH Inc. (2013-2017)	$64,464	$76,438	$73,781

	Town	State
Veterans (2013-2017)	171	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	156	5%	242	8%	394	14%	412	14%	918	32%	731	26%	2,853	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	2,441	164,992	2,446,049
Black Non-Hisp	193	2,843	350,820
Asian Non-Hisp	60	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	87	2,320	84,917
Hispanic or Latino	72	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	9.2%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	450	22%	673,582	27%
Associates Degree	182	9%	188,481	8%
Bachelors or Higher	948	46%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	168	1,267
23 - Construction	14	50
31-33 - Manufacturing	3	17
44-45 - Retail Trade	20	110
61 - Educational Services	6	383
62 - Health Care and Social Assistance	10	137
72 - Accommodation and Food Services	15	213
Total Government	11	91

Top Five Grand List (2018)

	Amount
CONNECTICUT LIGHT AND POWER	$8,573,040
ROCK COBBLE FARM LLC	$5,581,450
BLITZER DAVID D TRUSTEE	$5,249,500
RACHEL FITCH LLC	$4,644,700
KENT SCHOOL CORP	$3,874,700
Net Grand List (SFY 2016-2017)	$595,983,179

Major Employers (2016)

Kent Cetner School
Kent School
Marvelwood School
South Kent School
Club Getaway

Education

2018-2019 School Year

	Grades	Enrollment
Kent School District	PK-8	213
Regional School District 01	9-12	391

Pre-K Enrollment (PSIS)

	2018-2019
Kent School District	18

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 01	94.6%	100.0%	90.4%

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	81.8%	53.8%	*	51.3%	65.5%	43.0%
ELA	*	53.1%	*	54.9%	76.7%	56.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Kent School District	4.1%
Regional School District 01	11.9%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	73.6%	84.0%	86.8%
Private	26.4%	16.0%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Kent, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$12,731,142	Total Expenditures (2017)	$11,623,151	Annual Debt Service (2017)	$659,345
Tax Revenue	$10,960,540	Education	$7,784,758	As % of Expenditures	5.7%
Non-tax Revenue	$1,770,602	Other	$3,838,393	Eq. Net Grand List (2017)	$825,204,802
Intergovernmental	$1,259,101	Total Indebtedness (2017)	$2,395,227	Per Capita	$294,716
Per Capita Tax (2017)	$3,895	As % of Expenditures	20.6%	As % of State Average	195.2%
As % of State Average	132.9%	Per Capita	$855	Moody's Bond Rating (2017)	Aa2
		As % of State Average	34.0%	Actual Mill Rate (2017)	18.33
				Equalized Mill Rate (2017)	13.22
				% of Net Grand List Com/Ind (2017)	6.1%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	1,503	88,068	1,507,711
% Single Unit (2013-2017)	74.4%	73.6%	59.2%
New Permits Auth (2017)	3	142	4,547
As % Existing Units	0.2%	0.2%	0.3%
Demolitions (2017)	0	32	1,403
Home Sales (2017)	28	1,753	21,880
Median Price	$363,700	$250,100	$270,100
Built Pre-1950 share	30.8%	31.2%	29.3%
Owner Occupied Dwellings	788	57,330	906,798
As % Total Dwellings	70.3%	76.8%	66.6%
Subsidized Housing (2018)	42	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	0	57	536
$100,000-$199,999	0	563	5,237
$200,000-$299,999	5	538	6,681
$300,000-$399,999	8	315	3,863
$400,000 or More	15	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$963	$995	$1,123
Cost-burdened Renters	75.9%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	1,473	101,000	1,827,070
Residents Unemployed	44	4,014	78,242
Unemployment Rate	2.9%	3.8%	4.1%
Self-Employed Rate	21.9%	13.0%	10.0%
Total Employers	168	6,177	122,067
Total Employed	1,267	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Kent, CT	405	Kent, CT	405
New Milford, CT	138	Danbury, CT	204
Cornwall, CT	48	New Milford, CT	82
Warren, CT	47	Stamford, CT	71
Danbury, CT	40	Danbury, CT	61
Dover, NY	40	Greenwich, CT	47
Torrington, CT	37	Brookfield, CT	32

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	299	1,777
Violent	100	228

Disengaged Youth (2013-2017)

	Town	State
Female	10.6%	4.2%
Male	6.0%	5.6%

	Town
Library circulation per capita	9.55

Distance to Major Cities

	Miles
Hartford	40
New York City	78
Providence	105
Boston	132
Montreal	263

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Aquarion Water Company
(800) 732-9678

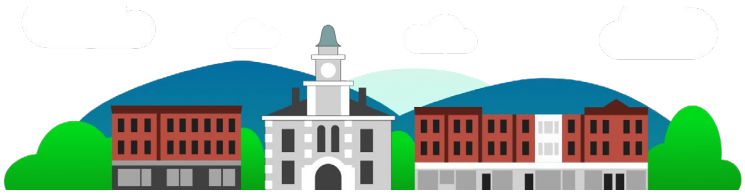
Cable Provider
Charter Communications of Western CT
(800) 827-8288

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

LITCHFIELD, CT



74 West Street
Litchfield, CT 06759
MMI #3843-06

Prepared for:
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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Litchfield and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Litchfield is a mostly rural town in the Litchfield Hills Region bordered on the east by Harwinton, on the south by Morris and Thomaston, on the west by Warren and Washington, and on the north by Goshen and Torrington.

Litchfield's population density of approximately 150 persons per square mile reflects its rural character. The density of Litchfield increased by 26% between 1960 and 2010, but in 2019 its population was estimated at 8,147, a decrease since 2010.

The total area of Litchfield is 56.8 square miles with a land area of 56.1 square miles. In addition to the central Borough of Litchfield, there are several other community centers in the town including the Borough of Bantam, Northfield, and Milton. There are four state parks or forests in Litchfield including Topsmead State Forest, Mt. Tom State Park, Mattatuck State Forest, and Humaston Brook State Park. A portion of Bantam Lake is also in Litchfield.

Other notable characteristics of the municipality include a quintessential New England green, rolling hills, forested land, patches of wetlands, scattered ponds, Bantam Lake, and the Naugatuck River on the eastern border of the town. Major highways serving the town include State Routes 8, 63, 118, 202 and 254.

2.2 Existing Land Use

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 67% of Litchfield is forested and approximately 10% is developed.

Table 2-1: 2015 Land Cover by Area

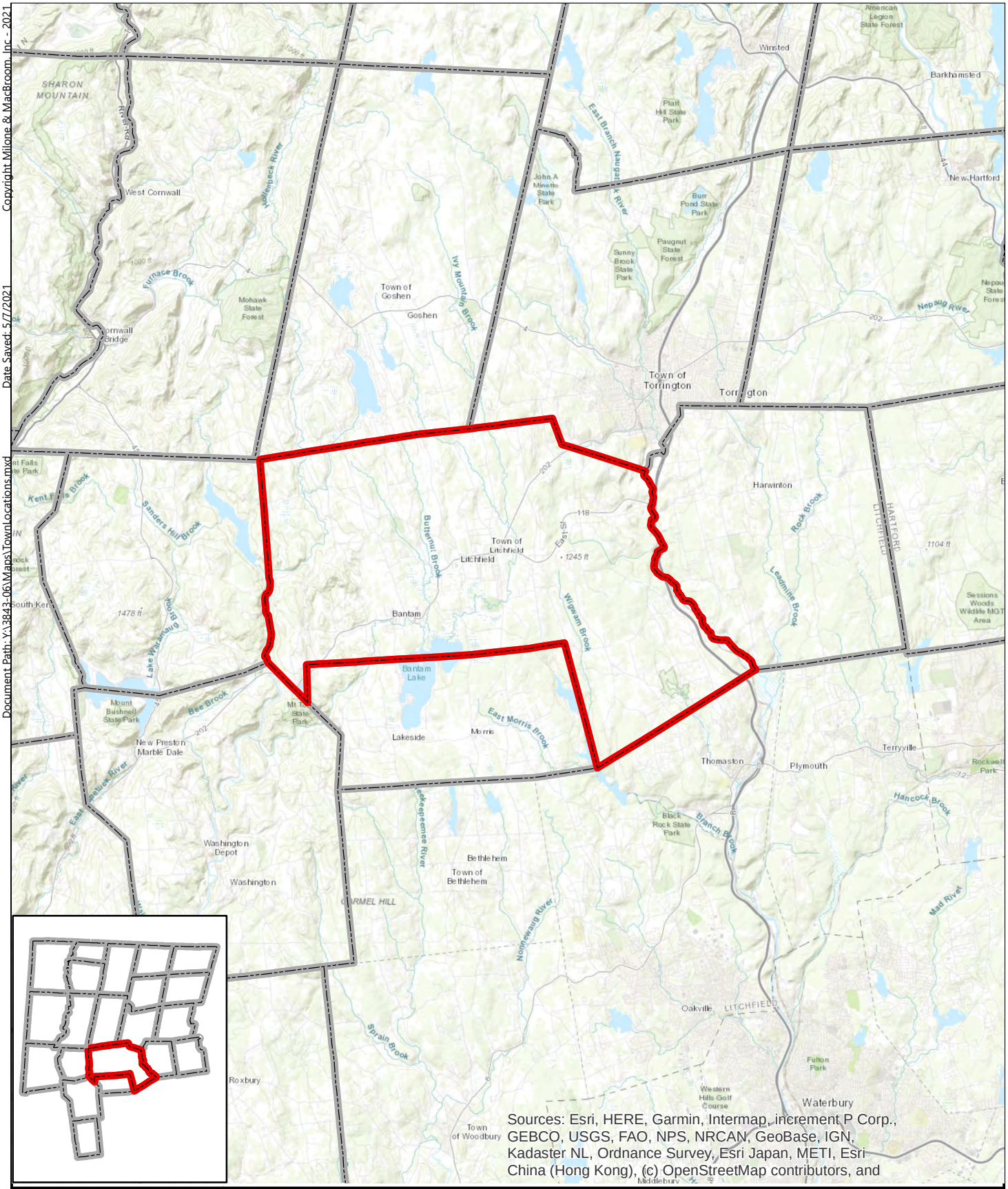
Land Cover	Area (acres)	Percent of Community
Developed	3,547.1	9.74%
Turf & Grass	1,666.2	4.57%
Other Grass	358.9	0.99%
Agricultural Field	5,380.2	14.77%
Deciduous Forest	17,977.6	49.34%
Coniferous Forest	4,633.2	12.72%
Water	738.6	2.03%
Non-Forested Wetland	214.1	0.59%
Forested Wetland	1,696.3	4.66%
Tidal Wetland	0.0	0.00%
Barren	42.2	0.12%
Utility Row	181.8	0.50%
Total	**36,436**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

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REGIONAL LOCATION: LITCHFIELD

HAZARD MITIGATION PLAN UPDATE - LITCHFIELD ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 2-1

2.3 Development Trends

Litchfield was incorporated in 1719 and thrived during the Revolution because the main roads from Hartford and southern Connecticut to the Hudson River Valley ran through Litchfield. Between 1784 and 1834, the town was an active, growing urban center that, by 1810, had grown to be the fourth largest town in the state of Connecticut. By 1810 the central village contained 125 houses, shops and public buildings. Between 1800 and 1900, Litchfield's population declined from 4,285 persons to 3,214 persons.

According to the US Census data, the population of Litchfield rebounded in the early 1900's, and by 1960 had increased to 6,264 persons, thus eclipsing the population during Litchfield's "Golden Age". Population growth between 1960 and 2010 was slow and steady with an average annual increase in population of 44 persons per year. As of 2010, the population of Litchfield was 8,466 persons.

U.S. Census Bureau estimates for 2019 show a population around 8,147 individuals, a decrease from 2010 of 3.8%. The Connecticut State Data Center predicts that population will decrease by 1.1% through 2025 to an estimated population of 8,056 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Litchfield decreased slightly between 2013 and 2017. The number of permits issued in 2013 and 2014 was 13 and 13, respectively, while 12 permits were issued in 2016, and 5 permits were issued in 2017. On average, 10 housing permits were issued each year in Litchfield between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Litchfield rose by approximately 3.9-percent between 2010 and 2019, from 3,975 units in 2010 to 4,136 units in 2019. In 2019, the housing stock was made up of approximately 83% single-unit structures, 5% two-unit structures, 13% multi-unit structures, and 0% mobile-homes or other types of structures. About 70% of the housing is owner occupied in Litchfield, with about 22% of the housing stock occupied by renters and 5% held for seasonal, recreational or occasional use (second homes).

According to the Connecticut Office of Policy and Management, Litchfield's 2019 Total Equalized Net Grand List was valued at $1,058,744,955. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Litchfield, included as Appendix C.

Overall, development in Litchfield has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the next five years is not expected to increase exposure.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Litchfield is considered to have a Medium level of social vulnerability, with a higher vulnerability score for the SVI categories of Household Composition and Disability, and Housing Type and Transportation. In other words, particular challenges in Litchfield may include the presence of residents who need additional assistance during a disaster event due to disabilities, as well as lower-quality housing and lack of access to personal vehicles for evacuation or other transportation.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Litchfield.

Litchfield is part of the Northeastern Highlands Ecoregion, which is characterized by "hills and mountains, a mostly forested land cover, nutrientpoor frigid and cryic soils (mostly Spodosols), and numerous highgradient streams and glacial lakes" (as described on the map "Ecoregions of New England").

2.5 Climate and Climate Change

Over the course of the year, the temperature in Litchfield typically varies from 17°F to 80°F and is rarely below 2°F or above 88°F. The warm season lasts from May 29 to September 15, with an average daily high temperature above 70°F. The cold season lasts from December 1 to March 11, with an average daily high temperature below 41°F.

Precipitation falls throughout the year in Litchfield. The wetter season lasts from May 3 to August 20, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on May 29. The drier season lasts from August 20 to May 3. The smallest chance of a wet day is 22% on January 31.

The most rain falls during the 31 days centered around June 4, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts from October 23 to April 22, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.4 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield as 4.80 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield at 5.70 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.8	6.0	8.5
NOAA Atlas 14	5.7	7.1	9.2

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Litchfield can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.2 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

The western half of the Town of Litchfield falls within the Shepaug River Watershed. It is drained by the East Branch Shepaug River and Bantam River. Tributaries to these two streams include Butternut Brook, Tannery Book, Moulthrop Brook, Butternut Brook, Marshepaug River, and Miry Brook. Other notable hydrologic features in this watershed include Ripley Swamp, Blue Swamp, and Bantam Lake.

The eastern side of Litchfield is within the Naugatuck River Watershed. It is drained by the Naugatuck River, which forms the eastern boundary of the Town. Tributaries include Gulft Stream, Spruce Brook, Jefferson Hill Brook, Humaston Brook, Wigwam Brook, Pitch Brook, Turner Brook, and Moosehorn Brook.

2.7 Governmental Structure and Capabilities

The Town of Litchfield has a number of existing authorities, policies, programs and regulations that serve to mitigate the impact of natural hazards. Existing local authorities include the Litchfield Board of Selectmen, Planning and Zoning Commission, Inland Wetlands Commission, Emergency Management Director, Fire Department, and Department of Public Works.

Issues such as flooding or downed trees can be reported by residents to the DPW by making a "request for service" call. The DPW then works to collect resident information, assess the issue being reported, then either address the issue immediately or make a near-term plan to rectify the service requested.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Litchfield are concentrated within the Milton Center Historic District and the Borough of Litchfield Historic District. Resources near flood sources may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

The primary transportation routes into and out of the town are Route 63 and Route 8 running north-south, and Route 202,118, and 254 running east-west). Other key roads include Maple Street, Whites Wood Road, and Mattatuck Trail.

Northwestern Connecticut Transit District provides a local bus service called the Candystriper (Deviated Flexible Route Service), available in Torrington, Winsted and Litchfield.

Utilities

Public water in Litchfield is primarily provided by the Aquarion Water Company – Litchfield System. A handful of small Community Water Systems and Non-Community Public Water Systems provide water in select areas. Some Residents and businesses in more rural parts of Town rely on private well water. The northeastern corner is partially served by the Torrington Water Company.

Eversource is the primary provider in Town for electricity and natural gas. According to geoISP (geoISP.com), there are two DSL providers in Town (AT&T, Connecticut Education Network), two

Cable Providers (CSC Holdings, Charter Spectrum, and Xfinity), three Fiber Internet Providers (Fibertech Networks, LLC, Connecticut Education Network, and Level(3) Communications), and four Mobile Wireless Providers (AT&T, Verizon, Sprint, and T-Mobile).

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Litchfield has identified several critical facilities throughout the town, as summarized on Table 2-3 below.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Litchfield Town Hall	74 West Street	Municipal			
Litchfield Town Hall Annex	80 Doyle Road, Bantam	EOC	✔		
Bantam Fire Company	92 Doyle Road, Bantam	Fire Station & EMS	✔	✔	
Northfield Volunteer Fire Company Incorporated	12 Knife Shop Road	Fire Station & EMS	✔	✔	
Litchfield Volunteer Fire Department	258 West Street	Fire Station & EMS	✔		
Litchfield Volunteer Ambulance Association	11 East Street	EMS	✔		
East Litchfield Volunteer Fire Company	365 East Litchfield Road	Fire Station	✔		
Litchfield Public Works	101 Russell Street	Municipal	✔		
WPCA	29 Stoddard Road	Utility	✔		
Litchfield Leaf Compost Facility	72 Little Pitch Road	Municipal Solid Waste			
Litchfield High School	14 Plumb Hill Road	Comfort Station		*	
Connecticut State Police Troop L - Litchfield Resident State Trooper	74 West Street	Law Enforcement			
Connecticut State Police Troop L Barracks – Headquarters	452 Bantam Road	Law Enforcement			
Bantam Fuel Mart	199 West St	Gas Station with Generator	✔		

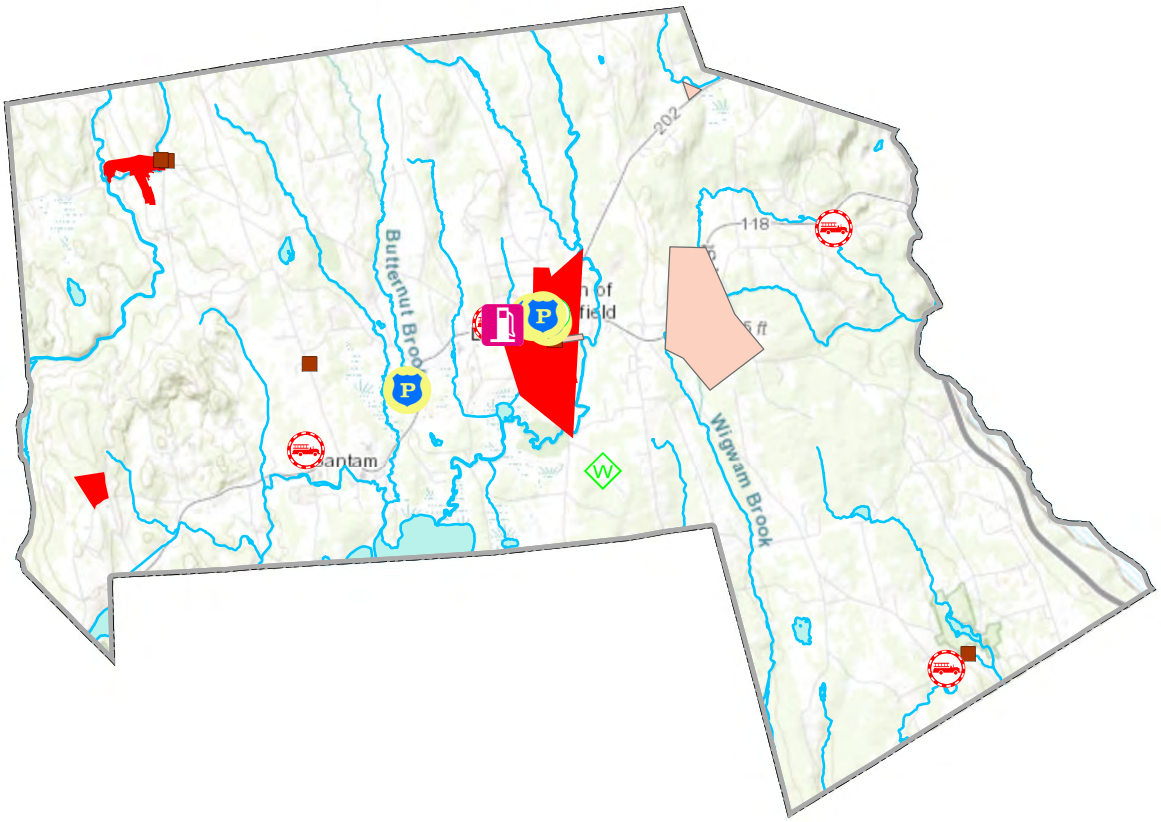
The major facilities at risk in the community in the event of a natural hazard include the Litchfield Town Hall, Town Hall Annex in Bantam, Litchfield Elementary School, Litchfield Middle School, Litchfield High School, the Town Public Works Department, Litchfield Fire House, Bantam Fire House, East Litchfield Fire House, Northfield Fire House, and the Litchfield Sewage Treatment Plant.

These are considered critical facilities in the event of a natural disaster because they might be needed for effective emergency response. All are potentially vulnerable to tornados, winter storms, wildfire, and earthquakes. None of the facilities are located within a floodplain.

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Critical Facilities & Cultural Resources

- EMS
- Fire Station
- Gas Station with Generator
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Area
- National Register District

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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - LITCHFIELD ANNEX
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GOSHEN, CT 06756

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SCALE 1 " = 10,453 '
DATE 5/7/2021
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FIG. 2-2

Emergency Response Capabilities

The Fire Departments in the town of Litchfield, Department of Public Works, and Emergency Management Director all possesses emergency equipment that can be deployed as needed in the event of an emergency. Procedures are also in place to open and maintain the Emergency Operations Center and emergency shelters in town.

Sheltering Capabilities

The Bantam Fire House and the Northfield Fire House serve as the town's emergency shelters. Litchfield High School is used as a comfort station, but does not have an emergency generator. The Town is exploring making updates to enable this facility to be used as an emergency shelter.

Communications

Litchfield has implemented the Everbridge public notification system, and utilizes it regularly. The Everbridge system was used to communicate with the public during Tropical Storm Isaias in 2020 and throughout the COVID-19 pandemic in 2020 and 2021.

Litchfield has also been working with other towns in the Litchfield Hills Region through the Northwestern CT/Litchfield Hills Public Safety Task Force to enhance communication and coordination. This has included efforts to standardize communication equipment and the equipment in local emergency operation centers, and also the upgrading of supplies at emergency shelters. The Town has programed the State's interoperability frequencies, including "STOCS," into response vehicles and portable radios used by first responders and Emergency Management staff. A standard operating procedure for this equipment is in development.

Other activities being pursued are a regionally coordinated public notification system, a badging registration system for emergency responders, improved training opportunities, and the development of written mutual aid agreements.

3 FLOODING

3.1 Existing Capabilities

Ordinances, Regulations and Plans

Land use regulations exist to protect natural resources, including erosion and sediment control regulations for new development, stormwater control regulations to minimize drainage problems, and a floodplain overlay zone to control development in flood prone areas.

The floodplain overlay zone provides that any new construction or substantial improvement of any residential structure shall have the lowest floor, including the basement, elevated to at least one foot above base flood elevation where base flood elevation is known. Nonresidential construction is required to have the lowest floor, including basement, elevated to at least one foot above the base flood elevation or where the structure is located below base flood elevation be flood-proofed to base flood elevation. A registered professional engineer or architect is required to certify the construction of structures in the floodplain in order to minimize flood damage. Additionally all attendant utilities or sanitary facilities should be located or designed to avoid infiltration or impairment by flood waters. Manufactured homes and recreational vehicles are prohibited or highly restricted, respectively.

Litchfield defines Substantial Improvement as being cumulative over a ten-year period.

Litchfield's subdivision regulations have detailed standards for the planning, design and construction of storm drainage systems in order to minimize adverse impacts associated with new construction activity. The Litchfield Conservation and Inland Wetland Commission enforces regulations to direct development away from wetlands, watercourses, floodplains and stream-belts.

NFIP, Flood Insurance, and Community Rating System

Litchfield maintains compliance with NFIP through its use of the Connecticut State Building Code, subdivision regulations, and zoning regulations. Litchfield expects to continue participation in NFIP.

According to FEMA, there are 29 flood insurance policies in force in Litchfield as of 6/30/2019 with an insurance value of $8,176,700. The previous edition of this HMP noted 37 flood insurance policies in force as of 8/31/2015 with an insurance value of $10,000,600.

Drainage and Street Flooding

The Litchfield Public Works Department routinely examines and clears public storm drains and catch basins of debris following periods of rainfall, snowfall, or windstorms. The town's DPW also monitors weather reports and maintains loaded trucks in preparation of winter storm events. The DPW has a large stockpile of material to use to repair the roughly 20 miles of dirt and gravel

roadways in Town following erosion events. Heavy precipitation in the past has resulted in washed-out roads that caused accessibility issues.

Structural Mitigation

Litchfield upgrades bridges and culverts as needed over time. Many of the major bridges in Town have been updated in recent years; the Town reports that it is beginning to work on updating its culverts.

New Capabilities and Completed Actions

Litchfield continues to maintain its strong flood mitigation capabilities.

The Town reports having mitigated much of the flooding that has been a concern along roadways including Camp Dutton Hill Road, Headquarters Road, and Milton Road.

Litchfield has hired engineers to survey areas with known high water-tables that have led to minor basement and underground utility flooding in the past. The Town has worked to mitigate this underground water issue in the past, and addresses new concerns as they are reported.

Summary

Litchfield mitigates flood damages primarily through regulating development in floodprone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate. While flooding concerns are relatively low in priority for the town, any areas that are a concern are budgeted for and addressed as quickly as possible.

3.2 Vulnerabilities and Risk Assessment

Flood prone areas in the community today, as mapped by FEMA, are presented in Figure 3-1.

Vulnerability Analysis of Areas Along Watercourses

The area of greatest flood concern locally is along the Bantam River, particularly south of the center of town. Some roadways that have experienced flooding issues in the past include Camp Dutton Hill Road, Headquarters Road, and Milton Road.

The Litchfield Soccer Club fields have had some minor flooding issues in the past; however, it is unclear as to whether adjacent properties have been impacted.

Flooding of the Naugatuck River is not of significant local concern due to the flood control projects constructed upstream after the Flood of 1955. The Army Corps of Engineers also now owns much of the land, or has flood control easements, along the floodprone areas of the Naugatuck River in Litchfield. The Flood of 1955 impacted Litchfield as it did other communities in the region. The flood took out a number of dams and the bridge on Rte 63 near Camp Dutton Road.

Vulnerability of Other Areas

Today, beaver contribute to localized flooding problems in the town periodically with the construction of dams on private properties that are difficult to remove. Beaver have also plugged culverts on local streets such as Brooks Road, which require routine maintenance by town personnel to remove.

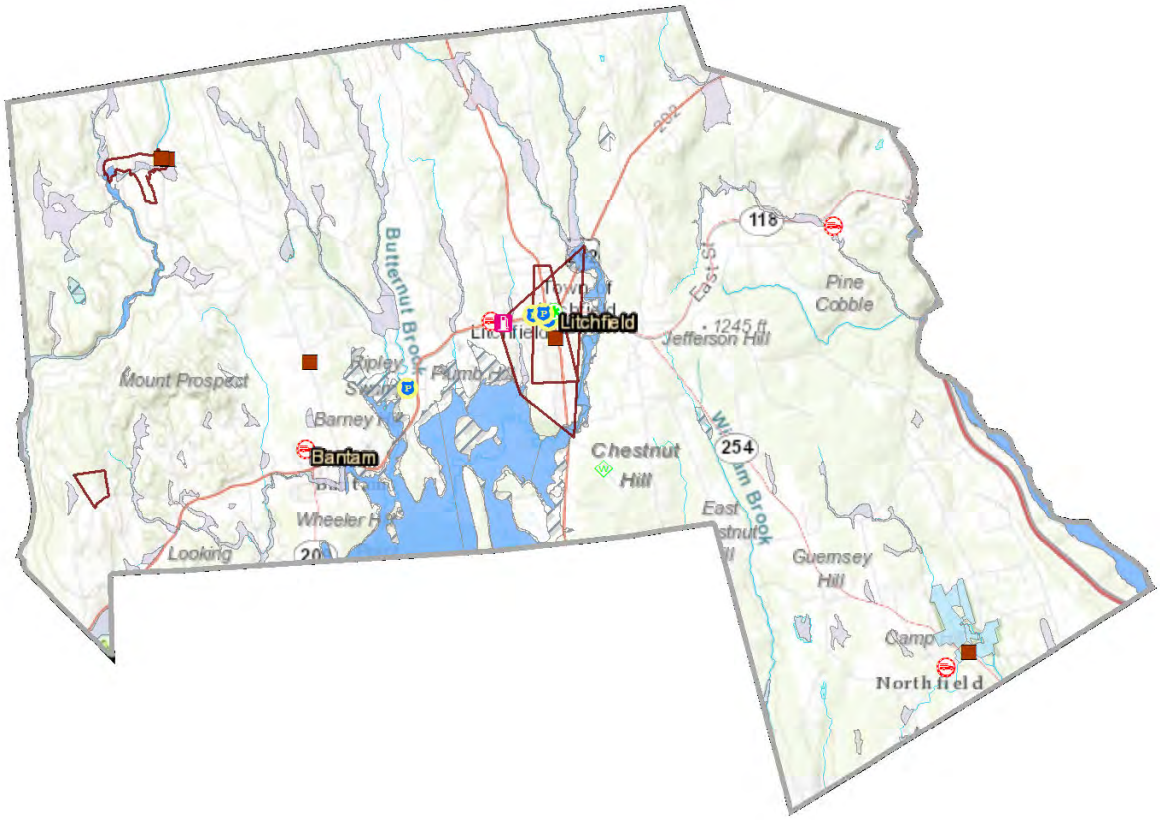
The Town has roughly 20 miles of dirt and gravel roadways; high precipitation events have washed-out parts of these roads in the past, causing accessibility issues.

Litchfield staff report that a number of properties and roadways are located in areas with a high water-table, which can lead to water accessing basement or underground utilities; reportedly there has not been a significant amount of flooding as a result.

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FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - LITCHFIELD ANNEX
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GOSHEN, CT 06756

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Feet

SCALE 1 " = 10,453 '
DATE 5/10/2021
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FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing capabilities appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Litchfield is 110 mph for a Category 1 event, 120 mph for a Category 2, and 125 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Eversource, the local electric utility, provides tree maintenance near its power lines. Town crews work to clear roads of debris. Town staff note that the key to being able to clear roads efficiently is working with Eversource to "make-safe" downed power lines so the DPW can remove debris.

The Town has a Tree Warden and Assistant Tree Warden.

New Capabilities and Completed Actions

Litchfield continues to maintain its strong tropical cyclone mitigation capabilities.

Summary

Litchfield mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

High wind events in conjunction with tree deterioration is one of the biggest concerns for the Litchfield. The Town has estimated that 1,300 trees have been damaged by the Emerald Ash Borer to the extent that they present a risk of falling during a storm; the Town wishes to remove these trees as soon as possible

Hurricanes have caused wide-spread power outages and could cause significant damage. Tropical Storms Isaias in August of 2020 resulted in town-wide tree damage and power outages. Communication with Eversource during this storm was a challenge, and municipal staff report that Eversource often seemed unaware of where their crews were needed and where Town crews were working. Hurricane Irene in 2011 left 72% of the town without power at its peak (3,364 households).

Litchfield also suffered hurricane-related damage from Storm Irene in August 2011 and Storm Sandy in October 2012. Both of these events caused significant power outages and the storms received Presidential Disaster Declarations.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Litchfield as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

New Capabilities and Completed Actions

Litchfield continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

Litchfield mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Litchfield has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

The central and southern portions of the United States are at higher risk for lightning and thunderstorms than is the northeast. However, FEMA reports that more deaths from lightning occur on the East Coast than elsewhere. Lightning-related fatalities have declined in recent years due to increased education and awareness.

Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Litchfield area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Litchfield is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the Town is believed to be low for any given year. All areas of the Town are susceptible to damage from high winds.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Such fires can be extremely dangerous during the summer months during dry and drought conditions.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

Tornadoes and straight-line winds have impacted the region multiple times in recent years. The Town has become more concerned about the occurrence of such events in the future, and the possibility of such events becoming more frequent because of climate change.

6 WINTER STORMS

6.1 Existing Capabilities

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas.

New Capabilities and Completed Actions

Litchfield continues to maintain its strong winter storm mitigation capabilities. The Town reports that many areas that had in the past been identified as concern for drifting snow have since been addressed; trees and other vegetation have been planted, or removed where appropriate, to assist with snow-drift control efforts.

Summary

Litchfield mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

A natural hazard of significant concern in Litchfield is a winter ice storm with high winds and power outages. A severe snowstorm occurred in March of 1978 that brought close to three feet of heavy snow. The town suffered a major ice storm in 2002 that resulted in downed power lines,

extensive tree damage, and expensive clean-up costs. Over 100 people required use of the emergency shelter in town during this storm event.

Winter storms cause road blockages and roof collapses (from heavy snow and ice). The most vulnerable parts of town, therefore, are those with dense development and lots of roads. From the town's perspective, the greatest vulnerability is town-maintained roads. In total, Litchfield maintains 130 miles of local roads.

Winter storms are a perennial concern with wide-ranging impacts. Snow covered roads take time and money to clear. Heavy snow, especially when accompanied by ice can cause roofs to collapse. Ice storms can also bring down power lines, causing outages. The snow storm of October 2011 left 99% of the town without power at its peak. Most of the town had no power for three days, with a quarter having no power for six days.

In recent years, snow events have reportedly not presented major challenges, as they have in years past. At times, some roads were a challenge to clear during heavy snowstorms.

7 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Litchfield. The Town has adopted these codes for new construction, and they are enforced by the Building Official.

New Capabilities and Completed Actions

Litchfield continues to maintain its earthquake and landslide mitigation capabilities.

Summary

Litchfield mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Earthquake Vulnerabilities

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Litchfield. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Litchfield

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

Actions Completed and New Capabilities

Litchfield continues to maintain its capabilities for mitigating and responding to dam failure risks.

Summary

Litchfield mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 39 DEEP-inventoried dams within the Town of Litchfield. These dams are listed in Table 8-1 and shown in Figure 8-1.

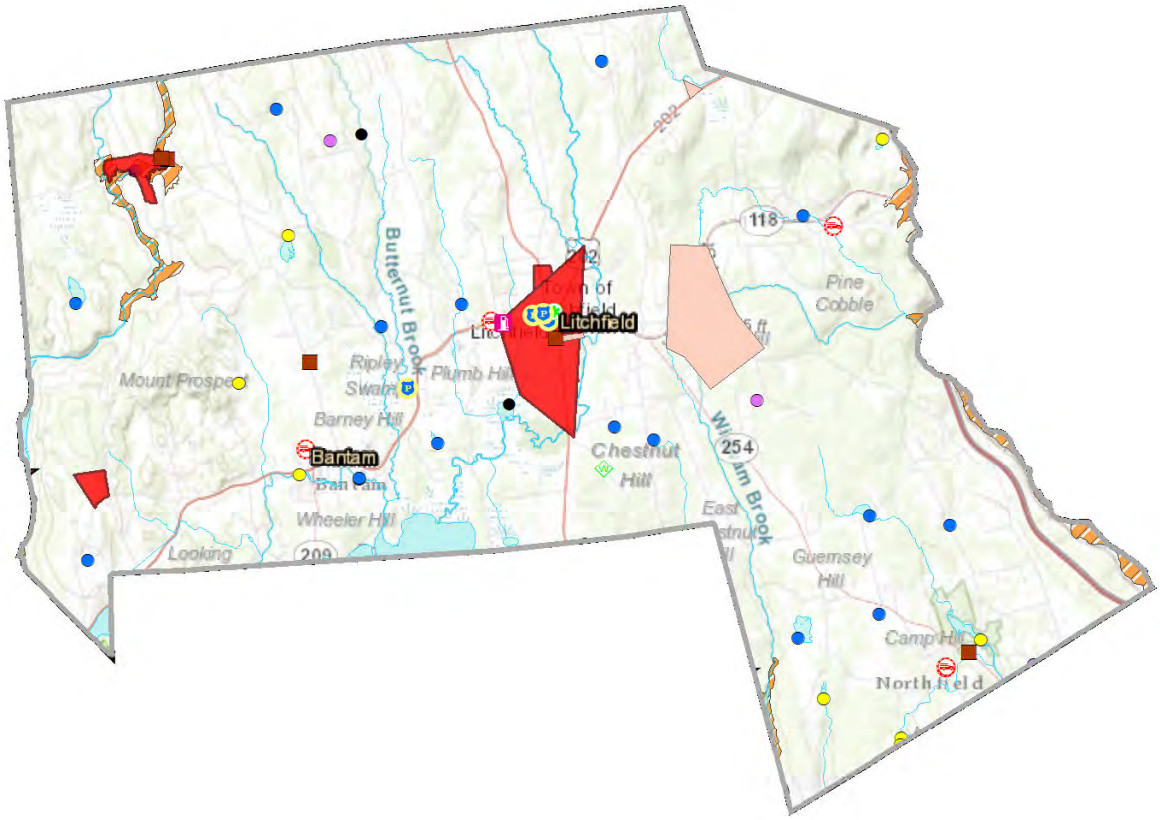
Table 8-1: DEEP-Inventoried Dams in Litchfield

Number	Name	Class	Owner
7401	BANTAM HYDRO DAM	BB	Power Utility
7402	NYSTROM POND DAM	B	Municipal
7403	IFFLAND POND DAM	BB	Private Corporation
7404	NORTHFIELD POND DAM	BB	State Owned
7405	LAKE FLOREN DAM	BB	Private Corporation
7406	MOROSANI POND #1 DAM	BB	Private
7407	MOROSANI POND #2 DAM	A	Private Corporation
7408	DUCK POND DAM	A	Land Trust
7409	NASER POND DAM	A	Private
7410	BLUEBERRY POND DAM	A	Private Corporation
7411	WEST LEIGH POND DAM	A	Private Corporation
7412	MILTON POND DAM	AA	Municipal
7413	CHESTNUT HILL POND DAM	A	Private
7414	PIKUL POND DAM	A	Private
7415	WILLIAMS POND DAM	A	Private
7416	BANTAM LAKE LEFT JAMB	A	Power Utility
7417	BANTAM LAKE RIGHT JAMB	A	Private
7419	SUTLIFFE POND DAM	A	Private
7420	GOOSE POND DAM	A	Private Corporation
7421	HEBRON POND DAM	AA	Private
7422	BUTTERNUT BROOK POND	-	Private
7423	LITCHFIELD FAMILY ESTATES DAM	A	Private
7424	UNNAMED POND DAM	-	Private
7425	UNNAMED POND DAM	A	Private
7426	UNNAMED POND DAM	BB	Federal
7427	UNNAMED POND DAM	AA	Private
7428	CT JUNIOR REPUBLIC DAM	A	Private
7429	BUTTERNUTT BROOK POND DAM	A	Private
7430	FARM POND DAM	-	Private
7431	IRVING POND DAM	AA	Private Corporation
7432	WHITE MEMORIAL DAM #2	-	Land Trust
7433	PRIVATE POND DAM	A	Private
7434	GOODWIN POND	-	Private
7435	WATERHOUSE POND DAM	-	Private
7436	BAKER POND DAM	A	Private
7437	SHEPAUG RESERVOIR DAM (USE 14912)	C	Municipal
7438	PETER'S DAM	A	Municipal
7439	NYSTROM POND DIKE	B	Municipal
7440	CAMP DUTTON ROAD DAM	AA	

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Legend

- EMS
- Fire Station
- Gas Station with Generator
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Area
- National Register District

Dam Hazard Class

- C - High Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - LITCHFIELD ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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0 5,000 10,000
Feet

SCALE 1 " = 10,453 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 8-1

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Litchfield is compliant with this program and has a designated Burning Official.

Actions Completed and New Capabilities

Litchfield continues to maintain its capabilities for mitigating and responding to wildfire risks.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

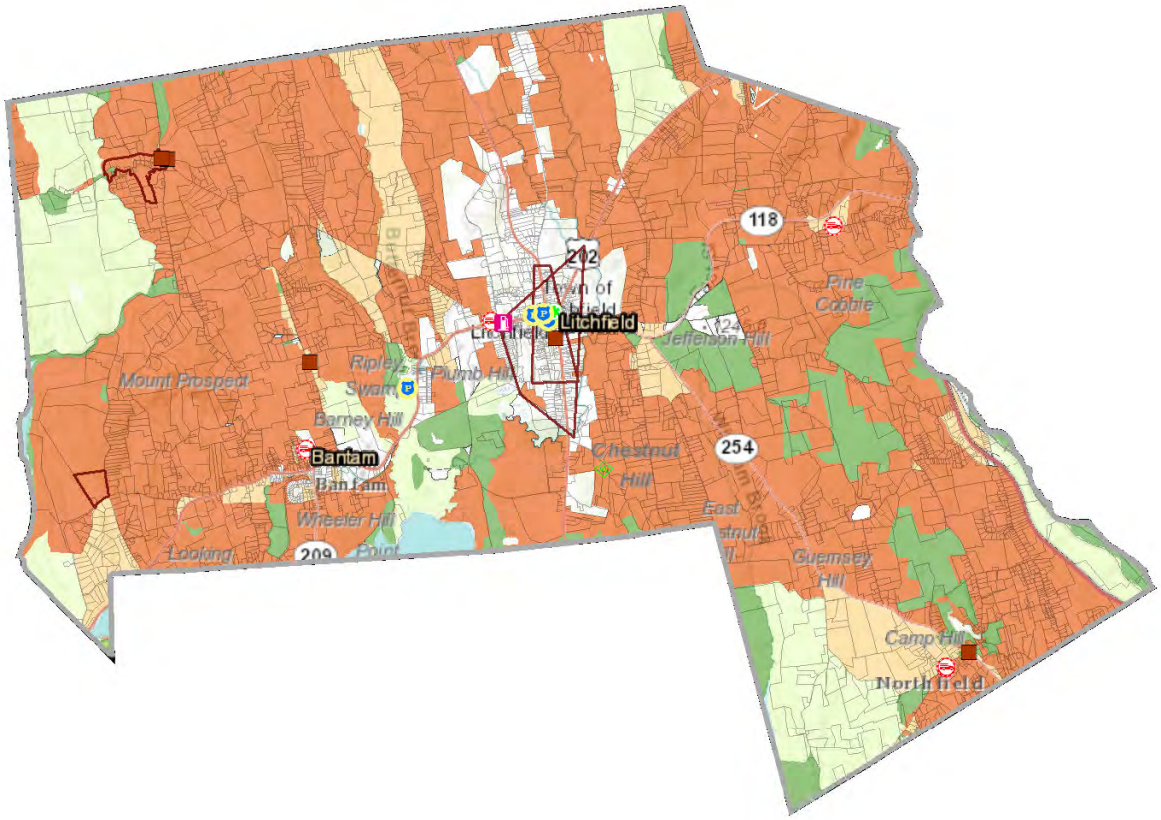
Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

The extensive forests and fields in Litchfield are prime locations for a wildfire. The many areas of Town where development has occurred adjacent to forestland are at an elevated risk of damage from wildfires. Such areas that are also located far from firefighting water sources are at highest risk.

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Legend

- EMS
- Fire Station
- Gas Station with Generator
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - LITCHFIELD ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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Feet

SCALE 1 " = 10,453 '
DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

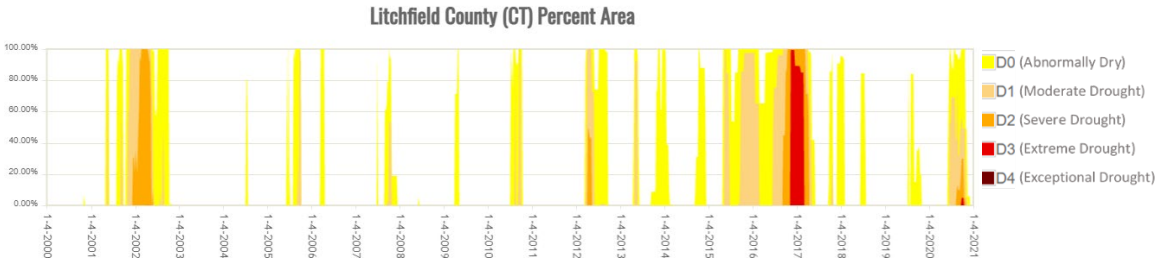


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

The Town is concerned about the effects that both an acute extended drought, as well chronically worsening droughts due to climate change, will have on water availability for private well owners. To the knowledge of Town officials, there are no current issues with private well water availability; however, Town officials are aware of the potential impacts that may occur.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

Strategy	Who	Status	Notes
1.1. Visit schools and educate children about natural hazards and how to prepare for them.	VFD, EMD	Drop	The Fire Department does fire education, but the Town does not do any natural-hazard specific education. The schools have not made requests for this type of education, but the Town would work with schools if requested. Town does not believe this action is necessary.
1.2. Make literature available on natural hazards and preparedness at Litchfield Town Hall and Town Library.	EMD, First Selectman	Carry Forward with Revision	Materials have been available at the town library. There are currently resources on the EM website. Revise to include an annual review of the EM website, as well as of hard-copy resources available at Library and Town Hall.
1.3. Maintain local Emergency Operations Plan and continue to coordinate with the Regional Public Safety Task Force, regional emergency planning team (REPT) and Red Cross on community planning, preparedness, response, and training.	EMD, First Selectman	Capability	EOP was revised in 2018, submitted in Feb 2019, and another update will be submitted in Feb 2021. REPT continues to meet at least 3 times a year, with additional meetings, as necessary. REPT steering committee meets quarterly.
1.4. Maintain the Emergency Notification System (e.g. Everbridge system) to provide emergency information to residents in the entire town or in a specific geographic area. This notice can provide not only warning of an impending situation but also information regarding how to prepare for a particular event.	EMD, First Selectman	Capability	Town will be renewing contract with Everbridge in the next few months. This is an annual contract. The town used the system for COVID info and during Isaias.

Strategy	Who	Status	Notes
2.1. Routinely inspect emergency response equipment, and train for response to natural disasters.	VFD, EMD	Capability	The Fire Department is always inspecting equipment, and runs drills on weekly basis. Recent equipment tests and inspections include Dive Team equipment and shelter cots. The Town had a tabletop exercise planned in May 2020 with the schools, but this was postponed due to COVID. This is a periodic occurrence. Schools also conduct drills on a regular basis to practice school emergency plans, as this is required by the state, and these drills are logged.
2.2. Acquire additional emergency response equipment including communication equipment, and portable generators for Town Hall, the High School, and Elementary School.	EMD, Fire Chief	Complete	Town is in the process of acquiring a message board, and they have acquired light towers and an amateur radio station. The town has also acquired portable generators; this is used at the repeater site on Camp Dutton Hill Road. Town has acquired 65 more shelter cots recently, and an 800 MHz portable radio which operates on the state's trunked system. The town is pursuing funding for an emergency response trailer in spring 2021, this would include supplies such as cots and other materials for mass casualty events.
2.3. Promote the use of interoperable communication equipment, and the development of standard operating procedures for emergency response in the regional area.	EMD, Fire Chief,, First Selectman	Capability	The 800 MHz radio is designed for interoperable communication and allows for communication between local EMDs. The town has programed the state's interop frequencies, including STOCS, into response vehicles and portable radios used by first responders and EM staff. An SOP is in development. A regional interoperability plan is being developed by ESF2 of the region 5 REPT.
2.4. Consider developing a Memorandum of Understanding with schools or school bus company to utilize school buses for mass transportation during an emergency.	EMD, First Selectman	Capability	Town has a verbal agreement that the company would make buses available if needed, and believes this to be sufficient.
2.5. Develop regional GIS capabilities as needed for access to aerial photos showing the number and location of properties and structures that could be affected by a natural disaster.	EMD, Fire Chief,, DEMHS	Complete	REPT is currently working to produce parcel mapping and assist with data development. DPW has acquired GIS which is being implemented and expanded upon as updates in information occur.
6.1. Implement control measures to mitigate the flooding created by beavers.	PWD	Capability	DPW conducts weekly inspections of known beaver impacted areas. Maintenance of areas that are a concern is part of the annual budget, unless more long-term mitigation has been performed. The Town has been able to obtain funds for beaver mitigation.
6.2. Implement clean-out schedule for all catch basins and drainage facilities.	PWD	Capability	Cleaned as needed. The Town recently purchased a catch basin cleaner.

Strategy	Who	Status	Notes
6.3. Monitor floodplain regulations and update as necessary based on DEEP's "Model Floodplain Management Regulations" and FEMA Guidelines.	Planning, Zoning Commission	Carry Forward with Revision	Action has not yet been performed due to limitations in funding and staffing. Carry forward but trim to focus on updating regulations based on DEEP model regulations.
6.4. Identify the location of structures that are susceptible to flooding to facilitate risk assessment and potential control measures (e.g. box culvert needed at Camp Dutton).	DPW, EMD, or DEEP	Complete	Camp Dutton Hill Road and Headquarters Road were two areas that were of concern; both are currently being addressed by mitigation projects. The DPW is continuously identifying and addressing such concerns.
6.5. Maintain appropriate funding to augment the municipal tree trimming program.	First Selectman, PWD	Capability	About 1,300 Ash trees that need to be removed in Litchfield. Money is being budgeted for tree removal. It is estimated that removals will cost ~$1 million.
6.6. Develop list of vulnerable populations for quick disaster response.	EMD, Human Services, First Selectman	Carry Forward	Facilities known to house vulnerable populations include Wells Run (affordable housing, managed by Litchfield Housing) and Bantam Falls (in Bantam Village). The Town can request a list of residents that need power for medical equipment from Eversource, but only in an emergency (such as power outages, situations when the First Selectman has declared an emergency, or if the Town EOP is activated). Action is carried forward. The Town should work with local organizations to develop this list.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. One proposed action is:

- Conduct a tabletop drill with the school's staff and admin regarding natural hazard response on an annual basis.

Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action LFD-01	
Develop list of vulnerable populations for quick disaster response.	
Lead	EMD, Human Services, First Selectman
Cost	$0 - $25,000
Funding	OB
Timeframe	2022
Priority	High

Action LFD-02	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action LFD-03	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action LFD-04	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action LFD-05	
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: **1. Disseminate a toolkit for pre-disaster business preparedness.** **2. Revise regulations to promote Low Impact Development.** **3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.**	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, Sustainable CT
Timeframe	2022 – 2024
Priority	High

Action LFD-06	
Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Med

Action LFD-07	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action LFD-08	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action LFD-09	
Conduct a tabletop drill with the school's staff and admin regarding natural hazard response on an annual basis.	
Lead	EMD; School
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action LFD-10	
Perform an annual review of the EM website, as well as of hard-copy natural hazard education resources available at Library and Town Hall.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action LFD-11	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action LFD-12	
Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action LFD-13	
Make necessary updates and improvements to the Litchfield High School (including installation of emergency generator).	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action LFD-14	
Develop a standard operating procedure for use of interoperable communication equipment in municipal and emergency vehicles.	
Lead	EMD
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEMHS
Timeframe	2024 – 2026
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
LFD-01	Develop list of vulnerable populations for quick disaster response.	Vulnerable Populations	EMD, Human Services, First Selectman	$0 - $25,000	OB	2022	1	0	1	1	1	1	0	0	0	0	0	0	0	0	6
LFD-02	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
LFD-03	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
LFD-04	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
LFD-05	Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	Sustainable CT	Planning	$25,000 - $50,000	OB, Sustainable CT	2022 – 2024	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
LFD-06	Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	RLP	Planning	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
LFD-07	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
LFD-08	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
LFD-09	Conduct a tabletop drill with the school's staff and admin regarding natural hazard response on an annual basis.	Other Emergency Response	EMD; School	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	0	0	1	1	1	1	0	0	0	0	0	0	0	0	5
LFD-10	Perform an annual review of the EM website, as well as of hard-copy natural hazard education resources available at Library and Town Hall.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
LFD-11	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
LFD-12	Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
LFD-13	Make necessary updates and improvements to the Litchfield High School (including installation of emergency generator).	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
LFD-14	Develop a standard operating procedure for use of interoperable communication equipment in municipal and emergency vehicles.	Emergency Communication	EMD	$50,000 - $100,000	OB, CIP, CT DEMHS	2024 – 2026	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3

APPENDIX B
RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF LITCHFIELD BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Litchfield has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Litchfield Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Litchfield and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Litchfield; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Litchfield, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Litchfield eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Litchfield;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Litchfield, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Litchfield this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

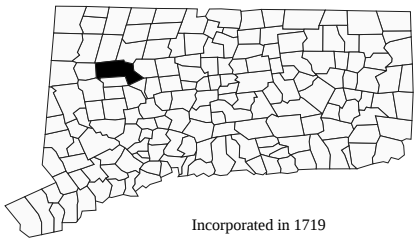
2019 CERC TOWN PROFILE

Litchfield, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
P.O. Box 488
Litchfield, CT 06759
(860) 567-7550

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1719

Demographics

Population

	Town	County	State
2000	8,316	182,193	3,405,565
2010	8,466	189,927	3,574,097
2013-2017	8,252	184,454	3,594,478
2020	8,197	193,116	3,604,591
'17 - '20 Growth / Yr	-0.2%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	56	921	4,842
Pop./Sq. Mile (2013-2017)	147	200	742
Median Age (2013-2017)	51	47	41
Households (2013-2017)	3,525	74,605	1,361,755
Med. HH Inc. (2013-2017)	$78,375	$76,438	$73,781

	Town	State
Veterans (2013-2017)	468	180,111

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	7,636	164,992	2,446,049
Black Non-Hisp	55	2,843	350,820
Asian Non-Hisp	83	3,516	154,910
Native American Non-Hisp	16	267	5,201
Other/Multi-Race Non-Hisp	79	2,320	84,917
Hispanic or Latino	383	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	7.3%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	1,884	30%	673,582	27%
Associates Degree	566	9%	188,481	8%
Bachelors or Higher	2,590	41%	953,199	38%

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	313	4%	845	10%	819	10%	1,380	17%	2,832	34%	2,063	25%	8,252	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	390	3,923
23 - Construction	42	155
31-33 - Manufacturing	12	69
44-45 - Retail Trade	54	525
62 - Health Care and Social Assistance	31	849
72 - Accommodation and Food Services	34	423
Total Government	24	555

Top Five Grand List (2018)

	Amount
Conn Light & Power Co DBA Eversource	$19,600,230
CRP/BWN Litchfield LLC	$6,951,130
Waterbury City of	$6,761,900
6645 Federal Square Realty LLC	$4,700,040
White Memorial Foundation Inc	$3,553,030
Net Grand List (SFY 2016-2017)	$1,031,893,928

Major Employers (2018)

Litchfield Town of
Forman School
Stop & Shop
Regional School District 6
Connecticut Junior Republic

Education

2018-2019 School Year

	Grades	Enrollment
Litchfield School District	PK-12	895

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	81.5%	53.8%	58.3%	51.3%	70.5%	43.0%
ELA	73.8%	53.1%	65.0%	54.9%	82.1%	56.1%

Pre-K Enrollment (PSIS)

	2018-2019
Litchfield School District	38

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Litchfield School District	98.4%	100.0%	97.2%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Litchfield School District	4.6%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	79.7%	84.0%	86.8%
Private	20.3%	16.0%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Litchfield, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$33,708,872	Total Expenditures (2017)	$33,489,731	Annual Debt Service (2017)	$3,631,294
Tax Revenue	$27,879,012	Education	$22,078,393	As % of Expenditures	10.8%
Non-tax Revenue	$5,829,860	Other	$11,411,338	Eq. Net Grand List (2017)	$1,422,154,129
Intergovernmental	$5,135,647	Total Indebtedness (2017)	$25,223,000	Per Capita	$174,113
Per Capita Tax (2017)	$3,395	As % of Expenditures	75.3%	As % of State Average	115.3%
As % of State Average	115.8%	Per Capita	$3,088	Moody's Bond Rating (2017)	Aa2
		As % of State Average	122.8%	Actual Mill Rate (2017)	26.70
				Equalized Mill Rate (2017)	19.50
				% of Net Grand List Com/Ind (2017)	9.3%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	4,224	88,068	1,507,711
% Single Unit (2013-2017)	78.7%	73.6%	59.2%
New Permits Auth (2017)	5	142	4,547
As % Existing Units	0.1%	0.2%	0.3%
Demolitions (2017)	0	32	1,403
Home Sales (2017)	69	1,753	21,880
Median Price	$306,200	$250,100	$270,100
Built Pre-1950 share	35.1%	31.2%	29.3%
Owner Occupied Dwellings	2,818	57,330	906,798
As % Total Dwellings	79.9%	76.8%	66.6%
Subsidized Housing (2018)	187	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	0	57	536
$100,000-$199,999	18	563	5,237
$200,000-$299,999	25	538	6,681
$300,000-$399,999	14	315	3,863
$400,000 or More	12	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$997	$995	$1,123
Cost-burdened Renters	44.0%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	4,700	101,000	1,827,070
Residents Unemployed	151	4,014	78,242
Unemployment Rate	3.1%	3.8%	4.1%
Self-Employed Rate	22.5%	13.0%	10.0%
Total Employers	390	6,177	122,067
Total Employed	3,923	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Litchfield, CT	730	Litchfield, CT	730
Torrington, CT	670	Torrington, CT	366
Watertown, CT	132	Waterbury, CT	258
Morris, CT	127	Hartford, CT	141
Goshen, CT	120	Farmington, CT	117
Waterbury, CT	117	Watertown, CT	113
Winchester, CT	117	Danbury, CT	104

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	965	1,777
Violent	75	228

Disengaged Youth (2013-2017)

	Town	State
Female	7.7%	4.2%
Male	2.7%	5.6%

	Town
Library circulation per capita	17.12

Distance to Major Cities

	Miles
Hartford	27
New York City	83
Providence	92
Boston	120
Montreal	264

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Gas Provider
Connecticut Natural Gas
(860) 727-3000

Water Provider
Metropolitan District Commission (MDC)
(860) 278-7850

Cable Provider
Cox Communication
(800) 955-9515

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

MORRIS, CT

3 East Street
Morris, CT 06763
MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 Torrington Road
Goshen, CT 06756
(860) 491-9884
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Prepared by:
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global **environmental** and **advisory** solutions

SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Morris and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Morris is a rural town in the Litchfield Hills Region bordered on the north and east by Litchfield, on the south by Bethlehem and Watertown, and on the west by Washington.

At one time, the town was a section of Litchfield, known as Litchfield South Farms, before its independent incorporation in 1859. According to the publication "One Hundred Years – A History of Morris Connecticut, 1859-1959" compiled by Laura Stoddard Weik, Morris developed out of the pioneer settlement of Litchfield.

Notable characteristics of the municipality include Bantam Lake (which at 916 acres, is the largest natural body of water in Connecticut), rolling hills, forested land, farmland, patches of wetlands, scattered ponds, the White Memorial Foundation Preserve, and two reservoirs owned and operated by the City of Waterbury (Pitch Reservoir and the Morris Reservoir). Major highways serving the town include State Routes 61, 63, 109, and 209.

2.2 Existing Land Use

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 57% of Morris is forested and approximately 9% is developed.

Table 2-1: 2015 Land Cover by Area

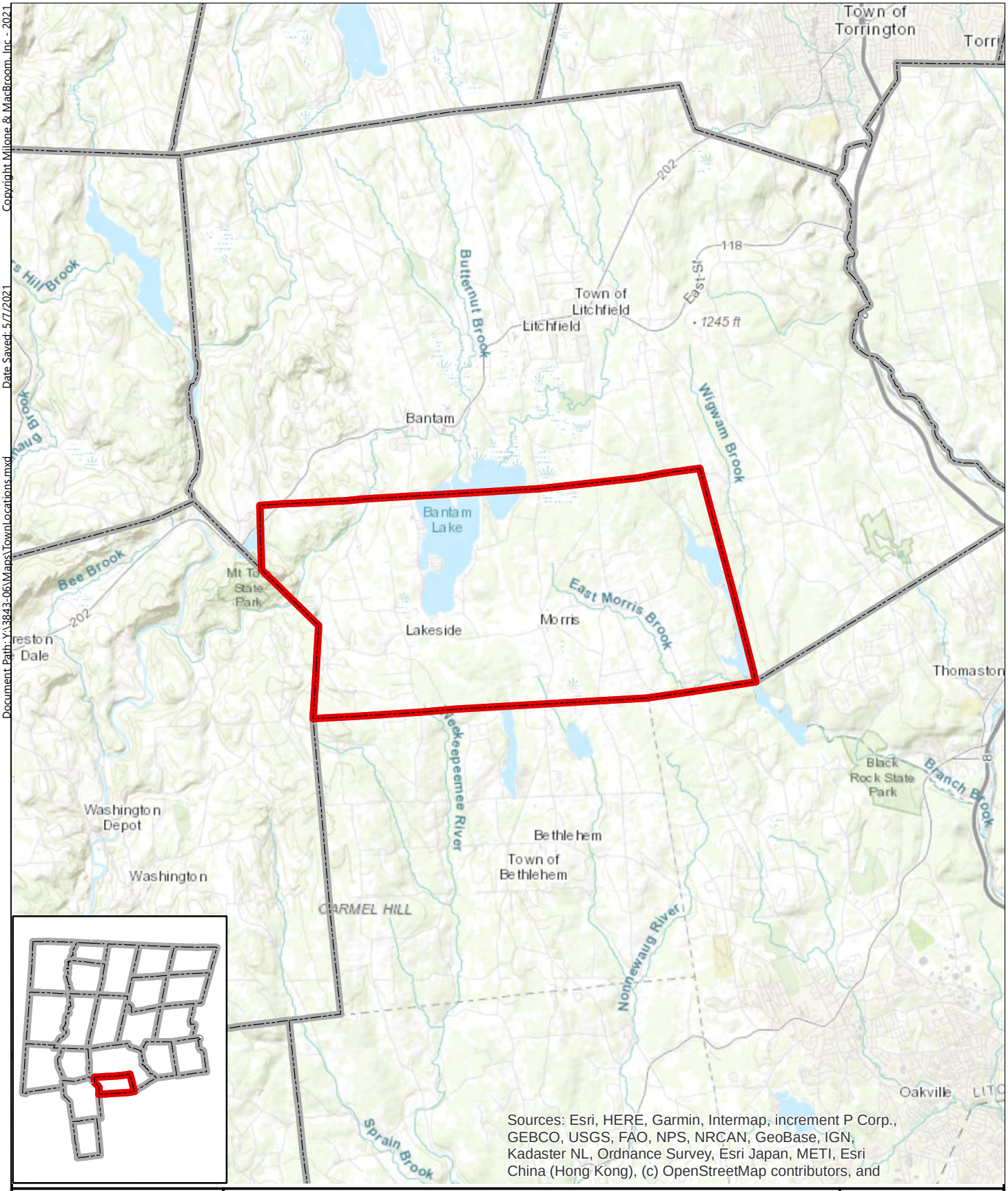
Land Cover	Area (acres)	Percent of Community
Developed	1,054.2	8.81%
Turf & Grass	760.2	6.35%
Other Grass	214.0	1.79%
Agricultural Field	2,009.2	16.80%
Deciduous Forest	5,751.6	48.08%
Coniferous Forest	586.8	4.91%
Water	1,039.9	8.69%
Non-Forested Wetland	31.8	0.27%
Forested Wetland	478.8	4.00%
Tidal Wetland	0.0	0.00%
Barren	35.6	0.30%
Utility Row	0.8	0.01%
Total	**11,963**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

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Date Saved: 5/7/2021

Document Path: Y:\3843-06\Maps\TownLocations.mxd



MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

REGIONAL LOCATION: MORRIS

HAZARD MITIGATION PLAN UPDATE - MORRIS ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 4,500 9,000
Feet

SCALE	1 " = 9,803 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-1

2.3 Development Trends

According to the US Census, the population of Morris increased an average of 24 persons per year over 50 years, from a population of 1,190 people in 1960 to 2,388 in 2010. U.S. Census Bureau estimates for 2019 show a population around 2,205 individuals, a decrease from 2010 of 7.7%. The Connecticut State Data Center predicts that population will increase by 5.5% through 2025 to an estimated population of 2,327 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Morris remained steady between 2013 and 2017. The number of permits issued in 2013 and 2014 was 0 and 1, respectively, while 1 permits were issued in 2016, and 1 permits were issued in 2017. On average, 1 housing permits were issued each year in Morris between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Morris rose by approximately 0.8-percent between 2010 and 2019, from 1,314 units in 2010 to 1,324 units in 2019. In 2019, the housing stock was made up of approximately 91% single-unit structures, 1% two-unit structures, 8% multi-unit structures, and 0% mobile-homes or other types of structures. Approximately 60% of the housing in town is owner occupied, with about 17% of the housing stock occupied by renters and 20% held for seasonal, recreational or occasional use (second homes).

According to the Connecticut Office of Policy and Management, Morris's 2019 Total Equalized Net Grand List was valued at $339,916,574. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Morris, included as Appendix C.

Overall, development in Morris has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the next five years is not expected to increase exposure.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Morris is considered to have a Low level of social vulnerability, with a higher vulnerability score for the SVI category of Socioeconomic Status. In other words, a particular challenge in Morris may include limited financial resources for some residents.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Morris.

Morris is part of the Northeastern Highlands Ecoregion, which is characterized by "hills and mountains, a mostly forested land cover, nutrient poor frigid and cryic soils (mostly Spodosols), and numerous high gradient streams and glacial lakes" (as described on the map "Ecoregions of New England").

2.5 Climate and Climate Change

Over the course of the year, the temperature in Morris typically varies from 17°F to 80°F and is rarely below 2°F or above 88°F. The warm season lasts from May 29 to September 15, with an average daily high temperature above 70°F. The cold season lasts from December 1 to March 11, with an average daily high temperature below 41°F.

Precipitation falls throughout the year in Morris. The wetter season lasts from May 3 to August 20, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on May 29. The drier season lasts from August 20 to May 3. The smallest chance of a wet day is 22% on January 31.

The most rain falls during the 31 days centered around June 4, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts from October 23 to April 22, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.4 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Morris as 4.83 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Morris at 5.69 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.8	6.0	8.5
NOAA Atlas 14	5.7	7.0	9.1

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Morris can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.2 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

The western half of Morris is within the Bantam River subregional watershed, and includes Bantam Lake, the largest naturally-formed lake in Connecticut. Significant streams in this watershed include Shears Brook (flowing through Camp Washington Pond Number 1 and Number 2), Nylbs Brook (flowing out of Jones Pond), Bizell Brook, Whittlesey Brook (flowing into Bantam Lake), and Cranberry Swamp.

The eastern portion of Morris is within the Branch Brook Subregional Basin. It is drained by East Morris Brook and Slab Meadow Brook, which flow into Pitch Brook near the eastern boundary of Town. Pitch Brook flows through the Pitch Reservoir and Morris Reservoir, before eventually becoming Branch Brook to the southeast along the border of Thomaston and Watertown.

Parts of the southern edge of Morris are within the East Spring Brook and the Weekeepeemee River Subregional Basins.

2.7 Governmental Structure and Capabilities

The Town of Morris has a number of existing authorities, policies, programs and regulations that serve to mitigate the impact of natural hazards. Existing local authorities include the Morris Board of Selectmen, Planning and Zoning Commission, Inland Wetlands Commission, Emergency Management Director, Fire Department, and Department of Public Works.

Morris has shown that it has the capability to apply for FEMA grants. The Town applied for a FEMA grant to install a generator at the Morris School, which was not awarded due to a technicality.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Morris include historic municipal buildings, barns, farmland, and other features. Resources near flood sources may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

The primary transportation routes into and out of the town are Route 109 running east-west, and Routes 209, 61, and 63 running north-south. Other key roads include Alain White Road. There is no local public transit system in Morris.

Utilities

Public water in Morris is provided by a handful of small Community Water Systems and Non-Community Public Water Systems. The majority of residents and businesses rely on private well water.

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Morris.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Morris has identified several critical facilities throughout the town, as summarized on Table 2-3 below.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Morris Town Hall	3 East Street	Municipal Facility	✓*		
James Morris Elementary School	10 East St	Emergency Shelter		✓	
Town Public Works Department	9 Town Garage Road	Municipal Facility	✓		
Morris Fire Company	15 South Street	Emergency Operations Center	✓		
Morris Senior Center	109-21 East Street	Community Facility	✓		

* Morris Town Hall has a generator, but it is reported to be insufficient.

The major facilities at risk in the community in the event of a natural hazard include the Morris Town Hall, James Morris Elementary School, Town Public Works Department, Morris Fire Company, and the Morris Senior Center.

These are considered critical facilities in the event of a natural disaster because they might be needed for effective emergency response. All are potentially vulnerable to tornados, winter storms, wildfire, and earthquakes. None of the facilities are located within a floodplain.

Morris notes that some critical facilities, notably town hall, lack sufficient emergency generation capacity.

Emergency Response Capabilities

Morris Fire Company serves as the emergency operations center.

The Morris Volunteer Fire Department, Department of Public Works, and Emergency Management Director all possess emergency equipment that can be deployed as needed in the event of an emergency. Procedures are also in place to open and maintain the Emergency Operations Center and emergency shelter in town.

Sheltering Capabilities

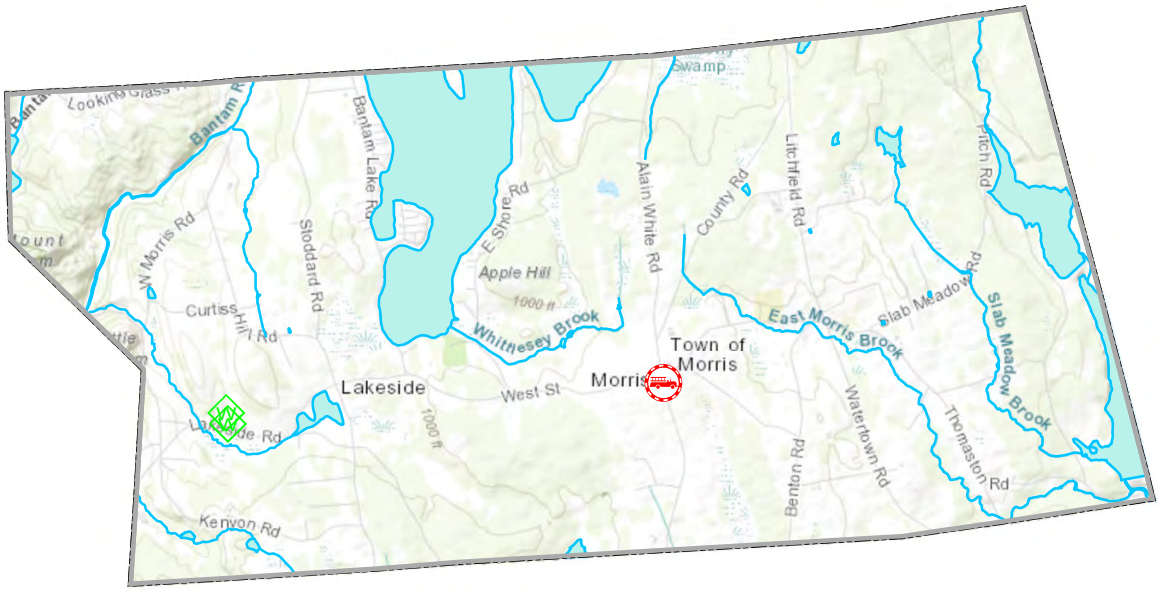
The James Morris Elementary School serves as the town's emergency shelter. The facility has water, showers, and a kitchen, but does not have emergency power. The Town previously applied for a FEMA grant to install a generator at the Morris School; however, the grant was not awarded because it was determined that the Regional School District Number 6, which owns the property, was the eligible applicant, and the Town was not. The Town will work with the superintendent of Regional School District No. 6 on making installation of an emergency generator part of the District's master plan, and on submitting a new grant application.

Communications

Morris has implemented the Everbridge Nixle public notification system in cooperation with Litchfield County Dispatch (LCD). Town staff report that this system has many benefits, but a drawback is that residents need to actively subscribe to receive notifications. The Town is currently actively working to get more individuals subscribed. The Town utilized the Nixle system during the severe summer storms in 2020, and found it to be useful. One primary utility of the system was to inform residents of road blockages.

Morris has also been working with other towns in the Litchfield Hills Region through the Northwestern CT/Litchfield Hills Public Safety Task Force to enhance communication and coordination. This has included efforts to standardize communication equipment and the equipment in local emergency operation centers, and also the upgrading of supplies at emergency shelters. Other activities being pursued are a regionally coordinated public notification system, a badging registration system for emergency responders, improved training opportunities, and the development of written mutual aid agreements.

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Critical Facilities & Cultural Resources

- EMS
- Fire Station
- Municipal Solid Waste
- National Register Building

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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - MORRIS ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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0 3,000 6,000
Feet

SCALE 1 " = 6,128 '
DATE 5/7/2021
PROJ. NO. 3843-06

FIG. 2-2

3 FLOODING

3.1 Existing Capabilities

Ordinances, Regulations and Plans

Land use regulations exist to protect natural resources, including erosion and sediment control regulations for new development, stormwater control regulations to minimize drainage problems, and a flood hazard area to control development in flood prone areas.

Within the flood hazard area, a development permit shall be obtained for any construction or development. All new construction or Substantial Improvement within the flood plain are required to be built at least six-inches above the base flood elevation (a six inch, or ½ foot, of freeboard is required). The Town defines Substantial Improvement as being cumulative over a one-year period.

Morris' subdivision regulations have detailed standards for the planning, design and construction of storm drainage systems in order to minimize adverse impacts associated with new construction activity. The Morris Inland Wetlands Commission enforces regulations to direct development away from wetlands, watercourses and floodplains.

NFIP, Flood Insurance, and Community Rating System

Morris maintains compliance with NFIP through its use of the Connecticut State Building Code, subdivision regulations, and zoning regulations. Its zoning regulations require that the lowest floor in any residential new construction or substantial improvement must be at least 6 inches above Base Flood Elevation (BFE). For non-residential, the lowest floor must also be at least 6 inches above BFE or flood-proofed to 6 inches above BFE. Morris expects to continue participation in NFIP.

According to FEMA, there are 26 flood insurance policies in force in Morris as of 6/30/2019 with an insurance value of $6,299,100. The previous edition of this HMP noted 28 flood insurance policies in force as of 8/31/2015 with an insurance value of $7,017,100.

Drainage and Street Flooding

The Morris Public Works Department routinely examines and clears public storm drains and catch basins of debris following periods of rainfall, snowfall, or windstorms. The town's DPW also monitors weather reports and maintains loaded trucks in preparation of winter storm events.

New Capabilities and Completed Actions

Morris continues to maintain its strong flood mitigation capabilities.

The area around East Shore Road has historically experienced periodic flooding due to poor drainage. The Town completed a drainage study in this area and identified a need for replacing culverts. Morris has replaced pipes under East Shore road near the Boat Launch. Replacement of the box culvert near the Town Beach turnoff is planned for coming years; the Town has begun directing money toward this project through the Capital Improvement Plan (CIP).

Summary

Morris mitigates flood damages primarily through regulating development in floodprone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate.

3.2 Vulnerabilities and Risk Assessment

Flood prone areas in the community today, as mapped by FEMA, are presented in Figure 3-1.

"One Hundred Years – A History of Morris Connecticut, 1859-1959" describes how, during one storm in 1897, "reports began to come in of highways washed away, bridges carried off, railway traffic stopped and all the concomitants of a severe storm…. Bantam river was higher than ever before in the summer, and overflowed the meadows along its course but there were no houses for it to surround. The morning train did not go down because of a culvert washed out at "Griswold's Crossing" between Bantam and West Morris. The washout was 70 feet long and 15 feet deep."

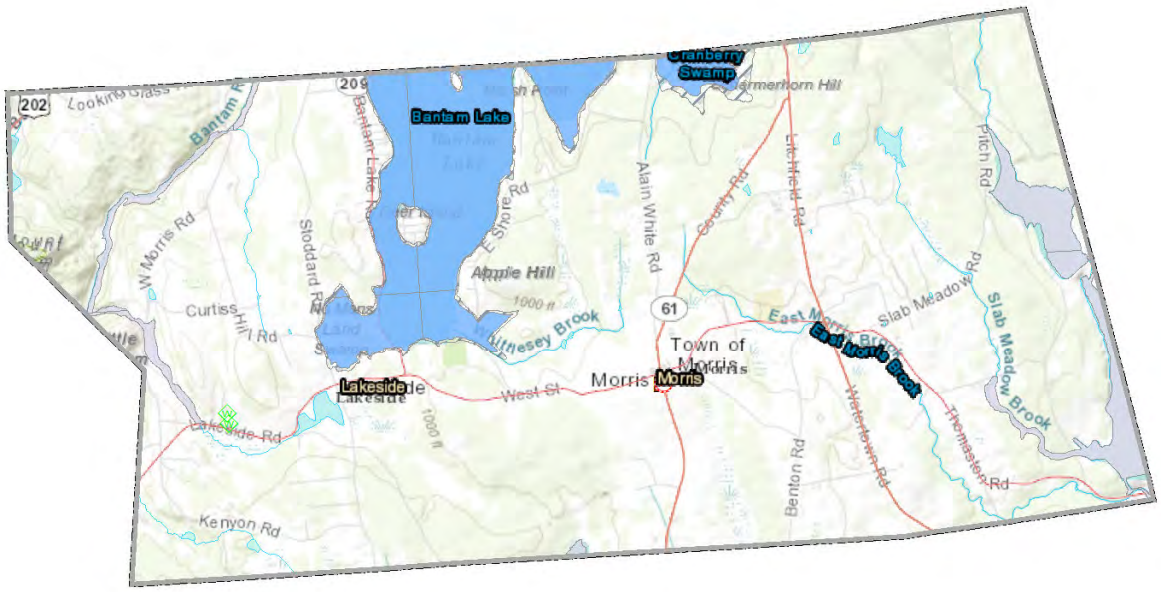
A brief account of the Flood of 1955 is also presented as follows: "Torrential rains caused by the passage of Hurricane "Diane" lashed the area. This followed closely the Hurricane "Connie" whose heavy rains had saturated the ground. The roads were flooded so that by Friday afternoon there was only one way, through Lakeside, open to Litchfield. The West Morris bridge was washed away... Bantam Lake was 10 feet above normal, at the peak which was reached by Saturday. The water flooded many cottages of Deer Island and damaged boats and docks."

Major concerns of Morris with regard to flooding include:

- Flooding caused by beavers.
- Flooding around Bantam Lake.
- Palmer Road onto Deer Island at Bantam Lake. Residences here are at risk, and occasionally are impacted by flooding; however, as these homes are constructed and repaired they are being elevated.

Historically, the East Shore Road area experienced periodic flooding due to poor drainage. The Town has improved drainage in this area, and flooding is no longer a concern.

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Legend

EMS	**Flood Zone**
Fire Station	A
Municipal Solid Waste	AE
National Register Building	X500

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FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - MORRIS ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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Feet

SCALE 1 " = 6,128 '
DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing capabilities appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Morris is 110 mph for a Category 1 event, 120 mph for a Category 2, and 125 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

The Town has been aggressive with tree trimming along municipal roads (only about 26 miles of road) with a budget of about $30,000 to 40,000 per year. Eversource has been trimming along power lines. Town reports that its tree trimming program is robust.

New Capabilities and Completed Actions

Morris continues to maintain its strong tropical cyclone mitigation capabilities.

Summary

Morris mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75

nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

Hurricanes have caused wide-spread power outages and could cause significant damage. Morris suffered Hurricane related damage from Storm Irene in August 2011 and Storm Sandy in October 2012. Both of these events caused significant power outages and the storms received Presidential Disaster Declarations. Hurricane Irene left 100% of the town without power at its peak (1,382 households).

Areas that are most vulnerable are those with greater levels of development.

A major concern of Morris with regards to high wind events is that power lines in heavily forested areas are at risk of being downed by falling tree limbs.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Morris as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

New Capabilities and Completed Actions

Morris continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

Morris mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Morris has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

The central and southern portions of the United States are at higher risk for lightning and thunderstorms than is the northeast. However, FEMA reports that more deaths from lightning occur on the East Coast than elsewhere. Lightning-related fatalities have declined in recent years due to increased education and awareness.

Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Morris area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Morris is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the Town is believed to be low for any given year. All areas of the Town are susceptible to damage from high winds.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Such fires can be extremely dangerous during the summer months during dry and drought conditions.

A major concern of Morris with regards to high wind events is that power lines in heavily forested areas are at risk of being downed by falling tree limbs.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

6 WINTER STORMS

6.1 Existing Capabilities

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas.

New Capabilities and Completed Actions

Morris continues to maintain its strong winter storm mitigation capabilities.

Summary

Morris mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

The natural hazard of greatest concern in Morris is winter ice storms with high winds and power outages. A severe snowstorm occurred in March of 1978 that brought close to three feet of heavy snow. The town suffered a major ice storm in 1978, and again in 2002, that resulted in downed power lines, extensive tree damage, and expensive clean-up costs. The snow storm of October 2011 left 99% of the town without power at its peak. At least half of the town had no power for five days.

Winter storms are a perennial concern with wide-ranging impacts. Snow covered roads take time and money to clear. Heavy snow, especially when accompanied by ice can cause roofs to collapse. Ice storms can also bring down power lines, causing outages. A major concern of Morris with regards to winter storm events is that power lines in heavily forested areas are at risk of being downed by falling tree limbs.

The most vulnerable parts of therefore, are those with dense development and lots of roads. From the town's perspective, the greatest vulnerability is town-maintained roads. In total, Morris maintains 39 miles of local roads.

7 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Morris. The Town has adopted these codes for new construction, and they are enforced by the Building Official.

New Capabilities and Completed Actions

Morris continues to maintain its earthquake and landslide mitigation capabilities.

Summary

Morris mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Earthquake Vulnerabilities

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Morris. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Morris

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

In recent years, the outlet control structure at Bantam Lake was upgraded.

Actions Completed and New Capabilities

Morris continues to maintain its capabilities for mitigating and responding to dam failure risks.

Summary

Morris mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential

- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 26 DEEP-inventoried dams within the Town of Morris. These dams are listed in Table 8-1 and shown in Figure 8-1.

Table 8-1: DEEP-Inventoried Dams in Morris

Dam#	Dam Name	Class	Owner Type
8701	MORRIS RESERVOIR DAM	C	Municipal
8702	PITCH RESERVOIR DAM	C	Municipal
8703	JONES POND DAM	BB	Private Corporation
8704	WHITE MEMORIAL BEAVER POND #7 DAM	A	Land Trust
8705	HERON POND	A	Land Trust
8706	CASTELLANO POND	A	Private
8707	EMMONS POND DAM	A	Private
8708	WILLIS POND	A	Private
8709	WATERTOWN ROAD POND	A	Municipal
8710	SLAB MEADOW #3	A	Private
8711	SLAB MEADOW #2		Private
8712	SLAB MEADOW #1	A	Private
8713	WHITE FLOWER FARM DAM #5	A	Private Corporation
8714	WHITE FLOWER FARM DAM #4	A	Private Corporation
8715	UNNAMED	A	Private
8716	PORTS POND DAM	AA	Private
8717	PORTS PASS POND	AA	Private
8718	MISSIONARY SOCIETY POND	AA	Private Corporation
8719	PLUNGE POOL #6 DAM		Land Trust
8720	TEAL POND #5 DAM	AA	Land Trust
8721	FAWN POND #4	AA	Land Trust
8722	WHITE MEMORIAL BEAVER POND #7 DIKE	A	Land Trust
8723	MASOPUST POND	AA	Private
8724	WHITE FLOWER FARM POND #2	A	Private Corporation
8725	WHITE FLOWER FARM POND #1		Private Corporation
8727	Unknown Dam research needed		Private

Significant and High Hazard dams in Morris include:
- Morris Reservoir Dam
- Pitch Reservoir Dam

The Flood of 1955 took out a number of dams and bridges in the community, including the outlet control structure to Bantam Lake.

Beaver Dams

Beavers contribute to localized flooding problems in the town periodically, with the construction of dams on private properties that are difficult to remove. Beaver have also plugged culverts on local streets such as John Weik Road, which require routine maintenance by town staff to remove.

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Legend

- EMS
- Fire Station
- Municipal Solid Waste
- National Register Building

Dam Hazard Class

- C - High Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - MORRIS ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,000 6,000
Feet

SCALE 1 " = 6,128 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 8-1

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Morris is compliant with this program and has a designated Burning Official.

The Fire Department has an annual budget item for fire pond and hydrant installation, inspection, and maintenance. A dry hydrant was repaired in October of 2020. Dry hydrants are tested on a regular basis.

Actions Completed and New Capabilities

Morris continues to maintain its capabilities for mitigating and responding to wildfire risks. A dry hydrant was repaired in October of 2020.

Summary

The Morris mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

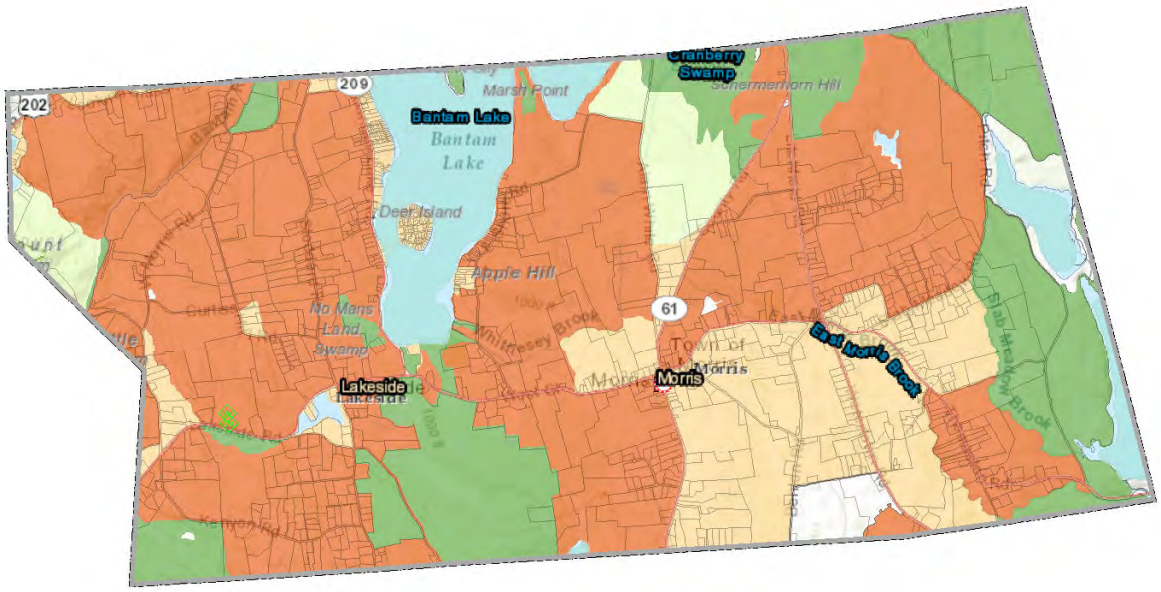
Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

The extensive forests and fields in Morris are prime locations for a wildfire. The many areas of Town where development has occurred adjacent to forestland are at an elevated risk of damage from wildfires. Such areas that are also located far from firefighting water sources are at highest risk.

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Date Saved: 5/9/2021

Document Path: Y:\3843-06\Maps\AnnexMaps.mxd



Legend

- EMS
- Fire Station
- Municipal Solid Waste
- National Register Building
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

WILDFIRE RISK AREAS

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FIG. 9-1

A serious forest fire in the summer of 1914 at Mt. Tom is described by "One Hundred Years – A History of Morris Connecticut, 1859-1959" as the "scene of the most stubborn and damaging forest fire ever seen in this town…and all the manpower in town as well as trained forest personnel and equipment of the State Department were engaged in the battle. Fire lines were dug and kept constantly patrolled until finally enough rain fell to wipe out the danger."

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

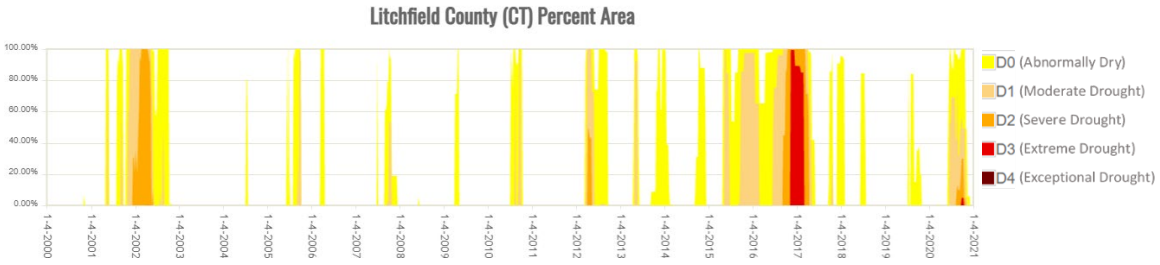


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Description	Dept.	Status	Notes
1.1	Visit schools and educate children about natural hazards and how to prepare for them.	Fire, EMD	Carry Forward	VFD does fire-prevention education programs, though the COVID pandemic has impacted this program. Carry forward action for broader education about natural hazard mitigation.
1.2	Make literature available on natural hazards and preparedness at Morris Town Hall (and website)	EMD, First Selectman	Carry Forward	Town wishes to carry this forward to share information in the Town Hall, on the Town Website, and on Facebook. The Town first needs to identify a good resource to share with the public. Specific sources or websites can be found at: www.ready.gov/publications portal.ct.gov/DEMHS/Emergency-Management/Resources-For-Individuals/Resources-for-Individuals portal.ct.gov/DEMHS/Emergency-Management/Resources-For-Individuals/Mitigation-Tips-for-Homeowners
1.3	Maintain local Emergency Operations Plan and continue to coordinate with the Regional Public Safety Task Force and Red Cross on community planning, preparedness, response, and training.	EMD, First Selectman	Capability	This is a capability. Town also coordinates with the regional school district's EOP and the Red Cross.
1.4	Continue to participate in LCD's Everbridge Emergency Notification System to provide emergency information to residents in the entire town or in a specific geographic area. This notice can provide not only warning of an impending situation but also information regarding how to pre- pare for a particular event.	EMD, First Selectman	Capability	This is a capability. The Town participates in the LCD system; additionally, the Town has implemented the Nixle Everbridge system locally.

#	Description	Dept.	Status	Notes
2.1	Routinely inspect emergency response equipment, and train for response to natural disasters.	Fire, EMD	Capability	This is a capability, performed by the Volunteer Fire Department
2.2	Acquire additional emergency response equipment including generators for the Town Hall, Elementary School, and Town Garage.	EMD, Fire	Carry Forward	Progress has been made on this action. The Town Garage, Fire House and Senior Center all have generators. The Elementary School and Town Hall do not; Town applied for a FEMA grant to pay for a generator for the Elementary School without success. Action is carried forward as two separate actions: one to install a generator at the Town Hall, and a second to work with the regional school district to complete a FEMA grant application for a generator at the Elementary School.
2.3	Promote the use of interoperable communication equipment and the development of standard operating procedures for emergency response in the regional area.	EMD, Fire, First Selectman	Complete	The Town has acquired new radios from DEMHS Region 5 through a State program to provide interoperable communication equipment for Fire Departments, EMS, EMD, and Police. Morris only has a Fire Department and EMD locally. Radios worked well in recent storms, and helped the Town stay in touch with the Region 5 coordinator and other municipal departments.
3.1	Continue to implement control measures to mitigate the flooding created by beavers.	PW	Capability	This is a capability. Town mitigates beaver activities through culvert replacements and upgrades, beaver deceivers and related measures, and trapping and removing as needed. The Town has had only moderate success with beaver deceiver measures, as the beavers eventually figure out how to block them, and they pose a significant maintenance challenge.
3.2	Maintain current program of clean-out schedules for all catch basins and drainage facilities	PW	Capability	This is a capability.
3.3	Review floodplain regulations and ordinances and update as necessary based on DEEP's "Model Floodplain Management Regulations"	PZC	Carry Forward	The State Building Code requires one foot of freeboard for construction within the floodplain; the DEEP model flood regulations have been updated to reflect this, but Morris has not yet adopted freeboard. This action is carried forward.
3.4	Continue to identify the location of structures that are susceptible to flooding to facilitate risk assessment and potential control measures.	DEMHS, DEEP	Capability	This is a capability. The only specific location of concern identified by the First Selectman is Palmer Road onto Deer Island. Residences there are at risk, and occasionally are impacted by flooding; however, as these homes are constructed and repaired they are being elevated. Town staff report that there is not much flood concern elsewhere in Town.

#	Description	Dept.	Status	Notes
3.5	Continue to implement the municipal tree trimming program to maintain the road right-of-way.	First Selectman, PW	Capability	This is a capability. The Town has been aggressive with tree trimming along municipal roads (only about 26 miles of road) with a budget of about $30,000 to 40,000 per year. Eversource has been trimming along power lines. Town reports that its tree trimming program is robust.
3.6	Conduct drainage feasibility study of the East Shore Road area to identify corrective actions for the periodic flooding at this location	First Selectman, PW	Completed	Town completed study and identified need for replacing culverts. Pipes under East Shore Road near the Boat Launch turnoff have been replaced. The box culvert under the road near the Town Beach turnoff is planned to be replaced in the future. The Town has begun directing money toward this project through its CIP.
3.7	Discuss requiring new buildings constructed in floodprone areas to be protected to the highest recorded flood level regardless of being within a defined Special Flood Hazard Area (SFHA).	PZC	Drop	All new structures built in the flood plain are required to be built above the base flood elevation. Additionally, new state building code standards and floodplain zoning regulation guidelines require elevation to one or two feet above base flood elevation (freeboard). Local enforcement of the State building code suspends the need for this action.
3.8	Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	PW	Carry Forward	This action has not yet been completed due to budget and funding limitations. Engineers working with Public works will do this action in the future.
3.9	Require the location of utilities underground in new developments or during redevelopment whenever possible.	Building, PZC, PW	Drop	Tow has very few new developments. This action is not required for new development, but many new subdivisions tend to do this if feasible. This action is not considered necessary.
3.10	Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	Fire, EMD, PW	Capability	This is a capability.
3.11	The Town should continue to require the installation of fire protection water in new developments.	Building, PZC	Capability	This is a capability. There is no public water system in town. Some developments have sprinkler systems – the Town Code has a requirement based on square footage of a building. The Fire Department has an annual budget item for fire pond and hydrant installation, inspection, and maintenance. A dry hydrant was repaired in October of 2020. Dry hydrants are tested on a regular basis.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. These include:

- Replace the box culvert near the Town Beach.

Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. All actions are listed below.

Action MRS-01	
Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB, Sustainable CT
Timeframe	2022
Priority	High

Action MRS-02	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action MRS-03	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action MRS-04	
Visit schools and educate children about natural hazards and how to prepare for them.	
Lead	EMD; School
Cost	$0 - $25,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2023
Priority	Low

Action MRS-05	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action MRS-06	
Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action MRS-07	
Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Med

Action MRS-08	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action MRS-09	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action MRS-10	
Make literature available on natural hazards and preparedness at Morris Town Hall (and website).	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action MRS-11	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action MRS-12	
Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEEP
Timeframe	2023 – 2025
Priority	High

Action MRS-13	
Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action MRS-14	
Install an emergency generator at the Town Hall.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action MRS-15	
Work with the regional school district to complete a FEMA grant application for a generator at the James Morris Elementary School.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action MRS-16	
Replace the box culvert near the Town Beach.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
MRS-01	Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	Sustainable CT	Planning	$0 - $25,000	OB, Sustainable CT	2022	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
MRS-02	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
MRS-03	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
MRS-04	Visit schools and educate children about natural hazards and how to prepare for them.	School Education	EMD; School	$0 - $25,000	OB, CT DEMHS	2022 – 2023	1	0	0	1	1	1	0	0	0	-1	0	0	0	0	4
MRS-05	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
MRS-06	Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
MRS-07	Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	RLP	Planning	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
MRS-08	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
MRS-09	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
MRS-10	Make literature available on natural hazards and preparedness at Morris Town Hall (and website).	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
MRS-11	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
MRS-12	Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	NRCC Guidance	DPW	$50,000 - $100,000	OB, CIP, CT DEEP	2023 – 2025	0	1	1	0	0	1	1	0	0	0	0	0	0	0	6
MRS-13	Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
MRS-14	Install an emergency generator at the Town Hall.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
MRS-15	Work with the regional school district to complete a FEMA grant application for a generator at the James Morris Elementary School.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
MRS-16	Replace the box culvert near the Town Beach.	Culvert & Bridge Upgrades	DPW	$100,000 - $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5

APPENDIX B

RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF MORRIS BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Morris has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Morris Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Morris and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Morris; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Morris, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Morris eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Morris;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Morris, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Morris this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

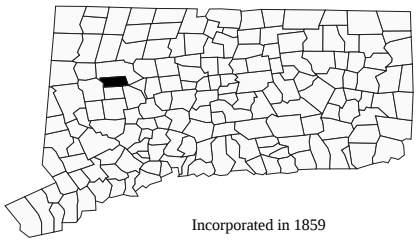
2019 CERC TOWN PROFILE

Morris, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
3 East Street P.O. Box 66
Morris, CT 06763
(860) 567-7430

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1859

Demographics

Population

	Town	County	State
2000	2,301	182,193	3,405,565
2010	2,388	189,927	3,574,097
2013-2017	2,367	184,454	3,594,478
2020	2,341	193,116	3,604,591
'17 - '20 Growth / Yr	-0.4%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	17	921	4,842
Pop./Sq. Mile (2013-2017)	136	200	742
Median Age (2013-2017)	47	47	41
Households (2013-2017)	900	74,605	1,361,755
Med. HH Inc. (2013-2017)	$89,107	$76,438	$73,781

	Town	State
Veterans (2013-2017)	141	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	139	6%	207	9%	325	14%	478	20%	815	34%	403	17%	2,367	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	2,256	164,992	2,446,049
Black Non-Hisp	0	2,843	350,820
Asian Non-Hisp	13	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	21	2,320	84,917
Hispanic or Latino	77	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	2.8%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	444	26%	673,582	27%
Associates Degree	158	9%	188,481	8%
Bachelors or Higher	681	40%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	85	525
23 - Construction	16	31
31-33 - Manufacturing	NA	NA
42 - Wholesale Trade	5	21
44-45 - Retail Trade	NA	NA
81 - Other Services (except Public Administration)	15	26
Total Government	12	62

Top Five Grand List (2018)

	Amount
DUNN LLC	$7,168,690
CITY OF WATERBURY	$5,919,330
WHITE MEMORIAL FOUNDATION	$5,236,840
CONNECTICUT LIGHT AND POWER	$3,510,410
WHITE FLOWER FARM INC	$2,644,490
Net Grand List (SFY 2016-2017)	$299,635,985

Major Employers (2018)

Town of Morris
Camp Washington
Dollar General
James Morris School
American Backplace

Education

2018-2019 School Year

	Grades	Enrollment
Regional School District 06	PK-12	912

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	77.8%	53.8%	75.0%	51.3%	58.7%	43.0%
ELA	75.9%	53.1%	81.8%	54.9%	68.1%	56.1%

Pre-K Enrollment (PSIS)

	2018-2019
Regional School District 06	58

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Regional School District 06	9.9%

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 06	97.2%	100.0%	94.1%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	72.3%	84.0%	86.8%
Private	27.7%	16.0%	13.2%

profiles.ctdata.org

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Morris, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$8,912,717	Total Expenditures (2017)	$8,726,553	Annual Debt Service (2017)	$0
Tax Revenue	$8,570,391	Education	$6,382,425	As % of Expenditures	0.0%
Non-tax Revenue	$342,326	Other	$2,344,128	Eq. Net Grand List (2017)	$428,473,618
Intergovernmental	$191,518	Total Indebtedness (2017)	$1,855,618	Per Capita	$188,175
Per Capita Tax (2017)	$3,741	As % of Expenditures	21.3%	As % of State Average	124.7%
As % of State Average	127.6%	Per Capita	$815	Moody's Bond Rating (2017)	-
		As % of State Average	32.4%	Actual Mill Rate (2017)	27.83
				Equalized Mill Rate (2017)	19.88
				% of Net Grand List Com/Ind (2017)	2.3%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	1,301	88,068	1,507,711
% Single Unit (2013-2017)	90.5%	73.6%	59.2%
New Permits Auth (2017)	1	142	4,547
As % Existing Units	0.1%	0.2%	0.3%
Demolitions (2017)	0	32	1,403
Home Sales (2017)	24	1,753	21,880
Median Price	$339,000	$250,100	$270,100
Built Pre-1950 share	40.1%	31.2%	29.3%
Owner Occupied Dwellings	767	57,330	906,798
As % Total Dwellings	85.2%	76.8%	66.6%
Subsidized Housing (2018)	29	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	0	57	536
$100,000-$199,999	3	563	5,237
$200,000-$299,999	5	538	6,681
$300,000-$399,999	7	315	3,863
$400,000 or More	9	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$790	$995	$1,123
Cost-burdened Renters	33.3%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	1,395	101,000	1,827,070
Residents Unemployed	50	4,014	78,242
Unemployment Rate	3.5%	3.8%	4.1%
Self-Employed Rate	22.8%	13.0%	10.0%
Total Employers	85	6,177	122,067
Total Employed	525	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Torrington, CT	63	Litchfield, CT	127
Morris, CT	57	Waterbury, CT	95
Litchfield, CT	32	Torrington, CT	76
Waterbury, CT	26	Morris, CT	57
Watertown, CT	25	Watertown, CT	46
Thomaston, CT	17	Hartford, CT	42
Naugatuck, CT	13	Washington, CT	34

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	413	1,777
Violent	0	228

Disengaged Youth (2013-2017)

	Town	State
Female	0.0%	4.2%
Male	0.0%	5.6%

	Town
Library circulation per capita	8.70

Distance to Major Cities

	Miles
Hartford	28
New York City	80
Providence	93
Boston	121
Montreal	267

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Municipal Provider
Local Contact

Cable Provider
Cablevision of Litchfield, Inc.
(860) 567-3103

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Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

NEW HARTFORD, CT

530 Main Street
New Hartford, CT 06057
MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of New Hartford and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of New Hartford is a rural town in the Litchfield Hills Region bordered on the north by Barkhamsted, the east by Canton, the south by Harwinton and Burlington, and on the west by Torrington.

The town encompasses 38.1 square miles (37 square miles of land), and was incorporated in October of 1738.

Notable characteristics of the municipality include the Farmington River, which traverses the northeastern portion of the town, New Hartford Town Center, West Hill Pond, Nepaug Reservoir, Nepaug State Forest, rolling hills, forested land, farmland, patches of wetlands, scattered ponds, and large lot residential development. Major highways serving the town include State Routes 44, 202, and 219.

2.2 Existing Land Use

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 73% of New Hartford is forested and approximately 9.5% is developed.

Table 2-1: 2015 Land Cover by Area

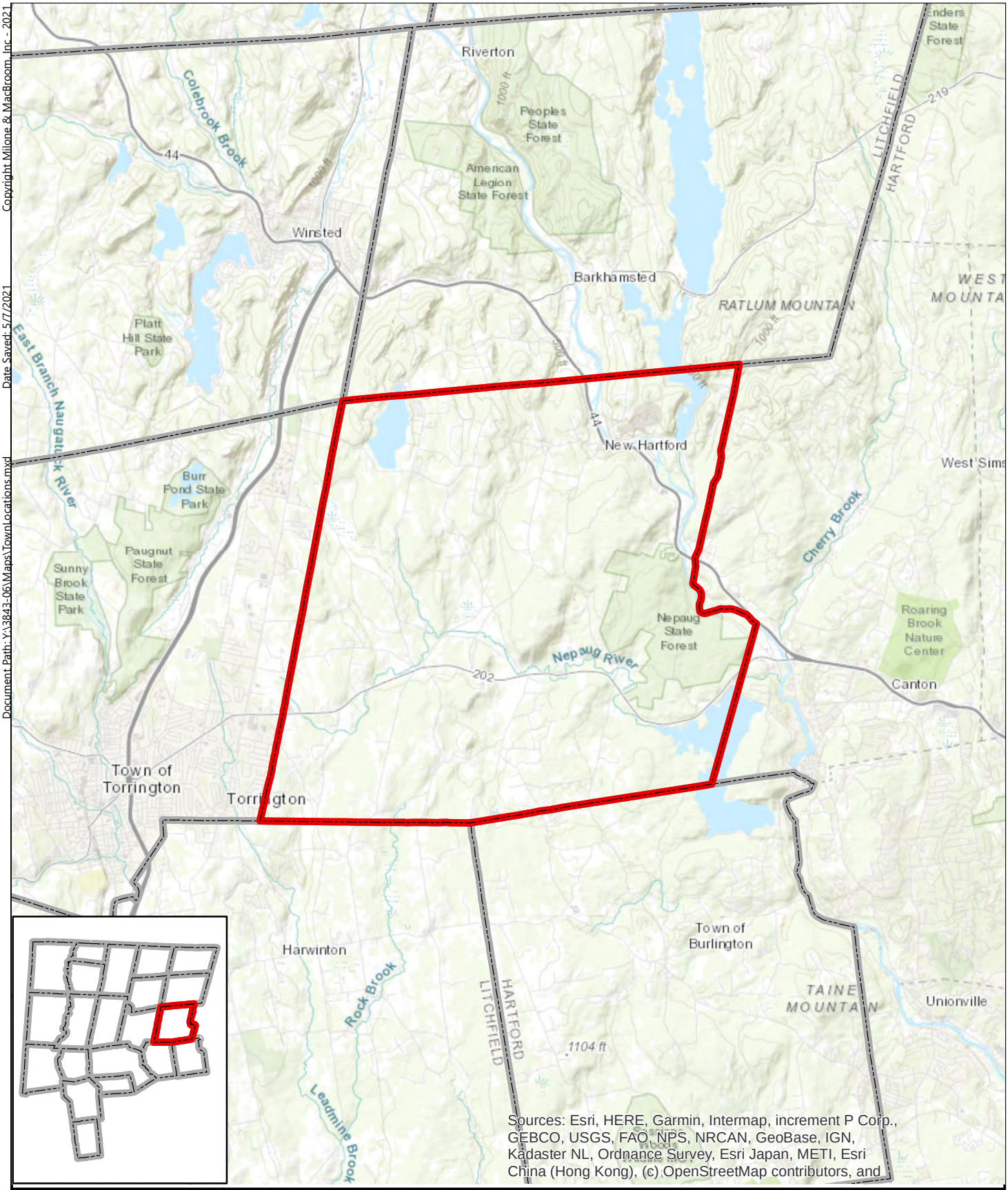
Land Cover	Area (acres)	Percent of Community
Developed	2,296.9	9.43%
Turf & Grass	933.6	3.83%
Other Grass	450.1	1.85%
Agricultural Field	1,759.7	7.22%
Deciduous Forest	9,818.7	40.30%
Coniferous Forest	7,429.9	30.50%
Water	915.4	3.76%
Non-Forested Wetland	103.1	0.42%
Forested Wetland	497.5	2.04%
Tidal Wetland	0.0	0.00%
Barren	79.3	0.33%
Utility Row	78.4	0.32%
Total	**24,363**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

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REGIONAL LOCATION: NEW HARTFORD

HAZARD MITIGATION PLAN UPDATE - NEW HARTFORD ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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SCALE	1 " = 10,198 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-1

2.3 Development Trends

The "New Hartford 2005 Plan of Conservation and Development" presents a brief description of the town's history:

> *"Much of New Hartford's history and physical structure is defined by natural resources (such as rivers) and by transportation (such as the railroads and roads).*
>
> *The Farmington and Nepaug Rivers and the hills and forests provided intense physical beauty and supported Native American settlements. The soils supported subsistence and commercial agriculture for settlers. The rivers also powered the mills of early settlers and provided water power for industry. The arrival of railroad service, coupled with the abundance of water power, helped turn New Hartford into a manufacturing center in the late 1800's…..*
>
> *Around the turn of the century, a drought and the availability of electric power elsewhere diminished the advantage of proximity to the rivers and New Hartford experienced fluctuations in population. Major floods later breached the dam on the Farmington River and vehicular traffic began to compete with railroads. With manufacturing businesses already moving south in search of cheaper labor, New Hartford again became a rural agricultural community.*
>
> *The importance of local rivers was further illustrated in the 1900's when the Metropolitan District Commission began acquiring land for public water supply reservoirs in New Hartford and other communities.*
>
> *After World War II, New Hartford began to experience suburban development although at a slower pace than other communities due to its remoteness from employment centers. However, during the later 1980's and 1990's, this growth accelerated as people commuted longer distances for community character and quality of life they sought."*

According to the US Census, the population of New Hartford increased an average of 79 persons per year, from a population of 3,033 people in 1960 to 6,970 in 2010. U.S. Census Bureau estimates for 2019 show a population around 6,703 individuals, a decrease from 2010 of 3.8%. The Connecticut State Data Center predicts that population will increase by 8.8% through 2025 to an estimated population of 7,292 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in New Hartford remained steady between 2013 and 2017. The number of permits issued in 2013 and 2014 was 6 and 6, respectively, while 9 permits were issued in 2016, and 7 permits were issued in 2017. On average, 7 housing permits were issued each year in New Hartford between 2013 and 2017. Many of these have reportedly been large lakeside homes redeveloped on existing properties that are demolished before new construction.

According to the U.S. Census Bureau, the overall number of housing units in New Hartford dropped by approximately 0.4-percent between 2010 and 2019, from 2,923 units in 2010 to 2,911 units in 2019. In 2019, the housing stock was made up of approximately 92% single-unit

structures, 1% two-unit structures, 7% multi-unit structures, and 0% mobile-homes or other types of structures. Over 80% of the housing in town is owner occupied, with about 13% of the housing stock occupied by renters and 6% held for seasonal, recreational or occasional use (second homes).

According to the Connecticut Office of Policy and Management, New Hartford's 2019 Total Equalized Net Grand List was valued at $695,088,247. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for New Hartford, included as Appendix C.

New Hartford anticipates a rise in development in the coming years, as demands seem to be shifting in the region. As of 2020, the Town was in early discussions with a developer for a new senior housing complex. The location of this site has not yet been determined.

There were five floodplain permits issued between 2010 and 2015; most of these permits were the replacement or reconstruction of existing structures with the exception of an additional propane tank and a moveable shed.

The Town has acquired a significant amount of open space over time, and owns parcels larger than 100 acres in size. Acquiring and preserving land as open space limits the exposure of potential new development to a variety of natural hazards, including flooding.

Overall, the slow pace of development in New Hartford has somewhat increased the community's exposure to natural hazards over the last five years; however, increased development has been balanced by improving hazard mitigation capabilities, including development regulations and preservation of open space. Risks are not expected to increase because of development over the next five years.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

New Hartford is considered to have a Low level of social vulnerability, with a relatively higher vulnerability score for the SVI category of Minority Status and Language. In other words, a

particular challenge in Morris may include residents who need additional assistance during a disaster event due to language barriers, or residents who are otherwise socially marginalized due to their minority status.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in New Hartford.

New Hartford is part of the Northeastern Highlands Ecoregion, which is characterized by "hills and mountains, a mostly forested land cover, nutrient-poor frigid and cryic soils (mostly Spodosols), and numerous highgradient streams and glacial lakes" (as described on the map "Ecoregions of New England").

2.5 Climate and Climate Change

Over the course of the year, the temperature in New Hartford typically varies from 18°F to 81°F and is rarely below 3°F or above 89°F. The warm season lasts for 3.6 months, from May 28 to September 15, with an average daily high temperature above 71°F. The hottest day of the year is July 20, with an average high of 81°F and low of 63°F. The cold season lasts for 3.3 months, from December 1 to March 10, with an average daily high temperature below 42°F. The coldest day of the year is January 30, with an average low of 18°F and high of 33°F.

Precipitation falls throughout the year in New Hartford. The wetter season lasts 3.5 months, from May 3 to August 20, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on May 29. The drier season lasts 8.5 months, from August 20 to May 3. The smallest chance of a wet day is 22% on January 29.

The most rain falls during the 31 days centered around October 1, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.4 inches.

The snowy period of the year lasts for 5.8 months, from October 25 to April 19, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 23, with an average total liquid-equivalent accumulation of 1.3 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in New Hartford as 4.90 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in New Hartford at 5.79 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.9	6.2	8.7
NOAA Atlas 14	5.8	7.2	9.3

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 New Hartford can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.3 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

The majority of New Hartford falls within the Nepaug River Subregional Basin. Within this basin, streams including South Nepaug Brook, Bakersville Brook, Torringford Brook, Cedar Swamp Brook, Finnak Brook, North Brook, Marandus Brook, and Beckwith Brook all flow into the Nepaug River, which flows eastward into the Nepaug River, sitting on New Hartford's Border with Canton and Burlington.

To the northeast of the Nepaug River watershed is the Farmington River Mainstem Subregional Basin. East Mountain Brook and Hallock Brook flow into the Farmington River.

The northeast corner of New Hartford falls within the East Branch Farmington River watershed, and includes Lake Mcdonough on the dammed East Branch Farmington. To the east of this reservoir is Ratlum Brook.

The northwest edge of New Hartford contains West Hill Pond and Laurel Lake, which drain northward into Morgan Brook in Barkhamsted.

The southwest corner of New Hartford is in the Leadmine Brook basin (drained by the East Branch Leadmine Brook), and the northern edge of the Rock Brook basin.

2.7 Governmental Structure and Capabilities

The Town of New Hartford has a number of existing authorities, policies, programs and regulations that serve to mitigate the impact of natural hazards. Existing local authorities include the New Hartford Board of Selectmen, Planning and Zoning Commission, Inland Wetlands Commission, Emergency Management Director, Fire Department, and Department of Public Works.

Town of New Hartford personnel have expressed concern in the past that local hazard vulnerability analysis is hampered by a lack of GIS capabilities.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some

of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in New Hartford are concentrated within the Pine Meadow Historic District, though other resources are distributed throughout Town. Historic resources include historic homes, churches, mill buildings (such as Gillette's Grist Mill), and more. Resources near flood sources, such as the Grist Mill, may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

The primary transportation routes into and out of the town are Route 202 running east-west, Route 219 running north-south, and Route 44 running northwest to southeast through the northeast corner of Town. Other key roads include West Hill Road, Cedar Lane, South Road, and South East Road.

There is no local public transit system in New Hartford.

New Hartford personnel have expressed concern in the past about the fact that there is no agreement for providing mass transportation in the event of a major incident.

Utilities

Public water in New Hartford is provided by the New Hartford Water Department (primarily serving the Pine Meadow are), as well as a handful of small Community Water Systems and Non-Community Public Water Systems. Many residents and businesses rely on private well water.

Eversource is the primary provider in Town for electricity and natural gas.

According to geoISP (geoISP.com), there is one DSL Providers (at&t), 2 Cable Internet providers (Charter Spectrum, CSC Holdings), and 2 Fiber Internet (Fibertech Networks, LLC; Connecticut

Education Network) providers in New Hartford, CT. There are also 4 Mobile Broadband (cellular) providers with service available in New Hartford.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

New Hartford has identified several critical facilities throughout the town, as summarized on Table 2-3 below.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
New Hartford Public Safety Department	530 Main Street	Emergency Response			
New Hartford Volunteer Ambulance Service	12b Greenwoods Rd	EMS			
New Hartford Fire Department Station 1	3 Greenwoods Rd	Emergency Response			
New Hartford Fire Department Station 2	3 Arrowhead Dr	Emergency Response			
Pine Meadow Volunteer Fire Department	366 Main Street	Emergency Response			
South End Volunteer Fire Department	20 Antolini Road	Emergency Response			
Town Hall	530 Main Street	Municipal Facility	✔		
Ann Antolini School	30 Antolini Road	Shelter	✔	✔	
Wastewater Treatment Plant	232 Main Street	Utility	✔		✔
Public Works Department	9 Greenwoods Road	Emergency Support	✔		✔
Barkhamsted Leaf Compost Facility	Barkhamsted	Solid Waste			

The major facilities at risk in the community in the event of a natural hazard include the New Hartford Town Hall, Ann Antolini Elementary School, Town Public Works Department, Wastewater Treatment Plant, and the four New Hartford Fire Stations.

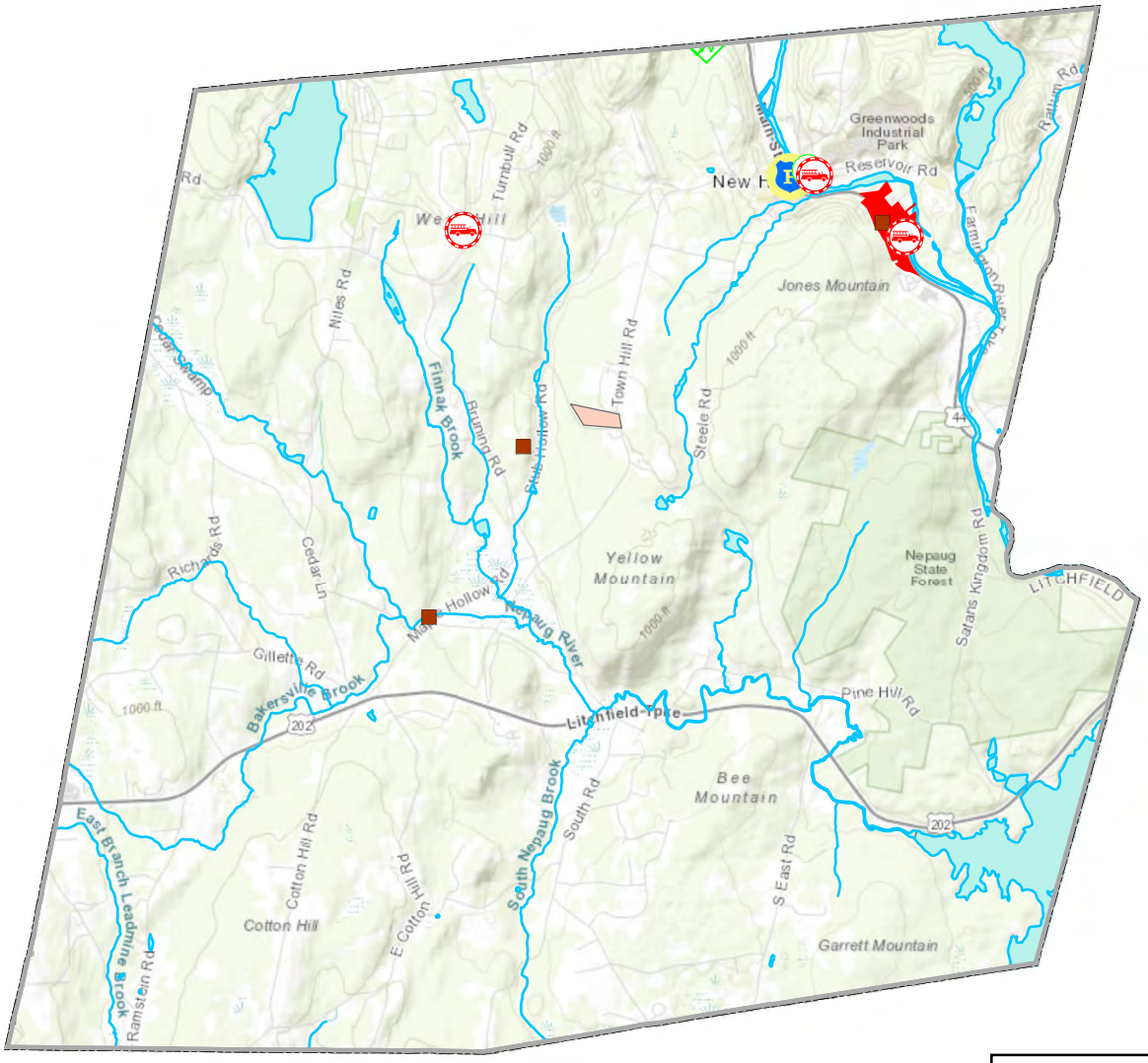
These are considered critical facilities in the event of a natural disaster because they might be needed for effective emergency response. All are potentially vulnerable to tornados, winter storms, wildfire, and earthquakes. Two of these facilities appear to be located within the 100-year floodplain of the Farmington River, as currently mapped.

The New Hartford public sewer system includes three pumping stations, each with backup power, in addition to the Wastewater Treatment Plant (WWTP) itself.

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Critical Facilities & Cultural Resources

- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register
- National Register District

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CHESHIRE, CT 06410
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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - NEW HARTFORD ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,000 6,000
Feet

SCALE	1 " = 6,373 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-2

Emergency Response Capabilities

New Hartford Town Hall serves as the emergency operations center for New Hartford.

The New Hartford Volunteer Fire Departments, Department of Public Works, and Emergency Management Director all possesses emergency equipment that can be deployed as needed in the event of an emergency. Procedures are also in place to open and maintain the Emergency Operations Center and emergency shelter in town.

The New Hartford, Pine Meadow, and South End Fire Departments all operate independently; the Town would like to see them all consolidated in the future.

Sheltering Capabilities

New Hartford Town Hall serves as an emergency shelter for smaller incidents.

The Ann Antolini Elementary School serves as the town's emergency shelter for larger incidents.

Town of New Hartford officials have expressed concern in the past about insufficient supplies for emergency shelters.

Communications

New Hartford has implemented the Everbridge public notification system in cooperation with Litchfield County Dispatch. The Town also utilizes direct emails, as well as social media, to communicate with residents. Reportedly the direct emails are more successful than Everbridge alerts.

New Hartford has also been working with other towns in the Litchfield Hills Region through the Northwestern CT/Litchfield Hills Public Safety Task Force to enhance communication and coordination. This has included efforts to standardize communication equipment and the equipment in local emergency operation centers, and also the upgrading of supplies at emergency shelters. Other activities being pursued are a regionally coordinated public notification system, a badging registration system for emergency responders, improved training opportunities, and the development of written mutual aid agreements.

3 FLOODING

3.1 Existing Capabilities

Ordinances, Regulations and Plans

Land use regulations exist to protect natural resources, including erosion and sediment control regulations for new development, stormwater control regulations to minimize drainage problems, and a floodplain overlay district area to control development in flood prone areas. The floodplain overlay district provides that any new construction or substantial improvement of any residential structure shall have the lowest floor, including the basement, elevated to at least one foot above the base flood elevation. Nonresidential construction is required to have the lowest floor, including basement, elevated to at least one foot above the base flood elevation or be flood-proofed to one foot above the base flood elevation. New Hartford defines Substantial Improvement as being cumulative over a ten-year period.

A registered professional engineer or architect is required to design and certify the construction of structures in the floodplain in order to minimize flood damage. Additionally all attendant utilities or sanitary facilities should be located or designed to avoid infiltration or impairment by flood waters. Recreational vehicles are permitted to remain within the overlay zone for no more than 4 weeks and must be licensed and road ready.

New Hartford's subdivision regulations have detailed standards for the planning, design and construction of storm drainage systems in order to minimize adverse impacts associated with new construction activity. The New Hartford Inland Wetlands Commission enforces regulations to direct development away from wetlands, watercourses and floodplains.

The New Hartford Elementary school is in flood prone area; flood evacuation procedures are included in the school's emergency plans.

NFIP, Flood Insurance, and Community Rating System

New Hartford maintains compliance with NFIP through its use of the Connecticut State Building Code, subdivision regulations, and zoning regulations. In fact, its zoning regulations require that the lowest floor in any residential new construction or substantial improvement must be *at least* 1 foot above Base Flood Elevation (BFE). For non-residential, the lowest floor must also be *at least* 1 foot above BFE or flood-proofed to 1 foot above BFE. Where they impose stricter guidelines, the Farmington River Protection Overlay District regulations supersede the Floodplain Overlay District regulations. New Hartford expects to continue participation in NFIP.

According to FEMA, there are 92 flood insurance policies in force in New Hartford as of 6/30/2019 with an insurance value of $18,841,500. The previous edition of this HMP noted 194 flood insurance policies in force as of 8/31/2015 with an insurance value of $41,614,700.

Drainage and Street Flooding

The New Hartford Public Works Department routinely examines and clears public storm drains and catch basins of debris following periods of rainfall, snowfall, or windstorms. The town's DPW also monitors weather reports and maintains loaded trucks in preparation of winter storm events.

Other Capabilities

During a heavy rain event or other storm, releases from Farmington River impoundments upstream are good at mitigating downstream flooding.

New Capabilities and Completed Actions

New Hartford continues to maintain its strong flood mitigation capabilities. The Town has performed extensive road-curbing work throughout town to help improve stormwater drainage and mitigate flooding of properties adjacent to roads.

The Carpenter Road bridge was recently completely reconstructed. The Town sought to increase the culvert size as well, but this was not permitted by DEEP. The old structure was a stone wall abutment without wingwalls, whereas the upgrade includes new wingwalls. Additionally, stream restoration work was performed as part of the project.

Summary

New Hartford mitigates flood damages primarily through regulating development in floodprone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate.

3.2 Vulnerabilities and Risk Assessment

The Flood of 1955 impacted New Hartford as it did other communities in the region. The flood took out a number of dams and bridges in the community, including the major bridges in the Town Center and at Satan's Kingdom.

Flood prone areas in the community today, as mapped by FEMA, are presented in Figure 3-1.

3.2.1 Vulnerability Analysis of Critical Facilities

Two critical facilities (Public Works and the WWTP) appear to be located within the 1% annual-chance floodplain of the Farmington River, as currently mapped by FEMA. Others, including the Public Safety Department, Volunteer Ambulance Service, Fire Department Station 1, Pine Meadow VFD, and Town Hall, are located in areas near flood zones, or may face access issues because of flooding.

The Town Public Works Department was previously proposed for relocation to another part of town where it would be outside of the floodplain.

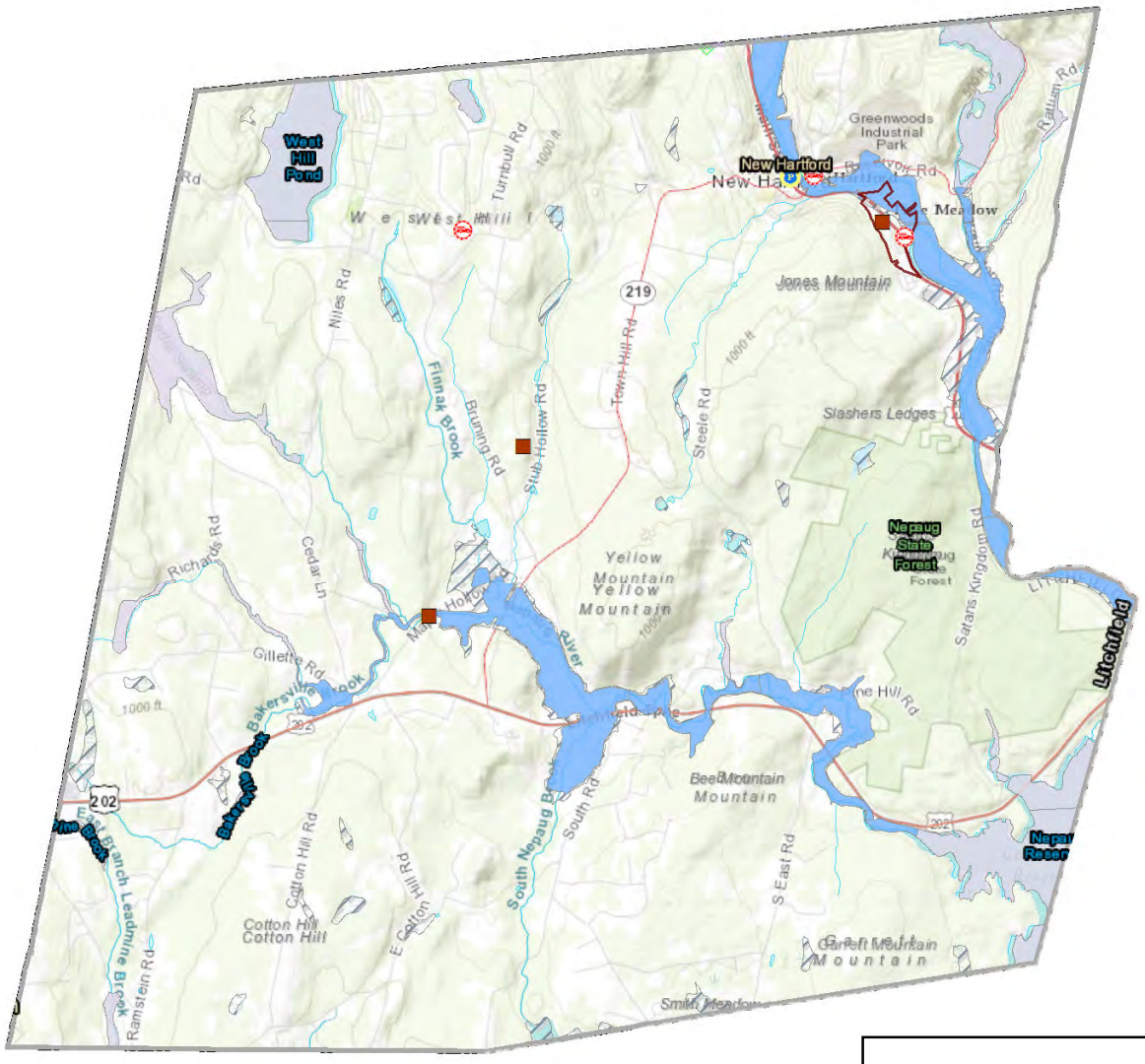
Additionally, the New Hartford Elementary School (not listed as a critical facility) is mapped within the 1% annual-chance flood hazard zone of the Farmington River.

3.2.2 Vulnerability Analysis of Areas Along Watercourses

The area of greatest flood concern locally is along the Farmington River and Nepaug River.

A specific concern is Carpenter Road Bridge over the Nepaug River. The bridge has been overtopped by floodwaters in the past. In 2020 and 2021 the bridge was upgraded, but was not increased in size; there is a concern that it therefore continues to be at risk. Note that, while referred to as a bridge, this structure appears to be a box-culvert.

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Legend

- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District

Flood Zone

- A
- AE
- FLOODWAY
- 0.2 PCT ANNUAL CHANCE

Flood Zone

- A
- AE
- X500

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FLOOD RISK AREAS

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FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing capabilities appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for New Hartford is 110 mph for a Category 1 event, 120 mph for a Category 2, and 130 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

The First Selectman serves as the tree warden. There is also a deputy tree warden. The town manages trees on public ways. Eversource, the local electric utility, provides tree maintenance near its power lines.

New Capabilities and Completed Actions

New Hartford continues to maintain its strong tropical cyclone mitigation capabilities. The Town has continued to expand public sewer and public water, which helps maintain those services during power outages.

The Town's tree maintenance budget has gone from $10,000 to $50,000 in the past 6 years to help mitigate storm issues.

Summary

New Hartford mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

Hurricanes have caused wide-spread power outages and could cause significant damage. New Hartford suffered hurricane related damage from Storm Irene in August 2011 and Storm Sandy in October 2012. Both of these events caused significant power outages and the storms received Presidential Disaster Declarations. Areas that are most vulnerable are those with greater levels of development.

Tropical Storm Isaias in August 2020 resulted in outages and blocked roads. There were minor challenges with pumping station generators during the weeklong outage; however, the generator ultimately remained in service and maintained capacity.

In general, power outages and downed trees are the biggest hazard concern for the town, during both large and relatively minor storm events. Trees tend to cause outages and blocked roads during various sized storms, including summer and winter events.

Areas that are typically of biggest concern regarding tree damage include:

- West Hill Road
- Stub Hollow Road
- Niles Road
- Hayward Road

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in New Hartford as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

New Hartford works to deliver ice to residents during power outages, and provides free water at town facilities.

New Capabilities and Completed Actions

New Hartford continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

New Hartford mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of New Hartford has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

The central and southern portions of the United States are at higher risk for lightning and thunderstorms than is the northeast. However, FEMA reports that more deaths from lightning occur on the East Coast than elsewhere. Lightning-related fatalities have declined in recent years due to increased education and awareness.

Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the New Hartford area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in New Hartford is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the Town is believed to be low for any given year. All areas of the Town are susceptible to damage from high winds.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Such fires can be extremely dangerous during the summer months during dry and drought conditions.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

6 WINTER STORMS

6.1 Existing Capabilities

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas.

New Capabilities and Completed Actions

New Hartford continues to maintain its strong winter storm mitigation capabilities.

Summary

New Hartford mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

Winter storms are a perennial concern with wide-ranging impacts. Snow covered roads take time and money to clear. Heavy snow, especially when accompanied by ice can cause roofs to collapse. Ice storms can also bring down power lines, causing outages.

A severe snowstorm occurred in March of 1978 that brought close to three feet of heavy snow. The town suffered a major ice storm in 1978, and again in 2002, that resulted in downed power

lines, extensive tree damage, loss of electrical power, and expensive clean-up costs. Another severe snow storm in October 2011 caused significant damage from downed tree limbs and extensive power outages. The snow storm of October 2011 left 100% of the town without power at its peak. At least 90% of the town had no power for four days.

Areas with higher levels of development are at greater risk of roof collapses due to snow accumulation. Local roads must be plowed by the town and represent a potential cost from a snow storm. In total, New Hartford maintains 97 miles of local roads.

Icing on roads can be a concern, particularly during storm conditions. Town staff report that Route 219 southbound, toward the downtown, experiences icing, as does Ratlum Road. Ratlum Road is often treated heavily during snow events due to high traffic of people visiting Ski Sundown.

7 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of New Hartford. The Town has adopted these codes for new construction, and they are enforced by the Building Official.

New Capabilities and Completed Actions

New Hartford continues to maintain its earthquake and landslide mitigation capabilities.

Summary

New Hartford mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Earthquake Vulnerabilities

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of TOWN. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of New Hartford

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

New Hartford staff attend annual Metropolitan District Commission (MDC) dam failure meetings, as well as a more intensive drills every five years. The Town would have about 30 minutes to evacuate if a failure were to occur.

Actions Completed and New Capabilities

New Hartford continues to maintain its capabilities for mitigating and responding to dam failure risks.

The West Hill Pond dam floodgate was recently rebuilt as a joint effort between new Hartford and Barkhamsted. This was a $100,000 project that was partly funded by both towns, with most of the funding sourced from fundraising efforts.

Summary

New Hartford mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 32 DEEP-inventoried dams within the Town of New Hartford. These dams are listed in Table 8-1 and shown in Figure 8-1.

Table 8-1: DEEP-Inventoried Dams in New Hartford

Dam#	Dam Name	Class	Owner Type
9201	NEPAUG DAM	C	Water Utility
9202	RICHARDS CORNER COMPENSATING DAM	C	Water Utility
9203	NEW HARTFORD RESERVOIR DAM	BB	Water Utility
9204	LAUREL LAKE DAM	BB	Lake Association
9205	JONES POND DAM	BB	Private
9206	FATTORE POND DAM	A	Private
9207	ATWOOD SWAMP POND	BB	Private
9208	STUB HOLLOW POND	A	Private
9209	SELUSKI BROS DAM	A	State Owned
9210	DISTRICT DAM	A	Water Utility
9211	NORTH BROOK POND DAM	A	Private
9212	HOLIDAY POND	A	Private
9213	DEZZANI POND	A	Private
9214	JONES POND DAM	A	Private
9215	VILLAGE WATER COMPANY RESERVOIR DAM		Private
9216	SURDAM POND [BREACHED]	AA	Private
9217	PESCE POND DAM		Private
9218	DUNBAR POND	A	Private
9219	SHOLOM POND DAM	A	Private
9220	COTTON POND DAM		Private
9221	ELVIA POND DAM	A	Private
9222	BUYAK POND DAM	AA	Private
9223	MARSH POND DAM	BB	Private
9224	RIZZO POND DAM	BB	Private
9225	HENDSEY POND DAM	A	Private
9226	COULOMBE POND DAM	A	Private
9227	GREENWOODS DAM		Private
9228	UNNAMED	AA	Private
9229	ROBBINS POND DAM	AA	Private
9230	DUMONT POND DAM	AA	Private
9231	SKI SUNDOWN POND DAM	A	Private Corporation
9232	NEW HARTFORD WASTEWATER PLANT RING LEVEE	BB	Municipal

Dam#	Dam Name	Class	Owner Type
9201	NEPAUG DAM	C	Water Utility
9202	RICHARDS CORNER COMPENSATING DAM	C	Water Utility
9203	NEW HARTFORD RESERVOIR DAM	BB	Water Utility
9204	LAUREL LAKE DAM	BB	Lake Association

High hazard dams in Town are:

- Nepaug Dam
- Richards Corner Compensating Dam

These two dams are operated by the MDC, which monitors and maintains the dams constantly.

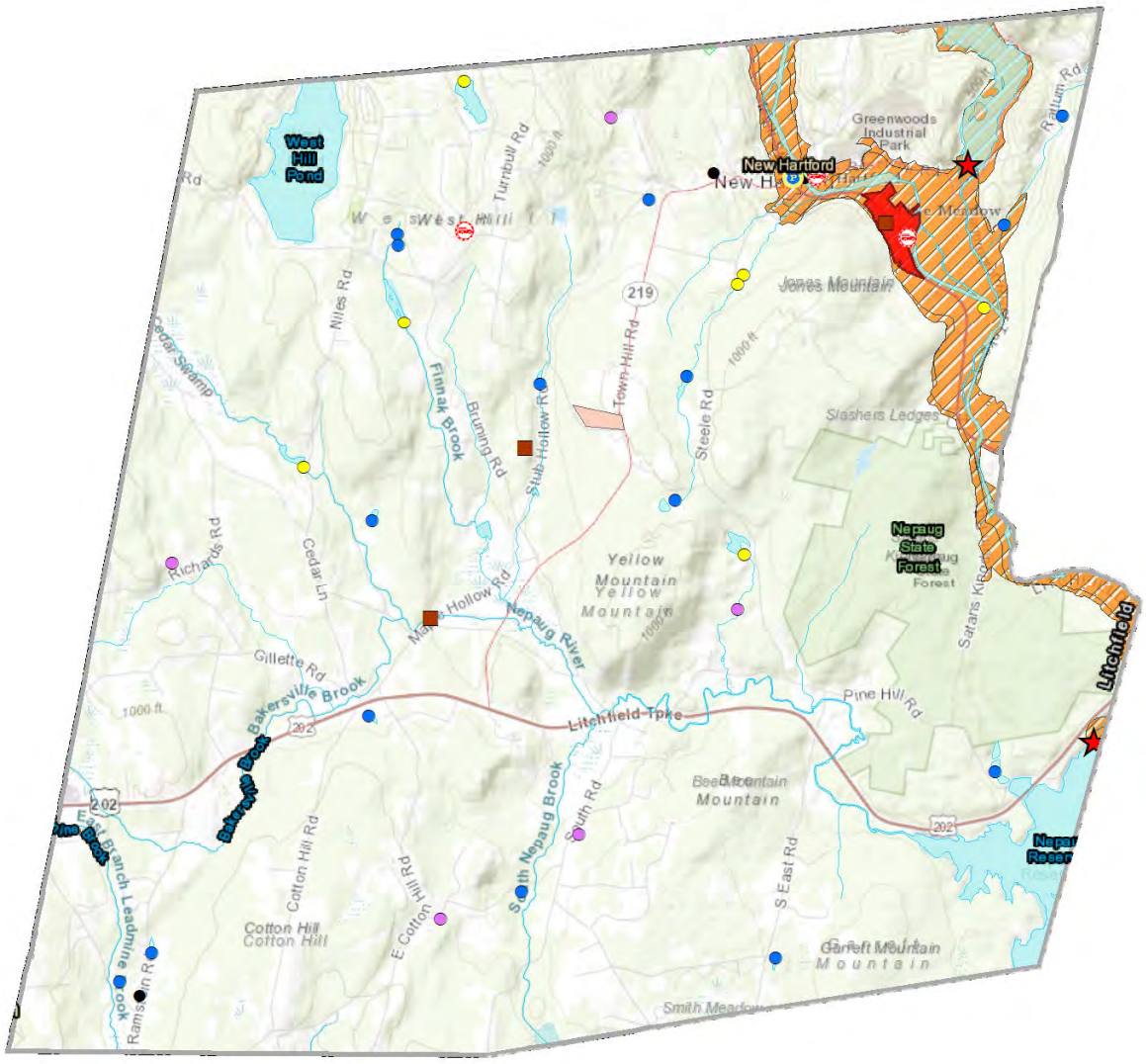
Beaver Dams

Today, beaver contribute to localized flooding problems in the town periodically with the construction of dams on private properties that are difficult to access and remove. Beavers have also plugged culverts on local streets, which require routine maintenance by town forces to remove. Areas of concern are in the south side of town, near Bakersville Brook.

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Legend

- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Area
- National Register District

Dam Hazard Class

- C - High Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

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FIG. 8-1

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of New Hartford is compliant with this program and has a designated Burning Official.

Actions Completed and New Capabilities

New Hartford continues to maintain its capabilities for mitigating and responding to wildfire risks. The Town has continued to expand public sewer and public water, which improves access to firefighting water.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

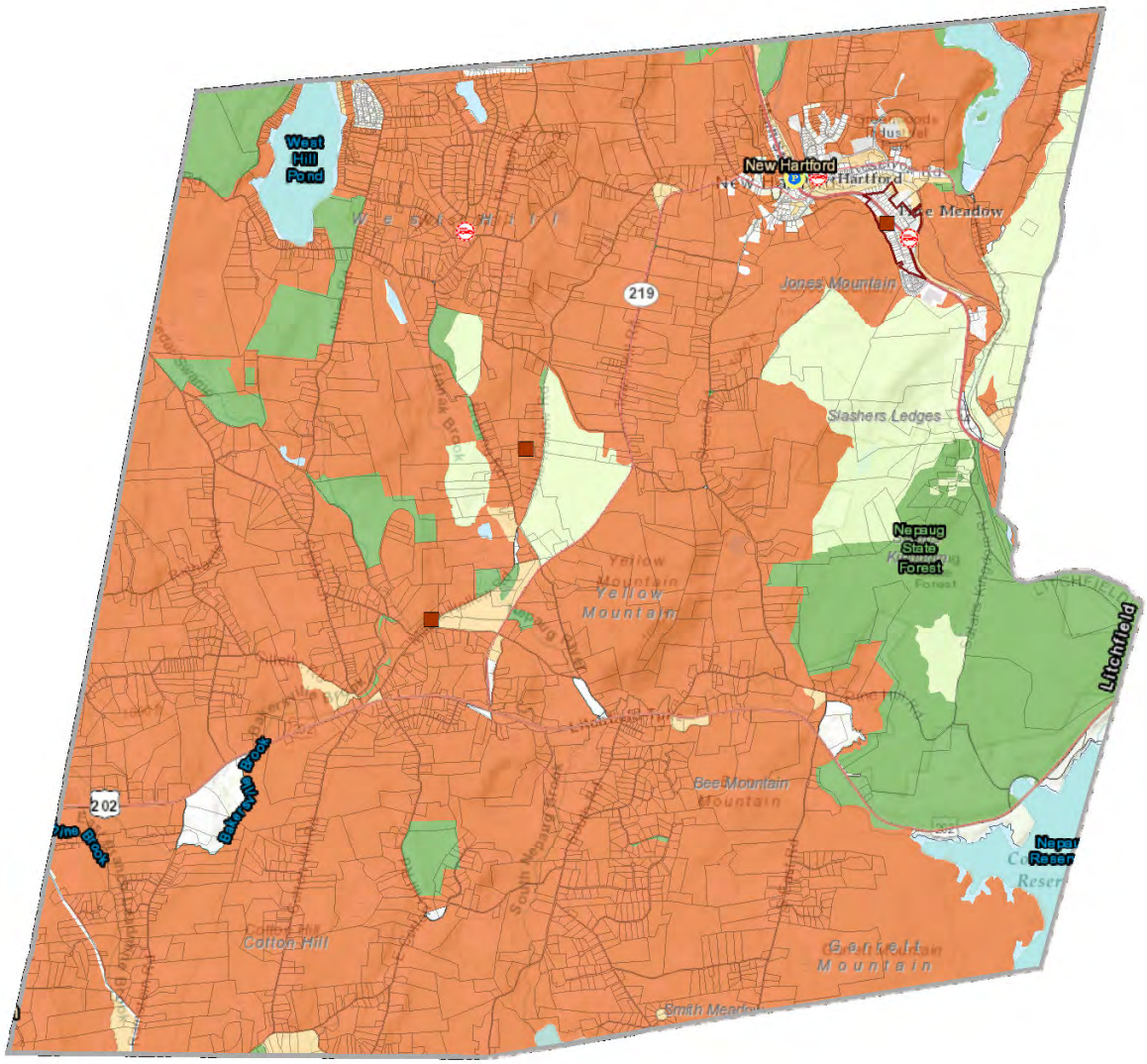
The extensive forests in New Hartford are prime locations for a wildfire. The many areas of Town where development has occurred adjacent to forestland are at an elevated risk of damage from wildfires. Such areas that are also located far from firefighting water sources are at highest risk.

Brush fires pose a problem periodically for local emergency response personnel. These are generally brought under control fairly quickly due to the accessibility provided by woods roads and other natural breaks in the forest cover.

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Legend

- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

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FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

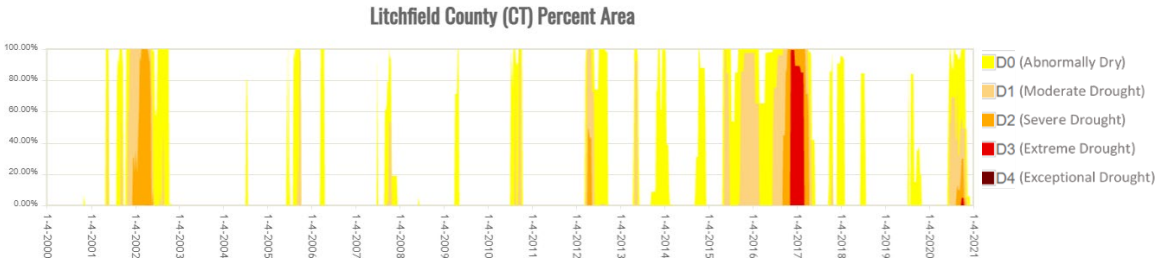


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Strategy	Who	Status	Notes
1.1	Visit schools and educate children about natural hazards and how to prepare for them.	Fire, EMD	Carry Forward	Town has not yet completed this action due to challenges interfacing with school staff and curriculum. Action carried forward.
1.2	Make literature available on natural hazards and preparedness at New Hartford Town Hall.	EMD, First Selectman	Drop	Town performs significant outreach by email and social media. Residents respond to email. Printed materials are not effective.
1.3	Maintain local Emergency Operations Plan and continue to coordinate with the Regional Public Safety Task Force and Red Cross on community planning, preparedness, response, and training.	EMD, First Selectman	Capability	The EOP is reviewed annually and updated on a 5-year basis. Town coordinates well with DEMHS, but less so with the Red Cross (typically only contacted after a structure fire). This is a capability; however, a new action is added targeted at Red Cross coordination.
1.4	Maintain Emergency Notification System to provide emergency information to residents in the entire town or in a specific geographic area. This notice can provide not only warning of an impending situation but also information regarding how to prepare for a particular event.	EMD, First Selectman	Capability	Town has access to Everbridge, but reports it is not as reliable as anticipated. The Town utilizes social media and email for public notification, which reportedly reach more residents. The Town can also utilize emergency first responders to spread information in person, if necessary.
2.1	Routinely inspect emergency response equipment, and train for response to natural disasters.	Fire, EMD	Capability	The Town fire departments are continuously inspecting equipment and drilling for emergencies. The departments acquired roughly $2 million worth of equipment, new trucks, and a tanker. This is separate budget from the Town's.
2.2	Cooperate with the Metropolitan District Commission in emergency response training exercises and updates of the Goodwin Dam Emergency Action Plan.	EMD, First Selectman	Capability	The town attends the MDC prep meeting/drill annually. This also includes attending an intensive meeting every 5 years. Evacuations in 30 minutes would be challenging, and this is typically noted during these meetings/drills.

#	Strategy	Who	Status	Notes
2.3	Acquire additional equipment and supplies for the emergency shelter at Ann Antolini School, including a generator.	Fire, EMD	Complete	Town has a generator at this site. Town has emergency road signs supplied by DEMHS, and the DEMHS emergency trailer is stationed in town at the fire department. Necessary equipment is readily available in adequate supply.
2.4	Promote the use of interoperable communication equipment, and the development of standard operating procedures for emergency response in the regional area.	EMD, Fire, First Selectman	Capability	All fire departments communicate with radio systems. The town has antennas and a shortwave radio system that they can use during an emergency. Transmission can be difficult on Rt 44 corridor north of Jones Mountain. Verizon towers have a generator in the area, but AT&T is typically not as reliable. Ad a new action to identify areas with poor reception and develop alternative methods.
2.5	Consider developing a Memorandum of Understanding with schools or school bus company to utilize school buses for mass transportation during an emergency.	EMD, First Selectman	Carry Forward	Action has not been necessary, because the town has a good working relationship with schools and the local school bus provider. Nevertheless, the action is carried forward.
2.6	Develop basic GIS capabilities as needed for access to aerial photos showing the number and location of properties and structures that could be affected by a natural disaster.	EMD,Fire, First Selectman	Capability	New Hartford does have a basic GIS system, and was in the process of expanding capabilities in 2020 at the time this plan was being written. One requirement for Tier 1 towns under the MS-4 program is mapping of outfalls and other drainage infrastructure.
3.1	Implement control measures to mitigate the flooding created by beavers.	PWD	Capability	Areas of concern are in the south side of town, near Bakersville Brook. Resident complaints and issues go through the Wetlands commission. The Town assists in trapping when feasible.
3.2	Develop clean-out schedules for all catch basins and drainage facilities.	PWD	Capability	Town has a schedule and is continuously maintaining and addressing cleaning. The town also rents necessary equipment to address the cleaning and is aware of the trouble spots.
3.3	Identify the location of structures that are susceptible to flooding to facilitate risk assessment and potential control measures.	DEMHS, DEEP	Capability	The town is aware of the areas and structures at risk of flooding.
3.4	Replace the undersized culvert at Carpenter Road with a larger one to prevent localized flooding in this area.	PWD	Carry Forward with Revisions	Carpenter Road culvert was not increased per DOT, but the bridge has been upgraded. Town has applied for grant funding. Old structure was a stone wall abutment without wingwalls, and the upgrade includes new wingwalls and the stream has reportedly been restored.

#	Strategy	Who	Status	Notes
3.5	Establish a designated area for brush disposal following storm related events that generate debris.	First Selectman, PWD	Complete	Town has a designated space. This is regional site with Barkhamsted and Winchester.
3.6	Relocate the New Hartford Public Works Garage out of the Farmington River Floodplain.	First Selectman, PWD	Carry Forward	This action is in the POCD, and there is a standing offer with adjacent property to purchase if ever possible. There is reportedly no immediate threat to the facility, as water has never inundated the site, however, the towns thinks this is a possible strategy if the opportunity arose.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. These include:

- Review Repetitive Loss properties to better understand where those areas are.
- Identify all privately-owned dam owners in Town and perform outreach to them about dam failure risks and mitigation.
- Improve coordination with the Red Cross on emergency planning and preparedness.
- Radio and cell phone reception is limited on the Route 44 corridor north of Jones Mountain; the Town wishes to explore alternative communication methods.

Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action NHFD-01	
Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB, Sustainable CT
Timeframe	2022
Priority	High

Action NHFD-02	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action NHFD-03	
Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action NHFD-04	
Consider developing a Memorandum of Understanding with schools or school bus company to utilize school buses for mass transportation during an emergency.	
Lead	EMD, First Selectman
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action NHFD-05	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action NHFD-06	
Visit schools and educate children about natural hazards and how to prepare for them.	
Lead	EMD; School
Cost	$0 - $25,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2023
Priority	Low

Action NHFD-07	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action NHFD-08	
Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action NHFD-09	
Contact the owners of Repetitive Loss Properties and nearby properties at risk to inquire about mitigation undertaken and suggest options for mitigating flooding in those areas. This should be accomplished with a letter directly mailed to each property owner.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action NHFD-10	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action NHFD-11	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action NHFD-12	
Improve coordination with the Red Cross on emergency planning and preparedness.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action NHFD-13	
Identify all privately-owned dam owners in Town and perform outreach to them about dam failure risks and mitigation.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action NHFD-14	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action NHFD-15	
Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	High

Action NHFD-16	
Monitor the Carpenter Road culvert to determine whether site is degrading over time due to undersized structure.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action NHFD-17	
Radio and cell phone reception is limited on the Route 44 corridor north of Jones Mountain; the Town wishes to explore alternative communication methods.	
Lead	EMD
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEMHS
Timeframe	2024 – 2026
Priority	Low

Action NHFD-18	
Relocate the New Hartford Public Works Garage out of the Farmington River Floodplain.	
Lead	First Selectman; PWD
Cost	More than $1 million
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
NHFD-01	Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	Sustainable CT	Planning	$0 - $25,000	OB, Sustainable CT	2022	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
NHFD-02	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
NHFD-03	Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
NHFD-04	Consider developing a Memorandum of Understanding with schools or school bus company to utilize school buses for mass transportation during an emergency.	Evacuation Bus	EMD, First Selectman	$0 - $25,000	OB	2022 – 2023	1	0.5	1	0	1	0	0	0	0	0	0	0	0	0	4
NHFD-05	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
NHFD-06	Visit schools and educate children about natural hazards and how to prepare for them.	School Education	EMD; School	$0 - $25,000	OB, CT DEMHS	2022 – 2023	1	0	0	1	1	1	0	0	0	-1	0	0	0	0	4
NHFD-07	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
NHFD-08	Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	RLP	Planning	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
NHFD-09	Contact the owners of Repetitive Loss Properties and nearby properties at risk to inquire about mitigation undertaken and suggest options for mitigating flooding in those areas. This should be accomplished with a letter directly mailed to each property owner.	RLP	Planning	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
NHFD-10	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
NHFD-11	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
NHFD-12	Improve coordination with the Red Cross on emergency planning and preparedness.	Other Emergency Response	EMD	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	0	0	1	1	1	1	0	0	0	0	0	0	0	0	5
NHFD-13	Identify all privately-owned dam owners in Town and perform outreach to them about dam failure risks and mitigation.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
NHFD-14	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
NHFD-15	Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
NHFD-16	Monitor the Carpenter Road culvert to determine whether site is degrading over time due to undersized structure.	Culvert & Bridge Upgrades	DPW	$100,000 - $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
NHFD-17	Radio and cell phone reception is limited on the Route 44 corridor north of Jones Mountain; the Town wishes to explore alternative communication methods.	Emergency Communication	EMD	$50,000 - $100,000	OB, CIP, CT DEMHS	2024 – 2026	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3
NHFD-18	Relocate the New Hartford Public Works Garage out of the Farmington River Floodplain.	Critical Facility Protection	First Selectman; PWD	More than $1 million	CIP, FEMA Grant, CT DEMHS	2025 – 2027	1	1	0	0	1	0	1	0	0	0	0	0	-1	0	4

APPENDIX B
RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF NEW HARTFORD BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of New Hartford has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of New Hartford Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of New Hartford and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of New Hartford; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of New Hartford, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of New Hartford eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of New Hartford;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of New Hartford, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of New Hartford this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

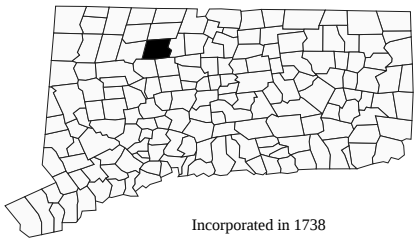
2019 CERC TOWN PROFILE

New Hartford, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
P.O. Box 316
New Hartford, CT 06057
(860) 379-3389

Belongs To
Litchfield County
LMA Hartford
Northwest Hills Planning Area



Incorporated in 1738

Demographics

Population

	Town	County	State
2000	6,088	182,193	3,405,565
2010	6,970	189,927	3,574,097
2013-2017	6,794	184,454	3,594,478
2020	7,265	193,116	3,604,591
'17 - '20 Growth / Yr	2.2%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	37	921	4,842
Pop./Sq. Mile (2013-2017)	183	200	742
Median Age (2013-2017)	45	47	41
Households (2013-2017)	2,605	74,605	1,361,755
Med. HH Inc. (2013-2017)	$96,291	$76,438	$73,781

	Town	State
Veterans (2013-2017)	313	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	281	4%	1,048	15%	814	12%	1,295	19%	2,291	34%	1,065	16%	6,794	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	6,446	164,992	2,446,049
Black Non-Hisp	54	2,843	350,820
Asian Non-Hisp	0	3,516	154,910
Native American Non-Hisp	20	267	5,201
Other/Multi-Race Non-Hisp	18	2,320	84,917
Hispanic or Latino	256	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	3.0%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	944	20%	673,582	27%
Associates Degree	371	8%	188,481	8%
Bachelors or Higher	2,138	46%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	182	1,463
23 - Construction	19	56
31-33 - Manufacturing	15	472
44-45 - Retail Trade	8	197
62 - Health Care and Social Assistance	8	62
72 - Accommodation and Food Services	14	101
Total Government	12	146

Top Five Grand List (2018)

	Amount
Metropolitan District Water Bureau	$11,659,530
Connecticut Light and Power	$10,894,110
Home Depot	$6,717,680
Ski Sundown Inc.	$2,874,370
PNL Nutmeg LLC	$2,430,750
Net Grand List (SFY 2016-2017)	$655,378,332

Major Employers (2016)

Inertia Dynamics
Perry Techology Corp
Syntac Coated Products
Home Depot
Hurley Manufacturing

Education

2018-2019 School Year

	Grades	Enrollment
New Hartford School District	PK-6	446
Regional School District 07	7-12	1075

Pre-K Enrollment (PSIS)

	2018-2019
New Hartford School District	15

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 07	98.2%	97.6%	98.8%

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	70.8%	53.8%	46.4%	51.3%	NA	43.0%
ELA	72.9%	53.1%	57.9%	54.9%	NA	56.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
New Hartford School District	3.2%
Regional School District 07	5.3%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	86.2%	84.0%	86.8%
Private	13.8%	16.0%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

New Hartford, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$25,134,641	Total Expenditures (2017)	$24,367,377	Annual Debt Service (2017)	$661,500
Tax Revenue	$19,856,873	Education	$18,785,328	As % of Expenditures	2.7%
Non-tax Revenue	$5,277,768	Other	$5,582,049	Eq. Net Grand List (2017)	$929,942,157
Intergovernmental	$4,784,602	Total Indebtedness (2017)	$10,496,408	Per Capita	$138,425
Per Capita Tax (2017)	$2,902	As % of Expenditures	43.1%	As % of State Average	91.7%
As % of State Average	99.0%	Per Capita	$1,562	Moody's Bond Rating (2017)	Aa3
		As % of State Average	62.1%	Actual Mill Rate (2017)	29.52
				Equalized Mill Rate (2017)	20.96
				% of Net Grand List Com/Ind (2017)	5.0%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	2,839	88,068	1,507,711
% Single Unit (2013-2017)	88.9%	73.6%	59.2%
New Permits Auth (2017)	7	142	4,547
As % Existing Units	0.2%	0.2%	0.3%
Demolitions (2017)	1	32	1,403
Home Sales (2017)	60	1,753	21,880
Median Price	$305,400	$250,100	$270,100
Built Pre-1950 share	23.2%	31.2%	29.3%
Owner Occupied Dwellings	2,294	57,330	906,798
As % Total Dwellings	88.1%	76.8%	66.6%
Subsidized Housing (2018)	81	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	2	57	536
$100,000-$199,999	11	563	5,237
$200,000-$299,999	26	538	6,681
$300,000-$399,999	16	315	3,863
$400,000 or More	5	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$938	$995	$1,123
Cost-burdened Renters	38.1%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	3,875	101,000	1,827,070
Residents Unemployed	135	4,014	78,242
Unemployment Rate	3.4%	3.8%	4.1%
Self-Employed Rate	14.3%	13.0%	10.0%
Total Employers	182	6,177	122,067
Total Employed	1,463	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Winchester, CT	310	Torrington, CT	386
Torrington, CT	288	Hartford, CT	319
New Hartford, CT	225	New Hartford, CT	225
Canton, CT	106	Farmington, CT	196
Barkhamsted, CT	95	Canton, CT	134
Bristol, CT	60	West Hartford, CT	129
Simsbury, CT	52	Avon, CT	118

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	577	1,777
Violent	31	228

Disengaged Youth (2013-2017)

	Town	State
Female	0.0%	4.2%
Male	0.0%	5.6%

	Town
Library circulation per capita	9.47

Distance to Major Cities

	Miles
Hartford	18
Providence	82
New York City	95
Boston	108
Montreal	257

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Municipal Provider
Local Contact

Cable Provider
Charter Communications of Western CT
(800) 827-8288

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

NORFOLK, CT

19 Maple Ave
Norfolk, CT
MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 Torrington Road
Goshen, CT 06756
(860) 491-9884
https://northwesthillscog.org

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Cheshire, Connecticut 06410
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www.slrconsulting.com

global **environmental** and **advisory** solutions

SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Norfolk and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Norfolk is a rural town in the Litchfield Hills Region bordered on the north by Massachusetts, on the east by Colebrook and Winchester, on the south by Goshen, and on the west by North Canaan and Canaan.

According to the publication entitled "Norfolk, Connecticut 1900 – 1975" edited by Alice V. Waldecker, Norfolk was known as a manufacturing town during the nineteenth century and produced many items including flour and mill stuffs, wooden bowls, shingles, cheese, clocks, brick, bolts and nuts, military rifles, leather goods, woolen and cotton yarns, and cabinet furniture. Many of the factories were located along the Blackberry River. Despite the construction of a railroad to Norfolk in the late 1800's, manufacturing declined during the twentieth century.

Today, the town is known for its elegant homes, scenic vistas, charming town center, extensive forestland, and three state parks. Campbell Falls, Haystack Mountain and Dennis Hill provide facilities for fishing, hiking, picnicking and winter sports. From the stone tower atop Haystack Mountain is a spectacular view of the entire area including New York State and Massachusetts. Major highways serving the town include State Routes 44, 272, and 182.

2.2 Existing Land Use

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 84% of Norfolk is forested and approximately 5% is developed.

Table 2-1: 2015 Land Cover by Area

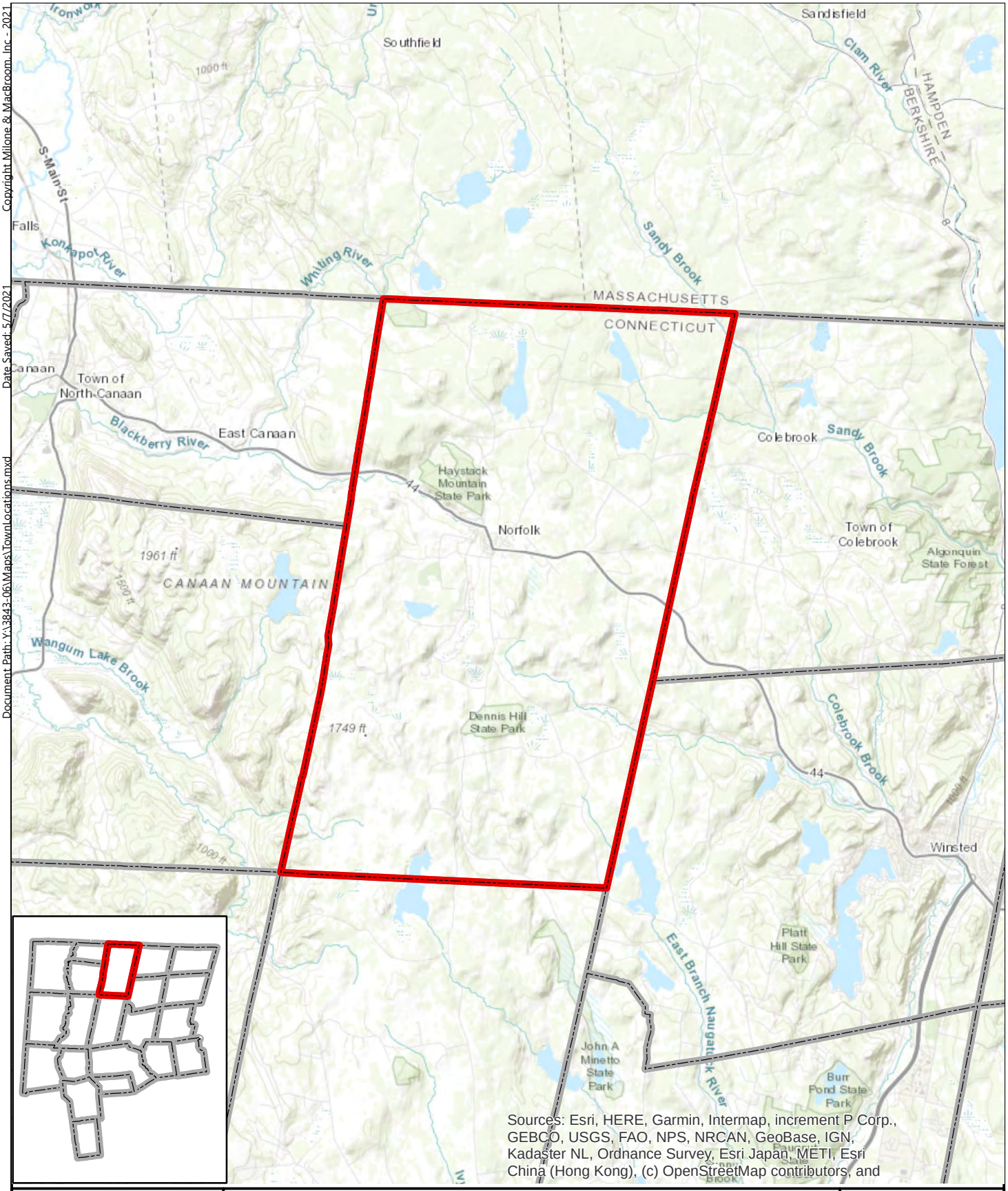
Land Cover	Area (acres)	Percent of Community
Developed	1,554.6	5.24%
Turf & Grass	580.9	1.96%
Other Grass	182.1	0.61%
Agricultural Field	1,358.2	4.58%
Deciduous Forest	13,459.1	45.37%
Coniferous Forest	10,134.3	34.16%
Water	915.4	3.09%
Non-Forested Wetland	208.1	0.70%
Forested Wetland	1,264.8	4.26%
Tidal Wetland	0.0	0.00%
Barren	5.7	0.02%
Utility Row	0.0	0.00%
Total	**29,663**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

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Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and

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FIG. 2-1

2.3 Development Trends

According to the US Census, the population of Norfolk declined from 1,827 people in 1960 to 1,709 persons in 2010. U.S. Census Bureau estimates for 2019 show a population around 1,628 individuals, a decrease from 2010 of 4.7%. The Connecticut State Data Center predicts that population will decrease by 3.5% through 2025 to an estimated population of 1,571 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Norfolk increased between 2013 and 2017. The number of permits issued in 2013 and 2014 was 0 and 2, respectively, while 5 permits were issued in 2016, and 6 permits were issued in 2017. On average, 3 housing permits were issued each year in Norfolk between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Norfolk dropped by approximately 3.4-percent between 2010 and 2019, from 967 units in 2010 to 935 units in 2019. In 2019, the housing stock was made up of approximately 79% single-unit structures, 10% two-unit structures, 11% multi-unit structures, and 0% mobile-homes or other types of structures. Approximately 57% of the housing in town is owner occupied, with about 20% of the housing stock occupied by renters and another 20% held for seasonal, recreational or occasional use (second homes).

According to the Connecticut Office of Policy and Management, Norfolk's 2019 Total Equalized Net Grand List was valued at $263,830,254. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Norfolk, included as Appendix C.

The municipality has experienced limited development in recent years. In 2020 Town staff reported a new affordable senior housing development was underway through the Foundation for Norfolk Living. Ten apartments had been completed, and 25 additional units were expected; this will include 19 single family homes.

Overall, development in Norfolk has not increased natural hazard risks over the last five years, as the slow pace of development has been balanced by improved municipal hazard mitigation capabilities. Risks are not expected to increase because of development over the next five years.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Norfolk is considered to have a Moderate level of social vulnerability, with a higher vulnerability score for the SVI category of Household Composition and Disability. In other words, a particular challenge in Norfolk may include the presence of residents who need additional assistance during a disaster event due to disabilities.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Norfolk.

Norfolk is part of the Northeastern Highlands Ecoregion, which is characterized by "hills and mountains, a mostly forested land cover, nutrient-poor frigid and cryic soils (mostly Spodosols), and numerous high-gradient streams and glacial lakes" (as described on the map "Ecoregions of New England").

2.5 Climate and Climate Change

Over the course of the year, the temperature in Norfolk typically varies from 17°F to 81°F and is rarely below 0°F or above 89°F. The warm season lasts from May 27 to September 15, with an average daily high temperature above 71°F. The cold season lasts from December 1 to March 10, with an average daily high temperature below 41°F.

Precipitation falls throughout the year in Norfolk. The wetter season lasts from April 9 to September 29, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on June 1. The drier season lasts from September 29 to April 9. The smallest chance of a wet day is 21% on January 29.

The most rain falls during the 31 days centered around September 30, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts from October 26 to April 20, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.3 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Norfolk as 4.65 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Norfolk at 5.61 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.7	5.9	8.3
NOAA Atlas 14	5.6	7.0	9.2

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Norfolk can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.0 to 6.1 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

The northwest corner of Norfolk drains by way of Ginger Creek westward, eventually joining the Whiting River in Massachusetts.

A large portion of Norfolk, including the village of West Norfolk, is within the Blackberry River Subregional Basin. Streams in this basin include North Brook, Wood Creek, Norfolk Brook, Spaulding Brook, Tobey Pond Brook, and Roaring Brook. These streams join Blackberry River, which then flows west into North Canaan. Wood Creek Pond is within this watershed.

The northeast corner of Norfolk is in the Sandy Brook Subregional Basin. This area is drained by Loon Brook and Doolittle Lake Brook. It includes the large waterbodies of Benedict Pond and Doolittle Lake.

To the south is the Mad River basin. This part of town is drained by Beckley Pond Brook and the Mad River.

The southern portion of Town is drained by Hall Meadow Brook. The southwest corner of Town is drained by Brown Brook (flowing through Wampee Pond, Bear Swamp Pond, and Wapato Pond). The southeast corner is drained by the East Branch Naugatuck River.

2.7 Governmental Structure and Capabilities

The Town of Norfolk has a number of existing authorities, policies, programs and regulations that serve to mitigate the impact of natural hazards. Existing local authorities include the Norfolk Board of Selectmen, Planning and Zoning Commission, Inland Wetlands Commission, Emergency Management Director, Fire Department, and Department of Public Works (DPW).

Resident complaints relevant to natural hazards, such as about downed or dangerous trees, or flooding issues, are submitted to Town Hall. These are then directed to the DPW, or tree contractors, as appropriate.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Norfolk are concentrated within the Norfolk Historic District, though other resources are distributed throughout Town. Resources near flood sources may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

The primary transportation routes into and out of the town are Route 44 running east-west, Route 272 running north-south, and Route 182 running east from near the Town center to ward Colebrook center. There is no local public transit system in Norfolk.

Utilities

Public water in Norfolk is provided by Aquarion Water Company. Residents and businesses outside of the service area rely on private well water.

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Norfolk.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Norfolk has identified several critical facilities throughout the town, as summarized on Table 2-3 below.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Norfolk Town Hall	19 Maple Avenue	EOC Cooling and Warming Center	✔	✔	
Norfolk Lions Club Ambulance	7 Shepard Road	EMS	✔		
Norfolk Volunteer Fire Department	20 Shepard Road	Fire Station	✔		
Bottelle School	128 Greenwoods Rd E	School	✔	✔	
Immaculate Conception Church	4 North Street	Church		✔	
Public Works Garage	36 Old Colony Road	Emergency services	✔		
Norfolk Transfer Station	599 Greenwoods Rd E	Municipal Solid Waste			
Norfolk Sewer District	258 Greenwoods Rd W	Utility			
State DOT Garage	190 North Street	State Facility	✔		
Georges Norfolk Garage	319 Greenwoods Rd E	Gas Station	✔		
State Police Communication Tower	746 Winchester Road	Communications			
ATT Cell Phone Tower	Loon Meadow Drive	Communications			
Town Cell Phone Tower	599 Greenwoods Rd E	Communications			
Verizon Cell Phone Tower	Ashpohtag Road	Communications			

The major facilities at risk in the community in the event of a natural hazard include the Norfolk Town Hall, the Botelle Elementary School, Town Garage on Old Colony Road, Norfolk Fire House and Norfolk Ambulance on Shepard Road, the water tank on Laurel Way, the Sewer Treatment Plant, the local gas station which is the only source of gasoline in town, and the phone company building near the town center.

These are considered critical facilities in the event of a natural disaster because they might be needed for effective emergency response. In addition to the above facilities, the existing cell towers in the community and radio tower on Loon Meadow Drive are considered critical facilities.

Norfolk is interested in installing backup power at the Sewer District (Wastewater Treatment Plant).

Emergency Response Capabilities

The Norfolk Volunteer Fire Department, Department of Public Works, and Emergency Management Director all possesses emergency equipment that can be deployed as needed in the

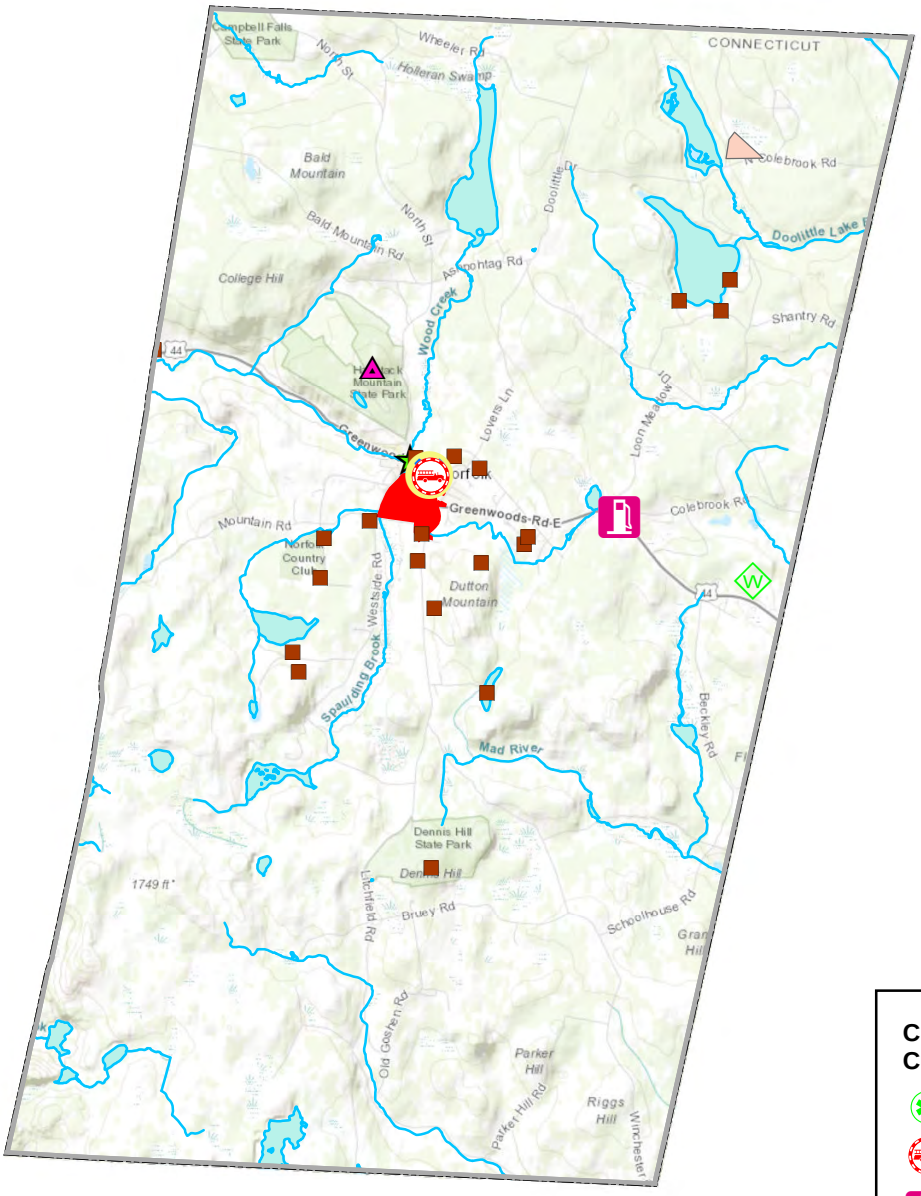
event of an emergency. Procedures are also in place to open and maintain the Emergency Operations Center, emergency shelter, and warming center in town.

Norfolk Town Hall serves as the town emergency operations center.

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Critical Facilities & Cultural Resources

- EMS
- Fire Station
- Gas Station with Generator
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Object
- National Register Structure
- National Register
- National Register District

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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - NORFOLK ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 2-2

The Town has invested in an emergency management trailer with a STOCS box, Ham Radio, and Repeater/Cross Band communication equipment. It also has heating and cooling systems, and can be used for a rehab trailer. This is a regional asset, though it is owned by the Town.

Norfolk has access to the Crisis Track program, acquired by NH COG. They Town is able to use this program to assist with emergency management and the mapping of critical facilities.

Sheltering Capabilities

The Botelle Elementary School serves as the town's primary emergency shelter. The school is also the back-up site for the State EOC. The Town has about 150 cots, along with blankets, pillows, and care kits, enough for roughly 10% of the population. Botelle School has its own food supply that can be utilized if needed. Town has a list of items needed during an emergency.

The Immaculate Conception Church on North Street serves as a backup shelter, although the building does not have emergency power, and so cannot house residents during a power outage. The Church is located next door to an elderly housing facility, and so is well-placed to serve those residents.

Communications

Norfolk communicates with the public about hazards primarily through social media. The local school system has an alert system that can be used to provide some redundancy to public notifications. The Town is also able to access the regional Everbridge system through Litchfield County Dispatch (LCD).

The State has a fiber optic system that runs to all police and fire stations; this system also goes to LCD. Botelle Elementary School also has fiber optic lines, along with a radio system that allows for direct communication with the Fire Department, ambulance service, the school bus company, and LCD.

Norfolk has also been working with other towns in the Litchfield Hills Region through the Northwest Hills Public Safety Task Force to enhance communication and coordination. This has included efforts to standardize communication equipment and the equipment in local emergency operation centers, and also the upgrading of supplies at emergency shelters. Other activities in place are the regionally coordinated public notification system (Everbridge), a badging registration system for emergency responders, and improved training opportunities.

Norfolk is served by LCD, which uses the State Police Communication Tower located on Winchester Road in Norfolk, and identified by the Town as a critical facility. Norfolk also uses social media (Facebook) to enhance local emergency awareness and response.

3 FLOODING

3.1 Existing Capabilities

Ordinances, Regulations and Plans

Land use regulations exist to protect natural resources, including erosion and sediment control regulations for new development, stormwater control regulations to minimize drainage problems, and a flood hazard area overlay zone to control development in flood prone areas.

The flood hazard area overlay zone provides that any new construction or substantial improvement of any residential structure shall have the lowest floor, including the basement, elevated to at least one foot above the base flood elevation. Nonresidential construction is required to have the lowest floor, including basement, elevated to at least one foot above the base flood elevation or be flood-proofed to one foot above the base flood elevation. Additionally all attendant utilities or sanitary facilities should be located or designed to avoid infiltration or impairment by flood waters.

Norfolk's subdivision regulations have detailed standards for the planning, design and construction of storm drainage systems in order to minimize adverse impacts associated with new construction activity. The Norfolk Inland Wetlands and Watercourses Commission enforces regulations to direct development away from wetlands, watercourses and floodplains.

NFIP, Flood Insurance, and Community Rating System

Norfolk maintains compliance with NFIP through its use of the Connecticut State Building Code, subdivision regulations, town ordinance (Flood Damage Prevention Ordinance #88), and zoning regulations. Norfolk expects to continue participation in NFIP.

According to FEMA, there are 3 flood insurance policies in force in Norfolk as of 6/30/2019 with an insurance value of $718,500. The previous edition of this HMP noted 6 flood insurance policies in force as of 8/31/2015 with an insurance value of $1,628,600.

Drainage and Street Flooding

In addition to these regulations, the Norfolk Public Works Department routinely examines and clears public storm drains and catch basins of debris following periods of rainfall, snowfall, or windstorms. The town's DPW also monitors weather reports and maintains loaded trucks in preparation of winter storm events.

The DPW is paying particular attention to some of the drainage concerns along more rural roads in Town, and is working on addressing those issues.

Structural Projects

Three flood control dams were built in town following the 1955 flood. These dams were constructed by the Army Corps of Engineers at the Botelle School, West Side Road, and Wood Creek near Route 272.

New Capabilities and Completed Actions

Norfolk continues to maintain its strong flood mitigation capabilities.

In 2020, the State of Connecticut was conducting a bank-stabilization project along the Blackberry River adjacent to Route 44.

Norfolk has identified several bridges in need of repair or upgrades, and has completed engineering analyses of these bridges.

The Town continues to improve the City Meadow site in the Town Center. This historic grazing pasture has been converted to wetlands and collects runoff from Route 44 and many local roads. The Town has restored native habitats and natural functions, and is continuing to work on improving resident access and wildlife viewing through installation of a public boardwalk. This project can serve as a regional example of using nature-based solutions to flood hazards.

Summary

Norfolk mitigates flood damages primarily through regulating development in floodprone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate.

3.2 Vulnerabilities and Risk Assessment

The Flood of 1955 impacted Norfolk, taking out a number of dams, structures, and bridges in the community. Areas along the Blackberry River were particularly impacted, and several rescues were needed.

Flood prone areas in the community today, as mapped by FEMA, are presented in Figure 3-1.

Vulnerability Analysis of Areas Along Watercourses

One area of concern due to flooding is along the Blackberry River. There are many properties located within the floodplain of the Blackberry River. Another area of concern is Parker Hill Road at Hall Meadow Brook. The town has studied this drainage area to determine why increased flooding is being experienced at this location and what can be done about it.

Vulnerability of Other Areas

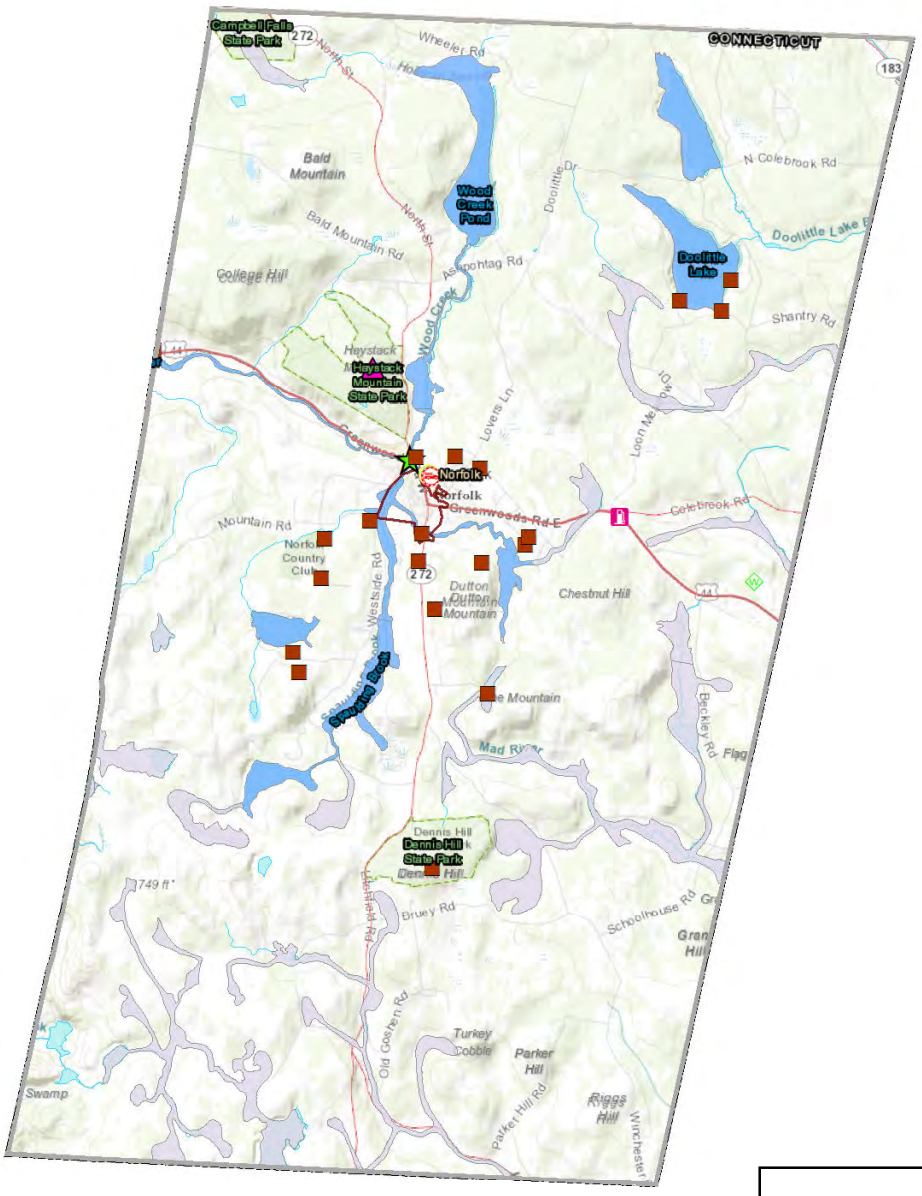
Beavers frequently plug culverts on local streets such as Bruey Road, which collapsed in the past due to water damage from a beaver dam. Routine maintenance is required by town staff to remove these beaver dams. A breached beaver dam once washed out a 60" culvert on South Sandisfield Road. The construction of beaver dams on private properties have proven difficult to remove at times due to the permission that is required from affected property owners.

Town staff report that there are some concerns regarding flooding due to inadequate drainage systems along some of the Town's more rural roads.

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Legend

- EMS
- Fire Station
- Gas Station with Generator
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Object
- National Register Structure
- National Register District

Flood Zone

- A
- AE

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FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - NORFOLK ANNEX
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FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing capabilities appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Norfolk is 105 mph for a Category 1 event, 115 mph for a Category 2, and 125 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Norfolk has a Tree Warden, and a budget for tree removal and maintenance. The Town uses Public Works to address the majority of tree maintenance needs, and has a relationship with a private contractor for larger jobs.

Eversource, the local electric utility, provides tree maintenance near its power lines. Norfolk has a liaison to coordinate with Eversource. In the past, the Town has supplied Eversource with a list of trees in need of trimming. Reportedly, despite these coordination efforts, communication with Eversource remains a challenge.

New Capabilities and Completed Actions

Norfolk continues to maintain its strong tropical cyclone mitigation capabilities.

The Town is working on promoting home energy conservation and alternative energy generation as part of efforts to build sustainability and local energy reliability. The Town has created a net-zero energy usage program for affordable housing. The Town is also constructing a solar farm near a municipal landfill site.

Summary

Norfolk mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

High wind events are the biggest concern for Norfolk, due to the risk of downed trees and limbs blocking road and cutting power. Town staff report that there are many trees along roads and over power lines that may pose risks during high wind events, and are in need of trimming and removal.

Hurricanes have caused wide-spread power outages and could cause significant damage. Norfolk suffered hurricane related damage from Storm Irene in August 2011 and Storm Sandy in October 2012. Both of these events caused significant power outages and the storms received Presidential

Disaster Declarations. Hurricane Irene caused significant power outages in town, affecting 99% of customers (1,102 out of 1,108).

Areas that are most vulnerable are those with greater levels of development.

Tropical Storm Isaias struck Norfolk in August of 2020. The storm caused power outages across Town, with Town staff reporting nearly all residents lost power. The Norfolk Sewer Plant also lost power, significantly impacting operational capacity, and reportedly almost leading to operational failure. The storm resulted in severe tree damage along many Town roadways.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Norfolk as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

New Capabilities and Completed Actions

Norfolk continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

Norfolk mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Norfolk has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

The central and southern portions of the United States are at higher risk for lightning and thunderstorms than is the northeast. However, FEMA reports that more deaths from lightning occur on the East Coast than elsewhere. Lightning-related fatalities have declined in recent years due to increased education and awareness.

Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Norfolk area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Norfolk is considered moderate in any given year.

Vulnerabilities and Risk

High wind events are the biggest concern for Norfolk, due to the risk of downed trees and limbs blocking road and cutting power.

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the Town is believed to be low for any given year. All areas of the Town are susceptible to damage from high winds.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Such fires can be extremely dangerous during the summer months during dry and drought conditions.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

The National Weather Service confirmed an EF0 tornado in Norfolk on August 3, 2020. The tornado created isolated damage within a forested area.

6 WINTER STORMS

6.1 Existing Capabilities

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas.

Norfolk DPW plows and treats municipal roads. The Town works to reduce salt use when feasible. The DPW is aware of areas prone to snow-drift and clears those areas more frequently.

New Capabilities and Completed Actions

Norfolk continues to maintain its strong winter storm mitigation capabilities.

Summary

Norfolk mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

Town staff report that snowstorms and ice storms occur annually but typically are not severe; it is estimated that the Town experiences one to two strong winter events each year, but has the

capacity to quickly recover. The more severe winter storm events typically result in a maximum of 20% of the population being without power, according to Town officials.

A severe snowstorm occurred in March of 1978 that brought close to three feet of heavy snow. The town also suffered a major ice storm in 1978, and again in 2002, that resulted in downed power lines, extensive tree damage, and expensive clean-up costs. The snow storm of October 2011 left 100% of the town without power at its peak. At least 50% of the town had no power for five days.

Areas with higher levels of development are at greater risk of roof collapses due to snow accumulation. Local roads must be plowed by the town and represent a potential cost from a snow storm. In total, New Hartford maintains 60 miles of local roads.

Snow drifting is known to be a problem on Winchester Road near Parker Hill Road and Broad Field Farm, Doolittle Drive near Husky Meadows Farm, and Route 272 near Dennis Hill State Park.

7 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Norfolk. The Town has adopted these codes for new construction, and they are enforced by the Building Official.

New Capabilities and Completed Actions

Norfolk continues to maintain its earthquake and landslide mitigation capabilities.

Summary

Norfolk mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Earthquake Vulnerabilities

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Norfolk. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Norfolk

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

Norfolk is home to numerous flood control dams, which are monitored and maintained by CT DEEP.

Actions Completed and New Capabilities

Norfolk continues to maintain its capabilities for mitigating and responding to dam failure risks.

Summary

Norfolk mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 34 DEEP-inventoried dams within the Town of Norfolk. These dams are listed in Table 8-1 and shown in Figure 8-1.

Table 8-1: DEEP-Inventoried Dams in Norfolk

Dam#	Dam Name	Class	Owner Type
9801	BIGELOW POND DAM	BB	Private Corporation
9802	BEAR SWAMP POND DAM	BB	Private Corporation
9803	WAPATO POND		Private
9804	WOOD CREEK POND DAM	B	State Owned
9805	DOOLITTLE LAKE DAM	BB	Lake Association
9806	BENEDICT POND DAM	BB	Lake Association
9807	WEST SIDE FLOOD CONTROL DAM #5	C	State Owned
9808	NORFOLK BROOK FLOOD CONTROL DAM #6	C	State Owned
9809	JOHN MORGAN DAM		Private
9810	WOOD CREEK FLOOD CONTROL DAM SITE #9	C	State Owned
9811	HAYSTACK MOUNTAIN POND DAM	A	State Owned
9812	BALD POND	A	Private
9813	CHILDS POND	A	Private
9814	WAMPEE POND DAM	BB	Private
9815	TOBEY POND DAM	BB	Private
9816	SPAULDING POND DAM	BB	Association
9817	HOOVER POND DAM	BB	Private
9818	SMITH POND DAM	A	Private
9819	MOECKEL POND DAM		Private
9820	CAMPS POND DAM		Private
9825	MEAD POND DAM	A	Private
9826	MILL POND	A	Private Corporation
9827	LAWRENCE POND	A	Private Corporation
9828	OLD NEWGATE COON CLUB UPPER DAM	A	Private Club
9829	BEAVER MARSH	AA	Private Corporation
9830	UNNAMED	AA	Private
9831	O'CONNOR POND		Private
9832	FARM POND		Private
9833	MEADE POND		Private
9834	HORSE PASTURE POND		Private
9835	DUCK POND		Private
9836	PODDLE POND		Private
9837	WOOD CREEK FLOOD CONTROL DIKE SITE #9	C	State Owned
9838	NORTH POND RESERVOIR DIKES	C	Water Utility

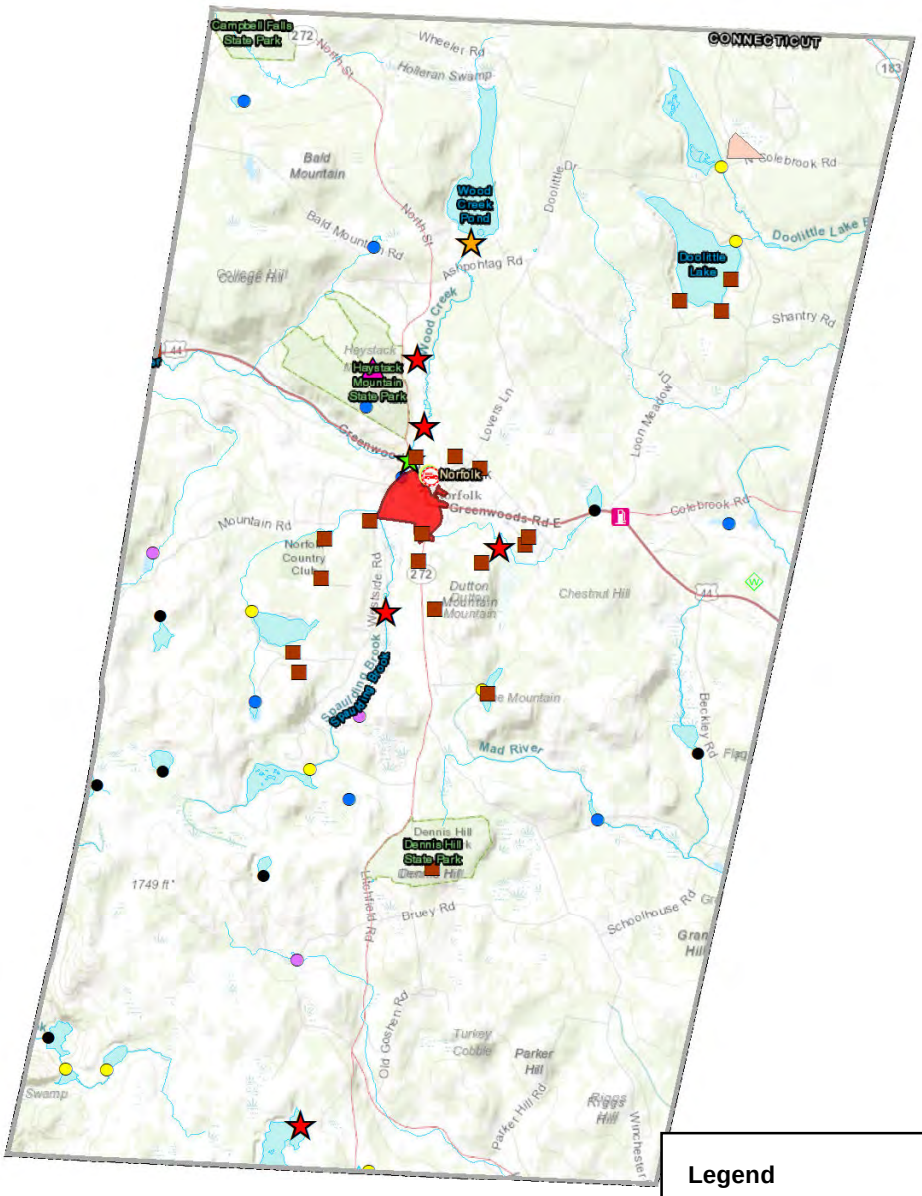
Significant and High Hazard dams in Town are:

- Wood Creek Pond Dam
- West Side Flood Control Dam #5
- Norfolk Brook Flood Control Dam #6
- Wood Creek Flood Control Dam Site #9
- Wood Creek Flood Control Dike Site #9
- North Pond Reservoir Dikes

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Legend

- EMS
- Fire Station
- Gas Station with Generator
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Object
- National Register Structure
- National Register Area
- National Register District

Dam Hazard Class

- C - High Hazard
- B - Significant Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified

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DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - NORFOLK ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,500 7,000
Feet

SCALE 1 " = 7,812 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 8-1

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Norfolk is compliant with this program and has a designated Burning Official.

Actions Completed and New Capabilities

Norfolk continues to maintain its capabilities for mitigating and responding to wildfire risks. Since adoption of the previous edition of the HMP, the Norfolk Fire Department has installed ten dry-hydrants in rural areas of Town.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

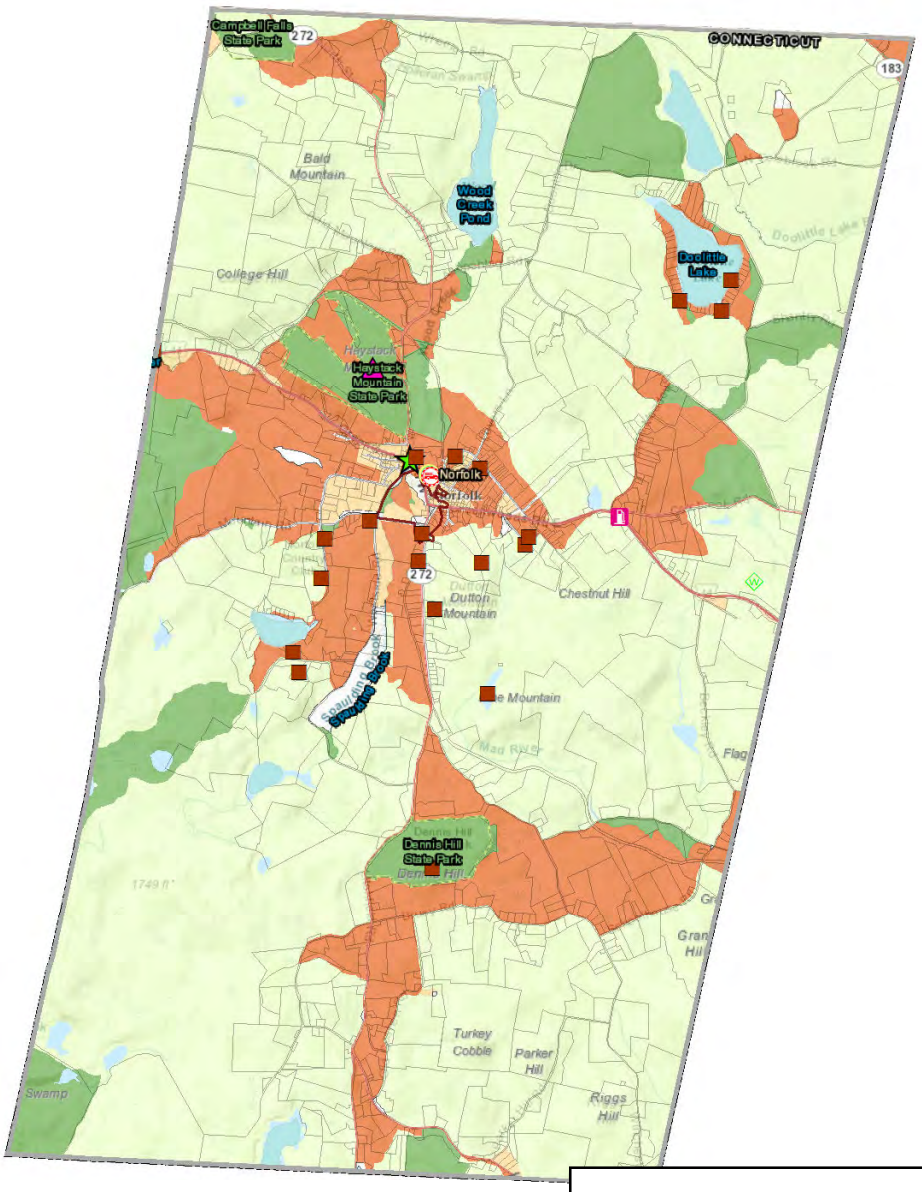
Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

Much of Norfolk is rural and heavily forested, and therefore vulnerable to wildfire risks. The southwest and northeast corners of Town pose elevated risks because of their remoteness.

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Legend

- EMS
- Fire Station
- Gas Station with Generator
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Object
- National Register Structure
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - NORFOLK ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,500 7,000
Feet

SCALE 1 " = 7,813 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

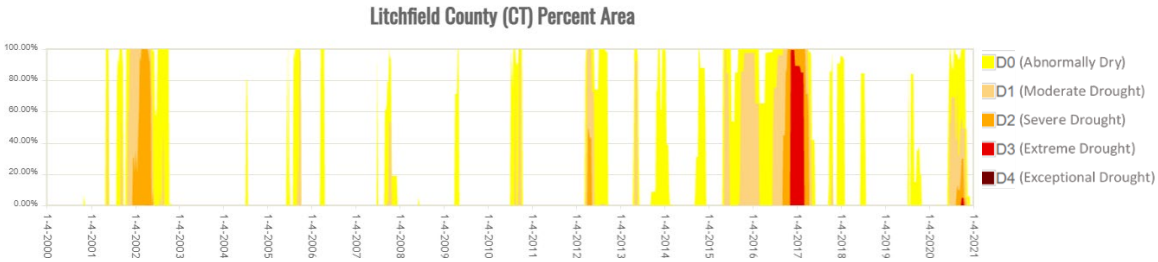


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Strategy	Dept.	Status	Notes
1.1	Visit schools and educate children about natural hazards and how to prepare for them.	Fire, EMD, Botelle School	Complete	Local school plan has been revised several times. Education about storms is done throughout the year.
1.2	Make literature available on natural hazards and preparedness at Norfolk Town Hall.	EMD, First Selectman	Complete	There is some printed available in town, and the town is very active on social media and online. There is an EMD-authored Facebook page.
1.3	Maintain local Emergency Operations Plan and continue to coordinate with the Regional Public Safe- ty Task Force and DEMHS Region 5 on community planning, preparedness, response, and training.	EMD, First Selectman	Capability	Plans are maintained, and the LEOP was recently updated in Summer 2020.
1.4	Maintain the Emergency Notification System (e.g. Everbridge system) to provide emergency information to residents in the entire town or in a specific geographic area. This notice can provide not only warning of an impending situation but also information regarding how to prepare for a particular event.	EMD, First Selectman	Capability	The Town can access Everbridge through LCD, which can relay messages on behalf of the Town; Town does not maintain its own Everbridge system. There is a school alert system that provides redundancy.
1.5	Continue use of social media to enhance public notification of emergency events and appropriate emergency response procedures.	EMD	Capability	The Town is very successful at using social media for public communication.
1.6	Provide information on the dangers of cold-related hazards to people and property	EMD	Capability	Seasonally distributed through social media.
1.7	Consider posting the snow plowing routes in Town buildings each winter to increase public awareness.	DPW	Carry Forward	Routes are constantly changing, and therefore difficult to post. Town will look in to posting some information.

#	Strategy	Dept.	Status	Notes
1.8	The Building Department should provide literature regarding appropriate design standards for mitigating icing, insulating pipes, and retrofits for flat- roofed buildings such as heating coils.	Building	Drop	Lack of knowledge about design standards is not a challenge locally, action is not considered necessary.
2.1	Routinely inspect emergency response equipment, and train for response to natural disasters.	Fire, EMD, DPW	Capability	This is a capability.
2.2	Acquire additional emergency response equipment and supplies for the emergency shelter, with the purchase of a generator being the top priority for the wastewater treatment plant.	EMD, Fire	Carry Forward with Revisions	Shelter has supplies; this is a capability. A generator for the WWTP has not yet been acquired due to lack of funding. This is carried forward as its own action. DPW will pursue acquisition of a grapple to assist with tree removal. This is added as a new action. The Town has identified that need for a new firehouse. This is added as a new action.
2.3	Promote the use of interoperable communication equipment, written mutual aid agreements, and the development of standard operating procedures for emergency response in the regional area. Integrate DEMHS Region 5 plans into local mitigation plans.	EMD, Fire, First Selectman	Capability	Town participates in regional interoperable communication programs. Town also participates in the statewide mutual aid system. DEMHS plans are integrated into local plans.
2.4	Consider developing a Memorandum of Understanding with the school bus transportation company to utilize school buses for mass transportation during an emergency.	EMD, First Selectman	Drop	Town has discussed use of buses, and includes their use the Emergency Operations Plan. The school bus company parks its buses in Town, so they are accessible. A formal MOU is not considered necessary. Town also owns a small bus if needed.
2.5	Consider developing basic GIS capabilities for access to aerial photos showing the number and location of properties and structures that could be affected by a natural disaster.	EMD, Fire, First Selectman	Complete	In Jan 2020, New England GEO updated Norfolk's parcels database, including property owner information, to improve emergency response capabilities. Project was funded by DEMHS. Town will continue to improve GIS capabilities.
3.1	Implement control measures to mitigate the flooding created by beavers. Evaluate feasibility of replacing culverts frequently impacted by beavers with free-span bridges.	DPW	Complete	Four areas in town often impacted, and the DPW strategically addresses issues. Town has evaluated beaver systems, but strategic maintenance often solves the problem. Replacing culverts with bridges likely not necessary.

#	Strategy	Dept.	Status	Notes
3.2	Develop clean-out schedules for all catch basins and drainage facilities.	DPW	Capability	This is a capability
3.3	Review floodplain regulations and ordinances and update as necessary based on DEEP's "Model Floodplain Management Regulations" and FEMA Guidelines.	PZC; IWC	Carry Forward	Zoning is currently reviewing floodplain regulations. Carry forward to completion. FEMA is updating maps in the Farmington River watershed; a small portion of the east end of Town falls into this update
3.4	Provide landscaping along sections of State and local roadways that are prone to drifting snow and high winds (e.g. Rte 272 near Dennis Hill State Park).	First Selectman, DPW	Drop	Town has limited space alongside roads to implement such measures. Working with private landowners to increase vegetation is a challenge. A private property-owner near Dennis Hill State Park has left a vegetated buffer between open fields and the road, which helps reduce drifting. Town is capable of plowing snow-drift areas. This action is not considered necessary.
3.5	Pursue funding to augment the municipal tree trimming program.	First Selectmen, DPW	Capability	Town annually allocates funding to the tree-trimming program. This is a capability.
3.6	Take an active role in siting new housing for vulnerable populations such as seniors and the elderly. Encourage housing developers to discuss proposed actions with the town prior to submitting applications.	First Selectmen, PZC	Capability	As of 2020, Town was taking an active role in a senior affordable housing project with Foundation for Norfolk Living.
3.7	Require green infrastructure (GI) as a consideration for all public works projects and significant residential and/or commercial construction, potentially using HMGP funding under climate resilient activities.	First Selectmen, DPW	Drop	Town tries to incorporate GI when feasible. The ongoing City Meadow project is one example. The Town does not believe requiring GI is necessary or practical.
3.8	Acquire a cost-estimate for a watershed study to identify appropriate methods of reducing flood risks.	First Selectmen; IWC	Carry Forward	No study has been performed due to funding limitations.
3.9	Conduct a comprehensive evaluation of the infrastructure at major watercourses to determine appropriate flood mitigation and stabilization measures.	First Selectmen; DPW	Complete	Town has had engineers evaluate bridge conditions, and they have identified seven bridges that are in poor or moderate condition and in need of upgrades. The Town has developed a plan to complete this work. A new action to replace or repair those seven identified bridges is carried forward.

#	Strategy	Dept.	Status	Notes
3.10	Compile a checklist that cross-references the bylaws, regulations, and codes related to flood damage prevention that may be applicable to a proposed project and make this list available to potential applicants.	Building; PZC	Drop	Town does not believe this action is necessary.
3.11	Selectively pursue conservation recommendations listed in the POCD and other studies and documents.	First Selectmen, Building, PZC, IWC; ConCom	Capability	Zoning and Wetlands use the POCD as guidance for development and conservation actions.
3.12	Review existing groundwater maps and conduct an inventory of potential groundwater supplies, potentially using HMGP funding under climate resilient activities.	First Selectmen, PZC; IWC	Drop	Town has access to groundwater mapping; this action is so longer necessary.
3.13	Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	DPW	Carry Forward	Action has not been completed due to lack of funding, and staff limitations. Town repairs culverts on a case-by-case basis. The Town has experienced barriers to culvert upsizing in the past due to logistical or funding limitations. For larger projects, the Town hires engineers and relies on their expertise for sizing. Replacements are usually in-kind in terms of size, but using updated materials.
3.14	When replacing or upgrading culverts, work with CT DOT to incorporate findings of the climate change pilot study and work with HVA to incorporate findings of the stream crossing assessment training.	DPW	Drop	Climate Change Pilot Study recommends using NRCC guidance for upgrades. Action is redundant with 3.14.
3.15	Ensure adequate barricades are available to block flooded areas in flood prone areas of the town.	DPW	Carry Forward	Town does have some barricades but would like to acquire more and to make upgrades to current stock.
3.16	Require the location of utilities under- ground in new developments or during redevelopment whenever possible.	Building, PZC, DPW	Drop	Developers often put utilities underground, but it is not required. Development in Town is limited, and topography and soil do not always allow underground utilities. Action is not considered necessary.
3.17	Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	EMD, DPW	Capability	DPW is aware of these areas.
3.18	The Town should continue to require the installation of fire protection water in new developments.	Building, PZC	Capability	Town requires either dry hydrants or cisterns for developments not on public water.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action NFK-01	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems. Additionally, increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2023
Priority	High

Action NFK-02	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action NFK-03	
Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action NFK-04	
Acquire a grapple to assist with tree removal (DPW).	
Lead	DPW
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action NFK-05	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action NFK-06	
Promote home energy conservation and alternative energy generation as part of efforts to build sustainability and local energy reliability.	
Lead	First Selectman
Cost	$25,000 - $50,000
Funding	CT DEEP, CEEF; HUD
Timeframe	2022 – 2024
Priority	High

Action NFK-07	
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, Sustainable CT
Timeframe	2022 – 2024
Priority	High

Action NFK-08	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action NFK-09	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action NFK-10	
Consider posting the snow plowing routes in Town buildings each winter to increase public awareness.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action NFK-11	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action NFK-12	
Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEEP
Timeframe	2023 – 2025
Priority	High

Action NFK-13	
Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action NFK-14	
Acquire a cost-estimate for a watershed study to identify appropriate methods of reducing flood risks.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action NFK-15	
Install an emergency generator at the WWTP.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action NFK-16	
Work with the Immaculate Conception Church on North Street to install an emergency generator, improving the building's capabilities as a backup shelter.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action NFK-17	
Complete bridge improvements and repairs identified through previously completed engineering analysis.	
Lead	DPW
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action NFK-18	
Construct or acquire a new firehouse.	
Lead	First Selectman; Fire
Cost	More than $1 million
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

Action NFK-19	
Ensure adequate barricades are available to block flooded areas in flood prone areas of the town.	
Lead	EMD
Cost	$100,000 - $500,000
Funding	OB, CIP, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
NFK-01	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems. Additionally, increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2023	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
NFK-02	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
NFK-03	Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
NFK-04	Acquire a grapple to assist with tree removal (DPW).	Tree and Debris Management	DPW	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	0	1	0	0	0	0	0	0	0	5
NFK-05	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
NFK-06	Promote home energy conservation and alternative energy generation as part of efforts to build sustainability and local energy reliability.	Energy Conservation	First Selectman	$25,000 - $50,000	CT DEEP, CEEF, HUD	2022 – 2024	1	0.5	1	1	0	1	1	0	0	0	0	0	0	0	7
NFK-07	Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	Sustainable CT	Planning	$25,000 - $50,000	OB, Sustainable CT	2022 – 2024	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
NFK-08	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
NFK-09	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
NFK-10	Consider posting the snow plowing routes in Town buildings each winter to increase public awareness.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
NFK-11	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
NFK-12	Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	NRCC Guidance	DPW	$50,000 - $100,000	OB, CIP, CT DEEP	2023 – 2025	0	1	1	0	0	1	1	0	0	0	0	0	0	0	6
NFK-13	Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
NFK-14	Acquire a cost-estimate for a watershed study to identify appropriate methods of reducing flood risks.	Study	DPW	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
NFK-15	Install an emergency generator at the WWTP.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
NFK-16	Work with the Immaculate Conception Church on North Street to install an emergency generator, improving the building's capabilities as a backup shelter.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
NFK-17	Complete bridge improvements and repairs identified through previously completed engineering analysis.	Culvert & Bridge Upgrades	DPW	More than $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
NFK-18	Construct or acquire a new firehouse.	Critical Facility Protection	First Selectman; Fire	More than $1 million	CIP, FEMA Grant, CT DEMHS	2025 – 2027	1	1	0	0	1	0	1	0	0	0	0	0	-1	0	4
NFK-19	Ensure adequate barricades are available to block flooded areas in flood prone areas of the town.	Emergency Equipment	EMD	$100,000 - $500,000	OB, CIP, CT DEMHS	2025 – 2027	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3

APPENDIX B

RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF NORFOLK BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Norfolk has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Norfolk Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Norfolk and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Norfolk; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Norfolk, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Norfolk eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Norfolk;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Norfolk, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Norfolk this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

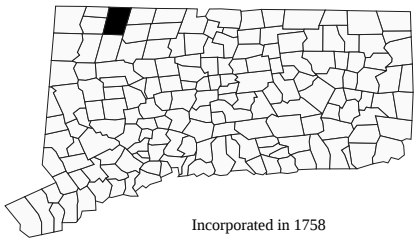
2019 CERC TOWN PROFILE

Norfolk, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
19 Maple Avenue
P. O. Box 592
Norfolk, CT 06058
(860) 542-5829

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1758

Demographics

Population

	Town	County	State
2000	1,660	182,193	3,405,565
2010	1,709	189,927	3,574,097
2013-2017	1,442	184,454	3,594,478
2020	1,629	193,116	3,604,591
'17 - '20 Growth / Yr	3.8%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	45	921	4,842
Pop./Sq. Mile (2013-2017)	32	200	742
Median Age (2013-2017)	54	47	41
Households (2013-2017)	645	74,605	1,361,755
Med. HH Inc. (2013-2017)	$74,844	$76,438	$73,781

	Town	State
Veterans (2013-2017)	111	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	37	3%	158	11%	121	8%	201	14%	546	38%	379	26%	1,442	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	1,365	164,992	2,446,049
Black Non-Hisp	3	2,843	350,820
Asian Non-Hisp	5	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	18	2,320	84,917
Hispanic or Latino	51	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	3.6%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	311	28%	673,582	27%
Associates Degree	82	7%	188,481	8%
Bachelors or Higher	494	44%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	79	334
23 - Construction	9	14
31-33 - Manufacturing	NA	NA
44-45 - Retail Trade	3	12
54 - Professional, Scientific, and Technical Services	8	26
81 - Other Services (except Public Administration)	19	24
Total Government	6	45

Top Five Grand List (2018)

	Amount
Conn Light and Power	$4,596,410
Susan M Sheehan	$2,088,450
Michael and Susan Foley	$1,812,860
Yale Farm LLC	$1,552,560
Ashpohtag LLC	$1,507,420
Net Grand List (SFY 2016-2017)	$297,706,608

Major Employers (2018)

Town of Norfolk
Infinity Hall
Consolini & Tonan Landscaping
Botelle School
Wood Creek Bar and Grill

Education

2018-2019 School Year

	Grades	Enrollment
Norfolk School District	PK-6	96
Regional School District 07	7-12	1075

Pre-K Enrollment (PSIS)

	2018-2019
Norfolk School District	8

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 07	98.2%	97.6%	98.8%

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	*	53.8%	*	51.3%	NA	43.0%
ELA	*	53.1%	*	54.9%	NA	56.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Norfolk School District	9.7%
Regional School District 07	5.3%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	98.4%	84.0%	86.8%
Private	1.6%	16.0%	13.2%

profiles.ctdata.org

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Norfolk, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$7,548,682	Total Expenditures (2017)	$7,352,159	Annual Debt Service (2017)	$165,531
Tax Revenue	$6,549,146	Education	$4,506,976	As % of Expenditures	2.3%
Non-tax Revenue	$999,536	Other	$2,845,183	Eq. Net Grand List (2017)	$369,963,681
Intergovernmental	$758,371	Total Indebtedness (2017)	$2,145,093	Per Capita	$225,313
Per Capita Tax (2017)	$3,974	As % of Expenditures	29.2%	As % of State Average	149.3%
As % of State Average	135.5%	Per Capita	$1,306	Moody's Bond Rating (2017)	-
		As % of State Average	52.0%	Actual Mill Rate (2017)	22.09
				Equalized Mill Rate (2017)	17.64
				% of Net Grand List Com/Ind (2017)	5.0%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	927	88,068	1,507,711
% Single Unit (2013-2017)	82.8%	73.6%	59.2%
New Permits Auth (2017)	6	142	4,547
As % Existing Units	0.6%	0.2%	0.3%
Demolitions (2017)	1	32	1,403
Home Sales (2017)	16	1,753	21,880
Median Price	$326,400	$250,100	$270,100
Built Pre-1950 share	49.4%	31.2%	29.3%
Owner Occupied Dwellings	518	57,330	906,798
As % Total Dwellings	80.3%	76.8%	66.6%
Subsidized Housing (2018)	16	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	0	57	536
$100,000-$199,999	3	563	5,237
$200,000-$299,999	2	538	6,681
$300,000-$399,999	4	315	3,863
$400,000 or More	7	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$748	$995	$1,123
Cost-burdened Renters	67.0%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	885	101,000	1,827,070
Residents Unemployed	33	4,014	78,242
Unemployment Rate	3.6%	3.8%	4.1%
Self-Employed Rate	18.6%	13.0%	10.0%
Total Employers	79	6,177	122,067
Total Employed	334	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Norfolk, CT	50	North Canaan, CT	61
Canaan, CT	42	Canaan, CT	60
Winchester, CT	33	Salisbury, CT	50
North Canaan, CT	30	Norfolk, CT	50
Torrington, CT	24	Torrington, CT	45
Salisbury, CT	13	Winchester, CT	32
Colebrook, CT	12	Hartford, CT	30

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	229	1,777
Violent	0	228

Disengaged Youth (2013-2017)

	Town	State
Female	0.0%	4.2%
Male	0.0%	5.6%

	Town
Library circulation per capita	12.72

Distance to Major Cities

	Miles
Hartford	30
Providence	92
New York City	99
Boston	114
Montreal	247

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Aquarion Water Company
(800) 732-9678

Cable Provider
Comcast Lakeville
(800) 266-2278

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

NORTH CANAAN, CT

100 Pease St
Canaan, CT 06018

MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 Torrington Road
Goshen, CT 06756
(860) 491-9884
https://northwesthillscog.org

Prepared by:
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99 Realty Drive
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global environmental and advisory solutions

SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of North Canaan and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The town of North Canaan is a picturesque rural town of almost 3,300 residents situated along the east bank of the Housatonic River. North Canaan is located in northwestern Litchfield County and is bordered by the municipalities of Canaan to the south, Norfolk to the east, Salisbury to the west and Sheffield, Massachusetts to the north. Note that the Village of Canaan is located in the Town of North Canaan, whereas the Town of Canaan is located to the south.

North Canaan is located in the northwest region of Connecticut in an area known as Litchfield Hills. The topography of the town is characterized by glacially formed mountains and hills interspersed with relatively flat and narrow floodplain areas. The Housatonic River, the Hollenbeck River, Blackberry River, Whiting River, and the Konkapot River along with numerous other small rivers and streams course through the town. The varying terrain of North Canaan makes the town vulnerable to an array of natural hazards.

2.2 Existing Land Use

The land area of North Canaan is approximately 19.6 square miles.

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 53% of North Canaan is forested and approximately 9.8% is developed.

Table 2-1: 2015 Land Cover by Area

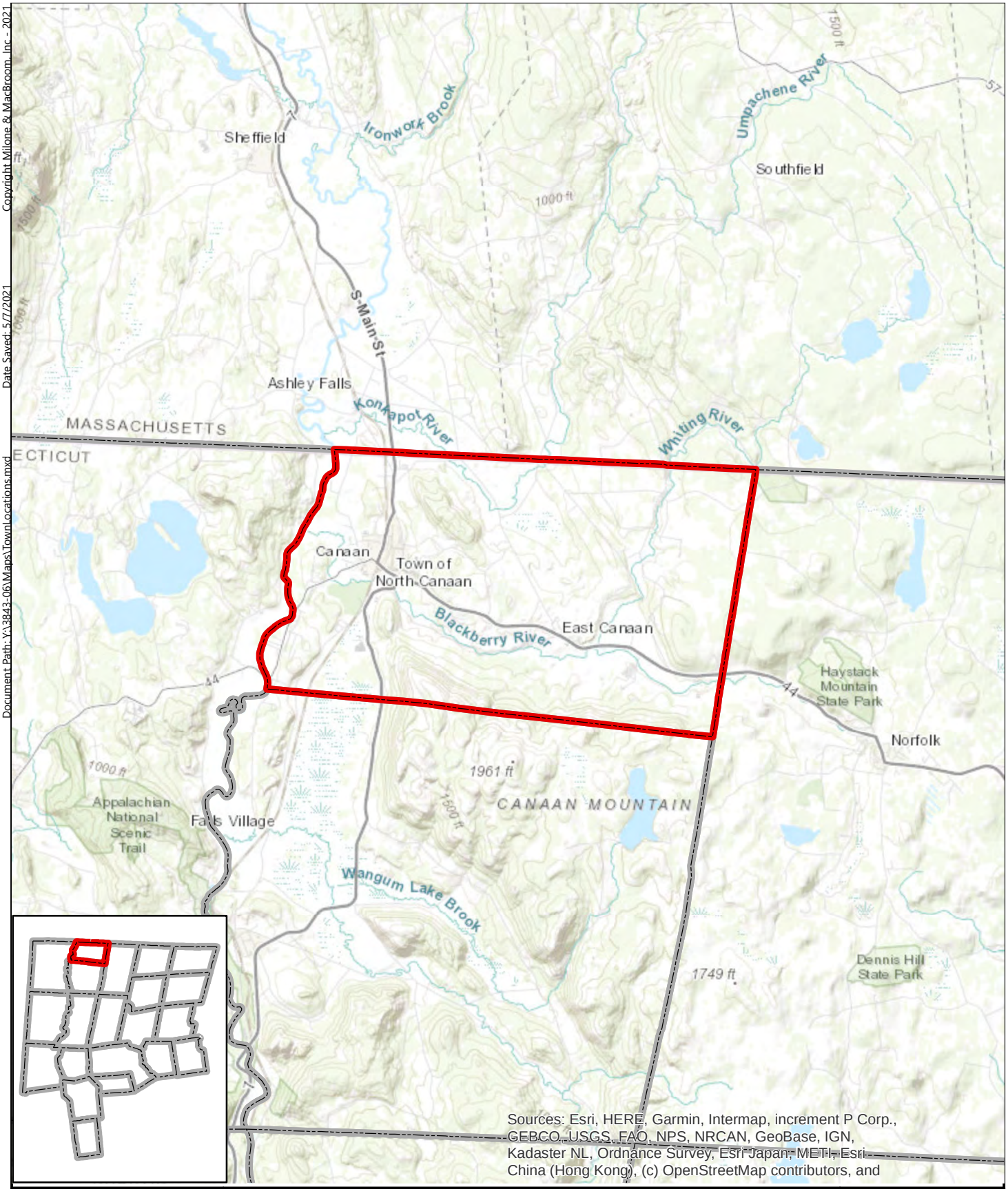
Land Cover	Area (acres)	Percent of Community
Developed	1,228	9.82%
Turf & Grass	627	5.02%
Other Grass	304.5	2.44%
Agricultural Field	3,121	24.98%
Deciduous Forest	4,162	33.31%
Coniferous Forest	2,216	17.73%
Water	113.8	0.91%
Non-Forested Wetland	14.2	0%
Forested Wetland	263.6	2.11%
Tidal Wetland	0	0.00%
Barren	430.4	3%
Utility Row	15.2	0%
Total	**12,495**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

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Document Path: Y:\3843-06\Maps\TownLocations.mxd



MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

REGIONAL LOCATION: NORTH CANAAN

HAZARD MITIGATION PLAN UPDATE - NORTH CANAAN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 4,500 9,000
Feet

SCALE	1 " = 9,182 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-1

2.3 Development Trends

The 2010 U.S. Census reported a population in North Canaan of 3,315 individuals. U.S. Census Bureau estimates for 2019 show a population around 3,281 individuals, a decrease from 2010 of 1.0%. The Connecticut State Data Center predicts that population will decrease by 6.4% through 2025 to an estimated population of 3,072 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in North Canaan remained steady between 2013 and 2017. The number of permits issued in 2013 and 2014 was 0 and 0, respectively, while 0 permits were issued in 2016, and 0 permits were issued in 2017. On average, 0 housing permits were issued each year in North Canaan between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in North Canaan rose by approximately 4.2-percent between 2010 and 2019, from 1,587 units in 2010 to 1,656 units in 2019. In 2019, the housing stock was made up of approximately 67% single-unit structures, 12% two-unit structures, 22% multi-unit structures, and 0% mobile-homes or other types of structures.

According to the Connecticut Office of Policy and Management, North Canaan's 2019 Total Equalized Net Grand List was valued at $314,719,582. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for North Canaan, included as Appendix C.

The 2006 Plan of Conservation and Development (POCD) states that future commercial uses are expected to be developed primarily in or adjacent to the existing downtown area. The Plan also outlines the following goals related to residential, commercial and industrial development in North Canaan:

- Residential – to provide for varying densities and types of accommodations based on the needs and desires of the citizens, the physical characteristics of the land, anticipated utility service and existing development patterns.

- Commercial – (1) to develop Canaan Center as a viable primary commercial area with sufficient land to provide needed commercial and ancillary services, anticipated utility services and efficient traffic circulation (2) to provide limited neighborhood retail and service uses for convenience shopping, in appropriate locations, designed to reduce strip commercial and avoid depreciation of adjacent properties or conflict with residential uses.

- Industrial – to protect North Canaan's industrial land with proper zoning regulations by planning for a cohesive type of industrial park development with provision for adequate vehicular ad utility services and proper protection for adjacent residential areas.

In general, North Canaan encourages future residential and non-residential development that can be supported by existing infrastructure. Future development should be consistent with and enhance the existing character of the town while avoiding adverse impacts to the environment (particularly in sensitive areas).

Little development has occurred in North Canaan in recent years, and little is expected in coming years. One exception to this is the planned construction of a Community Health and Wellness Center at 628 East Main Street. The over 7,000 square-foot, two-story building will replace two existing structures on the lot, and will provide important healthcare services to the Town. A portion of the property is in the Blackberry River's 1% annual-chance flood zone; the building will be outside the flood zone, and a portion of the parking within the zone will be constructed using gravel. The development plans include a rain garden and tree plantings. The proposal has been approved by the Planning and Zoning Commission, Inland Wetlands Commission, Sewer Commission, and Torrington Area Health District.

Overall, development in North Canaan has not increased natural hazard risks over the last five years, as the minimal development that has occurred was required to meet hazard-mitigation regulations and guidelines. Continuation of past development trends in the next five years is not expected to increase exposure.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

North Canaan is considered to have a medium level of vulnerability, with higher vulnerability scores for the SVI categories of Socioeconomic Status, Household Composition & Disability, and Housing Type & Transportation. Housing Type & Transportation is the top contributor to the community's "medium" SVI ranking; in other words, lower-quality housing and a lack of transportation services are vulnerabilities of concern in North Canaan.

2.4 Geology

North Canaan is underlain by relatively hard metamorphic and igneous bedrock including a variety of gneiss, schist, and marble. Glacially influenced hard pan soils are found throughout, with scattered deposits of sand and gravel found within river floodplains.

Continental ice sheets moved across Connecticut at least twice in the late Pleistocene era. As a result, North Canaan's surficial geology is characteristic of the depositional environments that occurred during glacial and postglacial periods. Stratified glacial meltwater deposits are generally coincident with inland floodplains; the amount of stratified drift also has bearing on the relative intensity of earthquakes.

North Canaan is covered primarily (nearly 75%) by glacial till. Tills contain an unsorted mixture of clay, silt, sand, gravel, and boulders deposited by glaciers as a ground moraine. The deposits are generally less than 50 feet thick although deeper deposits of till are scattered across the hillier sections of the town. Stratified glacial meltwater deposits are related to the various water bodies in town, particularly the Housatonic, Hollenbeck, Blackberry and Konkapot Rivers. These deposits primarily contain stratified sands and gravels.

2.5 Climate and Climate Change

Over the course of the year, the temperature in North Canaan typically varies from 17°F to 81°F and is rarely below 0°F or above 89°F. The warm season lasts from May 27 to September 15, with an average daily high temperature above 71°F. The cold season lasts from December 1 to March 10, with an average daily high temperature below 41°F.

Precipitation falls throughout the year in North Canaan. The wetter season lasts from April 9 to September 29, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on June 1. The drier season lasts from September 29 to April 9. The smallest chance of a wet day is 21% on January 29.

The most rain falls during the 31 days centered around September 30, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts from October 26 to April 20, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.3 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature
Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by

5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in North Canaan as 4.60 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in North Canaan at 5.13 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.6	5.8	8.3
NOAA Atlas 14	5.1	6.4	8.4

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 North Canaan can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.0 to 5.6 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

North Canaan is divided among the following five subregional drainage basins: Hollenbeck River, Housatonic River, Blackberry River, Konkapot River and Whiting River.

The majority of the drainage basins have FEMA-defined Special Flood Hazard Areas (SFHAs) along the primary watercourses. Such areas consist of 1% annual chance storm floodplains without elevations, 1% annual chance storm floodplains with elevations, and 0.2% annual chance floodplains. Refer to Section 3 for more detail regarding SFHAs.

Hollenbeck River

The Hollenbeck River drainage basin occupies a small portion of southwestern North Canaan. The headwaters of the Hollenbeck River begin in Cornwall. Many tributaries enter into the main channel of the river including Brown Brook and Wangum Lake Brook both which make up sub drainage basins of their own. Swamp Brook comes down from the north just extending into North Canaan and enters Hollenbeck less than two miles east of the mouth. The river channel becomes highly sinuous with tight meanders in the lower stretch before draining into the Housatonic River. Two low hazard classified dams sit along the Hollenbeck River, one in Canaan holding back the Hollenbeck Pond Dam and the other in Cornwall just off Bradford Brook called Van Doren Pond Dam.

Housatonic River

The Housatonic River drains an area of 1,948 square miles from Pittsfield, Massachusetts to Milford, Connecticut where it empties into Long Island Sound. The river flows a total of 134 miles from its upper reach to the sound with 1,234 square mile of the total drainage area existing in Connecticut. After crossing into Connecticut, the river creates the border for several towns including Salisbury, North Canaan, Canaan and just south, Sharon and Cornwall. Many of the sub regional drainages in these towns flow into the Housatonic River along with small tributaries that flow directly into the river, which make up the Housatonic sub regional drainage basin. The main channel of the Housatonic is lined with 100-year floodplains that extend on either side of the river with areas that further extend making up the 500-year floodplains.

Blackberry River

The Blackberry River drainage basin is part of a large network of converging streams covering a land area of around 27 square miles. With much of the headwaters in Norfolk, a few large ponds feed the tributaries that flow into the Blackberry River including Bigelow Pond, Tobey Pond and Wood Creek Pond. A few small tributaries begin in Canaan and flow north intersecting with the Blackberry River, responsible for the drainage of the northeast edge of Canaan. The majority of the drainage lies within Norfolk and North Canaan. The river flows west along Route 44 into North Canaan and flows into the Housatonic River. SFHAs lie alongside of much of the main channel expanding around the mouths of some input tributaries. The floodplains widen within the last two miles of stretch before the intersection of the Blackberry and Housatonic Rivers.

Konkapot River

Beginning in south western Massachusetts, the Konkapot River flows south across the Connecticut border in North Canaan and curves back up across the border again. The river drains a large sub regional drainage basin consisting of just less than 62 square miles, primarily in Massachusetts. Squabble Brook in North Canaan is the only tributary in town that flows to the Konkapot River, which is bordered by broad 100-year floodplains much outside of its meandering banks. The main channel of the Konkapot River is also surrounded by 100-year floodplains and some 500-year floodplains that extend outside of the 100-year boundaries.

Whiting River

The Whiting River begins in Massachusetts and flows south into North Canaan, where several branching tributaries merge from the east. Much of the sub basin area is in Massachusetts and a small portion in Norfolk with less than a quarter of the area making up the northeast corner of North Canaan. Just south of the Massachusetts border is the Whiting River Reservoir, held back by the Whiting River Dam which is classified as a high hazard potential dam. The Whiting River flows south into the Blackberry River converging at Route 44.

2.7 Governmental Structure and Capabilities

The Town of North Canaan is governed by a Selectman-Town Meeting form of government in which legislative responsibilities are shared by the Board of Selectmen and the Town Meeting. The First Selectman serves as the chief executive.

In addition to Board of Selectmen and the Town Meeting, there are boards, commissions and committees providing input and direction to Town administrators. Also, Town departments provide municipal services and day-to-day administration. Many of these commissions and departments play a role in hazard mitigation, including the Planning and Zoning Commission, Conservation and Inland Commission, the Building Official, the Land Use Office, the Fire Department, Emergency Medical Services, and the Highway Department.

Drainage complaints are routed through the First Selectman's office and the Highway Department. These complaints are usually received via phone, mail, or email and are recorded in a logbook. The complaints are investigated as necessary until remediation surrounding the individual complaint is concluded.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic resources in North Canaan include The Canaan Village Historic District and Union Depot. Resources like those located in Canaan Village, on the edge of the Blackberry River floodplain, may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

State and federal roads are the major transportation arteries (and therefore evacuation routes) into and out of the town. These include Route 7 (running north-south) and Route 44 (running east-west), which are integral to transportation across town and to neighboring communities. Other major routes include Allyndale Road and Canaan Valley Road, which travel north-south from the Massachusetts border to Route 44.

There is no local public transit system in North Canaan; however, the Town reportedly has a bus that can be used in the event of necessary evacuations. The bus has been used in the past to evacuate residents from the senior center.

Utilities

The Town of North Canaan has public water supply provided by Aquarion Water Company (in Canaan Village), as well as a handful of Non-Community Public Water Systems.

The Canaan Fire District owns and operates the only municipal sewer system in North Canaan, which serves approximately half of the town's residents (according to the 2006 POCD).

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in North Canaan.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

North Canaan has identified nine critical facilities. Many critical facilities, such as fire, and governmental buildings as well as utilities are required to ensure that day-to-day management of the town continues. Other facilities such as the senior center and local schools are also considered critical facilities since these contain populations that are more susceptible in an emergency or house important supplies. Not all municipal buildings are critical facilities. Table 2-3 presents a list of critical facilities in North Canaan.

Table 2-3: Critical Facilities

Facility	Address or Location	Type	Emergency Power	Shelter	SFHA
North Canaan Firehouse	4 East Main Street, Canaan	Regional Emergency Support	Yes		No
Town Hall	100 Pease Street	Emergency Operations Center, Secondary Shelter	Yes	Yes	No
North Canaan Highway Garage	10 Whiting Drive	Regional Emergency Support	Yes		No
North Canaan Elementary	90 Pease Street	Primary Shelter	Yes	Yes	No
North Canaan Volunteer Ambulance Corp.	15 Main Street	Regional Emergency Support	Yes		No
Senior Center	Quinn Street	Senior Housing	Yes		No
North Canaan Transfer Station	580 West Main St	Solid Waste			No
Connecticut State Police Troop B - North Canaan Resident State Trooper	100 Pease Street	Law Enforcement	*		No
Connecticut State Police Troop B Barracks - Headquarters	463 Ashley Falls Road	Law Enforcement	*		No

* The status of Emergency Power at the State Police facilities is not known by the Town.

Emergency Response Capabilities

The Town has an EOP that guides its response to emergencies arising from both natural and anthropogenic hazards. North Canaan staff report that the Town has implemented emergency response practices in the past (such as emergency alerts and opening shelters) with success.

The Emergency Management Director coordinates emergency preparedness in the town of North Canaan. The Director develops plans, protocols, and procedures that assure the safety of North Canaan's citizens. It also provides training for emergency response personnel, supports state and local emergency response exercises, and provides technical assistance to state and local emergency response agencies and public officials. The goal is to provide citizens with the highest level of emergency preparedness before, during, and after disasters or emergencies.

The Town's Emergency Operations Center (EOC), including its Emergency Communications Center, is located at the Town Hall. The EOC has a generator that can power the entire building.

Emergency services can also be cut off by fallen trees or washed-out culverts during certain emergencies. The Town performs tree and shrub removal, with a focus on critical roadways. During emergencies and following storms, the highway garage responds to calls related to downed trees.

Sheltering Capabilities

Emergency shelters are an important subset of critical facilities as they are needed in many emergency situations. North Canaan Town Hall is the primary shelter. This facility has a back-up generator. North Canaan Elementary School is the secondary shelter and also has backup power. In case of a sustained power outage, it is anticipated that 10 to 20% of the population would relocate, although not all of those relocating would necessarily utilize the shelter facilities.

Emergency Alerts

North Canaan staff report that getting emergency information to people is a significant challenge, as severe storms can take out power, phone lines, cellular service, and internet service. In the past, the Town handled reverse 9-1-1 alerts internally, utilizing Alert Now/Blackboard Connect call every resident. Residents reportedly wouldn't hear the message for multiple hours, or would ignore the calls and messages as spam.

North Canaan now outsources emergency notifications to the Litchfield County Dispatch, which has its own emergency alert system. This system has the ability to contact land-lines, and can be targeted to certain areas. The Town practices and runs drills with the emergency alert system.

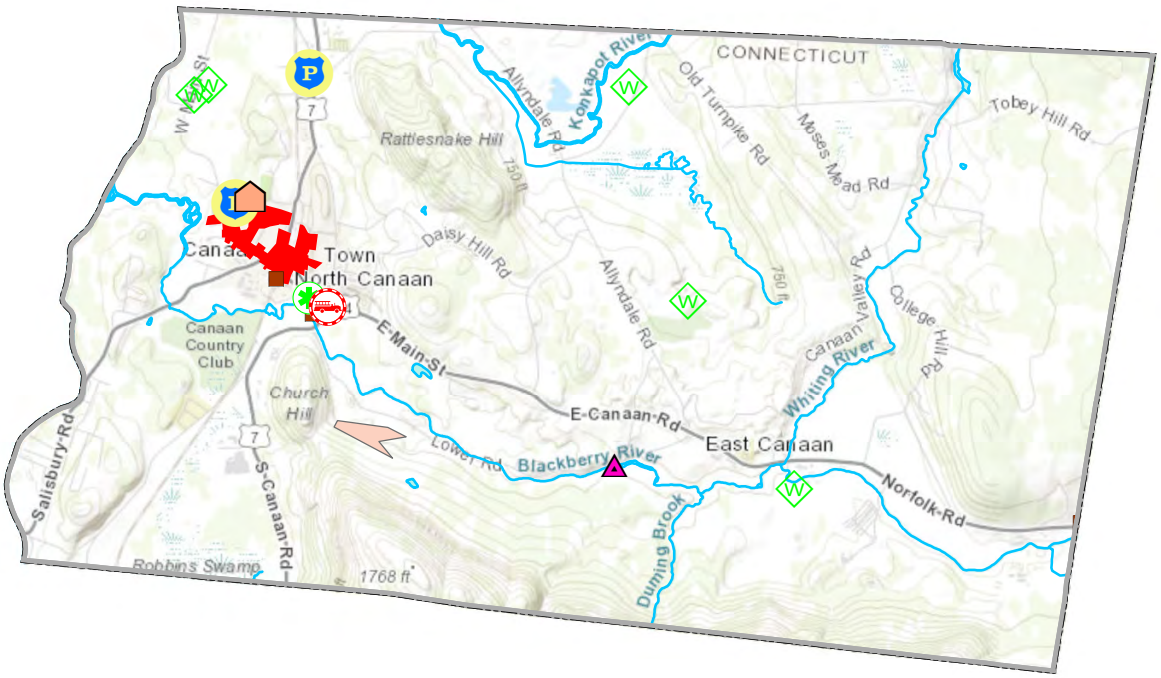
North Canaan also communicates with the public about emergencies over social media. The North Canaan Emergency Management Facebook Page has over 700 followers, or about 20% of the Town's residents.

The Town may pursue further improvements to its emergency alert system in the coming years.

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Critical Facilities & Cultural Resources

- Shelter
- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Structure
- National Register Area
- National Register District

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - NORTH CANAAN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 2,500 5,000
Feet

SCALE 1 " = 5,738 '
DATE 5/7/2021
PROJ. NO. 3843-06

FIG. 2-2

3 FLOODING

3.1 Existing Capabilities

The Town through its land use regulations works to reduce future increases in flow associated with development.

Ordinances, Regulations, and Plans

Regulations, codes, and ordinances that apply to flood hazard mitigation in conjunction with and in addition to NFIP regulations include:

- ***Floodplain Management Regulations***: The Town's Flood Regulations were revised and amended in 2007 and were effective in January 2008. This separate set of regulations is essentially the town's local version of the NFIP regulations. The regulations address floodplain management, including establishing areas of special flood hazard, restrictions, development permit requirements, permitted uses, and standards for flood hazard reduction. The objectives of the regulations are to:

  Protect human life and health; minimize expenditure of public money for costly flood control projects; minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public; to minimize damage to public facilities, infrastructure and utilities…located in the floodplain; help maintain a stable tax base by providing for the sound use and development of flood prone areas in such a manner as to minimize flood blight areas; insure that potential buyers are notified that property is in a flood hazard area; prevent increase in flood heights that would increase flood damage and result in conflicts between property owners; ensure that those who occupy the flood hazard areas assume responsibility for their actions and to discourage development in a floodplain if there is any practical alternative to locate the activity, use or structure outside of the floodplain.

  - Section 5.3 outlines specific standards for construction in Special Flood Hazard Areas, Zones A, A-1-30 and AE.

  - Section 5.3.1.1 states that all new construction, substantial improvements, and repair to structures that have sustained substantial damage which are residential structures shall have the bottom of the lowest floor, including basement, elevated to or above the base flood elevation. North Canaan defines substantial improvement as occurring cumulatively over a ten-year period.

  - Section 5.3.1.2 states that all new construction, substantial improvements, and repair to structures that have sustained substantial damage which are commercial, industrial or non-residential structures shall: (a) have the bottom of the lowest floor, including basement, elevated one foot above the base flood elevation (b) in lieu of being elevated, non-residential structures may be dry flood proofed to one foot above the base flood elevation provided that together with all attendant utilities and sanitary facilities the areas

of the structure below the required elevation are water tight with walls substantially impermeable to the passage of water, and provided that such structures are composed of structural components having the capacity of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy.

- ***Special Flood Hazard Areas, Ordinance***: The Town's Flood Ordinance was adopted in 1988, the purpose of which is to:

  Promote the public health; safety and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed to: restrict and prohibit uses which are dangerous to health safety and property due to water or erosion hazards; require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction; control the alteration of natural floodplains, streams, channels, and natural protective barriers which are involved in accommodation of flood waters and prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

  The Ordinance states that no development to any improved or unimproved real estate within a special flood hazard area shall be made except upon permit issued by the Town's Conservation and Inland Wetlands Commission.

- ***Zoning Regulations.*** The Town of North Canaan Zoning Regulations were most recently updated in 2009 and have been enacted to "retain the general "quality of life" of North Canaan - its residential character, its agricultural/industrial/ commercial economic base, historic heritage, and natural environment. At the same time to recognize the need for balanced growth at a pace and quality that does not upset this balance, while seeking to resolve problems that are incompatible with that quality of life; to promote and protect public health, safety and welfare; to encourage and facilitate the orderly growth and expansion of the Town in accordance with the adopted Town Plan of Development; to promote, protect and maintain a healthy agricultural economic base; to facilitate the adequate provision for transportation, public water, schools, parks and other public requirements; to protect the character and maintain the stability of residential, business and industrial areas within the Town; to provide for land uses, buildings and structures that are compatible with the town and its various neighborhoods."

- ***Inland Wetlands and Watercourse Regulations***. These regulations were and were amended in 1975. The purpose of the inland wetlands and watercourses regulations is to protect the quality of the inland wetlands and watercourses within the town of North Canaan by making provisions for the protection, preservation, maintenance, and use of inland wetlands and watercourses, including deterring and inhibiting the danger of flood and pollution.

  - Section 1-11 defines "Regulated Activity" means any operation or activity within or use of a wetland or watercourse involving removal or deposition of material, or any obstruction, construction, alteration or pollution, of such wetlands or watercourses, except as otherwise indicated in Section 2 of these regulations.

- Section 2.1 states that a residential home for which a building permit has been issued or on a subdivision lot, providing the permit has been issued or the subdivision approved as of the effective date of these regulations shall be permitted as of right.

- Section 3 states that Subject to the provisions of Section 2 hereof, regulated activities affecting the wetlands and watercourses of the Town are prohibited except as they may be licensed by the Commission, as hereinafter provided.

❑ ***Plan of Conservation and Development.*** This 2006 document is the Town's vision statement for future development. It is updated every 10 years.

- Recreation, Open Space and Conservation (Page 37) encourage public or private acquisition of open space to preserve the character of the town and to provide parklands and areas for public recreation.

- Recreation, Open Space and Conservation (Page 37) recommends the preservation, as practical, of areas of the community that provide flood protection, ground water retention, wildlife refuge, or other inherent natural resources.

- Open Space/Conservation (Page 42) identifies floodplains, swampland/wetlands, streambelts and steep slopes as open space land that should remain undeveloped due to natural conditions.

❑ ***Subdivision Regulations.*** Adopted in 1971 and amended in 2005, the Town's Subdivision Regulations establish minimum acceptable standards for the manner in which land is broken up into building lots. The regulations also set forth standards for the provision and construction of roads, drainage, sewer facilities, water service and other site improvements necessary to serve building lots.

- Section III (5) states that any land to be subdivided shall be of such character that it can be used for building purposes without danger to health, safety, and general welfare. No land subject to flooding as defined by the Town Floodplain Ordinance and Conservation and Inland Wetlands Regulations shall be subdivided for residential purposes or for any other use which will aggravate the flood hazard.

- Section IV (3-A) outlines the application requirements and requires a determination from the Town Conservation and Inland Wetlands Commission as to whether or not inland wetlands as shown on the inland wetlands map or flood hazard areas as shown on the Town's FEMA Flood Hazard Boundary Map in effect at the time of application, are included in the land to be subdivided.

- Section IV (3-F) requires the submittal an erosion and sedimentation control plan for any subdivision application which will involve a cumulative disturbed area that is more than one-half acre.

Overall, the intent of these regulations is to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas of the town of North Canaan by the establishment of standards designed to:

- ❑ Protect human life and public health.
- ❑ Minimize expenditure of money for costly flood control projects.
- ❑ Minimize the need for rescue and relief efforts associated with flooding.
- ❑ Minimize prolonged business interruptions.
- ❑ Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone, and sewer lines; and streets and bridges located in floodplains.
- ❑ Maintain a stable tax base by providing for the sound use and development of floodprone areas in such a manner as to minimize flood blight areas.
- ❑ Ensure that purchasers of property are notified of special flood hazards.
- ❑ Ensure the continued eligibility of owners of property in North Canaan for participation in the NFIP.

NFIP, Flood Insurance, and Community Rating System

The Town First Selectman is the NFIP administrator for the Town and oversees the enforcement of NFIP regulations. The degree of flood protection established by the variety of regulations in the Town meets the minimum reasonable for regulatory purposes under the NFIP. The Town is not enrolled in the Community Rating System program.

According to FEMA, there are 63 flood insurance policies in force in North Canaan as of 6/30/2019 with an insurance value of $11,118,700.

Drainage and Street Flooding

There are areas of street flooding throughout the town, and these are addressed by the Highway Department as necessary. The Highway Department is in charge of the maintenance of the town's drainage systems and performs clearing of bridges and culverts and other maintenance as needed. Drainage complaints are routed to the Office of the First Selectman and the Highway Department. The Town uses these reports to identify potential problems and plan for maintenance and upgrades.

Camp Brook

Town officials indicated that Camp Brook is the main source of flooding in town and noted that the culvert along this brook is State owned and needs to be replaced.

An April 10, 2014 article in the Lakeville Journal titled "So far so good on Camp Brook" discusses recent improvements along Camp Brook and



Photo Source: Lakeville Journal

noted that "a clean-out under the West Main Street Bridge appears to have prevented major flooding of roads and basements despite spring's high waters."

Communications

The Town can access the National Weather Service website at http://www.weather.gov/ to obtain the latest flood watches and warnings before and during precipitation events.

The National Weather Service issues a flood watch or a flash flood watch for an area when conditions in or near the area are favorable for a flood or flash flood, respectively. A flash flood watch or flood watch does not necessarily mean that flooding will occur. The National Weather Service issues a flood warning or a flash flood warning for an area when parts of the area are either currently flooding, highly likely to flood, or when flooding is imminent.

The town utilizes the Alert Now/Blackboard Connect emergency notification system to direct geographically specific emergency notification telephone calls into affected areas.

Natural Resource Protection

According to the Plan of Conservation and Development, one important goal of the Town of North Canaan is to "encourage public or private acquisition of open space to preserve the character of the town and to provide parklands and areas for public recreation." The plan also discusses the need to preserve areas that provide flood protection, groundwater retention, wildlife refuge and other natural resources. In addition, the plan identifies floodplains, swampland/ wetlands, streambelts, and steep slopes as areas that should remain undeveloped due to natural conditions.

New Capabilities and Completed Actions

North Canaan continues to maintain its strong flood mitigation capabilities. The Town is currently working on drainage improvements for Allendale Road, which has experienced flooding due to insufficient drainage in the past. An engineer will identify drainage needs and culverts that need increased capacity. The Town is working to apply for state grants.

Through permitting requirements and reviews by the Planning & Zoning and Inland Wetlands Commission, North Canaan has successfully ensured that the development plans for the new Community Health and Wellness Center appropriately addressed flood risks posed by the Blackberry River.

Summary

In summary, the Town primarily attempts to mitigate future flood damage and flood hazards by restricting building activities in floodprone areas. This process is carried out through both the Planning and Zoning and the Inland Wetlands Commissions. All watercourses are to be encroached minimally or not at all to maintain the existing flood-carrying capacity. These

regulations rely primarily on the FEMA-defined 1% annual chance flood elevations to determine flood areas.

3.2 Vulnerabilities and Risk Assessment

Flooding can impact a variety of river corridors and cause severe damages in the town of North Canaan but most often occurs along Camp Brook. Flooding due to poor drainage and other factors is also a persistent hazard in the town and can cause minor infrastructure damage and create nuisance flooding of yards and basements.

Vulnerability Analysis Along Watercourses

According to Town staff, flooding of the Camp River is the biggest hazard concern of the Town. A culvert under Route 44 is reportedly undersized, causing water to back up during significant precipitation events. The backed-up water floods properties adjacent to the brook. Floodwaters typically recede after a day or two.

On the Blackberry River, debris has been known to block a state bridge, causing water to back up to near the Fire House (see "Vulnerability Analysis of Critical Facilities" below). Ice jams can also be a problem at that bridge. The town reportedly contacts the state when blockages are observed, and state sends people to come and clean up the debris; this response is said to be very quick and effective. Management of trees and debris sources along the Blackberry River might help mitigate this flood risk.

North Canaan staff report that other potential flood risk areas are under control.

Vulnerability Analysis of Critical Facilities

The list of critical facilities provided by the Town was used with the parcel data to accurately locate each critical facility throughout the town. One facility was found to be immediately adjacent to the 1% annual chance floodplain. Table 3-1 lists this critical facility.

Table 3-1: Critical Facilities Located Within the 1% Annual Chance Floodplain

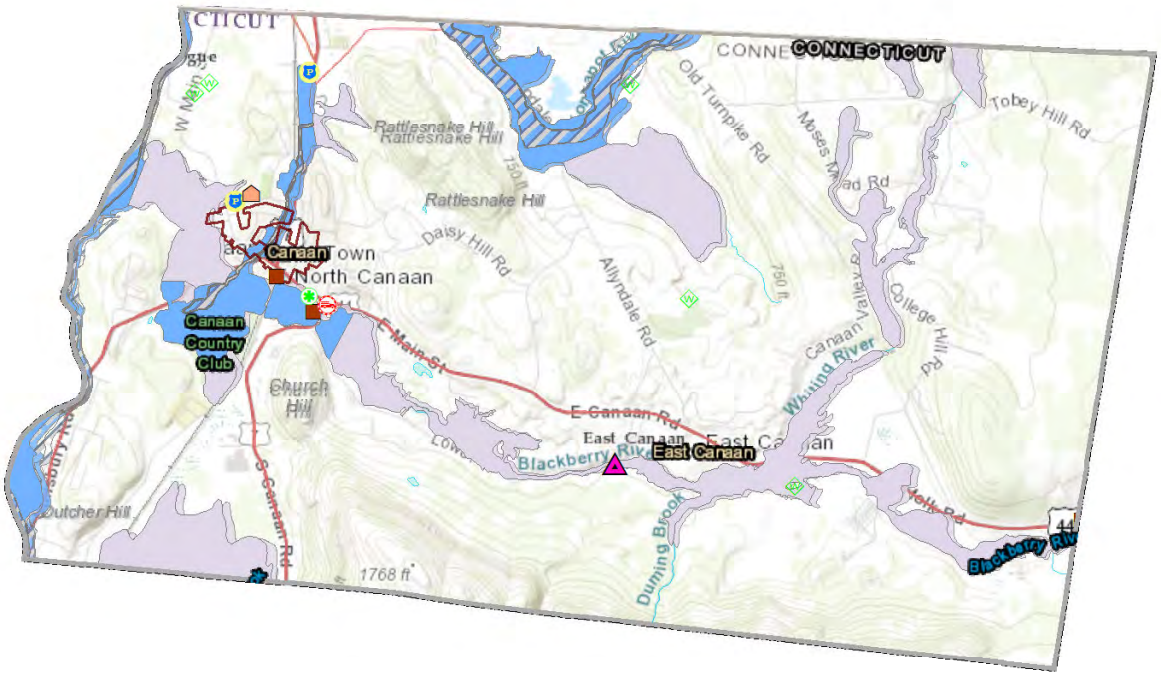
Name or Type	Address	Flooding Source
North Canaan Firehouse	4 East Main Street	Blackberry River

The North Canaan Firehouse is located on East Main Street. While this building is not known to have experienced serious flooding damage in recent years, its proximity to the Blackberry River makes it at risk to flooding.

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Legend

- Shelter
- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Structure
- National Register District

Flood Zone

- A
- AE
- FLOODWAY
- 0.2 PCT ANNUAL CHANCE

Flood Zone

- A
- AE
- FLOODWAY
- X500

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FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - NORTH CANAAN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing mitigation measures appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for North Canaan is 105 mph for a Category 1 event, 115 mph for a Category 2, and 120 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Parts of tall and older trees may fall during heavy wind events, potentially damaging structures, utility lines, and vehicles. Eversource, the local electric utility, provides tree maintenance near its power lines. Eversource was under intense scrutiny after storms Irene and Alfred in 2011. However, the town has a good relationship with Eversource, and more proactive maintenance has been conducted in recent years.

The Town tree warden assists in managing all trees on Town-owned property, including within the street rights-of-way. With its limited budget, the town tends to focus on the most critical roadways.

During Tropical Storm Irene, the Town used the Alert Now/Blackboard Connect emergency notification system to notify all residents in the SFHA that they may evacuate and use one of the shelters. Prior to severe storm events, the Town ensures that warning/notification systems and communication equipment are working properly and prepares for the possible evacuation of impacted areas.

New Capabilities and Completed Actions

North Canaan continues to maintain its strong tropical cyclone mitigation capabilities.

Summary

North Canaan mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

The Town of North Canaan is vulnerable to hurricane damage from wind and flooding. Wind damage can affect any area of Town, while flood damage tends to be limited to known flood risk areas. Wind risks include flying debris, damage to trees and utility lines, road blockages, fires started by downed power lines, and direct impacts on structures. All areas of growth and development increase the town's vulnerability to natural hazards such as hurricanes although new

development is expected to mitigate potential damage by meeting the standards of the most recent building code.

Most of North Canaan's existing housing stock predates the recent code changes, and therefore have an elevated susceptibility to roof and window damage from high winds. Homes located within SFHAs or other flood hazard areas are at risk from flooding from tropical cyclones, on top of wind hazards.

In general, as residents and businesses become more dependent on the internet and mobile communications, the impact of hurricanes on commerce will increase. A major hurricane has the potential of causing complete disruption of power and communications for up to several weeks, rendering electronic devices and those that rely on utility towers and lines inoperative.

Critical Facility Vulnerability

The Town is uncertain whether any Town-owned critical facilities have wind-mitigation measures installed to specifically reduce the effects of wind. Thus, nearly all of the critical facilities in Town are considered to be equally likely to be damaged by hurricane-force winds. Many of the Town's older structures, such as the Town Hall may not meet current building code with respect to wind.

Some critical facilities are more susceptible than others to flooding associated with hurricanes. Such facilities susceptible to flooding were discussed in Section 3.

Hurricane sheltering needs have not been calculated by the U.S. Army Corps of Engineers for the Town. During extended power outages, it is believed that only 10% to 20% of the affected population will require sheltering. In the case of a major hurricane, it is likely that the Town will depend on state and federal aid to assist sheltering displaced populations until normalcy is restored.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in North Canaan as explained in Section 4.0. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

Municipal responsibilities relative to summer storm and tornado mitigation and preparedness include:

- Developing and disseminating emergency public information and instructions concerning tornado, thunderstorm wind, lightning, and hail safety, especially guidance regarding in-home protection and evacuation procedures and locations of public shelters
- Designating appropriate shelter space in the community that could potentially withstand lightning and tornado impact
- Periodically testing and exercising tornado response plans
- Putting emergency personnel on standby at tornado "watch" stage
- Utilizing the Alert Now/Blackboard Connect emergency notification system to send warnings into potentially affected areas

Although tornadoes pose a threat to all areas of the state, their occurrence is not considered frequent enough to justify the construction of tornado shelters. Instead, the state has provided NOAA weather radios to all public schools as well as many local governments for use in public buildings. The general public continues to rely on mass media for knowledge of weather warnings. Warning time for tornadoes is very short due to the nature of these types of events, so predisaster response time can be limited. However, the NOAA weather radios provide immediate notification of all types of weather warnings in addition to tornadoes, making them very popular with communities.

New Capabilities and Completed Actions

North Canaan continues to improve its emergency response and communication capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

North Canaan mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of North Canaan has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

Thunderstorms are expected to impact North Canaan 20 to 30 days each year. The majority of these events do not cause any measurable damage. Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the North Canaan area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in North Canaan is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the town of North Canaan is believed to be low for any given year. All areas of the town are susceptible to damage from high winds although more building damage is expected in the town center while more tree damage is expected in the less densely populated areas.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Eversource trims trees along powers lines. The town tree warden can remove dead and diseased trees in rights-of-way or Town land. Town-owned equipment is used except for complex situations, which would call for the use of a contractor.

Town personnel note that strong thunderstorms will cause power lines to fall all over the town. Most downed power lines in North Canaan are detected quickly, and any associated fires are quickly extinguished. Such fires can be extremely dangerous during the summer months during dry and drought conditions. It is important to have adequate water supply for fire protection to ensure the necessary level of safety is maintained.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

Summary – The entire town of North Canaan is at relatively equal risk for experiencing damage from summer storms and tornadoes. Based on the historic record, at least one tornado has resulted in costly damage to the town. However, more frequent storm damages are relatively site

specific and occur to private property (and therefore are paid for by private insurance). For municipal property, the Town budget for tree removal and minor repairs is generally adequate to handle summer storm damage.

6 WINTER STORMS

6.1 Existing Capabilities

Programs that are specific to winter storms are generally those related to preparing plows and sand and salt trucks, tree trimming to protect power lines, and other associated snow removal and response preparations.

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas. As a result of the winter of 2010-2011, it is anticipated that many communities will develop and utilize programs for roof snow removal.

For municipal property, the Town budget for tree removal and minor repairs is generally adequate to handle winter storm damage although the plowing budget is often depleted. In particular, the heavy snowfalls associated with the winter of 2010-2011 drained the Town's plowing budget and raised a high level of awareness of the danger that heavy snow poses to roofs.

CTDOT plows all State roads and Interstates. The Town primarily uses Town staff for plowing operations on the remaining miles of roadway. The Town has four trucks for plowing and two additional smaller trucks that are primarily used for parking lots.

Prior to a winter weather event, the Town ensures that all warning/notification and communications systems are ready and ensures that appropriate equipment and supplies, especially snow removal equipment, are in place and in good working order. In some known problem areas, prestorm treatment is applied to roadways to reduce the accumulation of snow. When available the town uses Ice B' Gone for treatment of roads and a sand/salt combination as needed. The Town also prepares for the possible evacuation and sheltering of some populations that could be impacted by the upcoming storm (especially the elderly and special needs persons).

New Capabilities and Completed Actions

North Canaan continues to maintain its strong winter storm mitigation capabilities.

The Town has developed a plan to prioritize snow removal from the roof of critical facilities and other municipal buildings each winter. Adequate funding is available in the Town budget for this purpose.

The North Canaan Fire Company and Volunteer Ambulance Corp have developed a plan for how to address roads that become difficult to access during winter storms. The procedure is written out in the Fire Company's Emergency Operations Plan. This plan was developed in response to Winter Storm Alfred in 2011.

In the past, the Town has used snow fencing to mitigate snow drifting, and found it to be somewhat effective; however, the fencing itself would quickly be damaged or fall apart, and so the Town has ultimately stopped using this technique. Instead, the Town has acquired improved plows that are able to clear snow-drift areas.

Summary

North Canaan mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

The structures and utilities in the town of North Canaan are vulnerable to a variety of winter storm damage. Tree limbs and some building structures may not be suited to withstand high wind and snow loads. Ice can damage or collapse power lines, render steep gradients impassable for motorists, undermine foundations, and cause "flood" damage from freezing water pipes in basements. Drifting snow can occur after large storms, but the effects are generally mitigated through municipal plowing efforts.

Icing causes difficult driving conditions throughout the hillier sections of the town. Exposed hilltops are more at risk to high winds and snow drifts. Drifting snow is a concern on Allendale Road, Allen's Lane and Sodom Road. Snowfall characteristics can vary widely between the valleys and the hilltops. The Town's standard of treatment has been helpful in controlling ice in these problem areas.

The elderly population in North Canaan, in particular, is susceptible to the impacts created by winter storms due to resource needs (heat, electricity loss, safe access to food, etc.).

No critical facilities are believed to be more susceptible to winter storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to winter storms.

Summary – The entire town of North Canaan is at relatively equal risk for experiencing damage from winter storms although some areas (such as icing trouble spots and neighborhoods with a high concentration of flat roofs) are more susceptible. Based on the historic record, it is difficult to determine if any winter storms have resulted in costly damages to the Town as damage estimates for severe storms are generally spread over an entire county. Many damages are relatively site specific and occur to private property (and therefore are paid for by private insurance) while repairs for power outages are often widespread and difficult to quantify to any one municipality.

7 EARTHQUAKES

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the town of North Canaan. The Town has adopted these codes for new construction, and they are enforced by the Building Official. Due to the infrequent nature of damaging earthquakes, land use policies in the Town do not directly address earthquake hazards. However, various documents do indirectly discuss areas susceptible to earthquake damage and regulations that help to minimize potential earthquake damage:

- ***Subdivision Regulations***: The 2005 regulations do not explicitly address the issue of construction on steep slopes. The regulations do require that soil erosion and sediment control plans be developed for proposed projects.

- ***Plan of Conservation and Development***: States that slopes greater than 30% should be left undisturbed. Most of this category is located on the hillside and mountain areas of North Canaan and is especially concentrated in the Canaan Mountain area.

- ***Zoning Regulations:*** Section 4.16 states that no permit may be granted unless the land is suitable for multiple dwellings. Land subject to periodic flooding, poor drainage, steep slopes, or a specific hazardous condition, shall not be considered suitable.

7.2 Vulnerabilities and Risk Assessment

Surficial earth materials behave differently in response to seismic activity. Unconsolidated materials such as sand and artificial fill can amplify the shaking associated with an earthquake. In addition, artificial fill material has the potential for liquefaction. When liquefaction occurs, the strength of the soil decreases, and the ability of soil to support building foundations and bridges is reduced. Increased shaking and liquefaction can cause greater damage to buildings and structures and a greater loss of life.

Some areas in the town of North Canaan are underlain by sand and gravel. Structures in these areas are at increased risk from earthquakes due to amplification of seismic energy and/or collapse. The best mitigation for future development in areas of sandy material may be application of the most stringent building codes or possibly the prohibition of new construction. However, many of these areas occur in floodplains associated with the various streams and rivers in North Canaan, so they are already regulated. The areas that are not at increased risk during an earthquake due to unstable soils are the areas underlain by glacial till, which includes most of the town.

Areas of steep slopes can collapse during an earthquake, creating landslides. Seismic activity can also break utility lines such as water mains, electric and telephone lines, and stormwater management systems. Damage to utility lines can lead to fires, especially in electric and gas

mains. Dam failure can also pose a significant threat to developed areas during an earthquake. For this Plan, dam failure has been addressed separately in Section 9.0.
The AEL is the expected losses due to earthquakes each year. Note that this number represents a long-term average; thus, actual earthquake losses may be much greater or nonexistent for a particular year.

According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut is at a low to moderate risk for experiencing an earthquake of a magnitude greater than 3.5 and at a moderate risk of experiencing an earthquake of a magnitude less than 3.0 in the future. No earthquake with a magnitude greater than 3.5 has occurred in Connecticut within the last 30 years, and the USGS currently ranks Connecticut 43rd out of the 50 states for overall earthquake activity.

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the town of North Canaan. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of North Canaan

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

Based on the historic record and the probability maps generated from the USGS database, the state of Connecticut possesses areas of seismic activity. It is likely that Connecticut will continue to experience minor earthquakes (magnitude less than 3.0) in the future. While the risk of an earthquake affecting North Canaan is relatively low over the short term, long-term probabilities suggest that a damaging earthquake (magnitude greater than 5.0) could occur within the vicinity of North Canaan.

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

The Town uses Litchfield County Dispatch to send emergency notifications to residents; this system is able to send targeted alerts to specific at-risk areas. Dam failure inundation mapping can be used to help streamline the geographic contact areas if the failure of a major dam is imminent.

Actions Completed and New Capabilities

North Canaan continues to maintain its capabilities for mitigating and responding to dam failure risks.

Summary

The Town mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 8 DEEP-inventoried dams within the Town of North Canaan. These dams are listed in Table 8-1 and shown in Figure 8-1. Note that the unnamed dam #10003, though listed, has been breached.

Table 8-1: DEEP-Inventoried Dams in North Canaan

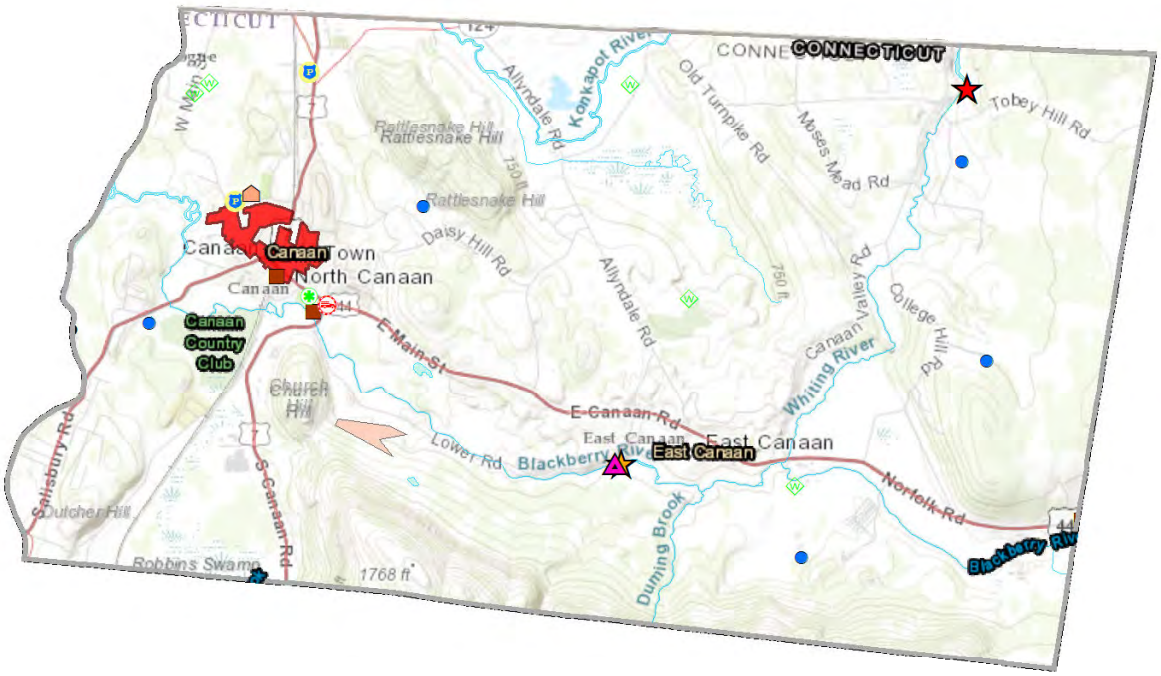
Number	Name	Class
10001	Whiting River Flood Control Dam / Site 15	C
10002	Hallowell Dam	A
10003	Unnamed Dam	BREACHED
10004	Industrial Monument Dam	B
10005	Lime Pond Dam	A
10006	Dutcher Pond Dam	A
10007	Hefter Dam / Emmonds Dam	A
10010	Freunds Pond Dam	A

The following section discusses known vulnerable areas located downstream of Class B and C dams.

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Legend

- Shelter
- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Structure
- National Register
- National Register District

Dam Hazard Class

- C - High Hazard
- B - Significant Hazard
- A - Low Hazard
- Unclassified

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DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - NORTH CANAAN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 2,500 5,000
Feet

SCALE 1 " = 5,738 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 8-1

Whiting River Dam (Dam No. 10001) – Whiting River, North Canaan

The Whiting River Flood Dam is located on the Whiting River and impounds a storage volume of 5,000 acre-feet from a contributing watershed of 14.14 square miles. The earthen dam was constructed in 1968 and is 80 feet in height and 580 feet in length. It is owned by the Connecticut DEEP and used to impound a reservoir for flood control. Repairs were completed in 1997, which included removing accumulated sediments.

Industrial Monument Dam (Dam No. 10004) – Blackberry River, North Canaan

The Industrial Monument Dam (aka Lower Pond Dam) is a class B run-of-the-river masonry dam located off of Lower Road at Beckley Furnace Industrial Monument State Park. The overall length of the dam is approximately 180 feet, and the maximum height is 19 feet. The 1.5-acre impoundment has a storage volume of 11 acre-feet from a drainage area of 39.85 square miles. It is owned by the Connecticut DEEP and used to impound a reservoir for recreation.

Due to the dam and impoundment size, the October 2012 EOP notes that it is not anticipated that a dam breach would generate an extreme flood wave that would cause tremendous damage to downstream areas. The dam hazard area includes a privately owned bridge located 370 feet downstream of the dam. Inundation or loss of this bridge would isolate two residential properties located south of the river. In September 1977, a flood washed out this crossing and stranded these two residential properties. Therefore, it is critical that the Town of North Canaan notify these properties to evacuate prior to either the bridge or its approach roadways becoming inundated by floodwaters.

However, the statements in the Industrial Monument Dam EOP indicate that downstream damage would not be severe if the dam were to fail. The EOP also states that two properties could be isolated if a bridge were washed out, as occurred during a flood in 1977. Based on the EOP, the losses associated with a failure of the Industrial Monument Dam would likely be less than $1 million for property damage, with loss of life unlikely.

Failure of the Whiting River dam would likely be a more severe incident than failure of the Industrial Monument Dam. However, the Whiting River dam was designed for flood control and is maintained for this purpose. Therefore, the impoundment is not full, and failure is unlikely.

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of North Canaan is compliant with this program and has a designated Burning Official.

The North Canaan Fire Company relies on the municipal water system for firefighting water where possible, and is able to access firefighting water from dry hydrants or directly from waterbodies outside of the service area. The Fire Department has some water storage capability in its tanker trucks and storage tanks. Town officials indicated that there are hydrants in the downtown areas and fire ponds are located on the outskirts of town.

The 2006 Plan of Conservation and Development suggested the following locations for installation of dry hydrants:

- Konkopot River – One at Clayton Road near Allyndale; one at Allyndale Road before Sodom.
- Whiting River – One on Toby Hill Road between Canaan Valley Road and Emmons Lane.
- Blackberry River – One on Route 44 near the intersection with Canaan Valley Road.
- Housatonic River – One on Route 44 near intersection with Bond Street.

The North Canaan Fire Department goes to the fires whenever possible. This proactive approach is believed to be effective for controlling wildfires. The town responds to fires in the State Forest before the state responds, and the local departments can utilize mutual aid agreements with surrounding towns and assemble up to 60 responders if needed.

Regulations regarding fire protection are also outlined in the *Subdivision Regulation*s.

- **Subdivision Regulations**, Section III states that each subdivision plan shall provide for adequate water supply, stormwater drainage, surface water drainage, sanitary sewer disposal, fire hydrants, utilities, sidewalks, curbs and any other improvements, in amounts and locations considered necessary by the Commission in amounts and locations considered necessary by the Commission to protect health, safety and the general welfare.

Other capabilities for reducing wildfire risk include:

- Encouraging property owners to widen access roads such that fire trucks and other emergency vehicles can access remote locations.
- Continuing intermunicipal cooperation in firefighting efforts.

- Providing outreach programs on how to properly manage burning and campfires on private property.
- Patrolling Town-owned and State-owned open space and parks to prevent unauthorized campfires.
- Enforcing regulations and permits for open burning.

Actions Completed and New Capabilities

The North Canaan Fire Company has recently updated the mutual-aid agreements with surrounding towns with tankers in order to improve access to firefighting water. Any fire-calls in non-hydrant areas of town automatically go directly into the mutual-aid system. Firefighting airplanes are available through this system.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

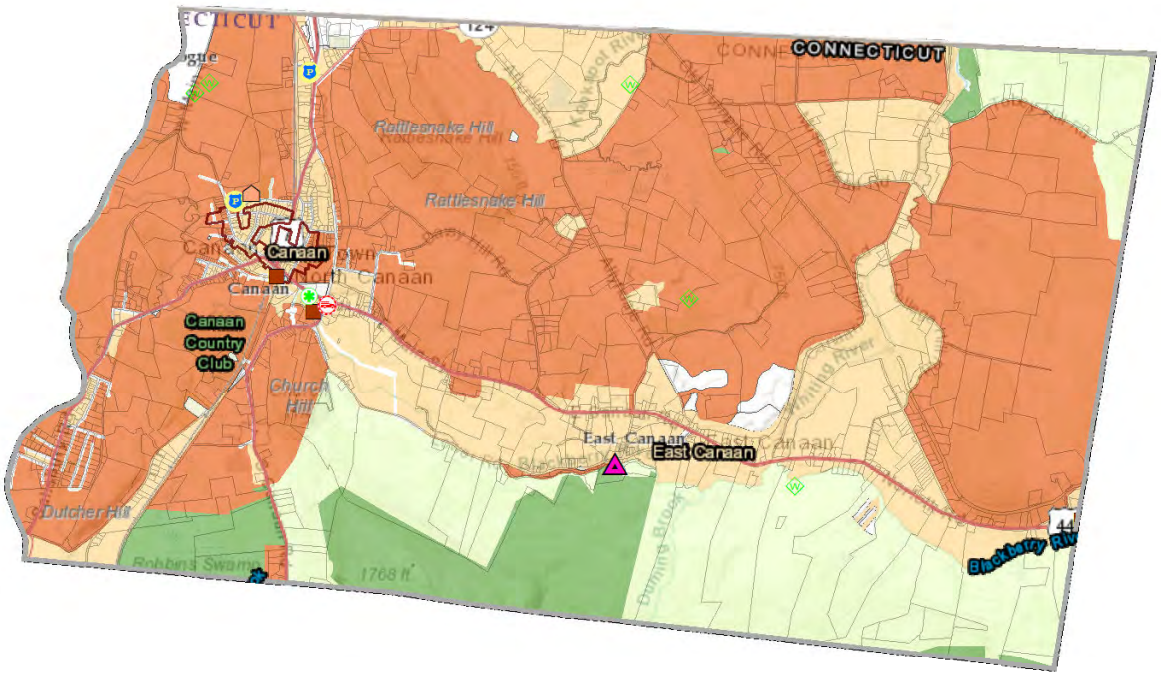
Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

Large areas of Forest are located in North Canaan. There hasn't been a major forest fire in the last ten years, but the town remains concerned about future fires, especially in the vicinity of Canaan Mountain, and would like to find ways to reduce risks posed by forest fires. The Canaan Valley area is off-hydrant, and is also an area of concern with regards to wildfires.

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Date Saved: 5/9/2021

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Legend

- Shelter
- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Structure
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - NORTH CANAAN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 2,500 5,000
Feet

SCALE 1 " = 5,738 '
DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

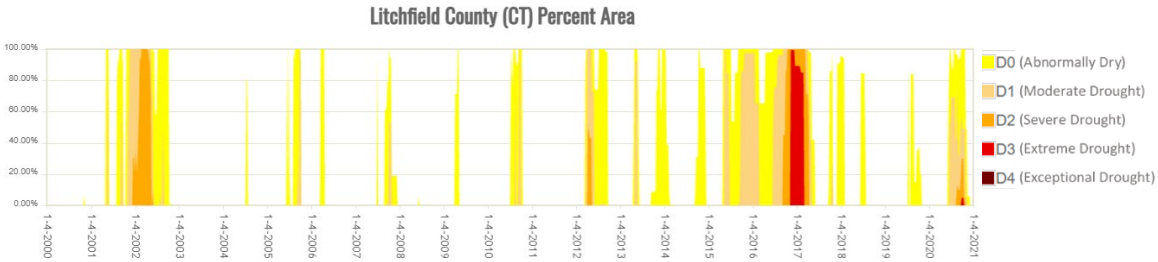


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

Action	Dept.	Status	Notes
Utilize the existing Alert Now/Blackboard Connect notification system to its fullest capabilities and encourage additional residents to subscribe	EMD	Capability	*No longer use Blackboard Connect. Town is served by the Litchfield County Dispatch, which has an alert system. The system has the capability to contact every land-line, and can be targeted to certain areas. The Town now uses that system.*
Encourage residents to purchase and use NOAA weather radios with alarm features	EMD	Carry Forward with Revisions	*Town will carry this action forward, but add encouragement to residents to download an emergency weather app on their phones. (NOAA Radios can operate during power, phone, and internet outages) Specifically, information with be put on the Town website.*
Review and update the Town EOP at least once annually	EMD	Capability	*Capability*
Consider requiring at least one foot of freeboard to the Floodplain Management Regulations.	P&Z	Capability	*Required by state building code.*
Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternative.	P&Z	Carry Forward	*Development in town is minimal, and flood risks are not a result of development and impervious surface expansion. Action has not been a priority. Town will carry forward.*
Encourage property owners to purchase flood insurance under the NFIP and to report claims when flooding damage occurs.	Building	Carry Forward with Revisions	*Town is interesting in providing information about flood risk through assessor's office and maps. Town believes informing residents of flood risk is the best approach. Encouraging purchasing of flood insurance is not considered to be specifically necessary, as most banks require flood insurance to give a home loan.*

Action	Dept.	Status	Notes
Consider conducting a Camp Brook watershed study to identify appropriate methods of reducing flood risks.	PW	Carry Forward	*Action has not yet been completed due to funding limitations. Flooding in this area appears to be the result of an undersized under State Route 44. The town cleans out the area around the culvert of debris to mitigate clogging. Culvert is under State jurisdiction.*
Consider elevations or acquisitions of homes along Camp Brook that are prone to flooding	PW, First Selectman	Drop	*There are no new homes along Camp Brook. No acquisitions have been completed, and no home elevations have been pursued. Property owners appear to be installing more sump pumps. This action is retired while a study is performed to determine the best actions for flood mitigation (previous action).*
Evaluate properties with flood risk such as the North Canaan Firehouse to determine potential flood damage reduction methods (see also #22 below)	PW	Capability & Carry Forward with Revisions	*Town staff report that the North Canaan Firehouse is not at flood risk, although it is near the Blackberry River. Town reviews flood risks for new development as a capability. A new Community Health and Wellness Center has been proposed in the area of the Fire House, in a location that may have flood risk. The town is requiring a stormwater plan, and will review property for flood risks to determine whether a flood mitigation plan is needed. This falls under the Zoning department.*
Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	P&Z, Building	Drop	*Town staff believe they have appropriate knowledge of flood damage prevention, and that training is not needed.*
Compile a checklist that cross-references the bylaws, regulations, and codes related to flood damage prevention that may be applicable to a proposed project and make this list available to potential applicants. The information in Section 3.4 provides a starting point for this list.	P&Z	Complete	*Complete*
Provide outreach regarding home elevation and relocation, flood barriers, dry floodproofing, wet floodproofing, and other home improvement techniques (Section 3.6.2) to private homeowners and businesses with flooding problems.	Building Official	Carry Forward with Revisions	*Town has not yet pursued this action. The Building Official will first compile a list of all houses in the floodplain. Once that list is completed the official will put together a packet of preventative measures to distribute to those property owners. This is carried forward as TWO actions.*
Provide outreach regarding which types of mitigation options are appropriate for reducing flood insurance premiums	Building Official	Drop	*This action is addressed by the response to the previous action.*

Action	Dept.	Status	Notes
Pursue the acquisition of additional municipal open space inside SFHAs and set it aside as greenways, parks, or other nonresidential, noncommercial, or nonindustrial use.	First Selectman	Carry Forward	*Partially complete; the Town purchased 38 acres a few years ago. This action is carried forward for additional progress.*
Selectively pursue conservation recommendations listed in the Plan of Conservation and Development and other studies and documents	First Selectman	Capability	*Town pursues POCD actions as standard practice.*
Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	PW	Drop	*Town replaces culverts in-kind as needed, and has found this to be sufficient. Changing the conveyance calculations is not considered necessary.*
When replacing or upgrading culverts, work with CT DOT to incorporate findings of the climate change pilot study and work with HVA to incorporate findings of the stream crossing assessment training.	PW	Drop	*Town replaces culverts in-kind as needed, and has found this to be sufficient. Changing the conveyance calculations is not considered necessary.*
Evaluate drainage problems in the town and develop a list of culverts to replace and increase capacities.	PW	Carry Forward with Revisions	*Town is currently working on drainage for Allendale Road. Will bring in an engineer to identify drainage needs and identify culverts that need increased capacity. Town is working to apply for state grants. Action is revised to address this specific project*
Work with the State to replace and increase the capacity of the Camp Brook culvert.	PW	Carry Forward	*Carry forward in conjunction with action to perform a study of the Camp Brook watershed.*
Replace and increase the capacity of the Route 44 culvert at Church Street	PW	Drop	*This action is addressed by previous action.*
Ensure adequate barricades are available to block flooded streets in floodprone areas	PW	Complete	*Town has a trailer full of barricades.*
Evaluate flood risks in the vicinity of the North Canaan Fire House. Potential mitigation actions may include constructing a berm or floodwall, floodproofing the building or relocating facilities on the site.	EMD, PW	Drop	*See previous action about Fire House*
Develop a town wide tree limb inspection and maintenance program to ensure that the potential for downed power lines is diminished. Continue to encourage property owners to trim branches located over structures and power lines.	PW	Complete	*Tree warden and public highway supervisor review trees along city roads, and take down bad trees. Chris Toomey is tree warden. Town relies on power company to trim along power lines*
The Building Department should provide literature regarding appropriate design standards for wind.	Building Official	Complete	*Design standards are in the State building code.*

Action	Dept.	Status	Notes
Encourage the use of structural techniques related to mitigation of wind damage in new residential and commercial structures to protect new buildings to a standard greater than the minimum building code requirements. Require such improvements for new municipal critical facilities.	PW, Building	Capability	*Town applies State Building Code (IRC and IBC).* *Recently an addition was constructed for the Ambulance Building. They had to follow stricter hurricane protection standards for the building because it is critical.*
Develop a plan to prioritize snow removal from the roof of critical facilities and other municipal buildings each winter. Ensure adequate funding is available in the Town budget for this purpose.	PW	Complete	*Completed*
Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies	EMD, PW	Completed	*Fire Company and Ambulance developed a plan for what to do when roads become dead-ended, or access is difficult. The procedure is written out in the Fire Company's Emergency Operations Plan. This came out of Winter Storm Alfred.*
The town should consider utilizing snow fencing in areas prone to snow drift.	PW	Drop	*Town has used snow fencing before and it was somewhat effective; however, the wooden ones would break, and the plastic ones would fall apart, so the Town did away with them. Action is no longer necessary – town has acquired improved plows that are able to clear snow-drift areas.*
The Building Department should provide literature regarding appropriate design standards for mitigating icing, insulating pipes, and retrofits for flat-roofed buildings such as heating coils.	Building Official	Complete	*Built into State Building Code*
Consider preventing residential development in areas prone to collapse	P&Z	Drop	*Landslides and areas prone to collapse are not an issue.*
Ensure that municipal departments have adequate backup facilities in case earthquake damage occurs to municipal buildings.	PW, EMD	Capability	*Town has multiple facilities and backup capabilities.*
Consider bracing vulnerable systems and assets inside critical facilities. This could help protect IT systems, important records and files.	PW, EMD	Drop	*Unnecessary. Electronic records and files are backed-up to the cloud.*
Include dam failure inundation areas in the Alert Now emergency contact database	EMD	Complete	*There is one dam up in Canaan Valley right on the Massachusetts line, and one run-of-the-river dam on the Blackberry that does not pose a failure concern. Litchfield County Dispatch can target alerts.*
Provide technical assistance referrals to private dam owners regarding effective maintenance strategies	PW	Drop	*Not necessary.*

Action	Dept.	Status	Notes
File EOPs/EAPs with town department and emergency personnel	EMD	Carry Forward	*Carry Forward*
Consider requiring a source of fire protection water, such as cisterns or dry wells when municipal water service is not available for residential or commercial building development.	Fire Department	Complete	*Fire Company has access to rivers and dry hydrants. They have recently updated the mutual-aid agreements with surrounding towns with tankers in order to improve access to firefighting water. Any fire calls in non-hydrant areas of town automatically go directly into the mutual-aid system. Firefighting airplanes are available through this system. The Canaan Valley area is off-hydrant.*
For the areas of elevated wildfire risk, such as Canaan Mountain the town may consider a combination of all of the available methods of wildfire risk reduction	Fire Department	Complete	*See above*
Consider installing additional dry hydrants or fire ponds in outlying parts of town where public water is not readily available for firefighting, including the areas identified in Section 9.5	Fire Department	Drop	*See above*

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action NCAN-01	
Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternative.	
Lead	P&Z
Cost	$0 - $25,000
Funding	OB
Timeframe	2022
Priority	High

Action NCAN-02	
A new Community Health and Wellness Center has been proposed in the area of the North Canaan Fire House, in a location that may have flood risk. The Town is requiring a stormwater plan, and will review property for flood risks to determine whether a flood mitigation plan is needed. This falls under the Zoning department.	
Lead	PW
Cost	$0 - $25,000
Funding	OB
Timeframe	2022
Priority	High

Action NCAN-03	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action NCAN-04	
File EOPs/EAPs with town department and emergency personnel	
Lead	EMD
Cost	$0 - $25,000
Funding	OB, CT DEEP
Timeframe	2022 – 2023
Priority	Low

Action NCAN-05	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action NCAN-06	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action NCAN-07	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action NCAN-08	
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, Sustainable CT
Timeframe	2022 – 2024
Priority	High

Action NCAN-09	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action NCAN-10	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action NCAN-11	
Proactively provide flood risk information to residents living in flood risk areas, through the assessor's office and maps.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action NCAN-12	
Put together a packet of preventative measures to distribute to owners of properties identified as being within the floodplain (Building Official).	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action NCAN-13	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action NCAN-14	
Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action NCAN-15	
Pursue the acquisition of additional municipal open space inside SFHAs and set it aside as greenways, parks, or other nonresidential, noncommercial, or nonindustrial use.	
Lead	First Selectman
Cost	$50,000 - $100,000
Funding	CT DEEP, Land Trust
Timeframe	2023 – 2025
Priority	Med

Action NCAN-16	
Conduct a Camp Brook watershed study to identify appropriate methods of reducing flood risks.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action NCAN-17	
Compile a list of all houses in the floodplain (Building Official).	
Lead	Building
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action NCAN-18	
Work with the State to identify a long-term solution to debris and ice jamming at the state bridge over the Blackberry River, downstream of the Fire House.	
Lead	EMD; DPW
Cost	$50,000 - $100,000
Funding	OB, CT DEMHS, CT DEEP
Timeframe	2023 – 2025
Priority	Low

Action NCAN-19	
Put information on the Town website encourage residents to purchase and use NOAA weather radios, or to download emergency weather apps on their phones. Note that NOAA Radios can operate during power, phone, and internet outages.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action NCAN-20	
Pursue further improvements to North Canaan's emergency alert system, particularly focusing on addressing challenges with communication during power, phone, cellular, and internet services.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action NCAN-21	
Hire an engineer to identify drainage needs along Allendale Road, and to identify culverts that need increased capacity (Town is working to apply for state grants to fund this effort).	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action NCAN-22	
Work with the State to replace and increase the capacity of the Camp Brook culvert.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

APPENDIX A

STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
NCAN-01	Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternative.	Enforcement	P&Z	$0 - $25,000	OB	2022	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
NCAN-02	A new Community Health and Wellness Center has been proposed in the area of the North Canaan Fire House, in a location that may have flood risk. The Town is requiring a stormwater plan, and will review property for flood risks to determine whether a flood mitigation plan is needed. This falls under the Zoning department.	Enforcement	PW	$0 - $25,000	OB	2022	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
NCAN-03	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
NCAN-04	File EOPs/EAPs with town department and emergency personnel	Dam EAP	EMD	$0 - $25,000	OB, CT DEEP	2022 – 2023	0	1	1	0	1	0	0	0	0	0	0	0	0	0	4
NCAN-05	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
NCAN-06	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
NCAN-07	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
NCAN-08	Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	Sustainable CT	Planning	$25,000 - $50,000	OB, Sustainable CT	2022 – 2024	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
NCAN-09	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
NCAN-10	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
NCAN-11	Proactively provide flood risk information to residents living in flood risk areas, through the assessor's office and maps.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
NCAN-12	Put together a packet of preventative measures to distribute to owners of properties identified as being within the floodplain (Building Official).	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
NCAN-13	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
NCAN-14	Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
NCAN-15	Pursue the acquisition of additional municipal open space inside SFHAs and set it aside as greenways, parks, or other nonresidential, noncommercial, or nonindustrial use.	Open Space	First Selectman	$50,000 - $100,000	CT DEEP, Land Trust	2023 – 2025	1	1	0	0	1	1	1	0	0	0	-1	0	0	0	6
NCAN-16	Conduct a Camp Brook watershed study to identify appropriate methods of reducing flood risks.	Study	DPW	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
NCAN-17	Compile a list of all houses in the floodplain (Building Official).	Study	Building	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
NCAN-18	Work with the State to identify a long-term solution to debris and ice jamming at the state bridge over the Blackberry River, downstream of the Fire House.	Debris/Ice Jam Management	EMD; DPW	$50,000 - $100,000	OB, CT DEMHS, CT DEEP	2023 – 2025	0	1	1	1	1	0	1	0	0	0	0	-1	0	0	5
NCAN-19	Put information on the Town website encourage residents to purchase and use NOAA weather radios, or to download emergency weather apps on their phones. Note that NOAA Radios can operate during power, phone, and internet outages.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
NCAN-20	Pursue further improvements to North Canaan's emergency alert system, particularly focusing on addressing challenges with communication during power, phone, cellular, and internet services.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
NCAN-21	Hire an engineer to identify drainage needs along Allendale Road, and to identify culverts that need increased capacity (Town is working to apply for state grants to fund this effort).	Culvert & Bridge Upgrades	DPW	$100,000 - $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
NCAN-22	Work with the State to replace and increase the capacity of the Camp Brook culvert.	Culvert & Bridge Upgrades	DPW	$100,000 - $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5

APPENDIX B

RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF NORTH CANAAN BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of North Canaan has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of North Canaan Board of Selectmen approved the previous version of the Plan in 2014; and

WHEREAS, the Town of North Canaan and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of North Canaan; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of North Canaan, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of North Canaan eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of North Canaan;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of North Canaan, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of North Canaan this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

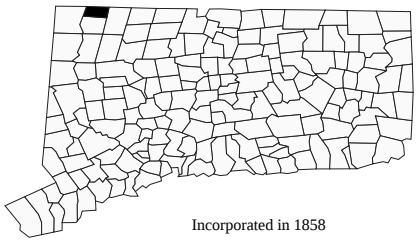
2019 CERC TOWN PROFILE

North Canaan, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
100 Pease Street
North Canaan, CT 06018
(860) 824-7313

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1858

Demographics

Population

	Town	County	State
2000	3,350	182,193	3,405,565
2010	3,315	189,927	3,574,097
2013-2017	3,331	184,454	3,594,478
2020	3,145	193,116	3,604,591
'17 - '20 Growth / Yr	-2.0%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	19	921	4,842
Pop./Sq. Mile (2013-2017)	171	200	742
Median Age (2013-2017)	47	47	41
Households (2013-2017)	1,366	74,605	1,361,755
Med. HH Inc. (2013-2017)	$72,411	$76,438	$73,781

	Town	State
Veterans (2013-2017)	296	180,111

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	3,075	164,992	2,446,049
Black Non-Hisp	25	2,843	350,820
Asian Non-Hisp	8	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	7	2,320	84,917
Hispanic or Latino	216	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	5.9%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	1,212	48%	673,582	27%
Associates Degree	133	5%	188,481	8%
Bachelors or Higher	571	22%	953,199	38%

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	170	5%	296	9%	317	10%	766	23%	990	30%	792	24%	3,331	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	103	1,853
23 - Construction	14	117
31-33 - Manufacturing	NA	NA
44-45 - Retail Trade	9	172
62 - Health Care and Social Assistance	11	507
Total Government	14	164

Top Five Grand List (2018)

	Amount
Specialty Minerals Inc	$15,405,560
Becton Dickinson & Co	$14,921,030
Limestone Partners LLC	$11,072,020
Canaan Developers LLC	$5,931,560
Connecticut Light & Power Co	$5,741,930
Net Grand List (SFY 2016-2017)	$319,365,915

Major Employers (2018)

Becton Dickinson	Specialty Minerals
Geer Corporation	Stop and Shop
Mountainside Treatment Center	

Education

2018-2019 School Year

	Grades	Enrollment
North Canaan School District	PK-8	255
Regional School District 01	9-12	391

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	*	53.8%	*	51.3%	50.0%	43.0%
ELA	*	53.1%	61.3%	54.9%	76.7%	56.1%

Pre-K Enrollment (PSIS)

	2018-2019
North Canaan School District	6

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
North Canaan School District	9.5%
Regional School District 01	11.9%

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 01	94.6%	100.0%	90.4%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	86.3%	84.0%	86.8%
Private	13.7%	16.0%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

North Canaan, Connecticu

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$12,222,980	Total Expenditures (2017)	$11,341,514	Annual Debt Service (2017)	$227,858
Tax Revenue	$8,998,609	Education	$8,963,975	As % of Expenditures	2.0%
Non-tax Revenue	$3,224,371	Other	$2,377,539	Eq. Net Grand List (2017)	$434,299,950
Intergovernmental	$3,051,929	Total Indebtedness (2017)	$1,646,507	Per Capita	$132,449
Per Capita Tax (2017)	$2,738	As % of Expenditures	14.5%	As % of State Average	87.7%
As % of State Average	93.4%	Per Capita	$502	Moody's Bond Rating (2017)	-
		As % of State Average	20.0%	Actual Mill Rate (2017)	27.50
				Equalized Mill Rate (2017)	20.67
				% of Net Grand List Com/Ind (2017)	27.4%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	1,676	88,068	1,507,711
% Single Unit (2013-2017)	70.8%	73.6%	59.2%
New Permits Auth (2017)	0	142	4,547
As % Existing Units	0.0%	0.2%	0.3%
Demolitions (2017)	1	32	1,403
Home Sales	NA	1,753	21,880
Median Price	$194,800	$250,100	$270,100
Built Pre-1950 share	47.4%	31.2%	29.3%
Owner Occupied Dwellings	920	57,330	906,798
As % Total Dwellings	67.3%	76.8%	66.6%
Subsidized Housing (2018)	152	4,817	167,879

Distribution of House Sales

	Town	County	State
Less than $100,000	NA	57	536
$100,000-$199,999	NA	563	5,237
$200,000-$299,999	NA	538	6,681
$300,000-$399,999	NA	315	3,863
$400,000 or More	NA	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$1,100	$995	$1,123
Cost-burdened Renters	52.8%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	1,724	101,000	1,827,070
Residents Unemployed	63	4,014	78,242
Unemployment Rate	3.5%	3.8%	4.1%
Self-Employed Rate	19.8%	13.0%	10.0%
Total Employers	103	6,177	122,067
Total Employed	1,853	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
North Canaan, CT	532	North Canaan, CT	532
Torrington, CT	229	Salisbury, CT	191
Winchester, CT	121	Torrington, CT	68
Salisbury, CT	94	Great Barrington, MA	53
Sheffield, MA	88	Sheffield, MA	51
Norfolk, CT	61	Sharon, CT	50
Pittsfield, MA	51	Canaan, CT	44

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	1,021	1,777
Violent	28	228

Disengaged Youth (2013-2017)

	Town	State
Female	0.0%	4.2%
Male	0.0%	5.6%

	Town
Library circulation per capita	4.27

Distance to Major Cities

	Miles
Hartford	36
Providence	98
New York City	99
Boston	119
Montreal	244

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Metropolitan District Commission (MDC)
(860) 278-7850

Cable Provider
Frontier
(800) 921-8101

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

ROXBURY, CT

29 North Street
Roxbury, CT 06783

MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 Torrington Road
Goshen, CT 06756
(860) 491-9884
https://northwesthillscog.org

Prepared by:
SLR CONSULTING
99 Realty Drive
Cheshire, Connecticut 06410
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global environmental and advisory solutions

SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Roxbury and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Roxbury was incorporated in 1796. It is located in central Litchfield County and is home to a population of approximately 2,105. Roxbury is bordered by the municipalities of Washington to the north, Woodbury to the east, Southbury to the south, and to the west by Bridgewater and New Milford.

The topography of the town is characterized by a generally rolling terrain with high plateaus, steep slopes and river and stream valleys. The Shepaug River, Jacks Brook, Transylvania Brook, and numerous other small rivers and streams course through the town. The varying terrain of Roxbury makes the town vulnerable to an array of natural hazards.

2.2 Existing Land Use

Roxbury is a rural municipality characterized by low density population and limited commercial uses. In general, land use in Roxbury largely consists of open space and low-density residential areas. Commercial uses are limited and are concentrated in the center of the Town.

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 74% of Roxbury is forested and approximately 6.9% is developed.

Table 2-1: 2015 Land Cover by Area

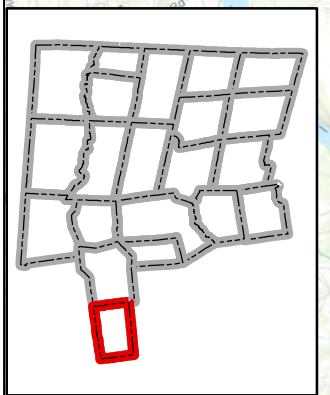
Land Cover	Area (acres)	Percent of Community
Developed	1,156	6.87%
Turf & Grass	464	2.76%
Other Grass	198.2	1.18%
Agricultural Field	2,382	14.16%
Deciduous Forest	11,081	65.87%
Coniferous Forest	1,045	6.21%
Water	183.2	1.09%
Non-Forested Wetland	30.5	0%
Forested Wetland	248.3	1.48%
Tidal Wetland	0	0.00%
Barren	7.3	0%
Utility Row	27.8	0%
Total	**16,823**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

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Date Saved: 5/7/2021

Document Path: Y:\3843-06\Maps\TownLocations.mxd



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

REGIONAL LOCATION: ROXBURY

HAZARD MITIGATION PLAN UPDATE - ROXBURY ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 4,000 8,000
Feet

SCALE	1 " = 8,090 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-1

2.3 Development Trends

The Town of Roxbury was originally part of Woodbury and was incorporated in 1796. Since its inception, Roxbury has largely been considered a rural community. Today, Roxbury contains a significant historic district. The Roxbury Center, Roxbury Iron Mine and Furnace Complex and Roxbury Station Historic District included on the National Register of Historic Places. Roxbury also consists of many farms and second homes for people that reside elsewhere in Connecticut or New York.

The 2010 U.S. Census reported a population in Roxbury of 2,262 individuals. U.S. Census Bureau estimates for 2019 show a population around 2,105 individuals, a decrease from 2010 of 6.9%. The Connecticut State Data Center predicts that population will increase by 5.2% through 2025 to an estimated population of 2,215 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Roxbury increased slightly between 2013 and 2017. The number of permits issued in 2013 and 2014 was 0 and 3, respectively, while 3 permits were issued in 2016, and 2 permits were issued in 2017. On average, 2 housing permits were issued each year in Roxbury between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Roxbury rose by approximately 0.2-percent between 2010 and 2019, from 1,167 units in 2010 to 1,169 units in 2019. In 2019, the housing stock was made up of approximately 95% single-unit structures, 0% two-unit structures, 4% multi-unit structures, and 0% mobile-homes or other types of structures.

According to the Connecticut Office of Policy and Management, Roxbury's 2019 Total Equalized Net Grand List was valued at $669,678,440. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Roxbury, included as Appendix C.

Development in Roxbury has historically been limited and typically centered around small residential subdivisions. There has been little new development in recent years; a proposal for a six-lot subdivision on North Street was withdrawn in December 2020. The Town has experienced an increase in renovations as residents are turning secondary homes into primary homes.

The Planning Commission is currently working on a detailed plan to address the growing concern that residents are leaving Roxbury to seek services in neighboring towns or moving to more affordable locations.

Despite the lack of on-going development, Roxbury has a great deal of open space throughout the town much of which is controlled by the Roxbury Land Trust.

Overall, development in Roxbury has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the next five years is not expected to increase exposure.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Roxbury is considered to have a low level of social vulnerability.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Roxbury. Geologic information discussed in the following section was acquired in Geographic Information System (GIS) format from the United States Geological Survey and the Connecticut DEEP.

The amount of stratified glacial meltwater deposits present in a community is important as areas of stratified materials are generally coincident with inland floodplains. These materials were deposited at lower elevations by glacial streams, and these valleys were later inherited by the larger of our present-day streams and rivers. Oftentimes these deposits are associated with public water supply aquifers or with wetland areas that provide significant floodplain storage. However, the smaller glacial till watercourses throughout Roxbury can also cause flooding. The amount of stratified drift also has bearing on the relative intensity of earthquakes.

Roxbury is underlain by relatively hard metamorphic and igneous bedrock including a variety of gneiss, schist, and marble and granite. The bedrock formations trend generally to the north-south. No mapped fault lines underlie Roxbury.

Continental ice sheets moved across Connecticut at least twice in the late Pleistocene era. As a result, Roxbury's surficial geology is characteristic of the depositional environments that occurred during glacial and postglacial periods.

Roxbury is covered primarily by glacial till. Glacial till contains an unsorted mixture of clay, silt, sand, gravel, and boulders deposited by glaciers as a ground moraine. The deposits are generally less than 50 feet thick although deeper deposits of till are scattered across the hillier sections of the town. Stratified glacial meltwater deposits are related to the various water bodies in town, particularly the Shepaug River. These deposits primarily contain stratified sands and gravels.

2.5 Climate and Climate Change

Over the course of the year, the temperature in Roxbury typically varies from 18°F to 80°F and is rarely below 2°F or above 88°F. The warm season lasts from May 29 to September 15, with an average daily high temperature above 71°F. The cold season lasts from December 1 to March 11, with an average daily high temperature below 42°F.

Precipitation falls throughout the year in Roxbury. The wetter season lasts from April 9 to August 19, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on May 29. The drier season lasts from August 19 to April 9. The smallest chance of a wet day is 22% on January 29.

The most rain falls during the 31 days centered around June 4, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.5 inches.

The snowy period of the year lasts for 5.8 months, from October 26 to April 19, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.3 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Roxbury as 4.94 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Roxbury at 5.50 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.9	6.2	8.7
NOAA Atlas 14	5.5	6.8	8.7

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Roxbury can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.0 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

Roxbury is divided among the following five subregional drainage basins: Jack's Brook, Shepaug River, Transylvania Brook, Sprain Brook and Hesseky Brook.

The majority of the drainage basins have FEMA-defined Special Flood Hazard Areas (SFHAs) along the primary watercourses. Such areas consist of 1% annual chance storm floodplains without elevations, 1% annual chance storm floodplains with elevations, and 0.2% annual chance floodplains. Refer to Section 3 for more detail regarding SFHAs.

Jacks Brook – The sub regional drainage of Jacks Brook makes up the central portion of Roxbury. The main brook channel starts off flowing south and eventually breaks to the east while joined by several small tributaries. Little Jacks Brook joins just upstream from the mouth of Jacks Brook where it outflows into the Housatonic River. A stretch of Jacks Brook upper reach, above and below Route 317, is bordered by fairly wide 100-year floodplains narrowing along the banks of the lower half. The drainage area of Jacks Brook covers just less than eight square miles of land area all located within Roxbury's borders.

Shepaug River – Originating at the Shepaug Reservoir, the Shepaug River flows directly south creating the lower east boarder of Roxbury. The Shepaug Reservoir is held back by the Shepaug River Dam which is classified as a high hazard dam. The Shepaug River continues to meander south through Washington and Roxbury with input from many streams and rivers including Bantam River, Bee Brook, Mallory Brook and other tributaries. After the rivers 26 mile stretch from its origin, it flows into the Housatonic River. The entire river from start to finish is bordered by 100-year floodplains generally widening as the channel gets closer to the mouth.

Sprain Brook – Starting off as a small pond, Sprain Brook flows south from Washington into Woodbury. A network of tributaries drains the northeast corner of Roxbury flowing east into Sprain Brook. The main channel flows through several ponds and has many tributary inputs before it reaches the Weekeepeemee River. The entire stretch of Sprain Brook follows Nettleton Hollow Road which continues straight to Route 47 with the mouth just before the intersection of Route 47 and 132. A consistent 100-year floodplain borders the channel from just below the headwaters to the mouth of the river.

Transylvania Brook – Transylvania Brook starts off as a small pond just inside the eastern border of Roxbury and flows south receiving input from several small streams. The brook then flows in and out of Gravel Pond and continues to meander south until it reaches the Weekeepeemee River. Less than half of the basin is in Roxbury with the rest south, draining a large section of Southbury. Much of the river once in Southbury is bordered by 100-year floodplain down the entire stretch to the mouth. Out of 7.2 square miles of drainage area, only about a third of Transylvania Brook's drainage is in Roxbury with the rest in Southbury and a small percentage draining the southwest corner of Woodbury.

Hesseky Brook – With a land area of just over six square miles, the Hesseky Brook sub-regional drainage basin lies within the towns of Southbury and Woodbury and a very small portion of Roxbury. Several tributaries feed into Hesseky Brook which flows south to the convergence with the Pomperaug River. Hesseky Brook is joined by a number of unnamed tributaries, as well as Good Hill Brook, which flows to the southeast into Hesseky Meadow Pond. In all, the Hesseky Brook drainage basin covers 6.22 square miles of land in the Towns of Southbury, Woodbury and Roxbury.

Of the five subregional drainage basins, the Shepaug River has the most influence on the town and its flood hazards. The majority of the town of Roxbury is located within the Shepaug River watershed. In Roxbury, the Shepaug River begins in the northwest portion and meanders through town in a southerly direction before joining Lake Lillinonah, which is a dammed portion of the Housatonic River that is located in Southbury. The river has been the subject of intense interest in the town due to significant flooding that occurs in the watershed. Many strategies within this plan will specifically address flooding concerns along the Shepaug River.

2.7 Governmental Structures and Capabilities

The Town of Roxbury is governed by a Selectman-Town Meeting form of government in which legislative responsibilities are shared by the Board of Selectmen and the Town Meeting. The First Selectman serves as the chief executive.

In addition to Board of Selectmen and the Town Meeting, there are boards, commissions and committees providing input and direction to Town administrators. Also, Town departments provide municipal services and day-to-day administration. Many of these commissions and departments play a role in hazard mitigation, including the Planning, Zoning, Inland Wetland and Conservation Commission, the Building Official, the Fire Department, Emergency Preparedness, and the Public Works.

Drainage complaints are routed through the First Selectman's office. These complaints are usually received via phone, fax, mail, or email and are recorded in a logbook. The complaints are investigated as necessary until remediation surrounding the individual complaint is concluded.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Roxbury are concentrated within the Roxbury Historic District, but include buildings and sites in other parts of Town as well. Resources near flood sources, such as Roxbury Brook, may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

The primary transportation routes into and out of the town are Route 67 (running from Bridgewater to the west down to Southbury in the south), Route 317 (connecting Roxbury Center to Woodbury in the east) and Route 199 (connecting Roxbury Center to Washington in the north). Other key roads include Wellers Bridge Road, South Street, and Painter Hill and Painter Ridge Roads.

There is no local public transit system in Roxbury; however, the Senior Center has a twelve-passenger, two-wheelchair bus that serves seniors and mobility-impaired residents.

Utilities

The Town of Roxbury does not have a public water supply; a handful of public and private facilities are served by small Community Water Systems and Non-Community Public Water Systems, while the vast majority of residents and businesses rely on private well water.

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Roxbury.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Roxbury has identified several critical facilities throughout the town. Table 2-3 identifies those critical facilities in Roxbury. The Town considers its fire, governmental, and major transportation arteries to be its most important critical facilities since these are needed to ensure that emergencies are addressed while day-to-day management of Roxbury continues.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	1% Floodplain
Fire Station	27 North Street	Emergency Response	✓		No
Town Hall	29 North Street	Critical Records Emergency Operations Center Secondary Shelter	✓	✓	No
Senior Center	7 South Street	Primary Shelter	✓	✓	No
Booth Free School	14 South Street	Tertiary Shelter		✓	No
Bernhardt Meadows	19 Bernhardt Meadow Ln	Senior Housing	*		No
Roxbury Market	26 North Street	Food and Grocery			No
Public Works	29 North Street	Emergency Assistance			No

Facility	Address or Location	Comment	Emergency Power	Shelter	1% Floodplain
Roxbury Transfer Station		Municipal Solid Waste			
Resident State Trooper	29 North Street	Law Enforcement			
Ambulance Association	27 North Street	EMS	✓		

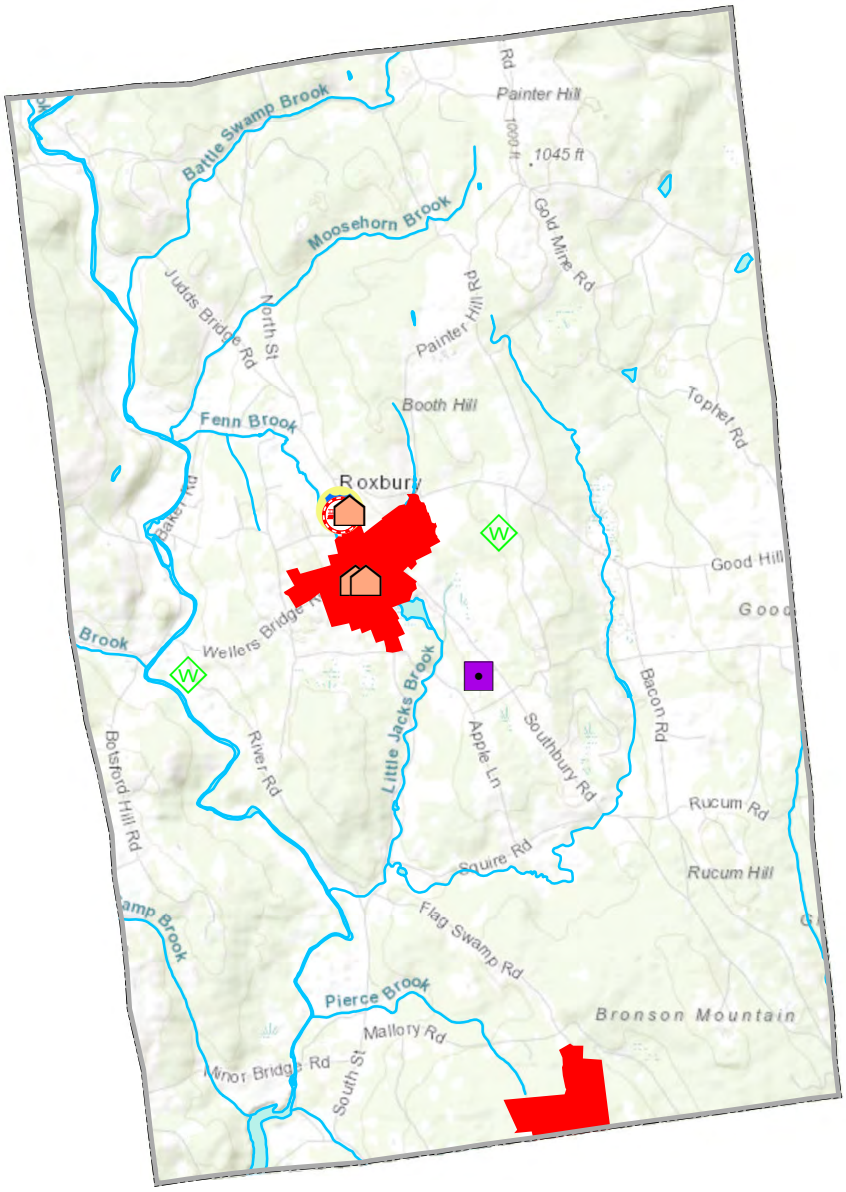
* Generator only supplies power to the community center in the complex.

The Town has been working to expand backup power at Bernhardt Meadows. Currently the emergency power system serves the community center, but not living areas. During an outage, the Fire Department stages a truck at the facility to ensure they do not miss an alarm or other emergency that might not be able to be relayed to emergency services without power.

Roxbury Market, near the Town Hall, Public Works, and Ambulance Association, is an essential community space following disasters. The Town is interested in assisting the business with acquisition of a backup generator.

Town staff also report that the Transfer Station and Public Works building are in need of emergency power. The cell phone towers located at the transfer station site have reportedly not provided sufficient coverage during past events. There is backup power for these towers, however during a recent event the power source failed; due to the fact that multiple service providers share the tower, it was a challenge to coordinate a response.

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Critical Facilities & Cultural Resources

- Shelter
- Care Facility
- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register District

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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - ROXBURY ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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PROJ. NO.	3843-06

FIG. 2-2

Sheltering Capabilities

Emergency shelters are an important subset of critical facilities as they are needed in many emergency situations. There are three identified shelters in the town that are also considered critical facilities. The Senior Center on South Street is the primary shelter for the town. The Town Hall on North Street is considered the backup shelter. Both facilities have backup generators. The third shelter is Booth Free School; this facility does not have standby power, but the Town is interested in pursuing installation of backup power here.

Emergency Response Capabilities

The Town's Emergency Operations Center (EOC), including its Emergency Communications Center, is located at Town Hall. Town staff have reported that the emergency power system at the Town Hall needs to be upgraded.

Roxbury does not have its own police force; it is served by a Resident State Trooper. The State Trooper's office is in the Town Hall, and served by that building's emergency power system.

The Roxbury Ambulance Association is looking to expand its building to allow for more storage and emergency response capabilities.

Emergency response capabilities are overseen by the Emergency Preparedness Director. The Director develops plans, protocols, and procedures that assure the safety of Roxbury's citizens. The Director also provides training for emergency response personnel, supports state and local emergency response exercises, and provides technical assistance to state and local emergency response agencies and public officials. The goal is to provide citizens with the highest level of emergency preparedness before, during, and after disasters or emergencies.

The Town utilizes Alert Now/Blackboard Connect, which has been acquired by Blackboard Connect to direct geographically specific emergency notification telephone calls into affected areas. This system provides emergency notifications to phones (text messages or calls) but can be used for non-emergency messages too. The town can also send email blasts.

Emergency services can also be cut off by fallen trees or washed-out culverts during certain emergencies. The Public Works Department performs tree and shrub removal and trimming on Town-owned lands and rights-of-way. During emergencies and following storms, the Public Works Department responds to calls related to downed trees.

FEMA preparedness materials are available at the senior center and the town hall. The Town also has an active Facebook page with some information regarding storm preparedness.

3 FLOODING

3.1 Existing Capabilities

Roxbury has *Ordinances* and *Subdivision Regulations* that regulate development, and *Inland Wetland Regulations* that regulate activities near wetlands. While regulations have not been updated to specifically address hazard mitigation, the DEEP's model regulations were used to update the regulations as necessary. Very few developments are permitted to impact wetlands or be built in FEMA Special Flood Hazard Areas (SFHA).

Ordinances, Regulations, and Plans

Regulations, codes, and ordinances that apply to flood hazard mitigation in conjunction with and in addition to NFIP regulations include:

- ***Zoning Regulations***. The Town of Roxbury Zoning Regulations have been enacted to "encourage the most appropriate use of land; to promote the health, safety and welfare of the community; to lessen congestion in the streets; to secure safety from fire, flood, panic and other danger; to provide adequate open spaces for light and air; to prevent overcrowding of land; to facilitate adequate provisions for community utilities and facilities, such as transportation, water, sewerage, schools, parks, and other public requirements; to conserve the value of buildings; regulate and restrict the location and use of buildings, structures and land for agricultural, residential, commercial, industrial or other purposes; to regulate and limit the height, size and bulk of buildings and structures hereafter erected or altered; to regulate and determine the size of yards and other spaces; protect historic resources; provide proper sedimentation control and the control of erosion caused by wind or water; encourage energy efficient patterns of development; and to retain the rural character of the town"

- ***Floodplain Management Ordinance***: The Town's Flood Regulations were adopted in 2003 and are essentially the town's local version of the NFIP regulations. The regulations were established to address Floodplain Management, including establishing areas of special flood hazard, restrictions, development permit requirements, permitted uses, and standards for flood hazard reduction. The objectives of the regulations are to:
  - Protect human life and health; minimize expenditure of public money for costly flood control projects; minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public; to help maintain a stable tax base by providing for the sound use and development of flood prone areas in such a manner as to minimize flood blight areas and to insure that potential home buyers are notified that property is in a flood area.
  - Section 5-73(1) of the Ordinance states that "no new construction or substantial improvement of any residential structure or other structures for human habitation shall be located in any SFHA."
  - Section 5-73(2) states that "new construction or substantial improvement of any commercial, industrial, or nonresidential structure and structures for other than human occupancy shall either have the lowest floor, including basement elevated at least one foot above the base flood elevation."

Roxbury defines Substantial Improvement as occurring over the lifetime of a structure.

- ***Inland Wetlands and Watercourse Regulations***. The purpose of the inland wetlands and watercourses regulations is to protect the quality of the inland wetlands and watercourses within the Town of Roxbury by making provisions for the protection, preservation, maintenance, and use of inland wetlands and watercourses, including deterring and inhibiting the danger of flood and pollution.
  - Section 2.1(bb) defines "Regulated Activities" as any operation within or use of a wetland or watercourse whether or not such wetland or watercourse is shown on the Inventory map involving removal or deposition of material, or any obstruction, construction, alteration or pollution, of such wetlands or watercourses, but shall not include the specified activities in Section 4 of these regulations. Further, any clearing, grubbing, filling, grading, paving, storage, excavating, constructing, installing, repairing, depositing or removal of material and discharging of water on land or any of the activities listed in subparagraphs (1) through (6) of this paragraph shall be deemed to be a Regulated activity when conducted in the following setback areas: (i) two hundred (200) feet of the ordinary high waterline of the Shepaug River and one hundred (100) feet of the ordinary high waterline of any other watercourse measured from the closest edge of the ordinary high water; (ii) one hundred (100) feet from all wetlands as defined in these regulations. These review areas are considered very protective of water resources and consistent with flood mitigation.
  - Section 4.1 states that no residential homes will be permitted "as of right" in wetlands and watercourses after July 1, 1987.
  - Section 4.4 states that no person may conduct or maintain a regulated activity without obtaining a permit. Section 7 outlines the permit application requirements.

- ***Plan of Conservation and Development.*** Effective in 1999 and amended in 2010. This document is the Town vision statement for future development.
  - Section 3 (page 6) recommends monitoring residential development patterns and review and update land use regulations and administration regularly.
  - Section 4 (page 8) recommends the protection and preservation of important features such as wetlands, watercourses and floodplains.
  - Section 4 (page 12) recommends maintaining low-intensity land use/land cover regulations in an effort to minimize impacts to water resources.

- ***Subdivision Regulations.*** Effective in 2001, the Town's Subdivision Regulations establish minimum acceptable standards of street construction; regulate the layout and development of lots and streets; and outline measures to prevent degradation of potable water sources, control erosion and siltation, preserve adequate and convenient open spaces, and retain the natural features of the land.
  - Section 3.04 requires that "land which the Commission finds to be unsuitable in its present condition for building purposes because of flooding, inadequate drainage, steep slopes, depth to bedrock, erosive soils, utility easements, or similar features which might pose a threat to public health, safety and welfare shall not be approved for subdivision unless adequate provisions are made by the subdivider to mitigate the unsuitable conditions in a manner satisfactory to the Commission."

- Section 4.06 states that "The Commission may determine that any parcel of land, regardless of size, may be unsuitable for building if it is found unsuitable for occupancy and building by reason of unsuitable soil, topography, water, flooding or other conditions."
- Section 4.12.2 requires "the design and construction of storm drain facilities shall not cause flooding of abutting property from the headwater and backwater produced by bridges, culverts and other structures."
- Section 4.16 states that "in areas subject to flooding proper provision shall be made for protective flood control measures including: storm drainage shall be designed to reduce exposure to flood hazards; roads shall be of such elevation or shall be suitably protected so as to allow emergency access during flood conditions; roads, drainage and other improvements shall be safe from flood damage; public and private improvements shall be designed to minimize flood damage and shall be capable of use without danger from flooding or flood related damages; All utilities and services (including sewage, water, and electric systems) shall be located and constructed to minimize or eliminate flood damage."
- Article III Driveways, Utility Crossing and Gated Property Emergency Access Ordinance:
  - Section 3-64 outlines the application process and requires engineered plans to show the existing road drainage along the entire frontage of a lot or parcel and the existing and proposed drainage on a lot per parcel. This includes culverts, streams, intermittent watercourses, ditches, swales, foundation and gutter drains, curtain drains and general site drainage.

NFIP, Flood Insurance, and Community Rating System

The degree of flood protection established by the variety of regulations in the Town exceeds the minimum NFIP requirements. The Town is not enrolled in the Community Rating System program. Although elevations are not common, one single family home along Baker Road was elevated in recent years due to its flood prone location.

According to FEMA, there are 15 flood insurance policies in force in Roxbury as of 6/30/2019 with an insurance value of $4,864,300.

Drainage and Street Flooding

Minor street flooding throughout town is addressed by the Public Works Department as necessary. These typically relate to small areas and result in limited, if any, property impacts. The Town has identified Squire Road at Route 67 and Botsford Hill Road at Route 67 as areas of flood concern.

The Public Works Department is in charge of the maintenance of the Town's drainage systems and performs clearing of bridges and culverts and other maintenance as needed. Drainage complaints are routed to the Office of the First Selectman. The Town uses these reports to identify potential problems and plan for maintenance and upgrades. The Town receives regular weather updates through Division of Emergency Management and Homeland Security (DEMHS) Region 5 email alerts as well as watches and warnings through the National Weather Service.

Structural Projects and Bridge Scour

Roxbury has been very proactive with investigating the potential for bridge scour along the Shepaug River. Undersized drainage systems, including culverts are addressed on a case-by-case basis through system maintenance and/or upgrades as necessary.

Communications

The Departments of Fire and Emergency Services are responsible for monitoring local flood warnings. The Town can access the National Weather Service website at http://www.weather.gov/ to obtain the latest flood watches and warnings before and during precipitation events.

The National Weather Service issues a flood watch or a flash flood watch for an area when conditions in or near the area are favorable for a flood or flash flood, respectively. A flash flood watch or flood watch does not necessarily mean that flooding will occur. The National Weather Service issues a flood warning or a flash flood warning for an area when parts of the area are either currently flooding, highly likely to flood, or when flooding is imminent.

Public Information and Education

FEMA preparedness materials are available at the Roxbury senior center and town hall. The town has an active Facebook page with some preparedness information.

Natural Resource Protection

According to the Roxbury Land Trust website, "3,400 acres or about 17 percent of Roxbury is conserved as open space under the Trust's stewardship." The town also owns some open space and according to the Plan of Conservation and Development, has appropriated approximately $800,000 for open space protection. With these lands set aside from development, the risk of floodprone development is lowered.

In summary, the Town primarily attempts to mitigate future flood damage and flood hazards by restricting building activities in floodprone areas. This process is carried out through both the Planning Commission and the Inland Wetlands Commissions. All watercourses are to be encroached minimally or not at all to maintain the existing flood-carrying capacity. These regulations rely primarily on the FEMA-defined 1% annual chance flood elevations to determine flood areas.

New Capabilities and Completed Actions

Roxbury continues to maintain its strong flood mitigation capabilities.

The Town has applied for state-administered federal grant funds for bridge repairs, but has been unsuccessful. The Town has been working to repair the culvert structure on Botsford Hill Road; the State has declared this structure to be in "poor" condition, and the Town agrees.
The town is currently working to complete a culvert replacement on Davenport Road.

A few years ago, the Town made repairs to the center column of Wellers Bridge, per the state's recommendation.

Summary

In summary, the Town mitigates flood damages by restricting building activities in floodprone areas, maintaining street drainage systems, completing structural projects on bridges and culverts, alerting residents to hazards, and preserving open space.

3.2 Vulnerabilities and Risk Assessment

This section discusses specific areas at risk to flooding within the Town. As shown in the historic record, flooding can impact a variety of river corridors and cause severe damages in the Town of Roxbury. Flooding due to poor drainage and other factors is also a persistent hazard in the Town and can cause minor infrastructure damage and create nuisance flooding of yards and basements.

Vulnerability Analysis of Critical Facilities

The list of critical facilities provided by the Town (Section 2.9) was used with the parcel data to accurately locate each critical facility throughout the town. One of the critical facilities, the Children's Station, was found to lie within the 1% annual chance floodplains.

The Children's Station is a child daycare facility located on Baker Road. While this building is not known to have experienced serious flooding damage in recent years, its proximity to the Shepaug River makes it at risk to flooding. While this facility is susceptible to the 1% annual chance flood, they may also be susceptible to floods of lesser magnitude.

Booth Free School appears to be located in an area with minimal flood risk, but the rear of the property may be within an A zone. The back area of the Booth Free school has flooded during heavy precipitation events. This impacts fields and playgrounds. The building itself is not believed to be in a flood risk zone.

Vulnerability Analysis of Areas Along Watercourses

The primary waterways in the town are the Shepaug River, Jacks Brook, Transylvania Brook and tributaries of Sprain Brook. The remaining waterways in Roxbury are mostly small streams and brooks.

The most frequently flooded areas in the town are adjacent to Shepaug River. The Judd's Bridge and Hodge Park areas are the most floodprone. As previously mentioned, Tropical Storm Irene caused significant flooding in this area. Several animals from Judd's Bridge Farm drowned during

the event. The Tunnel Road area was severely flooded, and several residents had to be rescued by boat.

Town staff report that a recent ice jam at the Shepaug Dam caused severe damage to an adjacent farm; this type of event has been observed multiple times in the past. Flood waters have also impacted Route 67 and an adjacent park.

Wellers Bridge, Route 67, and commercial enterprises such as Stuart's Greenhouse and the nearby Riverview Bed and Breakfast are located in the SFHA of the Shepaug River. In general, these areas are known as the Roxbury Station section of the town. The Children's Station is located here as well. The Town was recently informed that Wellers Bridge has been identified as "scour critical."

There are numerous culverts throughout town that are at risk of failure. The town is currently working to complete a culvert replacement on Davenport Road, and the Wakeley Road culvert is also a concern.



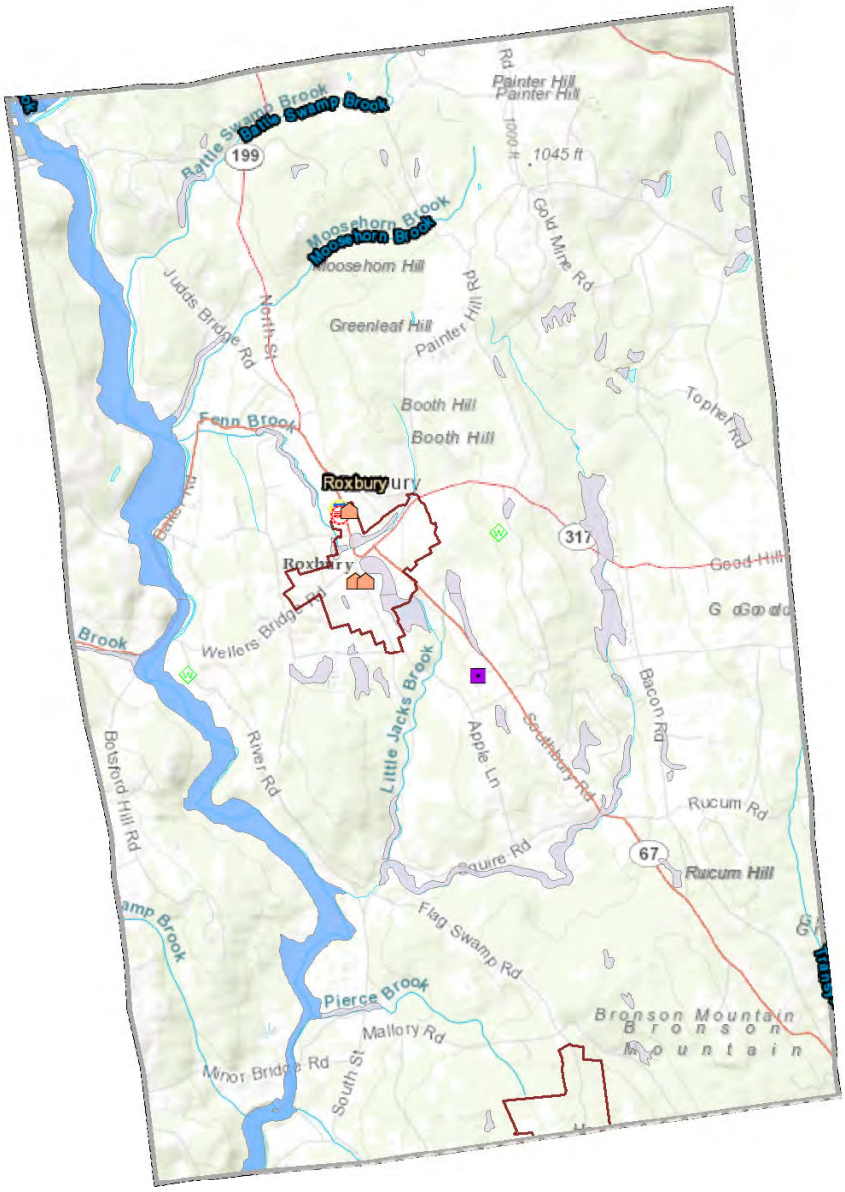
Other areas of flood concern are Squire Road at Route 67 (the low area where Jacks Brook crosses under the road) and Botsford Hill Road at Route 67. In particular, the twin culverts at Botsford Hill Road (tributary to Shepaug River; pictured to the left) are believed to be undersized and have become clogged with debris and washed out many times, including during Tropical storms Irene and Floyd. During Hurricane Floyd water completely engulfed the roadway surrounding the bridge, causing issues with school dismissal. The State has declared this structure to be in "poor" condition. During Irene, driveways along Squire Road were washed out where Jacks Brook crosses underneath the driveways.

There are other areas around the town that suffer from street flooding due to undersized or nonexistent drainage systems. Bacon Hill Road is a flood concern; during heavy precipitation events, large amounts of water flow down this roadway making travel dangerous.

The Town discourages new construction and substantial reconstruction within the 1% annual chance floodplain by raising concerns during the floodplain permit process. New development is strictly managed through the Town's land use process.

Unpaved roads such as Evergreen Drive – whether private or town-owned – have reportedly suffered from washouts and erosion during heavy rain and flood events, and are a particular concern for the Town. In a town like Roxbury with many unpaved roads, this is a special set of flood-related risks.

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Legend

- Shelter
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- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register District

Flood Zone

- A
- AE
- X500

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FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - ROXBURY ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing mitigation measures appropriate for flooding were discussed previously. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Roxbury is 110 mph for a Category 1 event, 120 mph for a Category 2, and 125 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Parts of tall and older trees may fall during heavy wind events, potentially damaging structures, utility lines, and vehicles. Eversource, the local electric utility, provides tree maintenance near its power lines. The town has placed significant importance on storm recovery, and this has resulted in improved attention from the utility companies. For example, Eversource was present in Roxbury in October 2013 with five contracted crews to trim trees.

In an effort to reduce power outages, the town may consider hardening the utilities along the main power routes, especially along the Route 199 and Route 67 corridors. These corridors are considered critical for uninterrupted power supply as well as for evacuation and transit. Connecticut Light & Power completed a significant amount of work along both lines following the significant outages experienced in 2013.

The Town has a tree warden and a deputy tree warden, both employed by the Public Works Department, who are responsible for managing all trees on Town-owned property, including within the street rights-of-way. Services are contracted out since the town does not have its own equipment. The budget has increased in recent years to around $25,000. Public Works does a lot of post-storm cleanup and tree-debris removal.

During Tropical Storm Irene, the Town used the CTAlert/Blackboard Connect system to notify all residents in the SFHA that they may evacuate and use one of the shelters. Prior to severe storm events, the Town ensures that warning/notification systems and communication equipment are working properly and prepares for the possible evacuation of impacted areas.

New Capabilities and Completed Actions

Roxbury continues to maintain its strong tropical cyclone mitigation capabilities.

Summary

Roxbury mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Tropical Storm Isaias, which occurred August 4, 2020, caused outages in 99.4% of the Town, according to Town officials. The Town reportedly contacted Eversource repeatedly to request that they cut power so that Public Works could begin to clear roads and allow for emergency access. It took between 3 and 4 days for Eversource to respond, during which emergency access was virtually impossible. Ultimately the Town cleared both Town and state roads.

Bernhardt Meadows was without power for about four days. This raised serious health concerns, given the fact that many senior residents went without air-conditioning and running water

because of the outage. The only reprieve for the residents was to gather in the community center (which has emergency power); this raised major health concerns because of the risk of COVID-19 exposure.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

The Town of Roxbury is vulnerable to hurricane damage from wind and flooding. Wind damage can affect any area of Town, while flood damage tends to be limited to known flood risk areas. Wind risks include flying debris, damage to trees and utility lines, road blockages, fires started by downed power lines, and direct impacts on structures. All areas of growth and development increase the town's vulnerability to natural hazards such as hurricanes although new development is expected to mitigate potential damage by meeting the standards of the most recent building code.

Most of Roxbury's existing housing stock predates the recent code changes, and therefore have an elevated susceptibility to roof and window damage from high winds. Homes located within SFHAs or other flood hazard areas are at risk from flooding from tropical cyclones, on top of wind hazards.

In general, as residents and businesses become more dependent on the internet and mobile communications, the impact of hurricanes on commerce will increase. A major hurricane has the potential of causing complete disruption of power and communications for up to several weeks, rendering electronic devices and those that rely on utility towers and lines inoperative.

There are several dead-end roads in Town, such as Carriage Lane, that make emergency access a challenge during a heavy wind event.

Critical Facility Vulnerability

All critical facilities are considered to be equally susceptible to high winds; on the other hand, some critical facilities are more susceptible than others to flooding associated with hurricanes. Such facilities susceptible to flooding were discussed in Section 3.

Town staff report that emergency power at the Town Hall needs to be upgraded, making that facility susceptible to power outages. Following Tropical Storm Isaias on August 4, 2020, the backup power system received services to enable continued operations.

Hurricane sheltering needs have not been calculated by the U.S. Army Corps of Engineers for the Town. During extended power outages, it is believed that only 10% to 20% of the affected population will require sheltering. In the case of a major hurricane, it is likely that the Town will

depend on state and federal aid to assist sheltering displaced populations until normalcy is restored.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Roxbury as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

Municipal responsibilities relative to summer storm and tornado mitigation and preparedness include:

- Developing and disseminating emergency public information and instructions concerning tornado, thunderstorm wind, lightning, and hail safety, especially guidance regarding in-home protection and evacuation procedures and locations of public shelters.
- Designating appropriate shelter space in the community that could potentially withstand lightning and tornado impact.
- Periodically testing and exercising tornado response plans.
- Putting emergency personnel on standby at tornado "watch" stage.
- Utilizing the Alert Now/Blackboard Connect emergency notification system to send warnings into potentially affected areas.

Although tornadoes pose a threat to all areas of the state, their occurrence is not considered frequent enough to justify the construction of tornado shelters. Instead, the state has provided NOAA weather radios to all public schools as well as many local governments for use in public buildings. The general public continues to rely on mass media for knowledge of weather warnings. Warning time for tornadoes is very short due to the nature of these types of events, so predisaster response time can be limited. However, the NOAA weather radios provide immediate notification of all types of weather warnings in addition to tornadoes, making them very popular with communities.

New Capabilities and Completed Actions

Roxbury continues to maintain its summer storm mitigation capabilities.

Summary

Roxbury mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource. For municipal property, the Town budget for tree removal and minor repairs is generally adequate to handle summer storm damage.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Roxbury has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

Thunderstorms are expected to impact Roxbury 20 to 30 days each year. The majority of these events do not cause any measurable damage. Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the North Canaan area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Roxbury is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the town of North Canaan is believed to be low for any given year. All areas of the town are susceptible to damage from high winds although more building damage is expected in the town center while more tree damage is expected in the less densely populated areas.

Town personnel note that strong thunderstorms will cause power lines to fall all over the town. Most downed power lines in Roxbury are detected quickly, and any associated fires are quickly extinguished. Such fires can be extremely dangerous during the summer months during dry and drought conditions.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

The Town of Roxbury reports that the typical cost for the town to respond to downed branches and wires from a localized severe thunderstorm is $5,000 to $10,000 (equipment and labor). The damage from the recent severe downburst/wind event on May 27, 2014 was approximately $5,000, but this figure does not include the costs borne by private landowners or the financial losses associated with the school closures.

Summary

The entire town of Roxbury is at relatively equal risk for experiencing damage from summer storms and tornadoes. Based on the historic record, tornados and straight-line wind events have occurred in and around the town of Roxbury. However, more frequent storm damages are relatively site specific and occur to private property (and therefore are paid for by private insurance).

6 WINTER STORMS

6.1 Existing Capabilities

Programs that are specific to winter storms are generally those related to preparing plows and sand and salt trucks, tree trimming to protect power lines, and other associated snow removal and response preparations.

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 35 psf for all other areas. As a result of the winter of 2010-2011, it is anticipated that many communities will develop and utilize programs for roof snow removal.

CTDOT plows all state roads and Interstates. The Town primarily uses Town staff for plowing operations on the remaining roadways. The Town has six trucks including one V-plow and the ability to contract additional private crews/trucks. Priority is given to plowing egresses to critical facilities. A total of 27 roads in the town are private and are *not* plowed by the Town.

During some heavy snow events, the Town's crews have cleared state roads in order to enable people to get in and out of town. According to town officials, in some cases action must be taken quickly in order to ensure roads are accessible.

Prior to a winter weather event, the Town ensures that all warning/notification and communications systems are ready and ensures that appropriate equipment and supplies, especially snow removal equipment, are in place and in good working order. In some known problem areas, prestorm treatment is applied to roadways to reduce the accumulation of snow. The Town also prepares for the possible evacuation and sheltering of some populations that could be impacted by the upcoming storm (especially the elderly and special needs persons).

New Capabilities and Completed Actions

Roxbury continues to maintain its strong winter storm mitigation capabilities.

Summary

Roxbury mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

After a storm, snow piled on the sides of roadways can inhibit sight lines and reflect a blinding amount of sunlight. When coupled with slippery road conditions, poor sightlines and heavy glare create dangerous driving conditions. Stranded motorists, especially senior and/or handicapped citizens, are at particularly high risk of injury or death from exposure during a blizzard. The elderly population in Roxbury, in particular, is susceptible to the impacts created by winter storms due to resource needs (heat, electricity loss, safe access to food, etc.).

The structures and utilities in the town of Roxbury are vulnerable to a variety of winter storm damage. Tree limbs and some building structures may not be suited to withstand high wind and snow loads. Ice can damage or collapse power lines, render steep gradients impassable for motorists, undermine foundations, and cause "flood" damage from freezing water pipes in basements. Drifting snow can occur after large storms, but the effects are generally mitigated through municipal plowing efforts.

The Town has indicated that Painter Hill Road and Painter Ridge Road have a higher risk of drifting snow than other areas due to open areas. The higher elevations tend to ice first, including these roads, which is also a concern on unpaved roads. Ice is also a problem on the unpaved roads. Of the 60 miles of Town roads, 28 miles are unpaved.

Unpaved roads in Town are a particular concern due to icing.

No critical facilities are believed to be more susceptible to winter storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to winter storms.

A few barns collapsed in Roxbury in January and February 2014. Town staff have noted that there is a structure at the transfer station that houses machinery that is not suitable for heavy snow loads; this structure needs to be upgrade or replaced.

Summary

The entire town of Roxbury is at relatively equal risk for experiencing damage from winter storms although some areas (such as icing trouble spots and neighborhoods with a high concentration of flat roofs) are more susceptible. Based on the historic record, it is likely that some winter storm events have costly consequences for the town. Nevertheless, many damages are relatively site specific and occur to private property (and therefore are paid for by private insurance) while repairs for power outages are often widespread and difficult to quantify to any one municipality.

For municipal property, the Town budget for tree removal and minor repairs is generally adequate to handle winter storm damage although the plowing budget is often depleted.

7 EARTHQUAKES

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the town of Roxbury. The Town has adopted these codes for new construction, and they are enforced by the Building Official. Due to the infrequent nature of damaging earthquakes, land use policies in the Town do not directly address earthquake hazards. However, various documents do indirectly discuss areas susceptible to earthquake damage and regulations that help to minimize potential earthquake damage:

- ***Plan of Conservation and Development.*** The 1999 plan states the following:
  - Section 4 (page 8) identifies a strategy to protect and preserve important natural features such as wetlands, watercourses, steep slopes ad floodplains.
  - Section 4 (page 13) identifies the need to "monitor effectiveness of inland wetlands regulations and soil erosion and sedimentation control requirements for development on slopes in excess of 25% and to consider additional regulation as necessary."

- ***Subdivision Regulations***. The 2010 regulations do not explicitly address the issue of construction on steep slopes. The regulations do require that soil erosion and sediment control plans be developed for proposed projects.

- ***Zoning Regulations***, Section 7.7 of the Town's Zoning Regulations requires a soil erosion and sediment control plan to be submitted with any application for development if the development includes, cumulatively, a disturbed area of more than one-half (1/2) acre.).

7.2 Vulnerabilities and Risk Assessment

Surficial earth materials behave differently in response to seismic activity. Unconsolidated materials such as sand and artificial fill can amplify the shaking associated with an earthquake. In addition, artificial fill material has the potential for liquefaction. When liquefaction occurs, the strength of the soil decreases, and the ability of soil to support building foundations and bridges is reduced. Increased shaking and liquefaction can cause greater damage to buildings and structures and a greater loss of life.

Some areas in the town of Roxbury are underlain by sand and gravel. Structures in these areas are at increased risk from earthquakes due to amplification of seismic energy and/or collapse. The best mitigation for future development in areas of sandy material may be application of the most stringent building codes or possibly the prohibition of new construction. However, many of these areas occur in floodplains associated with the various streams and rivers in Roxbury, so they are already regulated. The areas that are not at increased risk during an earthquake due to unstable soils are the areas underlain by glacial till, which includes most of the town.

Areas of steep slopes can collapse during an earthquake, creating landslides. Seismic activity can also break utility lines such as water mains, electric and telephone lines, and stormwater

management systems. Damage to utility lines can lead to fires, especially in electric and gas mains. Dam failure can also pose a significant threat to developed areas during an earthquake. For this Plan, dam failure has been addressed separately in Section 9.0.
The AEL is the expected losses due to earthquakes each year. Note that this number represents a long-term average; thus, actual earthquake losses may be much greater or nonexistent for a particular year.

According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut is at a low to moderate risk for experiencing an earthquake of a magnitude greater than 3.5 and at a moderate risk of experiencing an earthquake of a magnitude less than 3.0 in the future. No earthquake with a magnitude greater than 3.5 has occurred in Connecticut within the last 30 years, and the USGS currently ranks Connecticut 43rd out of the 50 states for overall earthquake activity.

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the town of Roxbury. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Roxbury

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

Based on the historic record and the probability maps generated from the USGS database, the state of Connecticut possesses areas of seismic activity. It is likely that Connecticut will continue to experience minor earthquakes (magnitude less than 3.0) in the future. While the risk of an earthquake affecting Roxbury is relatively low over the short term, long-term probabilities suggest that a damaging earthquake (magnitude greater than 5.0) could occur within the vicinity of Roxbury.

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is charged with the responsibility for administration and enforcement of Connecticut's dam safety laws. The existing statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard to life, health, or property.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

The dam safety requirements are codified in Sections 22a-401 through 22a-411 inclusive of the Connecticut General Statutes. Sections 22a-409-1 and 22a-409-2 of the Regulations of Connecticut State Agencies have been enacted and set requirements for the registration, classification, and inspection of dams. Dams must be inventoried by the owner with the Connecticut DEEP according to Connecticut Public Act 83-38.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an EAP after the Commissioner of DEEP adopts regulations. The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. New regulations shall establish the requirements for such EAPs, including but not limited to (1) criteria and standards for inundation studies and inundation zone mapping; (2) procedures for monitoring the dam or structure during periods of heavy rainfall and runoff, including personnel assignments and features of the dam to be inspected at given intervals during such periods; and (3) a formal notification system to alert appropriate local officials who are responsible for the warning and evacuation of residents in the inundation zone in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board program, which can provide noncompetitive state funding for repair of municipality-owned dams. Funding is limited by the State Bond Commission. State statute Section 25-84 allows municipalities to form Flood and Erosion Control Boards, but municipalities must take action to create the board within the context of the local government such as by revising the municipal charter. The Town regulated flood control measures via the Planning Commission. Item 1.02.8 of the Subdivision Regulations establishes the Commission's authority to provide for protective flood control measures.

The one high-hazard dam in the Town is routinely inspected by the Connecticut DEEP. The upstream Class C dams located in Warren are maintained, operated, and inspected by both the City of Waterbury and the Connecticut DEEP. The City of Waterbury is responsible for notifying the appropriate emergency response personnel should a dam breach occur.

The Town uses the Blackboard Connect system for reverse 911-type emergency notification. The dam failure inundation mapping discussed in the next section can be used to help streamline the geographic contact areas if the failure of a major dam is imminent.

Actions Completed and New Capabilities

continues to maintain its capabilities for mitigating and responding to dam failure risks.

Summary

Roxbury mitigates dam failure primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

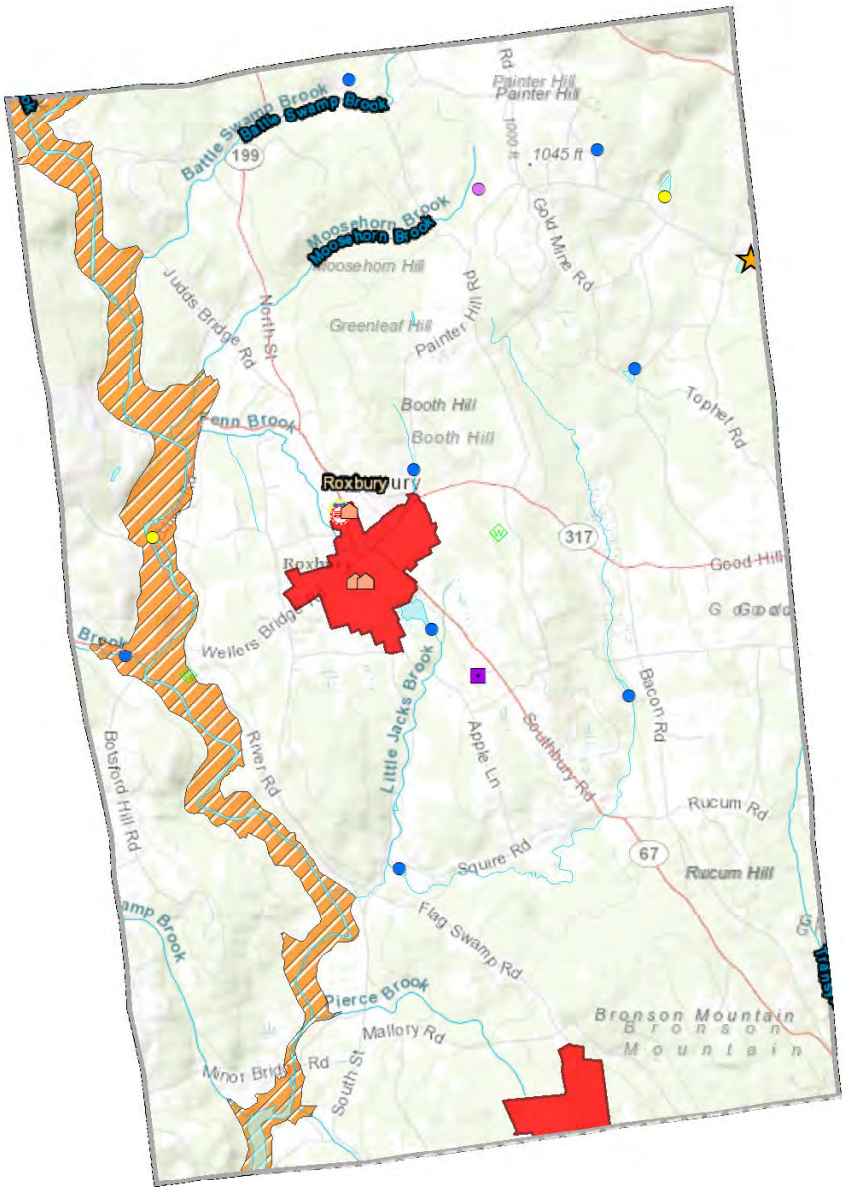
- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 18 DEEP-inventoried dams within the Town of Roxbury. These dams are listed in Table 8-1 and shown in Figure 8-1.

Table 8-1: DEEP-Inventoried Dams in Roxbury

Dam#	Dam Name	Class	Owner
12001	PANTHER POND DAM	B	Private
12002	CUTLER POND DAM	BB	Private
12003	BOTSFORD ROAD POND DAM	BB	Private
12004	COPLEY POND DAM	A	Private
12005	YELDING DAM	A	Private
12006	GASSER POND	A	Private
12007	VALLEY FARM POND	A	Private
12008	WRIGHT'S POND DAM	A	Private
12009	WRIGHT'S POND DAM		
12010	CLOVER KNOLLS DAM	A	Private
12011	MILLER POND DAM	A	Private
12012	HURLBUT POND #3		Private
12013	HURLBUT POND #2		Private
12014	HURLBUT POND #1		Private
12015	RAIKES POND DAM	AA	Private
12016	ALLEN POND #2		Private
12017	ALLEN POND #1		Private
12018	HODGE POND		Private

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Legend

- Shelter
- Care Facility
- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register District

Dam Hazard Class

- B - Significant Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Dam Failure Inundation

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WWW.MMINC.COM

DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - ROXBURY ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 2,500 5,000
Feet

SCALE 1 " = 5,853 '
DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 8-1

The following section discusses known vulnerable areas located downstream of Class B and C dams. In addition to the two high hazard dams in Roxbury, failure of two dams located in Warren has the potential to affect Roxbury: the Upper Shepaug Reservoir Dam and the Shepaug Reservoir Dam.

Upper Shepaug Reservoir (Dam No. 14901) - West Branch Shepaug River, Warren

The Upper Shepaug Reservoir Dam, also known as the Cairns Dam, is a Class C dam located at the southern end of Cairns Reservoir and impounds a storage volume of 13,942 acre-feet from a contributing watershed of 10.4 square miles. The earthen dam was constructed in 1965 and is 87 feet in height and 1,000 feet in length. A 96" RCP diversion pipe through center of dam acts as a secondary outlet. It is owned by the City of Waterbury and used to impound a reservoir for public water supply. The structure was modified for flow monitoring in 2007 by the City of Waterbury (installation of a meter with phone/electric lines). In June 2008, the Waterbury Water Department installed release structures and gate valves in two existing 48" gates that serve the dam, as well as an automated gate valve control system.

An Emergency Operation Plan and Operation and Maintenance Manual were developed for the City of Waterbury in June 1989 by HRP Associates and revised in February 1991. The June 1989 plan includes a dam breach analysis. The analysis notes that the first significant downstream features are the Shepaug Reservoir and Dam. The model indicates that the Shepaug River Dam would begin breaching approximately 25 minutes after the Upper Shepaug Reservoir Dam breach begins.

A number of bridges in Roxbury would be flooded from ten to 44 feet above their decks, including Judds Bridge Road, Route 67, and Wellers Bridge Road. Population centers would be at risk from a flood wave. The Judd's Bridge area would be affected just shy of two hours and Roxbury Station at 2 hours and 20 minutes. The Minor Bridge Road area would be reached after three hours. The peak flood wave passage would occur approximately 30 minutes after the initial flood wave hits the area.

Shepaug Reservoir (Dam No. 14912) - Shepaug River, Warren

The Shepaug Reservoir Dam is a Class C dam located at the southern end of the Lower Shepaug Reservoir and impounds a storage volume of 2,937 acre-feet from a contributing watershed of 38.2 square miles. It is owned by the City of Waterbury and used to impound a reservoir for public water supply. The concrete gravity dam was constructed in 1933 and is 65 feet in height and 500 feet in length. The crest is approximately 8.5-feet above the spillway. A gate chamber discharges through the Shepaug Aqueduct to Fitch Reservoir or through two 48" blowoffs to Shepaug River. The Shepaug River downstream of the dam is contained within stone masonry walls.

The structure was inspected on April 23, 1997, and no major repair issues were noted. The structure was modified for flow monitoring in 2007. Repairs were permitted in February 2013 that included the restoration of downstream masonry training walls that had collapsed after TS Irene. The repairs were made possible using FEMA funds and were completed as of September 2013.

An EAP for the Shepaug Reservoir Dam was prepared in 2001 addressing actions to be taken during an emergency. The City of Waterbury is responsible for notifying all emergency response personnel. A 1982 Management Plan by HRP Associates includes the results of the dam breach analysis documented in the Upper Shepaug Reservoir EOP. The analysis indicates that the following streets and roads would be inundated by a flood wave:

- ❑ Tunnel Road (from Town Line to Judd's Bridge Road)
- ❑ Walker Brook Road (from 0.1 mile north of Lower Church Hill Rd. to Judd's Bridge Road)
- ❑ Lower Church Hill Road (Walker Brook Rd. north 0.1 miles)
- ❑ Judd's Bridge Rd. (from 0.1 mile west of Walker Brook Rd. to 0.5 miles south of Battle
- ❑ Swamp Rd.)
- ❑ Hodge Road (entire length)
- ❑ Tamarack Lane (entire length)
- ❑ Sentry Hill Rd. (from Rt. 67 to Tamarack Lane)
- ❑ Rt. 67/Baker Rd. (from Sentry Hill Rd. to 0.2 miles west of Botsford Rd.)
- ❑ Evergreen Drive (entire length)
- ❑ Evergreen Lane (entire length)
- ❑ Chalybes Rd. (from Rt. 67 to 0.1 mile east of Rt. 67)
- ❑ Mine Hill Rd. (from 0.1 mile west of Hodge Rd. to Rt. 67)
- ❑ Quarry Road (entire length)
- ❑ Botsford Hill Rd. (from Rt. 67 to 0.2 miles south of Rt. 67)
- ❑ Wellers Bridge Road (from Rt. 67 to .1 mile east of River Road)
- ❑ River Road (west side) (entire length)
- ❑ Lower Falls Road (from Minor Bridge Road to .4 miles south of Minor Bridge Rd.)
- ❑ South Street (west side) (from River Road to Falls Road)

Panther Dam (Dam No. 12001) - Sprain Brook Trib, Roxbury

The Panther Dam is a Class B dam located at the northeast end of the impoundment located on an unnamed tributary to Sprain Brook, impounding a three-acre reservoir feet from a contributing watershed of 1.94 square miles. It is privately owned and used to impound a reservoir for recreation. The earthen dam is 16 feet in height and 215 feet in length, with a crest width of 12 feet. The concrete spillway is located on the left embankment and there is a low-level outlet at the center of the toe of the dam.

The reservoir discharges to an unnamed watercourse that flows northward crossing under Painter Hill Road and Washington Road (Route 47) before its confluence with Sprain Brook. The downstream channel flows east approximately 2,100 feet, passing by three houses and crossing Painter Hill Road again. An additional 2,200 feet downstream, the stream crosses Route 47 before joining Sprain Brook. The dam was inspected by the CT DEEP Dam Division on August 6, 2013 and found to be in poor condition. The 2013 inspection noted seepages, cracks in the left concrete buttress, and undermining. Downstream hazards include the three houses on Painter Hill Road and Route 47.

Cutler Pond Dam (Dam No. 12002)

The Cutler Pond Dam (aka Pratt Pond Dam) is a Class BB dam located on the south side of its impoundment, discharging to an unnamed watercourse that feeds into the Panther Dam impoundment. The unnamed watercourse crosses under Painter Hill Road and Tophet Road before reaching the downstream reservoir. The crest of the dam is a driveway. Although the dam and emergency spillway extend 100 feet along the pond shoreline, the embankment only extends 20 feet across the discharge channel. Noted downstream hazards include the Painter Hill Road culvert and the rear of a farm property. Since the previous HMP, the dam has been downgraded from Hazard Class B to Hazard Class BB.

Botsford Road Pond Dam (Dam No. 12003)

The Botsford Road Pond Dam is a Class BB dam located on the Shepaug River near the intersection of Mine Hill Road and State Route 67. The dam and river at this area are located in the mapped inundation area of the Cairns Dam (Upper Shepaug Reservoir Dam) in Warren. Since the previous HMP, the dam has been downgraded from Hazard Class B to Hazard Class BB.

Other Dams

Town officials also noted that small private dams have washed out, with four of these private damaged during Irene. Some of these were adjacent to driveways, which left people stranded. The small dams are more of a concern in Roxbury than the larger dams. The Inland Wetland Commission has worked diligently to expedite approvals for dam repairs.

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Roxbury is compliant with this program and has a designated Burning Official.

Regulations regarding fire protection are outlined in the *Zoning Regulations* and the *Subdivision Regulations*.

- ***Zoning Regulations, Section 5.6*** outlines the following guidelines for fire ponds: ***"***(1) Fire ponds and dry hydrants may be required for Special Permit Uses in all zones where deemed necessary by the Commission in consultation with the Town Fire Department to protect the public health and safety (2) A fire pond location shall be: On poorly and very poorly drained soil areas, within approximately 175 feet of a road and Such that the pond can provide a minimum of 60,000 gallons usable water with an adequate and reliable recharge."

- ***Subdivision Regulations, Section 4.14*** outlines the following guidelines for fire protection: "(1) each subdivision plan shall provide for fire protection facilities (2) fire protection facilities shall be sized and constructed in accordance with National Fire Protection Association (NFPA) Standard 1142, 1999 Edition -Standard on Water Supplies for Suburban and Rural Firefighting (3) Fire protection facilities shall be located in areas approved by the Fire Chief and which can be easily accessed by emergency personnel (4) The Commission may waive the requirement of providing fire protection facilities where the ultimate number of lots within the parcel of land being subdivided is nine lots or less provided that the subdivider deposits funds in a dedicated Town account for fire protection facilities (5) Underground tanks, dry hydrants, and other fire protection facilities shall be offered to the Town for acceptance (6) The land area containing any fire protection facility and access area shall, as necessary, be encumbered by easements approved by the Town Attorney to ensure the Town's perpetual right to access and maintain any fire protection facility for firefighting purposes, and obligate the property owners to not inhibit the use of the fire protection facility for firefighting purposes without the approval of the Fire Chief (7) The Commission may require the use of landscaping or other materials to screen pipes, access drives, or other structures associated with the installation of fire ponds or tanks (8) All fire protection measures required by the Commission shall be completed prior to the issuance of a certificate of occupancy for any dwelling in the subdivision."

The Fire Marshal determines the appropriate fire protections throughout the town. Fire ponds, dry hydrants and cisterns are all utilized in Roxbury and are all viable options.

The Roxbury Fire Department goes to the fires whenever possible. This proactive approach is believed to be effective for controlling wildfires.

Other capabilities for reducing wildfire risk include:

- ❑ Encouraging property owners to widen access roads such that fire trucks and other emergency vehicles can access remote locations.
- ❑ Continuing intermunicipal cooperation in firefighting efforts.
- ❑ Providing outreach programs on how to properly manage burning and campfires on private property.
- ❑ Patrolling Town-owned open space and parks to prevent unauthorized campfires.
- ❑ Enforcing regulations and permits for open burning.

Actions Completed and New Capabilities

Roxbury continues to maintain its capabilities for mitigating and responding to wildfire risks.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

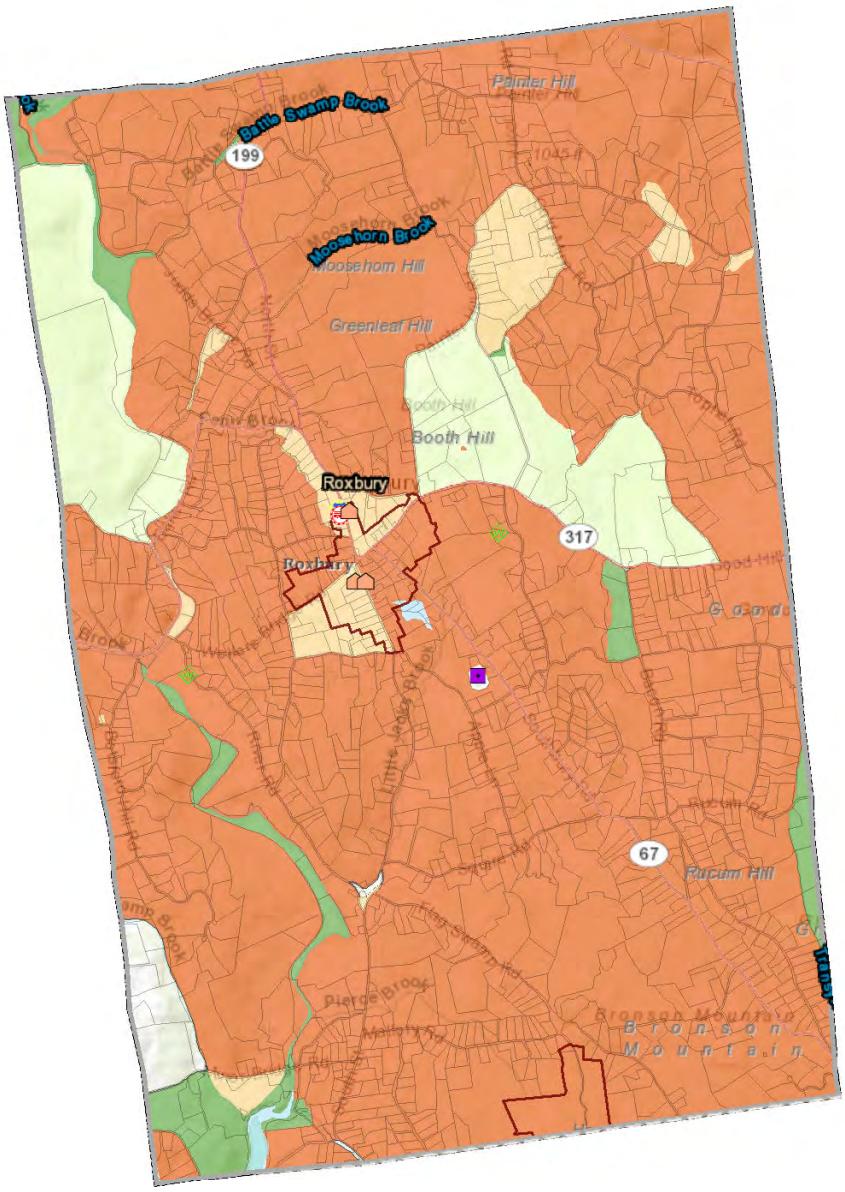
Wildfire Vulnerabilities and Risk

Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

Roxbury officials have identified the area between South Street and Apple Lane as a high-risk area due to the lack of hydrants or fire ponds in the area.

According to the Town of Roxbury, the total cost to fight wildfires in any given year is $10,000 to $100,000 (equipment and labor) depending on the size and scope of the event. Costs associated with the 45-acre brush fire off Spring Street in 2013 were $$100,000, but much of this was in-kind costs of volunteer manpower and equipment from Roxbury and other local towns and State agencies that participated in controlling this event over a two-week period.

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Legend

- Shelter
- Care Facility
- EMS
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - ROXBURY ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 2,500 5,000
Feet

SCALE 1 " = 5,853 '
DATE 5/10/2021
PROJ. NO. 3843-06

FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

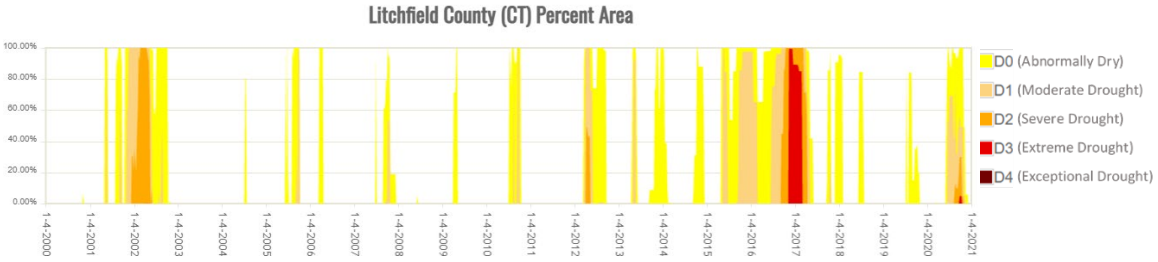


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Description	Dept.	Status	Notes
1	Consider providing standby power supply to Booth Free School	Regional School District #12	Carry Forward	Ongoing effort. While the town owns the building, the region is responsible for getting the standby power. The town would be willing to work to help get a grant for this.
2	Encourage Roxbury Market to install standby power.	First Selectman	Carry Forward	This town service area was without power during Isaias for day. This area includes the post office, bank, and offices above the market. It could be considered a "hub" for the town. Another "hub" area includes restaurants, pizza place, liquor store, veterinarian, these are all private owned but main service area for the town and lacks backup power.
3	Utilize the Blackboard Connect and email blast emergency notification system to their fullest capabilities	EM	Capability	Capability, the first selectman's office uses this all the time for calls, emails and texts
4	Encourage residents to purchase and use NOAA weather radios with alarm features	EM	Drop	The town has encouraged residents to sign into blackboard for alerts, along with CT alert.
5	Review and update the Town EOP at least once annually	EM	Carry Forward with Revisions	Each department knows their responsibilities, but a complete overview of the EOP is due.
6	Consider adding flood prevention regulations to the Town zoning regulations.	Planning	Drop	Anything in floodplain deals with the building department. There is a floodplain ordinance, and the State building code.

#	Description	Dept.	Status	Notes
7	Consider requiring new buildings constructed in flood prone areas to be protected to the highest recorded flood level regardless of being within a defined SFHA.	IWC	Capability	Town already does this
8	Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternative.	IWC	Capability	This falls under the wetlands commission, anything to do with water they deal with.
9	Evaluate flood prone properties along Tunnel Road to determine potential flood damage reduction methods such as elevating homes.	IWC	Carry Forward with Revisions	This is where the boat rescue was required. There will be no new development here. Remove elevation – this will likely not happen
10	Evaluate flood prone properties along Route 67 to determine potential flood damage reduction methods such as elevating homes and floodproofing businesses.	IWC	Carry Forward with Revisions	Most recent homes are elevated. The older homes are not. This is where some of the businesses are located.
11	Provide technical assistance regarding floodproofing measures to interested residents. Pursue funding for home elevations should any residents become interested.	IWC	Drop	No residents have shown interest in elevation. The residents will go through the town for this action regardless.
12	Encourage property owners to purchase flood insurance under the NFIP and to report claims when flooding damage occurs.	First Selectman	Drop	Town building department would supply information if necessary. Town ordinance does this.
13	Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	IWC, Building	Capability	This would fall under wetlands or building. Both departments take necessary classes for this action.
14	Compile a checklist that cross-references the bylaws, regulations, and codes related to flood damage prevention that may be applicable to a proposed project and make this list available to potential applicants. The information in Section 3.4 provides a starting point for this list.	IWC	Complete	This is already worked into standard operating procedures.
15	Provide outreach regarding home elevation and relocation, flood barriers, dry floodproofing, wet floodproofing, and other techniques (Section 3.6.2) to private homeowners and businesses with flooding problems.	Building	Capability	Standard operating procedures – building department would provide this.
16	Selectively remove debris from bridges (such as the fallen tree upstream of Judd's Bridge)	PW	Capability	The town is always removing debris throughout town.
17	Encourage residents along Squire Road to increase conveyances under driveways to reduce the potential for future washouts.	PW	Carry Forward With Revision	Town wide issue. Squire road was recently redone.

#	Description	Dept.	Status	Notes
18	Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	PW	Complete	Guidance is not used, but the town hired an engineering firm to look at all culverts.
19	When replacing or upgrading culverts, work with CT DOT to incorporate findings of the climate change pilot study and work with HVA to incorporate findings of the stream crossing assessment training.	PW	Carry Forward	Has not worked with DOT, but worked with HVA on Botsford Hill
20	Replace the twin culverts at Botsford Hill Road and Route 67 to increase conveyance capacity and reduce future flood damage.	PW	Carry forward	This is in progress. The town is seeking funding and assistance for this project.
21	Consider paving, chip sealing, or hardening unpaved roads to reduce the incidence of washouts and erosion that can hinder access and egress.	PW	Carry Forward with Revisions	Town has done this, but residents on dirt roads do not typically want this. The town uses calcium on the roadways to harden them up. Heavy downpours typically are challenging. The town does have a grader and regrades these roads when necessary.
22	Ensure adequate barricades are available to block flooded streets in flood prone areas	EM & PW	Complete	Have adequate barriers
23	Work with the Children's Station to develop a site-specific evacuation plan for the daycare facility, given its location in the flood risk zone.	EM	Drop	Business is no longer there
24	The Building Department should provide literature regarding appropriate design standards for wind.	Building	Capability	This is being done.
25	Encourage the use of structural techniques related to mitigation of wind damage in new residential and commercial structures to protect new buildings to a standard greater than the minimum building code requirements. Require such improvements for new municipal critical facilities.	Building	Capability	This is being done.
26	Provide town wide tree limb inspection and maintenance programs to ensure that the potential for downed power lines is diminished. Continue to encourage property owners to trim branches located over structures and power lines.	PW	Capability	Eversource does this, as well as the first selectman. The town also hires outside tree company to maintain throughout town as well. Town works with Eversource too.
27	Pursue funding to place utilities underground in existing developed areas.	PW, First Selectman	Carry Forward	The town has investigated this, but it is challenging to find funding. This would be useful around the town green.
28	Develop a plan to prioritize snow removal from the roof of critical facilities and other municipal buildings each winter. Ensure adequate funding is available in the Town budget for this purpose.	PW	Capability	Town has no formal plan, but hires contractor and has PW, not worth developing a formal plan.

#	Description	Dept.	Status	Notes
29	Provide information on the dangers of cold-related hazards to people and property.	EM/ First Selectman	Capability	During the winter, the town sends out this type of information as part of email blasts.
30	The Building Department should provide literature regarding appropriate design standards for mitigating icing, insulating pipes, and retrofits for flat-roofed buildings such as heating coils.	Building	Capability	Being done.
31	Consider posting the snow plowing routes in Town buildings each winter to increase public awareness.	EM	Remove	Not necessary.
32	Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	EM	Capability	The town is aware of these areas and has these plans if needed.
33	Develop a plan to address snow drift in the vicinity of Painter Hill Road and Painter Ridge Road. Snow fencing and certain vegetation buffers may be helpful to reduce drifting.	PW	Complete	The town implements snow fencing and it is likely the best option to combat the issue.
34	Consider preventing residential development in areas prone to collapse	Planning	Drop	No areas of concern
35	Ensure that municipal departments have adequate backup facilities in case earthquake damage occurs to municipal buildings.	First Selectman	Complete	Town has adequate back up can work remotely and has cloud back up
36	Consider bracing systems and assets inside critical facilities. This could help protect IT systems, important records and files.	EM	Drop	Facilities are adequately constructed, there is minimal concern.
37	Provide technical assistance to private dam owners regarding effective maintenance strategies	EM	Drop	Not sure information is dispersed; however, wetlands would assist if necessary. The town is unable to provide necessary assistance and the owner would likely need to seek the assistance of an engineer.
38	File EOPs/EAPs with town department and emergency personnel	EM	Carry Forward with Revisions	EAP needs updates, 1 dam on the Shepaug, near the distillery. Failure of this dam could have impacts. This would likely add to the scour problem
39	Include dam failure inundation areas in the Blackboard Connect emergency contact database	EM	Complete	The roads and areas that would be impacted are in the database. Every road can be chosen individually.
40	Continue to require the installation of fire protection water in new developments where other sources of water are distant, and installation of sprinkler systems where access is limited for fire apparatus.	Zoning	Capability	Enforced by Zoning and Wetlands through permit review

#	Description	Dept.	Status	Notes
41	Increase the availability of water sources in the town's area of high risk where the 45-acre fire occurred several years ago	Fire Department	Drop	Unsure of how to expand availability. Town does have mutual aid agreements. This needs to be brought in from other departments.
42	Pursue the acquisition of additional municipal open space inside SFHAs and set it aside as greenways, parks, or other nonresidential, noncommercial, or nonindustrial use.	First Selectman	Capability	The town has pursued various lands and has worked with the land trust to do so. The town has designated significant open space near water.
43	Selectively pursue conservation recommendations listed in the Plan of Conservation and Development and other studies and documents	Planning, ConCom, First Selectman	Capability	POCD was just upgraded in March 2020, certain groups are tasked with completing actions.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action RXB-01	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action RXB-02	
Coordinate with CT DEEP to encourage the owner of the Shepaug River dam near Mine Hill Road and Route 67 (Botsford Road Pond Dam) to develop an updated EAP. File the EAP in a known and accessible location.	
Lead	EMD
Cost	$0 - $25,000
Funding	OB, CT DEEP
Timeframe	2022 – 2023
Priority	Low

Action RXB-03	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action RXB-04	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action RXB-05	
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, Sustainable CT
Timeframe	2022 – 2024
Priority	High

Action RXB-06	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action RXB-07	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action RXB-08	
Complete a comprehensive review of the EOP.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action RXB-09	
Develop alternative access routes, evacuation plans, and/or other plans and procedures to mitigate the risk of isolation by flooding or debris on dead-end roads such as Carriage Lane.	
Lead	EM, DPW, Fire
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action RXB-10	
Encourage residents Town-wide to increase conveyances under driveways to reduce the potential for future washouts.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action RXB-11	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action RXB-12	
When replacing or upgrading culverts, review culvert conveyances based on Northeast Regional Climate Center Guidance, in accordance with the findings of the CT DOT climate change pilot study. Additionally, work with HVA to incorporate findings of the stream crossing assessment training.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEEP
Timeframe	2023 – 2025
Priority	High

Action RXB-13	
Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action RXB-14	
Evaluate flood prone properties along Tunnel Road to determine potential flood damage reduction methods.	
Lead	IWC; Building
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action RXB-15	
Evaluate flood prone properties along Route 67 to determine potential flood damage reduction methods such as elevating homes and floodproofing businesses.	
Lead	IWC; Building
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action RXB-16	
Provide standby power supply to Booth Free School	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action RXB-17	
Encourage Roxbury Market to install standby power.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action RXB-18	
Expand backup power at Bernhardt Meadows so it can power living areas in addition to the community center.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action RXB-19	
Install emergency power at the Transfer Station and the Public Works building.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action RXB-20	
Upgrade emergency power system at the Town Hall.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action RXB-21	
Mitigate drainage-related flooding on Bacon Hill Road.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	Med

Action RXB-22	
Replace the twin culverts at Botsford Hill Road and Route 67 to increase conveyance capacity and reduce future flood damage.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action RXB-23	
Complete the culvert replacement on Davenport Road.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action RXB-24	
Replace the Wakeley Road culvert with a larger structure, based on NRCC precipitation figures.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action RXB-25	
Evaluate options for mitigating scour risks at Wellers Bridge, which has been identified as "scour critical."	
Lead	DPW
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action RXB-26	
Expand the Roxbury Ambulance Association to allow for more storage and emergency response capabilities.	
Lead	First Selectman; EMD
Cost	More than $1 million
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

Action RXB-27	
Upgrade storage structure for equipment and machinery at the Transfer Station, which has been identified as unlikely to be able to withstand heavy snow loads.	
Lead	DPW
Cost	More than $1 million
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

Action RXB-28	
Pursue funding to place utilities underground in existing developed areas.	
Lead	PW, First Selectman
Cost	More than $500,000
Funding	CIP, CT DEMHS
Timeframe	2026 – 2027
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
RXB-01	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
RXB-02	Coordinate with CT DEEP to encourage the owner of the Shepaug River dam near Mine Hill Road and Route 67 (Botsford Road Pond Dam) to develop an updated EAP. File the EAP in a known and accessible location.	Dam EAP	EMD	$0 - $25,000	OB, CT DEEP	2022 – 2023	0	1	1	0	1	0	0	0	0	0	0	0	0	0	4
RXB-03	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
RXB-04	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
RXB-05	Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	Sustainable CT	Planning	$25,000 - $50,000	OB, Sustainable CT	2022 – 2024	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
RXB-06	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
RXB-07	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
RXB-08	Complete a comprehensive review of the EOP.	Other Emergency Response	EMD	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	0	0	1	1	1	1	0	0	0	0	0	0	0	0	5
RXB-09	Develop alternative access routes, evacuation plans, and/or other plans and procedures to mitigate the risk of isolation by flooding or debris on dead-end roads such as Carriage Lane.	Other Emergency Response	EM, DPW, Fire	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	0	0	1	1	1	1	0	0	0	0	0	0	0	0	5
RXB-10	Encourage residents Town-wide to increase conveyances under driveways to reduce the potential for future washouts.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
RXB-11	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
RXB-12	When replacing or upgrading culverts, review culvert conveyances based on Northeast Regional Climate Center Guidance, in accordance with the findings of the CT DOT climate change pilot study. Additionally, work with HVA to incorporate findings of the stream crossing assessment training.	NRCC Guidance	DPW	$50,000 - $100,000	OB, CIP, CT DEEP	2023 – 2025	0	1	1	0	0	1	1	0	0	0	0	0	0	0	6
RXB-13	Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
RXB-14	Evaluate flood prone properties along Tunnel Road to determine potential flood damage reduction methods.	Study	IWC; Building	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
RXB-15	Evaluate flood prone properties along Route 67 to determine potential flood damage reduction methods such as elevating homes and floodproofing businesses.	Study	IWC; Building	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
RXB-16	Provide standby power supply to Booth Free School	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
RXB-17	Encourage Roxbury Market to install standby power.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
RXB-18	Expand backup power at Bernhardt Meadows so it can power living areas in addition to the community center.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
RXB-19	Install emergency power at the Transfer Station and the Public Works building.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
RXB-20	Upgrade emergency power system at the Town Hall.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
RXB-21	Mitigate drainage-related flooding on Bacon Hill Road.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
RXB-22	Replace the twin culverts at Botsford Hill Road and Route 67 to increase conveyance capacity and reduce future flood damage.	Culvert & Bridge Upgrades	DPW	$100,000 - $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
RXB-23	Complete the culvert replacement on Davenport Road.	Culvert & Bridge Upgrades	DPW	$100,000 - $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
RXB-24	Replace the Wakeley Road culvert with a larger structure, based on NRCC precipitation figures.	Culvert & Bridge Upgrades	DPW	$100,000 - $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
RXB-25	Evaluate options for mitigating scour risks at Wellers Bridge, which has been identified as "scour critical."	Culvert & Bridge Upgrades	DPW	More than $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
RXB-26	Expand the Roxbury Ambulance Association to allow for more storage and emergency response capabilities.	Critical Facility Protection	First Selectman; EMD	More than $1 million	CIP, FEMA Grant, CT DEMHS	2025 – 2027	1	1	0	0	1	0	1	0	0	0	0	0	-1	0	4
RXB-27	Upgrade storage structure for equipment and machinery at the Transfer Station, which has been identified as unlikely to be able to withstand heavy snow loads.	Critical Facility Protection	DPW	More than $1 million	CIP, FEMA Grant, CT DEMHS	2025 – 2027	1	1	0	0	1	0	1	0	0	0	0	0	-1	0	4
RXB-28	Pursue funding to place utilities underground in existing developed areas.	Harden Power Lines	PW, First Selectman	More than $500,000	CIP, CT DEMHS	2026 – 2027	1	1	0	1	1	0	0	0	-1	0	0	0	-1	0	1

APPENDIX B
RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF ROXBURY BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Roxbury has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Roxbury Board of Selectmen approved the previous version of the Plan in 2014; and

WHEREAS, the Town of Roxbury and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Roxbury; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Roxbury, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Roxbury eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Roxbury;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Roxbury, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Roxbury this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

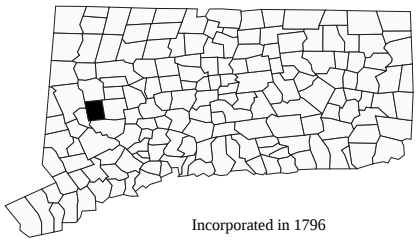
2019 CERC TOWN PROFILE

Roxbury, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
P.O. Box 203
Roxbury, CT 06783
(860) 354-9938

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1796

Demographics

Population

	Town	County	State
2000	2,136	182,193	3,405,565
2010	2,262	189,927	3,574,097
2013-2017	2,231	184,454	3,594,478
2020	2,251	193,116	3,604,591
'17 - '20 Growth / Yr	0.3%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	26	921	4,842
Pop./Sq. Mile (2013-2017)	85	200	742
Median Age (2013-2017)	51	47	41
Households (2013-2017)	920	74,605	1,361,755
Med. HH Inc. (2013-2017)	$119,167	$76,438	$73,781

	Town	State
Veterans (2013-2017)	128	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	30	1%	278	12%	286	13%	229	10%	860	39%	548	25%	2,231	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	2,132	164,992	2,446,049
Black Non-Hisp	0	2,843	350,820
Asian Non-Hisp	41	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	6	2,326	84,923
Hispanic or Latino	52	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	2.5%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	264	16%	673,582	27%
Associates Degree	110	7%	188,481	8%
Bachelors or Higher	1,017	62%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	90	328
23 - Construction	12	53
31-33 - Manufacturing	NA	NA
44-45 - Retail Trade	NA	NA
56 - Administrative and Waste Services	15	50
81 - Other Services (except Public Administration)	19	42
Total Government	6	73

Top Five Grand List (2018)

	Amount
Connecticut	$8,097,550
Davis Farm Holdings LLC	-$666,666
Booth Mark Trustee	-$666,666
Arnhold John & Jody as Trustees	-$666,666
WienerZzena et al Trustees	-$666,666
Net Grand List (SFY 2016-2017)	$700,191,940

Major Employers (2016)

RRR Maintenance LLC
Roxbury Market
Wragg Well Drilling

Education

2018-2019 School Year

	Grades	Enrollment
Regional School District 12	PK-12	685

Pre-K Enrollment (PSIS)

	2018-2019
Regional School District 12	41

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 12	92.3%	96.0%	90.0%

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	78.6%	53.8%	*	51.3%	67.9%	43.0%
ELA	*	53.1%	89.7%	54.9%	76.8%	56.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Regional School District 12	8.8%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	66.5%	84.0%	86.8%
Private	33.5%	16.0%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Roxbury, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$10,116,883	Total Expenditures (2017)	$9,359,965	Annual Debt Service (2017)	$6,116
Tax Revenue	$9,585,179	Education	$6,668,800	As % of Expenditures	0.1%
Non-tax Revenue	$531,704	Other	$2,691,165	Eq. Net Grand List (2017)	$993,373,056
Intergovernmental	$84,278	Total Indebtedness (2017)	$300,412	Per Capita	$457,565
Per Capita Tax (2017)	$4,425	As % of Expenditures	3.2%	As % of State Average	303.1%
As % of State Average	150.9%	Per Capita	$138	Moody's Bond Rating (2017)	-
		As % of State Average	5.5%	Actual Mill Rate (2017)	13.70
				Equalized Mill Rate (2017)	9.67
				% of Net Grand List Com/Ind (2017)	0.3%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	1,185	88,068	1,507,711
% Single Unit (2013-2017)	94.5%	73.6%	59.2%
New Permits Auth (2017)	2	142	4,547
As % Existing Units	0.2%	0.2%	0.3%
Demolitions (2017)	1	32	1,403
Home Sales	NA	1,753	21,880
Median Price	$595,900	$250,100	$270,100
Built Pre-1950 share	27.3%	31.2%	29.3%
Owner Occupied Dwellings	745	57,330	906,798
As % Total Dwellings	81.0%	76.8%	66.6%
Subsidized Housing (2018)	24	4,817	167,879

Distribution of House Sales

	Town	County	State
Less than $100,000	NA	57	536
$100,000-$199,999	NA	563	5,237
$200,000-$299,999	NA	538	6,681
$300,000-$399,999	NA	315	3,863
$400,000 or More	NA	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$1,346	$995	$1,123
Cost-burdened Renters	42.8%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	1,313	101,000	1,827,070
Residents Unemployed	41	4,014	78,242
Unemployment Rate	3.0%	3.8%	4.1%
Self-Employed Rate	26.6%	13.0%	10.0%
Total Employers	90	6,177	122,067
Total Employed	328	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Roxbury, CT	124	Danbury, CT	130
New Milford, CT	37	Roxbury, CT	124
Washington, CT	37	New Milford, CT	87
Bridgewater, CT	29	Waterbury, CT	46
Woodbury, CT	25	Newtown, CT	31
Watertown, CT	23	Brookfield, CT	30
Danbury, CT	21	Washington, CT	27

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	534	1,777
Violent	0	228

Disengaged Youth (2013-2017)

	Town	State
Female	0.0%	4.2%
Male	0.0%	5.6%

	Town
Library circulation per capita	7.18

Distance to Major Cities

	Miles
Hartford	35
New York City	70
Providence	99
Boston	129
Montreal	276

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Municipal Provider
Local Contact

Cable Provider
Charter Communications of Western CT
(800) 827-8288

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

SALISBURY, CT



27 Main Street
PO Box 548
Salisbury, CT 06068

MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 Torrington Road
Goshen, CT 06756
(860) 491-9884
https://northwesthillscog.org

Prepared by:
SLR CONSULTING
99 Realty Drive
Cheshire, Connecticut 06410
(203) 271-1773
www.slrconsulting.com

global **environmental** and **advisory** solutions

SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Salisbury and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

Salisbury is a picturesque rural town situated along the west bank of the Housatonic River in northwest Litchfield County. It was incorporated in 1741 and has continued to maintain its character and charm. Salisbury is home to a population of approximately 3,625. It is bordered by the municipalities of Sharon to the south, North Canaan and Canaan to the east, Mt. Washington and Sheffield, Massachusetts to the north, and North East, New York to the west.

According to the 2000 Salisbury FEMA Flood Insurance Study, "the topography of the region is variable. Located in the Litchfield Hills section of the Housatonic River basin, it contains a scattered portion of the Berkshire Hills. Glacially-formed mountains and hills tend to be narrow and flat-topped. The maximum elevation is 2,380 feet on the south slope of Mt. Frissell, which is also the highest point in Connecticut. The lowest elevation is 530 feet in the southeast corner of the town in the Housatonic River floodplain. Floodplain regions are narrow and steep, while various lakes, ponds and some swampy areas are present among the region." The varying terrain of Salisbury makes the town vulnerable to an array of natural hazards.

2.2 Existing Land Use

The land area of Salisbury is approximately 60 square miles, which includes the villages of Salisbury, Lakeville, Lime Rock and the hamlets of Taconic and Amesville. A large portion of Salisbury is occupied by Mount Frissell, Bear Mountain, Lions Head, Mount Riga and open, natural spaces. The beautiful landscape and recreational opportunities in the town attract many visitors to Salisbury year-round.

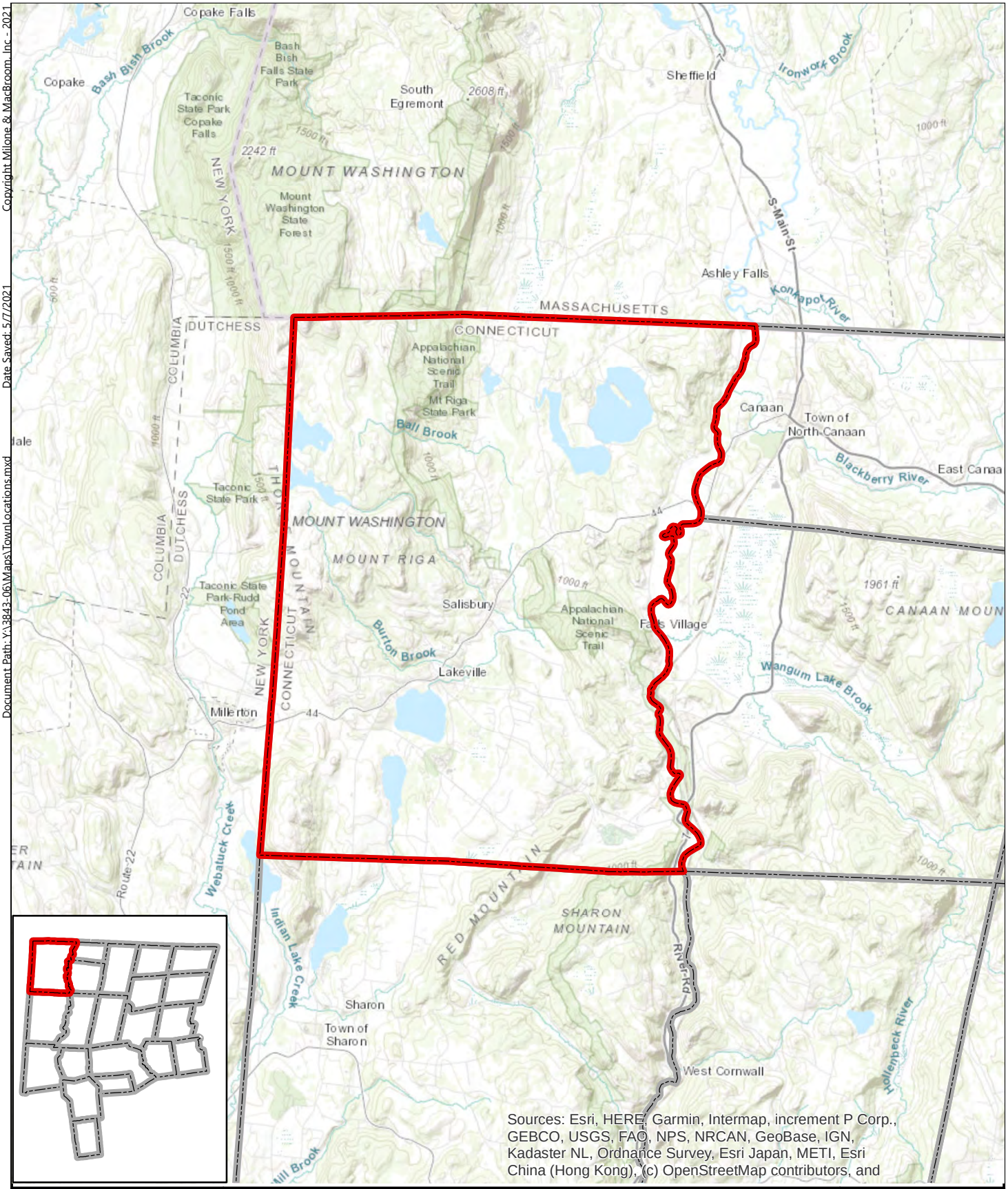
A small portion of the town consists of low-density residential and minor commercial uses. The majority of the businesses in the town are located within the village centers.

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 64% of Salisbury is forested and approximately 7.4% is developed.

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Date Saved: 5/7/2021

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MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

REGIONAL LOCATION: SALISBURY

HAZARD MITIGATION PLAN UPDATE - SALISBURY ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 5,500 11,000
Feet

SCALE	1 " = 11,443 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-1

Table 2-1: 2015 Land Cover by Area

Land Cover	Area (acres)	Percent of Community
Developed	2,861	7.43%
Turf & Grass	1,731	4.49%
Other Grass	371.5	0.96%
Agricultural Field	6,429	16.69%
Deciduous Forest	14,423	37.45%
Coniferous Forest	9,364	24.31%
Water	2202.7	5.72%
Non-Forested Wetland	222.2	1%
Forested Wetland	850.9	2.21%
Tidal Wetland	0	0.00%
Barren	18.5	0%
Utility Row	40.9	0%
Total	**38,514**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

2.3 Development Trends

The 2010 U.S. Census reported a population in Salisbury of 3,741 individuals. U.S. Census Bureau estimates for 2019 show a population around 3,625 individuals, a decrease from 2010 of 3.1%. The Connecticut State Data Center predicts that population will decrease by 12.5% through 2025 to an estimated population of 3,173 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Salisbury decreased slightly between 2013 and 2017. The number of permits issued in 2013 and 2014 was 10 and 2, respectively, while 4 permits were issued in 2016, and 7 permits were issued in 2017. On average, 6 housing permits were issued each year in Salisbury between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Salisbury rose by approximately 10.6-percent between 2010 and 2019, from 2,593 units in 2010 to 2,902 units in 2019. In 2019, the housing stock was made up of approximately 89% single-unit structures, 4% two-unit structures, 5% multi-unit structures, and 1% mobile-homes or other types of structures.

According to the Connecticut Office of Policy and Management, Salisbury's 2019 Total Equalized Net Grand List was valued at $1,280,069,980. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for salisbury, included as Appendix C.

Residential development pressures are minimal in Salisbury, as the town strives to maintain a rural character with busy village centers. Development has reportedly been limited to a couple minor subdivisions per year.

Town officials have identified a need for a diversified population within Salisbury and are exploring additional housing options, particularly near the village centers. The 2012 Plan of Conservation and Development recommended the following:

- Increasing the number and range of housing units in Salisbury
- Encouraging the development of accessory apartments in existing structures
- Establishing cluster housing to preserve open space (4) endorsing the practice of mixed-use properties in the village centers (to provide for second-story apartments over existing businesses)
- Encouraging the conversion of existing buildings in the village centers into multi-unit housing.

If this type of development unfolds, the town should take care to ensure that vulnerable populations are sited in locations that are at low risk for natural hazards such as floods and wildfires.

Overall, development in Salisbury has not significantly increased exposure to natural hazards over the last five years. Acceleration of development trends in the next five years may increase exposure.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Salisbury is considered to have a low level of social vulnerability, with higher vulnerability scores for the SVI categories of "Household Composition & Disability" and "Housing Type & Transportation." In other words, particular challenges in Salisbury may include the presence of residents who need additional assistance during a disaster event due to disabilities, and lower-quality housing stock, and lack of access to transportation.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Salisbury.

The amount of stratified glacial meltwater deposits present in a community is important as areas of stratified materials are generally coincident with inland floodplains. These materials were deposited at lower elevations by glacial streams, and these valleys were later inherited by the larger of our present-day streams and rivers. Oftentimes these deposits are associated with public water supply aquifers or with wetland areas that provide significant floodplain storage. However, the smaller glacial till watercourses throughout Salisbury can also cause flooding. The amount of stratified drift also has bearing on the relative intensity of earthquakes.

Salisbury is primarily underlain by relatively hard metamorphic and igneous bedrock including a variety of schist, marble and gneiss. Salisbury is covered primarily (nearly 75%) by glacial till. Tills contain an unsorted mixture of clay, silt, sand, gravel, and boulders deposited by glaciers as a ground moraine. The deposits are generally less than 50 feet thick although deeper deposits of till are scattered across the hillier sections of the town. Stratified glacial meltwater deposits are related to the various water bodies in town, particularly the Housatonic River. These deposits primarily contain stratified sands and gravels.

2.5 Climate and Climate Change

Over the course of the year, the temperature in Salisbury typically varies from 17°F to 81°F and is rarely below 0°F or above 89°F. The warm season lasts from May 27 to September 15, with an average daily high temperature above 71°F. The cold season lasts from December 1 to March 10, with an average daily high temperature below 41°F.

Precipitation falls throughout the year in Salisbury. The wetter season lasts from April 9 to September 29, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on June 1. The drier season lasts from September 29 to April 9. The smallest chance of a wet day is 21% on January 29.

The most rain falls during the 31 days centered around September 30, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts from October 26 to April 20, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.3 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Salisbury as 4.61 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Salisbury at 5.14 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.6	5.9	8.4
NOAA Atlas 14	5.1	6.4	8.4

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Salisbury can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.0 to 5.6 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

Salisbury is divided among the following nine subregional drainage basins: Andrus Brook, Factory Brook, Housatonic River, Indian Lake Creek, Sages Ravine Brook, Salmon Creek, Schenob Brook, Spruce Swamp Creek, and Webatuck Creek.

The majority of the drainage basins have FEMA-defined Special Flood Hazard Areas (SFHAs) along the primary watercourses. Such areas consist of 1% annual chance storm floodplains without elevations, 1% annual chance storm floodplains with elevations, and 0.2% annual chance floodplains.

Andrus Brook

Andrus Brook, located in the northeast corner of Salisbury, flows north into Massachusetts to Stony Brook which then flows into the Housatonic River. The area of drainage in Salisbury makes up less than one square mile.

Housatonic River

The Housatonic River drains an area of 1,948 square miles from Pittsfield, Massachusetts to Milford, Connecticut where it empties into Long Island Sound. The river flows a total of 134 miles from its upper reach to the sound with 1,234 square mile of the total drainage area existing in Connecticut. After crossing into Connecticut, the river creates the border for several towns including Salisbury, North Canaan, Canaan and just south, Sharon and Cornwall. Many of the sub regional drainages in these towns flow into the Housatonic River along with small tributaries that flow directly into the river, which make up the Housatonic sub regional drainage basin. The main channel of the Housatonic is lined with 100-year floodplains that extend on either side of the river with areas that further extend making up the 500-year floodplains.

Indian Lake Creek

Originating at Indian Lake, split by the Connecticut-New York boundary, Indian Lake Creek flows through Salisbury. Wononpakook Lake, Beeslick Pond, Deep Lake, Ore Hill Pond and several unnamed tributaries are located within the Indian Lake Creek drainage basin in Salisbury and drain south into Sharon.

Sages Ravine Brook

Beginning in the southwest corner of Massachusetts, Sages Ravine Brook flows south across the border into Salisbury and into Schenob Brook. The sub basin makes up a small portion of Salisbury's north edge.

Factory Brook

Factory Brook itself is a short stretch of river, less than two miles to the mouth but drains a land area of over fifteen and a half square miles with many tributaries extending to the north. The main channel is bordered by 100-year floodplains from the outflow of Wononskopomuc Lake to

the mouth at Spruce Swamp Creek. Three main tributaries flow from the north including Burton Brook, Pettee Brook, and Wachocastinook Creek that provide input along the main stretch of the channel. Wachocastinook Creek flows out of South Pond just east of the New York border.

Spruce Swamp Creek

Spruce Swamp Creek is formed by the convergence of Moore and Garnett Brook with Fisher Pond as the northern most extent. The creek flows south with Factory Brook flowing in from the east just before the stretch turns into Salmon Creek near the center of Salisbury.

Salmon Creek

The Salmon Creek sub basin is approximately 11.8 square miles in size with the majority of the basin area extending north into Salisbury and the lower third in Sharon. White Hollow Brook makes up the section of drainage area located in Salsibury running north east before converging with Salmon Creek which then continues its course and dumps into the Housatonic River. Lake Tavolan is the largest body of water draining within this basin including a few other small unnamed ponds and tributaries. White Hollow Brook contains some vast sections of 100-year floodplain as well as much of Salmon Creek from the headwaters all the way to the mouth. Along sections of Salmon Creek are also small areas of 500-year floodplain that extend beyond the margin of the 100-year floodplains. Factory Brook and Spruce Swamp Creek are tributaries of Salmon Creek that also have their own descriptions. However, when you combine all three basins, Salmon Creek has a very large watershed, which encompasses the majority of Salisbury.

Schenob Brook

With the entire sub regional drainage basin consisting of around 21 square miles, more than half of the area is located in Massachusetts. The remainder of the basin is located in northeast Salisbury. The system begins in North Canaan with Washington Lake and Washinee Lake, where Schenob Brook flows out of the northwest corner of Washinee Lake north to Massachusetts. Washining Lake and Washinee Lake are located within this drainage basin.
Webatuck Creek

The sub regional drainage basin of Webatuck Creek resides primarily in New York but skirts in and out along the western border of Salisbury and Sharon. The main creek channel flows through a small section of both towns but the majority of the drainage area collects water from the furthest extents of a few small tributary streams that flow west into New York.

2.7 Governmental Structure and Capabilities

The Town of Salisbury is governed by a Selectman-Town Meeting form of government in which legislative responsibilities are shared by the Board of Selectmen and the Town Meeting. The First Selectman serves as the chief executive.

In addition to Board of Selectmen and the Town Meeting, there are boards, commissions and committees providing input and direction to Town administrators. Also, Town departments

provide municipal services and day-to-day administration. Many of these commissions and departments play a role in hazard mitigation, including the Planning and Zoning Commission, Conservation Commission, the Building Official, the Land Use Office, the Fire Marshal, the Highway Department and Emergency Management. The Emergency Management Director coordinates emergency preparedness for the Town of Salisbury.

Drainage complaints are routed through the First Selectman's office and the highway department. These complaints are usually received via phone, mail, or email and are recorded in a logbook. The complaints are investigated as necessary until remediation surrounding the individual complaint is concluded.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Salisbury are concentrated within the Salisbury Historic District, but include buildings and sites in other parts of Town as well. Resources near flood sources may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

The primary transportation routes into and out of the town are Route 44 and Route 112 running east-west, and Route 41 running north-south. Other key roads include Indian Mountain Road and Salmon Kill Road. There is no local public transit system in Salisbury.

Utilities

Public water in Salisbury is provided by Aquarion Water Company, as well as a handful of public and private facilities are served by small Community Water Systems and Non-Community Public Water Systems. Many residents and businesses rely on private well water.

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Salisbury.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Salisbury has identified five critical facilities. Many critical facilities such as fire and governmental buildings as well as utilities are required to ensure that day-to-day management of the town continues. Not all municipal buildings are critical facilities. Other facilities such as nursing homes, schools, and emergency supply storage areas may also be considered critical facilities since these contain populations that are more susceptible in an emergency or house important supplies.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	In SFHA
Town Hall	27 Main Street	Critical Records/ Backup EOC			
Salisbury Volunteer Ambulance Facility	Under Mountain Road	EOC / secondary shelter	✓	✓	
Salisbury Central School	45 Lincoln City Road	Primary Shelter	✓	✓	
Salisbury Firehouse	4 Brook Street	Emergency Response	✓		
Highway Garage		Emergency Response	✓		

Sheltering Capabilities

Emergency shelters are an important subset of critical facilities as they are needed in many emergency situations. The Salisbury Central School is the primary shelter. This facility has a back-up generator. The Southbury Volunteer Ambulance Facility is the secondary shelter, and also has

backup power. In case of a sustained power outage, it is anticipated that 10 to 20% of the population would relocate, although not all of those relocating would necessarily utilize the shelter facilities.

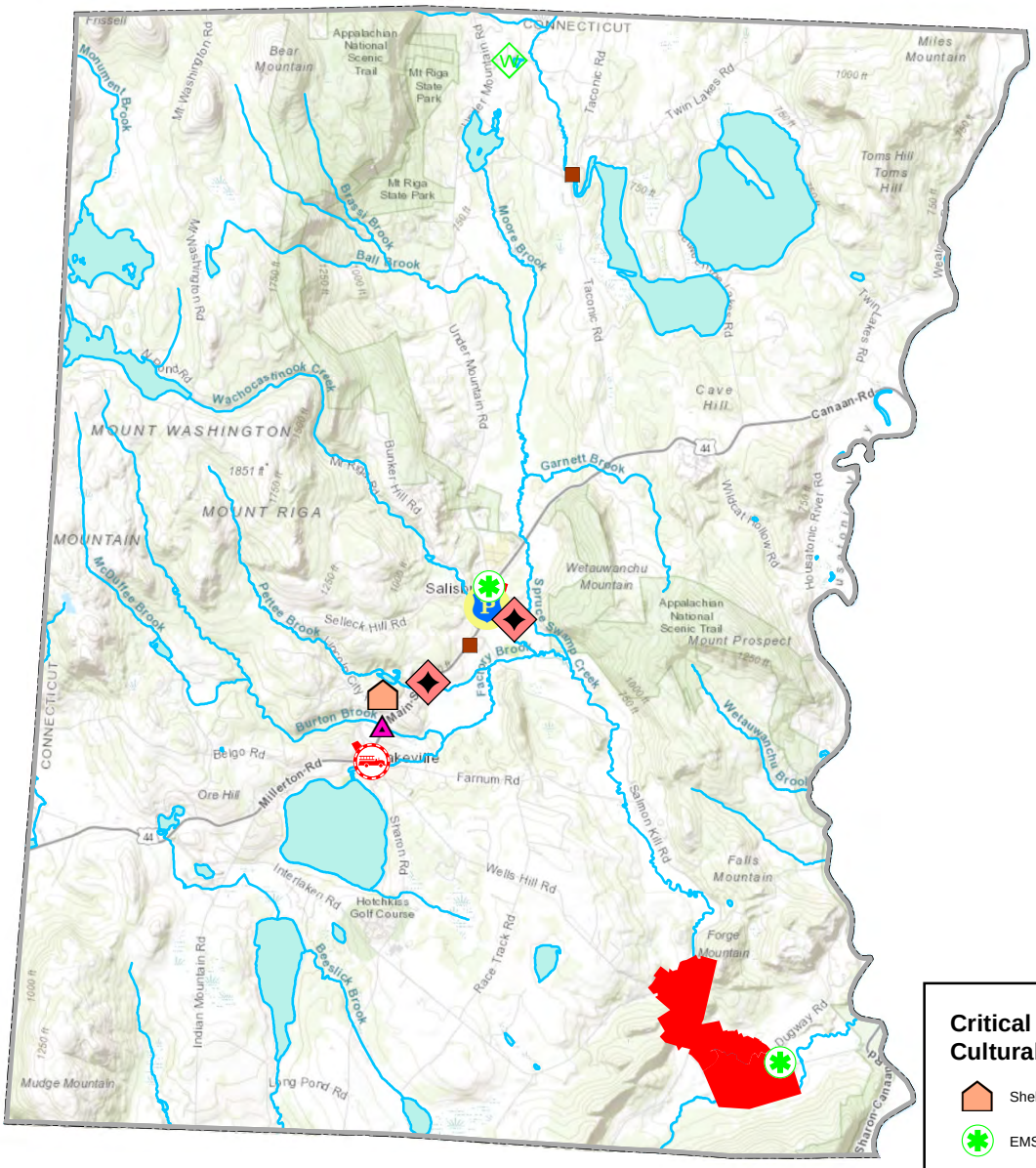
Emergency Response Capabilities

The Emergency Management Director and the Salisbury Volunteer Ambulance Facility coordinates emergency preparedness in the Town of Salisbury. The department develops plans, protocols, and procedures that assure the safety of Salisbury's citizens. It also provides training for emergency response personnel, supports state and local emergency response exercises, and provides technical assistance to state and local emergency response agencies and public officials. Its goal is to provide citizens with the highest level of emergency preparedness before, during, and after disasters or emergencies.

The Town's Emergency Operations Center (EOC), including its Emergency Communications Center, is located at the Salisbury Volunteer Ambulance facility. The EOC has a generator that can power the entire building.

The Town has an EOP that guides its response to emergencies arising from both natural and anthropogenic hazards. At this time the Town does not utilize the program known as CTAlert to direct geographically specific emergency notification telephone calls into affected areas. It is believed that this system may not be cost effective as many residents do not have cell phones and rely on landlines. Town officials indicated that AT&T and Verizon wireless send cell phone messages during emergency situations.

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Critical Facilities & Cultural Resources

- Shelter
- EMS
- Emergency Response
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Structure
- National Register District

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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - SALISBURY ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 2-2

State and federal roads are the major transportation arteries (and therefore evacuation routes) into and out of the town. These include Route 7 and Route 44, which are integral in transporting patients to the hospital.

Emergency services can be cut off by fallen trees or washed-out culverts during certain emergencies. The Town performs tree and shrub removal, with a focus on critical roadways. During emergencies and following storms, the highway garage responds to calls related to downed trees.

Communications

The Town of Salisbury is subscribed to the CT Alert emergency notification system; however, it does not utilize the system very frequently. The Town First Selectman receives alerts from the Water Company and from Eversource when issues arise.

Salisbury has good communication capability with all of its neighbors as well as levels of communication redundancy. Radios, cellular phone, electronic mail, and social media are all used to transmit information between personnel.

Town officials have historically expressed concerned with the response time of AT&T during storm events and power outages. AT&T has reportedly been slow to respond with generators when the power goes out and this could have a significant impact on the town. AT&T has indicated that it is easier to bring in portable generators if service to the tower is out. While in the past Town officials have suggested that AT&T place permanent back-up generators at its towers and facilities, Town staff expressed satisfaction with AT&T's current practices during development of the current edition of this Hazard Mitigation Plan.

Salisbury posts storm preparedness information on the Town website, hosted on the Emergency Services page. This page includes a downloadable "Storm Advice" one-page document that includes key information for preparing for storms.

3 FLOODING

3.1 Existing Capabilities

The Town through its land use regulations works to reduce future increases in flow associated with development.

Ordinances, Regulations, and Plans

Regulations, codes, and ordinances that apply to flood hazard mitigation in conjunction with and in addition to NFIP regulations include:

- ***Zoning Regulations***. The Town of Salisbury Zoning Regulations have been enacted to accomplish the following purposes: "promoting and protecting the public health, safety convenience and general welfare of the community; conserving and protecting natural resources, such as ridgelines, farmland, wetlands, watercourses, and other natural resources and areas; protecting water quality, especially groundwater and existing potential drinking water supplies; conserving the value of buildings and property and encouraging the most appropriate use of land throughout the town; lessening congestion in the streets and securing safety from fire, panic, flood and other dangers; providing and maintaining adequate light and air and privacy; facilitating adequate provision of transportation, water, gas, electric power, sewerage, drainage, schools, parks and other public requirements; assuring the proper provision is made for sedimentation control and the control of erosion caused by wind or water; encouraging the development of housing opportunities, including opportunities for multifamily dwellings, consistent with soil types, terrain and infrastructure capacity... and implementing the Plan of Conservation and Development for the Town of Salisbury."
  - Article IV, Section 401 identifies the standards and requirements of Floodplain Overlay District, which is essentially the town's local version of the NFIP regulations. The Floodplain Overlay District provides for the regulation of areas subject to potential flooding. These regulations establish necessary minimum standards and review procedures over the use of land in the Flood Plain Overly District in order to: reduce flooding hazard to human life and health, reduce damage to public and private property, minimize disruptions of commerce and governmental services, protect property values, maintain the capacity of natural drainage systems to safely store and transport flood waters, minimize damaging flood erosion, and minimize increases in downstream flood potential. The regulations include but are not limited to the following:
  - Article IV, Section 401.3 (a) states that "no residential structures will be permitted in a floodway. No encroachment including fill, other new construction, substantial improvements and other development shall be permitted in a floodway unless technical evaluation demonstrates that the encroachment will not result in any increase in flood levels during the base flood discharge. All other Flood Plain Overlay District standards must also be satisfied."
  - Article IV, Section 401.3 (j) where base flood elevations have been determined but there is no designated floodway, no new construction, substantial improvement or other development (including fill) shall be permitted which will increase base flood elevations

more than one (1) foot at any point along the watercourse based upon the development site at full build out.
  - Article IV, Section 401.3 (m) new construction and substantial improvement of any residential structure shall have the lowest floor, including basements, raised at least one foot above the base-flood elevation.
  - Article IV, Section 401.3 (n) new construction and substantial improvement of any non-residential structure shall have the lowest floor, including basements, raised or flood-proofed to at least one foot above the base-flood elevation. Flood proofing shall conform to standards set by the Federal Insurance Administration and shall be certified by a registered professional engineer or architect.
  - Article IV, Sections 402, 403 and 404 outline the requirements associated with the Housatonic Overlay District, the Aquifer Protection Overlay District and the Lake Protection Overlay District, respectively.

- ***Inland Wetlands and Watercourse Regulations***. The purpose of the Inland Wetlands and Watercourses Regulations is to protect the quality of the inland wetlands and watercourses within the Town of Salisbury by making provisions for the protection, preservation, maintenance, and use of inland wetlands and watercourses, including deterring and inhibiting the danger of flood and pollution.
  - Section 2.1 defines "Regulated Activity" as any operation within or use of a wetland or watercourse involving removal or deposition of material, or any obstruction, construction, alteration or pollution, of such wetlands or watercourses, and any earth moving, clearing, filling, grading, paving, excavating, construction, depositing or discharging of storm water on land or clear cutting of trees within 75 feet of wetlands and watercourses, but shall not include the specified activities in Section 4 (22a-40 of the Connecticut General Statutes) of these regulations. The location of any active portion of any subsurface waste disposal system within 150 feet of the mean waterline of any watercourse or 75 feet of all wetlands measured horizontally from the boundary of any wetland or watercourse is deemed a regulated activity.
  - Section 4.1 states that no residential homes will be permitted "as of right" in wetlands and watercourses after July 1, 1987.
  - Section 4.4 states that no person may conduct or maintain a regulated activity without obtaining a permit. Section 7 outlines the permit application requirements.

- ***Plan of Conservation and Development.*** Effective in 2012, this document is the Town vision statement for future development.
  - Section 2 (pages 4 through 8) outline strategies for natural resource protection including but not limited to; minimization or avoidance of wetland disturbance and filling; protection of floodplains from development and inappropriate uses; preservation of rocky talus slopes and outcrops; preservation of vernal pools and associated upland habitats; maintenance of ecological connectivity between upland and wetland habitats; protection of wildlife corridors; protection of groundwater resources; minimization of stressors that degrade rivers; streams and wetlands; utilization of native plants; and wetland and riparian restoration.
  - Section 2 (page 4) encourages the preservation of critical or unique wetland systems.

- Section 2 (page 11) states that the adoption of regulations encouraging the implementation of Low Impact Development stormwater management should be considered.
- Section 4 (page 42) discusses the potential creation of a separate Inland Wetlands Agency, which would allow the Conservation Commission to focus on issues or preservation and stewardship which are distinct when contrasted with the regulatory authority vested in IMA's.

- ***Subdivision Regulations.*** Effective in 2008, the Town's Subdivision Regulations establish minimum acceptable standards of street construction; regulate the layout and development of lots and streets; and outline measures to prevent degradation of potable water sources, control erosion and siltation, preserve adequate and convenient open spaces, and retain the natural features of the land.
  - Section 5.1.1 states that subdivisions shall be designed and arranged, and provision shall be made, to: preserve natural features; make the best use of natural terrain; prevent the pollution of wetlands, watercourses and waterbodies; protect the quality and quantity of water supplies and to minimize flood damage.
  - Section 5.3.1 (a-f) outlines objectives related to open space areas. The objectives include but are not limited to: the preservation of wetlands, vernal pools, watercourses, floodplains, streams, ponds, lakes and adjacent regulated areas as wells as ridgelines, slopes greater than twenty five percent, archeological and historic sites, distant open views visible from public roads, and unusual natural areas, areas of valuable wildlife diversity, biotic corridors and the protection of aquifers, aquifer recharge areas, and public water supply watersheds.
  - Section 7.0 outlines stormwater drainage requirements and Section 7.1.1 states that the storm water drainage system shall provide for drainage from the entire parcel and shall take into account land outside the parcel that drains across the parcel. In addition, section 7.1.2 requires that the overall storm water drainage system shall be designed so that the peak runoff rate at all points where the storm water leaves the property does not exceed the rate existing prior to the development. Section 7.17 states that all bridges and any culvert which carries a major waterway which is subject to seasonal flooding, or which is part of a watershed of more than 10 square miles in area, or which is otherwise designated by the selectmen; and all cross culverts on dead-end streets shall be designed for a storm return frequency of 100 years.

The intent of these regulations is to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas of the Town of Salisbury by the establishment of standards designed to:

- Protect human life and public health
- Minimize expenditure of money for costly flood control projects
- Minimize the need for rescue and relief efforts associated with flooding
- Minimize prolonged business interruptions
- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone, and sewer lines; and streets and bridges located in floodplains

- Maintain a stable tax base by providing for the sound use and development of floodprone areas in such a manner as to minimize flood blight areas
- Ensure that purchasers of property are notified of special flood hazards
- Ensure the continued eligibility of owners of property in Salisbury for participation in the NFIP

NFIP, Flood Insurance, and Community Rating System

Mr. Curtis Rand, the Town First Selectman is currently the NFIP administrator for the Town and oversees the enforcement of NFIP regulations. The degree of flood protection established by the variety of regulations in the Town exceeds the minimum NFIP requirements. Specifically, the town requires one foot of freeboard. The Town is not enrolled in the Community Rating System program.

According to FEMA, there are 43 flood insurance policies in force in Salisbury as of 6/30/2019 with an insurance value of $11,674,800.

Drainage and Street Flooding

The Town Highway Department is in charge of the maintenance of the town's drainage systems and performs clearing of bridges and culverts and other maintenance as needed. There are areas of street flooding throughout the town, and these are addressed by the Highway Department as necessary. Drainage complaints are routed to the Town Highway Department. The Town uses these reports to identify potential problems and plan for maintenance and upgrades.

Structural Projects

The Amesville/Water Street Bridge which spans the Housatonic River between Salisbury and Falls Village was replaced in 2014-15. This bridge is a conduit for the Falls Village Fire Department and Ambulance Services who serve the hamlet of Amesville in Salisbury. The replacement was critical to ensuring appropriate response times in emergency situations.



Communications

The Town can access the National Weather Service website at http://www.weather.gov/ to obtain the latest flood watches and warnings before and during precipitation events.
The National Weather Service issues a flood watch or a flash flood watch for an area when conditions in or near the area are favorable for a flood or flash flood, respectively. A flash flood watch or flood watch does not necessarily mean that flooding will occur. The National Weather Service issues a flood warning or a flash flood warning for an area when parts of the area are either currently flooding, highly likely to flood, or when flooding is imminent.

The Town receives regular weather updates through Division of Emergency Management and Homeland Security (DEMHS) Region 5 email alerts as well as watches and warnings through the National Weather Service.

Natural Resource Protection

Salisbury is proactive in preserving land throughout Town, including within the Salmon Creek watershed, which has been identified as having flood issues in the past. Town staff estimate that 40% of the land in Town is preserved or wild. Salisbury focuses preservation efforts, to an extent, on headwater areas. In 2019 the Town implemented conservation easements on about 1,000 acres in headwaters of two villages. This is reportedly effective at mitigating flooding that would occur if these areas were developed.

According to the Plan of Conservation and Development for the Town of Salisbury "many individuals and organizations have been instrumental in securing protection and stewardship of important lands and landscapes within Salisbury. For example, the Salisbury Association has had, and will continue to play, a central role in the protection of the Town's many unique, scenic, historic and fragile areas. Many other organizations have made and continue to make significant contributions to the protection of Salisbury's landscape (such as the federal and state governments, The Nature Conservancy, Weantinogue Heritage Land Trust, and others)."

In addition, the 2009 Salisbury Natural Resource Inventory provides an overview of the natural resources within the Town of Salisbury as well as recommendations for preserving them. The report identifies a need to "change subdivision regulations to require minimum mandatory conservation areas in subdivisions in order to properly address natural resource protection of the land."

New Capabilities and Completed Actions

Salisbury continues to maintain its strong flood mitigation capabilities. Recent mitigation projects include replacement of the Amesville/Water Street Bridge, incorporation of stormwater management measures into construction of a new Transfer Station, and institution of conservation easements on about 1,000 acres of land located in the headwaters of local drainage basins.

Summary

Salisbury mitigates flood damages primarily through regulating development in floodprone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate. The Town has very strong wetlands setback rules, and its regulations include stormwater runoff mitigation requirements. Restricting building activities in floodprone areas is currently carried out through both the Planning and Zoning and the Conservation Commission. However, this may eventually be the responsibility of an Inland Wetland Agency, should one be formed. All watercourses are to be encroached minimally or not at all to maintain the existing flood-carrying capacity. These regulations rely primarily on the FEMA-defined 1% annual chance flood elevations to determine flood areas.

3.2 Vulnerabilities and Risk Assessment

This section discusses specific areas at risk to flooding within the town. Flooding can impact a variety of river corridors and cause severe damages in the Town of Salisbury but most often occurs in the Housatonic River watershed. Flooding due to poor drainage and other factors is also a persistent hazard in the town and can cause minor infrastructure damage and create nuisance flooding of yards and basements.

Town officials report that flooding has not caused significant damage in Salisbury in the last 20 years.

Vulnerability Analysis of Repetitive Loss Properties

Based on correspondence with the State of Connecticut NFIP Coordinator at the Connecticut DEEP, no repetitive loss properties (RLPs) are located in the Town of Salisbury.

Vulnerability Analysis of Critical Facilities

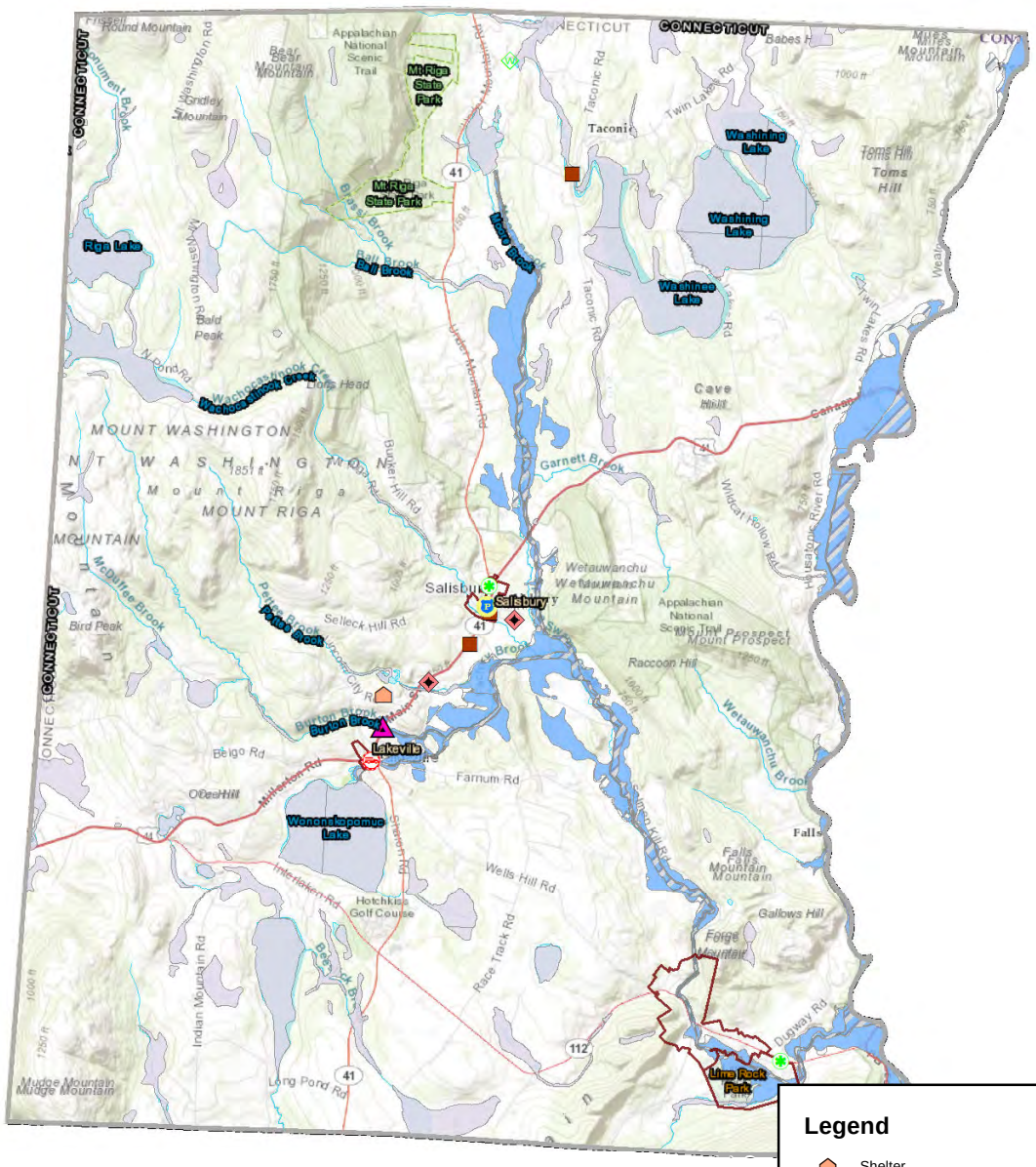
The list of critical facilities provided by the Town (Section 2.9) was used with the parcel data to accurately locate each critical facility throughout the town. None of the critical facilities were found to lie within the 1% annual chance floodplains of a variety of watercourses in the town.

Vulnerability of Other Areas

According to the 1998 Flood Insurance Study for the Town of Salisbury, "the town is subject to flooding from the Housatonic River, Salmon Creek, Factory Brook, Burton Brook and various tributaries, streams, brooks and swampy areas in the community."

In order to minimize flooding impacts, the Town discourages new construction and substantial reconstruction within the 1% annual chance floodplain by raising concerns during the floodplain permit process. However, given the historic development patterns of the town, many areas within floodplains were developed before floodplain management was even a consideration. New development is strictly managed through the Town's land use process.

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FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - SALISBURY ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 3-1

Other problem areas identified by town officials include the following:

- Housatonic River Road
- Salmon Kill Road
- Riga Road
- Dugway Road
- Lakeville – located downstream of Lakeville Lake, some low-lying areas located in mapped flood zones experience flooding in homes. Lakeville Lake does not have a spillway, and is currently gate-controlled by the Highway Department. It is unclear how the lack of a spillway impacts flood risk downstream, or how the installation of a spillway would change risks.
- Two bridges along Riga Road have issues with scouring which could lead to potential instability – these bridges are scheduled for maintenance and repair.
- Riverbank stabilization is needed along various portions of the Housatonic River.

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing mitigation measures appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Salisbury is 105 mph for a Category 1 event, 115 mph for a Category 2, and 120 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Parts of tall and older trees may fall during heavy wind events, potentially damaging structures, utility lines, and vehicles. Eversource, the local electric utility, provides tree maintenance near its power lines.

The Town tree warden assists in managing all trees on Town-owned property, including within the street rights-of-way. With its limited budget, the town tends to focus on the most critical roadways.

During emergencies, the Town currently has two designated emergency shelters available for residents as discussed in Section 2.9.

Prior to severe storm events, the Town ensures that warning/notification systems and communication equipment are working properly and prepares for the possible evacuation of impacted areas.

New Capabilities and Completed Actions

Salisbury continues to maintain its strong tropical cyclone mitigation capabilities. Overhead utilities were buried underground along Academy Street, reducing the risk to those utilities from high wind events (as well as snow events).

Summary

Salisbury mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

The Town of Salisbury is vulnerable to hurricane damage from wind and flooding. Wind damage from hurricanes and tropical storms can affect all areas of Town, while areas susceptible to

flooding are even more vulnerable. Wind risks include flying debris, damage to trees and utility lines, road blockages, fires started by downed power lines, and direct impacts on structures.

In general, as residents and businesses become more dependent on the internet and mobile communications, the impact of hurricanes on commerce will increase. A major hurricane has the potential of causing complete disruption of power and communications for up to several weeks, rendering electronic devices and those that rely on utility towers and lines inoperative.

Critical Facility Vulnerability

The Town is uncertain whether any Town-owned critical facilities have wind-mitigation measures installed to specifically reduce the effects of wind. Thus, nearly all of the critical facilities in Town are considered to be equally likely to be damaged by hurricane-force winds. Many of the Town's older structures, such as the Town Hall may not meet current building code with respect to wind.

Some critical facilities are more susceptible than others to flooding associated with hurricanes. Such facilities susceptible to flooding were discussed in Section 3.

Hurricane sheltering needs have not been calculated by the U.S. Army Corps of Engineers for the Town. During extended power outages, it is believed that only 10% to 20% of the affected population will require sheltering. In the case of a major hurricane, it is likely that the Town will depend on state and federal aid to assist sheltering displaced populations until normalcy is restored.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Salisbury as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

Municipal responsibilities relative to summer storm and tornado mitigation and preparedness include:

- Developing and disseminating emergency public information and instructions concerning tornado, thunderstorm wind, lightning, and hail safety, especially guidance regarding in-home protection and evacuation procedures and locations of public shelters
- Designating appropriate shelter space in the community that could potentially withstand lightning and tornado impact
- Periodically testing and exercising tornado response plans
- Putting emergency personnel on standby at tornado "watch" stage
- Utilizing the Alert Now/Blackboard Connect emergency notification system to send warnings into potentially affected areas.

Although tornadoes pose a threat to all areas of the state, their occurrence is not considered frequent enough to justify the construction of tornado shelters. Instead, the state has provided NOAA weather radios to all public schools as well as many local governments for use in public buildings. The general public continues to rely on mass media for knowledge of weather warnings. Warning time for tornadoes is very short due to the nature of these types of events, so predisaster response time can be limited. However, the NOAA weather radios provide immediate notification of all types of weather warnings in addition to tornadoes, making them very popular with communities.

New Capabilities and Completed Actions

Salisbury continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

Salisbury mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Salisbury has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

Thunderstorms are expected to impact Salisbury 20 to 30 days each year. The majority of these events do not cause any measurable damage. Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Salisbury area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Salisbury is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the town of Salisbury is believed to be low for any given year. All areas of the town are susceptible to damage from high winds although more building damage is expected in the town center while more tree damage is expected in the less densely populated areas.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Eversource trims trees along powers lines. The town tree warden can remove dead and diseased trees in rights-of-way or Town land. Town-owned equipment is used except for complex situations, which would call for the use of a contractor. The Town of Salisbury reports that the typical cost for the town to respond to downed branches and wires from a localized severe thunderstorm is $1,500.

Town personnel note that strong thunderstorms will cause power lines to fall all over the town. Most downed power lines in Salisbury are detected quickly, and any associated fires are quickly extinguished. Such fires can be extremely dangerous during the summer months during dry and drought conditions. It is important to have adequate water supply for fire protection to ensure the necessary level of safety is maintained.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

Summary – The entire Town of Salisbury is at relatively equal risk for experiencing damage from summer storms and tornadoes. Based on the historic record, at least one tornado has resulted in costly damage to the town. However, more frequent storm damages are relatively site specific and occur to private property (and therefore are paid for by private insurance). For municipal property, the Town budget for tree removal and minor repairs is generally adequate to handle summer storm damage.

6 WINTER STORMS

6.1 Existing Capabilities

Programs that are specific to winter storms are generally those related to preparing plows and sand and salt trucks, tree trimming to protect power lines, and other associated snow removal and response preparations.

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas. As a result of the winter of 2010-2011, it is anticipated that many communities will develop and utilize programs for roof snow removal.

For municipal property, the Town budget for tree removal and minor repairs is generally adequate to handle winter storm damage although the plowing budget is often depleted. In particular, the heavy snowfalls associated with the winter of 2010-2011 drained the Town's plowing budget and raised a high level of awareness of the danger that heavy snow poses to roofs.

CTDOT plows all State roads and Interstates. The Town primarily uses Town staff for plowing operations on the remaining miles of roadway. The Town has eight trucks for plowing. Two of the trucks are six wheelers, one is a one-ton truck, and another is a one-ton dump truck. Priority is given to plowing egresses to critical facilities. The First Selectman has noted that snow removal is a relatively fundamental capability in Salisbury.

Prior to a winter weather event, the Town ensures that all warning/notification and communications systems are ready and ensures that appropriate equipment and supplies, especially snow removal equipment, are in place and in good working order. In some known problem areas, prestorm treatment is applied to roadways to reduce the accumulation of snow. The town uses sand and salt for deicing. The Town also prepares for the possible evacuation and sheltering of some populations that could be impacted by the upcoming storm (especially the elderly and special needs persons).

New Capabilities and Completed Actions

Salisbury continues to maintain its strong winter storm mitigation capabilities. The Town has acquired a snow blower to remove snow from the Fire Station's flat roof, and in general has the capacity to remove snow from municipal building roofs.

Summary

Salisbury mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

The structures and utilities in the Town of Salisbury are vulnerable to a variety of winter storm damage. Tree limbs and some building structures may not be suited to withstand high wind and snow loads. Ice can damage or collapse power lines, render steep gradients impassable for motorists, undermine foundations, and cause "flood" damage from freezing water pipes in basements. Drifting snow can occur after large storms, but the effects are generally mitigated through municipal plowing efforts. However, the primary areas of concern are located along Hammertown Road, Long Pond Road, Weatogue Road, Twin Lakes Road, Stateline Road, Indian Mountain, Belgo Road and Salmon Kill Road.

Icing causes difficult driving conditions throughout the hillier sections of the town. Exposed hilltops are more at risk to high winds and snow drifts. Snowfall characteristics can vary widely between the valleys and the hilltops. The Town's standard of sand/salt treatment has been helpful in controlling ice in these problem areas.

The elderly population in Salisbury is particularly susceptible to the impacts created by winter storms due to resource needs (heat, electricity loss, safe access to food, etc.).

No critical facilities are believed to be more susceptible to winter storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to winter storms.

Note that the Town's public assistance reimbursement for Winter Storm Alfred was $26,000. A few barns collapsed in Roxbury in January and February 2014. The losses were likely significant, although the figures are not available because the properties are privately owned.

Summary – The entire Town of Salisbury is at relatively equal risk for experiencing damage from winter storms although some areas (such as icing trouble spots and neighborhoods with a high

concentration of flat roofs) are more susceptible. Based on the historic record, it is difficult to determine if any winter storms have resulted in costly damages to the Town as damage estimates for severe storms are generally spread over an entire county. Many damages are relatively site specific and occur to private property (and therefore are paid for by private insurance) while repairs for power outages are often widespread and difficult to quantify to any one municipality.

7 EARTHQUAKES

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Salisbury. The Town has adopted these codes for new construction, and they are enforced by the Building Official. Due to the infrequent nature of damaging earthquakes, land use policies in the Town do not directly address earthquake hazards. However, various documents do indirectly discuss areas susceptible to earthquake damage and regulations that help to minimize potential earthquake damage:

- ***Subdivision Regulations***: The 2008 regulations do not explicitly address the issue of construction on steep slopes. However, the regulations do require that soil erosion and sediment control plans be developed for proposed projects.

- ***Zoning Regulations***: Article I, Section 100.3(g) states that the Zoning Regulations shall regulate development to minimize erosion and sedimentation, ground and surface water pollution and adverse impact on wetlands, watercourses, lakes and ponds, flood hazard areas, steep slopes, ridgelines and other sensitive and significant features of the natural environment.

7.2 Vulnerabilities and Risk Assessment

Surficial earth materials behave differently in response to seismic activity. Unconsolidated materials such as sand and artificial fill can amplify the shaking associated with an earthquake. In addition, artificial fill material has the potential for liquefaction. When liquefaction occurs, the strength of the soil decreases, and the ability of soil to support building foundations and bridges is reduced. Increased shaking and liquefaction can cause greater damage to buildings and structures and a greater loss of life.

Some areas in the Town of Salisbury are underlain by sand and gravel. Structures in these areas are at increased risk from earthquakes due to amplification of seismic energy and/or collapse. The best mitigation for future development in areas of sandy material may be application of the most stringent building codes or possibly the prohibition of new construction. However, many of these areas occur in floodplains associated with the various streams and rivers in Salisbury, so they are already regulated. The areas that are not at increased risk during an earthquake due to unstable soils are the areas underlain by glacial till, which includes most of the town.

Areas of steep slopes can collapse during an earthquake, creating landslides. Seismic activity can also break utility lines such as water mains, electric and telephone lines, and stormwater management systems. Damage to utility lines can lead to fires, especially in electric and gas mains. Dam failure can also pose a significant threat to developed areas during an earthquake. For this Plan, dam failure has been addressed separately in Section 9.

According to the 2014 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut is at a low to moderate risk for experiencing an earthquake of a magnitude greater than 3.5 and at a moderate risk of experiencing an earthquake of a magnitude less than 3.0 in the future. No earthquake with a magnitude greater than 3.5 has occurred in Connecticut within the last 30 years, and the USGS currently ranks Connecticut 43rd out of the 50 states for overall earthquake activity.

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Salisbury. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Salisbury

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

Based on the historic record and the probability maps generated from the USGS database, the state of Connecticut possesses areas of seismic activity. It is likely that Connecticut will continue to experience minor earthquakes (magnitude less than 3.0) in the future. While the risk of an earthquake affecting Salisbury is relatively low over the short term, long-term probabilities suggest that a damaging earthquake (magnitude greater than 5.0) could occur within the vicinity of Salisbury.

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

Actions Completed and New Capabilities

Salisbury continues to maintain its capabilities for mitigating and responding to dam failure risks.

Summary

Salisbury mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally. Town officials have indicated that most dams in Salisbury are well maintained and there are no concerns at this time.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

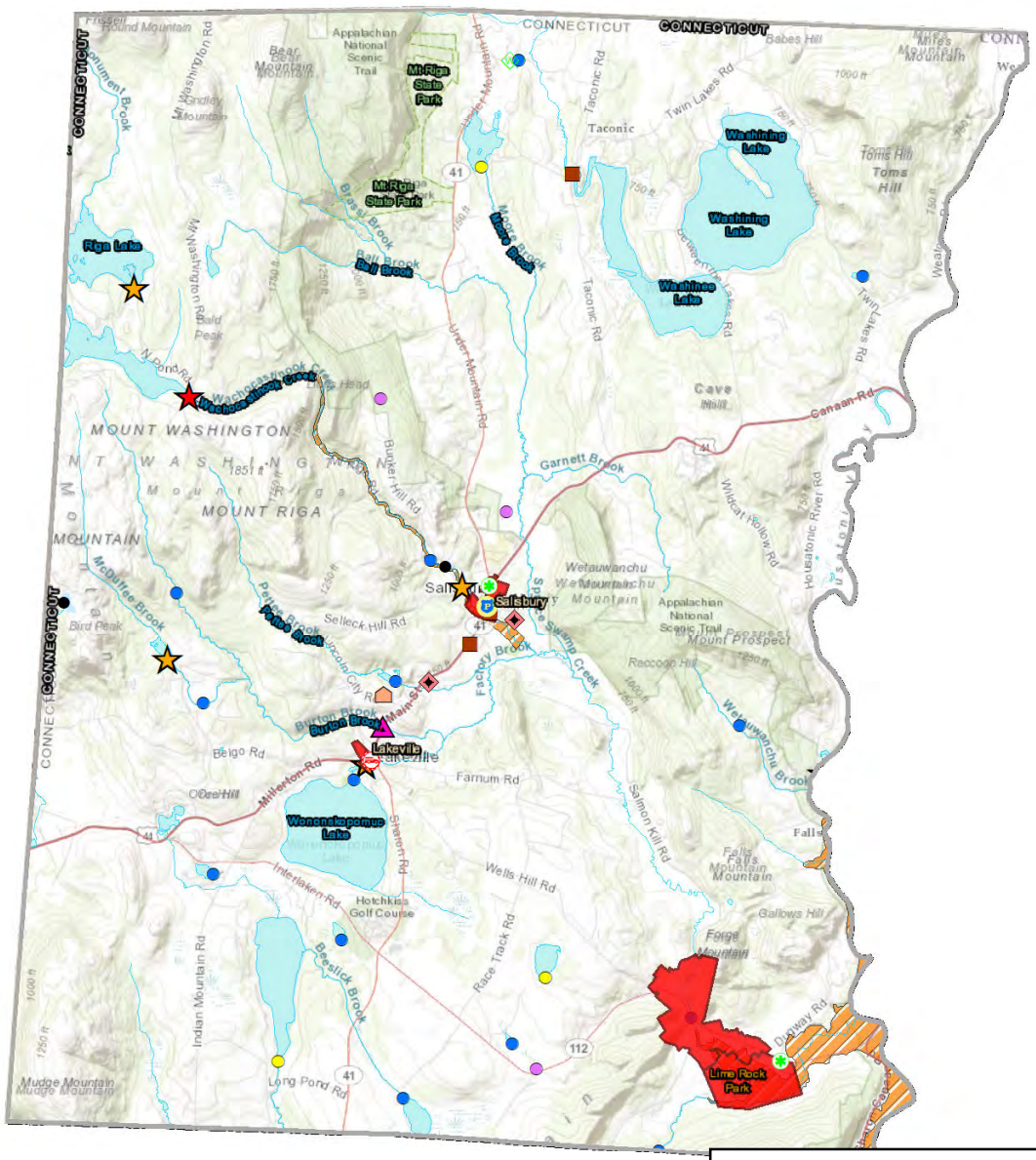
As of 2020, there were 28 DEEP-inventoried dams within the Town of Salisbury. These dams are listed in Table 8-1 and shown in Figure 8-1. Note that the status of a number of these dams is unknowns; some may have been breached.

Table 8-1: DEEP-Inventoried Dams in Salisbury

Number	Name	Class
12201	HOLLY POND DAM	B
12202	SOUTH POND DAM	C
12203	TWIN LAKES DAM	BB
12204	RIGA LAKE DAM	B
12205	FISHER POND DAM	BB
12206	BUCKLEY DAM	A
12207	LAKE TAVOLAN DAM	BB
12208	CHURCH HOMES DAM	AA
12209	BICKEL DAM	A
12210	MCTERRY CORPORTION DAM	A
12211	WONONPAKOOK LAKE DAM	BB
12212	DEEP LAKE DAM	A
12213	MCLANES POND DAM	A
12214	PEWTER POND DAM	B
12215	WACHOCASTINOOK BROOK DAM	BREACHED
12216	LIME ROCK DAM	A
12217	GRASSLAND POND DAM	A
12218	WONONSKOPOMUC LAKE DAM	A
12219	BEESLICK POND DAM	A
12220	LAKEVILLE RESERVOIR #2 DAM	B
12221	MALTBY POND DAM (breached 2004)	Unclassified
12223	LAKEVILLE RESERVOIR #3 DAM	A
12224	NASON POND DAM	A
12225	MORRILL POND DAM	AA
12226	ANDERSON POND DAM / MURPHY POND DAM	AA
12228	LORENZO POND DAM	A
12231	ROSENTHAL DAM	A
12232	HOCKEY RINK POND DAM	A

The following section discusses known vulnerable areas located downstream of Class B and C dams.

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CONNECTICUT
MOUNT WASHINGTON
MOUNT RIGA
MOUNTAIN
Salisbury
Lakeville
Lakeville
Mt Riga State Park
Mt Riga State Park
Riga Lake
Washining Lake
Washining Lake
Washinee Lake
Wononskopomuc Lake
Lime Rock Park
Hotchkiss Golf Course
Appalachian National Scenic Trail
Bear Mountain
Taconic
Toms Hill
Cave Hill
Babes Hill
Mudge Mountain
Forge Mountain
Falls Mountain
Mount Prospect
Wetauwanchu Mountain
Bird Peak
Bald Peak
Gay Head
Raccoon Hill
Gallows Hill
Wachusett Brook
Bunker Hill Rd
Under Mountain Rd
Taconic Rd
Twin Lakes Rd
Canaan Rd
Garnett Brook
Wildcat Hollow Rd
Housatonic River Rd
Selleck Hill Rd
Factory Brook
Swamp Creek
Main St
Beigo Rd
Millerton Rd
Farnum Rd
Salmon Kill Rd
Wells Hill Rd
Interlaken Rd
Sharon Rd
Indian Mountain Rd
Beeslick Brook
Race Track Rd
Long Pond Rd
Dugway Rd
Wetauwanchu Brook
Bunker Hill Rd
Bassett Brook
Ball Brook
Bald Peak
Monument Brook
Washington Rd
Ashley Mountain
Frissell Mound Mountain
Twin Lakes Rd
Housatonic River
Taconic Rd
Under Mountain Rd
Bunker Hill Rd
Selleck Hill Rd
Factory Brook
Swamp Creek
Main St
Beigo Rd
Millerton Rd
Farnum Rd
Salmon Kill Rd
Wells Hill Rd
Interlaken Rd
Sharon Rd
Indian Mountain Rd
Beeslick Brook
Race Track Rd
Long Pond Rd
Dugway Rd
Wetauwanchu Brook
Bunker Hill Rd
Bassett Brook
Ball Brook
Bald Peak
Monument Brook
Washington Rd
Ashley Mountain
Frissell Mound Mountain
Twin Lakes Rd
Housatonic River Rd

Holly Pond (Dam No. 12201) - Factory Brook, Salisbury

The Holly Pond Dam is a Class B dam located at the northern end of Holly Pond, a small impoundment downstream of the Wonoskopomuc Lake Dam. The watershed to Holly Pond is an estimated 2.8 square miles. The earthen/concrete dam is 4 feet in height and 40 feet in length. It is owned by the Town of Salisbury and used to impound a reservoir for recreation. The dam discharges to Factory Brook, flowing northwest under Holley Street, Sharon Road and Salmon Kill Road before its confluence with Salmon Creek. Floodwaters from a structure failure pose a threat to a number of structures along these downstream roads.

South Pond (Dam No. 12202) - Wachocastinook Creek, Salisbury

The South Pond Dam is a Class C dam located at the southeast end of South Pond and impounds a storage volume of 1,206 acre-feet from a contributing watershed of 3.43 square miles. The earthen dam was constructed in 1850 and is 22 feet in height and 300 feet in length. The dam has a 15" low level outlet structure. It is owned by the Mount Riga, Inc. and used to impound a reservoir for recreation. The dam discharges to Wachocastinook Creek, flowing southeast alongside Mt. Riga Road for much of its length. Three additional impoundments are located on the creek downstream of South Pond Dam.

An EOP for the South Pond Dam was prepared by Lenard Engineering, Inc. in March 1995, and updated in 1997 addressing actions to be taken during an emergency, and documenting limits of potential flooding. As summarized in in the 1997 Phase II Report dam breach analysis, the following residences would be threatened by a breach of the South Pond Dam:

- ❑ 5, 10 Riga Lane
- ❑ 8 Mt. Riga Road
- ❑ 146, 98, 106, 114, 142, 138, 80 Factory Street
- ❑ 7 Sellack Hill Road
- ❑ 62, 54, 50, 58 Main Street (includes Scoville Memorial Library)
- ❑ 329 Millerton Road
- ❑ 45, 47, 46, 52, 37, 33 Library Street (includes Salisbury Town Garage)
- ❑ 86 Washinee Street
- ❑ 35 Indian Cave Road – Day Care
- ❑ 30 Salmon Kill Road – Nursing Association

Riga Lake Dam (Dam No. 12204) - Monument Brook, Salisbury

The Riga Lake Dam is a Class B dam located at the southeast end of Riga Lake and impounds a storage volume of 765 acre-feet from a contributing watershed of 2.38 square miles. It is owned by Mount Riga, Inc. and used to impound a reservoir for recreation.

The structure is an earth embankment with concrete slab spillway that was replaced in 1985. The dam consists of a 200-foot earthen embankment with stone buttressed downstream slope; a 21-foot-long stone masonry principal spillway with concrete cap, and a 120-foot-long emergency

spillway. The structure is 11 feet in height and the crest width varies from 15 to 25 feet. A 24-inch ductile iron pipe serves as a low-level outlet.

Repairs to the dam were completed in 2011, and included the repair of cracks on the left upstream training wall.

The dam discharges to an unnamed watercourse that flows approximately 2,500 feet southward, and under North Pond Road, to South Pond. Downstream hazards include an unpaved road 500 feet downstream of the dam where the discharge stream enters South Pond.

Pewter Pond Dam (Dam No. 12214) - Wachocastinook Creek, Salisbury

The Pewter Pond Dam is a Class B dam located at the southern end of Pewter Pond, a 0.5-acre impoundment located downstream of South Pond Dam on the Wachocastinook Creek. The estimated contributing watershed is 6.0 square miles. It is privately owned and used to impound a reservoir for recreation.

The stone masonry dam is 10 feet in height and 145 feet in length. Repairs to the low-level outlet structure, spillway and left downstream training wall were completed in 2002. The outlet structure consists of a 2'x3' concrete box and three-foot diameter riveted steel penstock outlet structures.

The dam discharges to Wachocastinook Creek, flowing southeast under Selleck Hill Road and State Route 44 before its confluence with Factory Brook and Salmon Creek. The dam and creek would be affected by upstream failure of South Pond, as indicated by inundation mapping developed for South Pond Dam. The crossing of Selleck Hill Road approximately 250 feet downstream of the dam is the primary hazard concern.

Lakeville Reservoir #2 (Dam No. 12220) - McDuffee Brook, Salisbury

The Lakeville Reservoir #2 Dam is a Class B dam located at the southern end of Lakeville Reservoir #2 and impounds a 3-acre pond from a contributing watershed of 0.94 square miles. It is owned by the Aquarion Water Company of Connecticut and used to impound a reservoir for public water supply.

The earthen dam was constructed in 1906 and was originally 22 feet in height, but later raised to a total height of 30 feet. The dam crest is 230 feet in length and provides 6.6 feet of freeboard. The concrete spillway has a height of seven feet and length of 40 feet. Two 12-inch cast iron wedge gates form the inlet/outlet structure. The outlet line discharges to a downstream pumphouse. Emergency repairs were completed in 2003 that included the installation of stop logs on the spillway.

The dam discharges to McDuffee Brook, which flows southwest to its confluence with Burton Brook, approximately 4,500 feet downstream of the dam. Burton Brook continues to flow southeast under State Route 44 and Walton Street, to its confluence with Factory Brook. Downstream hazards include residential properties, Reservoir Road, and a driveway crossing.

The dam was last formally inspected in 2008 by GZA. There is no USACE Phase I report for the structure. Concrete spillway repairs were completed in 2003. GZA also prepared an ECP in 2002 that is on file at the CT DEEP. This document also includes an Operation and Maintenance Manual. There is no dam breach analysis or inundation map on file.

Great Falls Dam (Dam No. 2101) - Housatonic River, Canaan

The Great Falls Dam is a run-of-river dam located on the Housatonic River in Canaan. It is owned by First Light Power Resources and used to impound a reservoir for hydroelectric generation at the Falls Village Hydrostation. The Housatonic River forms the boundary between Canaan and Salisbury at this location. The dam impounds a reservoir with a surface area of 150 acres, and a storage volume of 1,135 acre-feet from a contributing watershed of 634 square miles.
The concrete dam was constructed in 1913 and consists of a concrete ogee spillway that is 14 feet in height and 300 feet in length. The pumped-storage generation utilizes underground components connecting the upper and lower reservoirs. These components include a powerhouse, water tunnel, shafts, and access tunnel. In March 1987, CL&P constructed a fourth hydroelectric generating unit at the dam.

The dam was designed to pass all flows except the PMF (113,000 cfs), and a Phase II report notes that failure would not cause significant incremental downstream damage. The structure was not designed to have any freeboard during the design flood event.

There was in incident on May 24, 1989 that resulted in 386 feet of canal being washed out and undermined, and a 400-foot section was unstable under railroad loading conditions. Earth backfill on the river side of the canal washed out, consisting of 30% of the area between the failure and the bend upstream in the canal.

In accordance with the EAP on file, a test message was sent to downstream residents regarding failure and flooding on the Housatonic River on June 30, 2004. The EAP for the Housatonic Project/Falls Village Development was last updated in 2012. The inundation map developed with the dam breach analysis indicates that the extent of impact includes the Warren Turnpike, high school athletic fields, Route 7, Route 112, the Lime Rock Race Track (adjacent to Salmon Creek), and a covered bridge. The mapping notes that an incremental rise in water surface elevations of 2.04 feet extends 15.3 miles downstream of the Falls Village Dam.

Other Areas

Lakeville Lake and Twin Lakes have been identified as potentially problematic areas with regard to flooding or impoundment failure. These lakes do not have spillways and are currently gate-controlled by the Highway Department. It has been proposed that the lack of a spillway could potentially have negative impacts downstream; however, Town officials claim that the current gate-controlled system gives the Town more control, and installing spillways might, in fact, increase flood risks downstream.

Twin Lake is upstream of farmland and preserved wetlands, while Lakeville Lake drains into Lakeville village. There is reportedly occasional flooding in low-lying areas that impacts homes; Town staff report that this flooding is due to the location of these homes within a flood zone, and is not related to the upstream impoundment.

9 WILDFIRES

9.1 Existing Capabilities

The Salisbury Fire Department goes to the fires whenever possible. This proactive approach is believed to be effective for controlling wildfires. The Fire Department has some water storage capability in its tanker trucks and storage tanks but primarily relies on the use of the municipal water system to fight fires throughout the town whenever possible.

The Town responds to fires in the State Forest before the state responds, and the local departments can utilize mutual aid agreements with surrounding towns if needed. In addition, there are six working dry hydrants in Salisbury located in the vicinity of the Housatonic River and Weatouge Road.

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Salisbury is compliant with this program and has a designated Burning Official.

Regulations regarding fire protection are outlined in Section 10 of the *Subdivision Regulation*s.

- ***Subdivision Regulations, Section 10.0*** requires that all fire protection measures are completed prior to the issuance of a certificate of occupancy for any dwelling in a subdivision.
- ***Subdivision Regulations, Section 10.1*** outlines the requirements for fire hydrants. Specifically, the regulations require that fire hydrants be installed in subdivisions to be served by a public water supply system. In addition, fire hydrants must within 1,000 of a residential building.
- ***Subdivision Regulations, Section 10.2*** discusses the requirements associated with fire ponds, dry hydrants and cisterns. According to this section, the Commission may require the construction of fire ponds, cisterns or dry hydrants in areas which are not served by public water supply systems. The Commission may also require the construction of an access way which is capable of supporting emergency vehicles. In addition, the regulations provide specifications which state that the cisterns must have a minimum capacity of 10,000 gallons or greater if warranted and they must be located underground in or adjacent to a right of way.

Other capabilities for reducing wildfire risk include:

- Encouraging property owners to widen access roads such that fire trucks and other emergency vehicles can access remote locations.
- Continuing intermunicipal cooperation in firefighting efforts.

- ❑ Providing outreach programs on how to properly manage burning and campfires on private property.
- ❑ Patrolling Town-owned and State-owned open space and parks to prevent unauthorized campfires.
- ❑ Enforcing regulations and permits for open burning.

Actions Completed and New Capabilities

Salisbury continues to maintain its capabilities for mitigating and responding to wildfire risks.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

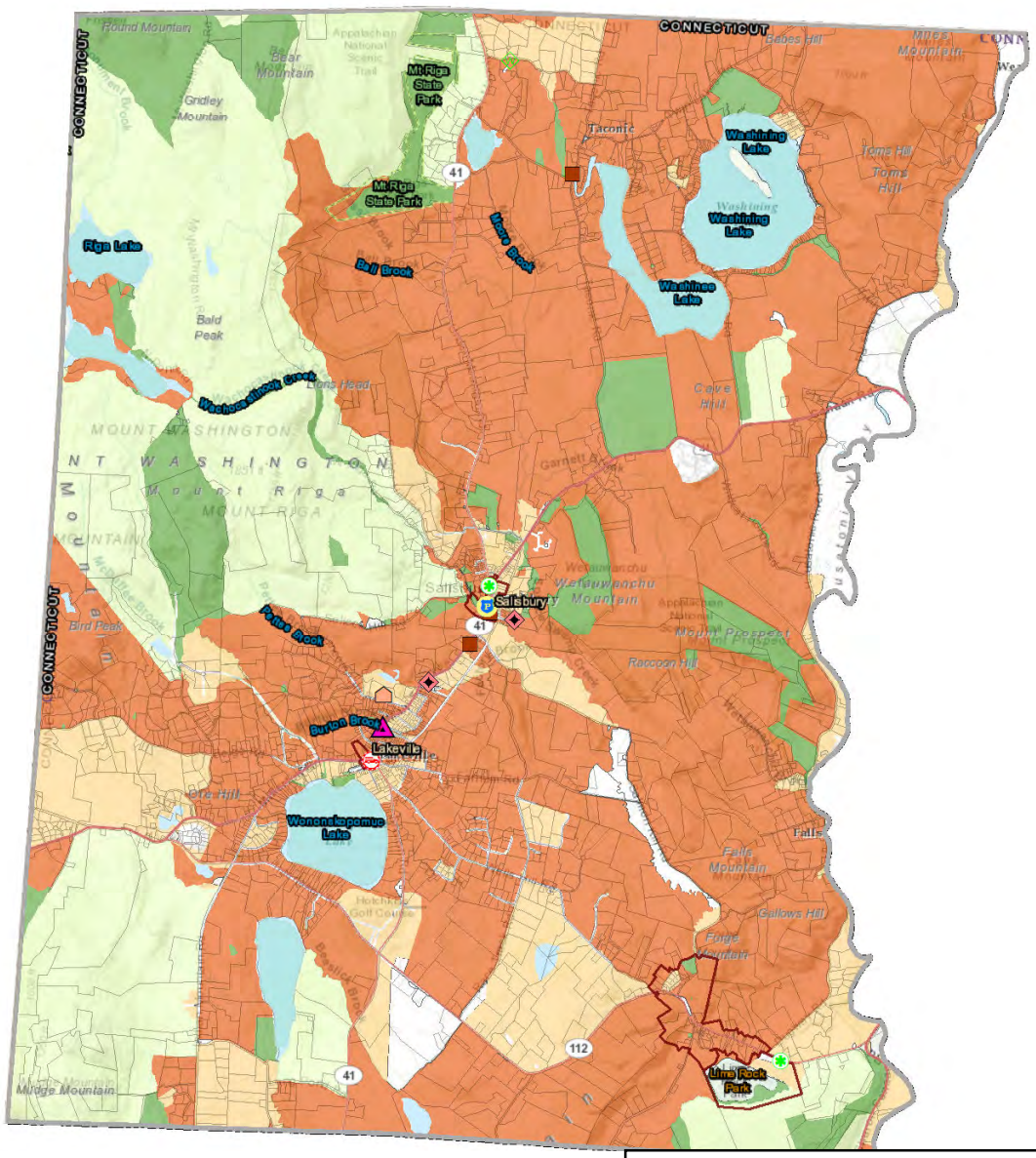
Wildfire Vulnerabilities and Risk

Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

The Appalachian Trail runs through Salisbury and attracts approximately 30 to 40 thousand hikers/campers per year. Accidental ignition of wildfires by hikers and campers in this area is a significant concern for the Town; the last fire caused by campers burned approximately 75 acres in 2011.

According to the Town of Salisbury, the total cost to fight wildfires in any given year is $10,000 (equipment and labor) depending on the size and scope of the event. Property damage from a typical wildfire can approach $10,000 as well. The Bear Mountain fire in 2011 had associated firefighting and damage costs of $75,000.

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Legend

- Shelter
- EMS
- Emergency Response
- Fire Station
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Structure
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - SALISBURY ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,500 7,000
Feet

SCALE 1 " = 7,838 '
DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

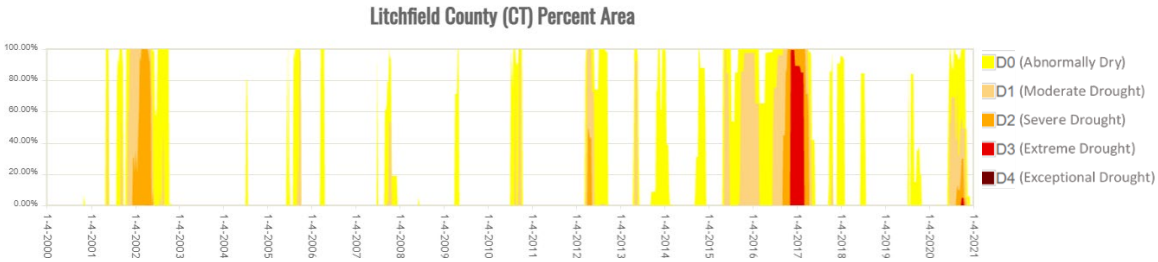


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Strategies	Responsible	Status	Notes
1	Consider subscribing to the CT Alert emergency notification system and utilize it to its fullest capabilities	EMD	Complete	Town has subscribed, but reportedly does not use often.
2	Encourage residents to purchase and use NOAA weather radios with alarm features	EMD	Capability	Storm Advice document hosted on Emergency Services webpage encourages purchase of NOAA radio.
3	Obtain standby power for the Town Hall.	EMD	Drop	Town has explored this, but space constraints make installation challenging (due in part to an historic graveyard located behind the building). Town does not wish to pursue.
4	Work with AT&T representatives to identify the most efficient way to provide backup power to the cell towers during power outages.	EMD	Drop	Town reports that AT&T response to equipment outages is sufficient. Action is no longer necessary.
5	Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternative.	P&Z	Capability	Stormwater management requirements exist within Zoning Regulations. Additionally, Town has very strong setbacks next to wetlands. Town does not have large development projects that will have significant impacts on stormwater. This is a capability.
6	Provide technical assistance regarding floodproofing measures to interested residents. Pursue funding for home elevations should any residents become interested.	Building Official	Capability	Town is able to provide technical guidance to residents. This is a capability. Pursuing funding for flood mitigation on behalf of residents is outside the Town's scope of operations.

#	Strategies	Responsible	Status	Notes
7	Encourage property owners to purchase flood insurance under the NFIP and to report claims when flooding damage occurs.	Building Official	Capability	Information available on Town website. Property owners made aware of flood insurance by lending agencies and other parties.
8	Consider conducting a Salmon Creek watershed study to identify appropriate methods of reducing flood risks.	PW	Drop	Town proactively preserves land within this watershed, particularly near headwaters, in part to help mitigate downstream flood impacts. Town does not believe that a watershed study is warranted.
9	Compile a checklist that cross-references the bylaws, regulations, and codes related to flood damage prevention that may be applicable to a proposed project and make this list available to potential applicants.	P&Z	Drop	Action is not necessary given small number and magnitude of development that occurs in Town.
10	Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	P&Z, Building	Capability	Town has recently hired a new Planning & Zoning Administrator and a new Building Inspector. The two positions work together closely, and are very well informed with regards to flood damage prevention.
11	Consider the creation of a separate Inland Wetlands Agency, which would allow the Conservation Commission to focus on issues or preservation and stewardship which are distinct when contrasted with the regulatory authority vested in inland wetland agencies.	First Selectman	Completed	This action has been completed.
12	Pursue the acquisition of additional municipal open space inside SFHAs and set it aside as greenways, parks, or other nonresidential, noncommercial, or nonindustrial use.	First Selectman	Completed	Town aggressively pursues open space acquisition, and specifically considers flood mitigation contributions of those acquisitions. Numerous acquisitions and conservation easements have been completed within the past five years.
13	Selectively pursue conservation recommendations listed in the Plan of Conservation and Development and other studies and documents	First Selectman	Capability	This is a capability. New POCD scheduled for 2022.

#	Strategies	Responsible	Status	Notes
14	Conduct maintenance on the two bridges along Riga Road that have issues with scouring that may lead to instability.	PW	Completed	Action has been completed. Maintenance is ongoing.
15	Consider installing spillways on Lakeville Lake and Twin Lakes to allow for a more controlled release of water.	PW	Drop	Installation of spillways would be cost-prohibitive; both gate systems are located on dams with roads build on top of them, and so replacing with spillways would require removing the roads and building bridges in their places. Twin Lakes is located upstream of farmland and preserved wetlands, and does not pose significant failure risk. Lakeville Lake drains into Lakeville, and presents more risk. Town believes that the current gate systems provide more control, and replacing with spillways lead to more frequent minor flooding downstream without significant failure risk reduction benefits.
16	Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	PW	Carry Forward	Town has not yet completed this action due to limited staffing and funding. Action is carried forward.
17	When replacing or upgrading culverts, work with CT DOT to incorporate findings of the climate change pilot study and work with HVA to incorporate findings of the stream crossing assessment training.	PW	Carry Forward with Revisions	Town has not identified specific culverts in need of replacement in recent years. Action is carried forward, revised to refer specifically to NRCC guidance.
18	Identify and prioritize areas along the Housatonic River where riverbank stabilization is needed.	PW	Complete	Two located along Town roads have been identified; these locations already have stabilization measures in place. Town will continue to maintain.
19	Ensure adequate barricades are available to block flooded streets in floodprone areas	PW	Complete	Town has adequate equipment.
20	Develop a town wide tree limb inspection and maintenance program to ensure that the potential for downed power lines is diminished. Continue to encourage property owners to trim branches located over structures and power lines.	PW	Capability	Managed by the Highway Department

#	Strategies	Responsible	Status	Notes
21	Continue requiring the location of utilities underground in new developments or during redevelopment whenever possible. Pursue funding to place them underground in existing developed areas.	P&Z	Capability	Town has limited new developments. Underground utilities installed as appropriate.
22	Consider placing above ground utilities underground if possible to reduce impacts from wind and storm damage.	P&Z	Carry Forward	Did in academy street in Salisbury. Very effective. Would like to keep doing but too expensive.
23	The Building Department should provide literature regarding appropriate design standards for wind.	Building Official	Capability	Provided through local implementation of State building codes.
24	Encourage the use of structural techniques related to mitigation of wind damage in new residential and commercial structures to protect new buildings to a standard greater than the minimum building code requirements. Require such improvements for new municipal critical facilities.	PW, Building	Capability	Implement State Building Codes.
25	Develop a plan to prioritize snow removal from the roof of critical facilities and other municipal buildings each winter. Ensure adequate funding is available in the Town budget for this purpose.	PW	Capability	This is a capability.
26	Provide information on the dangers of cold-related hazards to people and property	EMD	Capability	Local residents are aware of these hazards.
27	Consider posting the snow plowing routes in Town buildings each winter to increase public awareness.	PW	Drop	This action is not considered necessary.
28	Consider utilizing snow fencing in areas prone to snow drift.	PW	Capability	Town has snow fencing that can be deployed if necessary, but they reportedly have not had significant drift issues in the past.

#	Strategies	Responsible	Status	Notes
29	The Building Department should provide literature regarding appropriate design standards for mitigating icing, insulating pipes, and retrofits for flat-roofed buildings such as heating coils.	Building Official	Capability	Town is able to provide technical assistance.
30	Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	EMD, PW	Capability	Town is aware of these locations
31	Consider preventing residential development in areas prone to collapse	P&Z	Capability	This is a capability
32	Ensure that municipal departments have adequate backup facilities in case earthquake damage occurs to municipal buildings.	PW, EMD	Capability	Town has multiple facilities, split between its two villages. This is a capability.
33	Consider bracing vulnerable systems and assets inside critical facilities. This could help protect IT systems, important records and files.	PW, EMD	Capability	Town backs up IT systems to the cloud.
34	Collect EAP's for Class B and C dams and file them with appropriate town departments and emergency personnel.	EMD	Capability	This is a capability
35	Include dam failure inundation areas in the CT Alert emergency contact database when obtained	EMD	Capability	EAPs have list of property owners at risk.
36	Revise and enhance the town's website concerning the local regulatory requirements concerning Open Burning.	FD	Completed	Information available on website salisburyct.us/livinginsalisbury/burnpermits Town is more conservative about allowing open burning than the State is.
37	For the areas of elevated wildfire risk identified in the plan, the town may consider a combination of all of the available methods of wildfire risk reduction	FD	Capability	Town is confident in its wildfire-fighting abilities

#	Strategies	Responsible	Status	Notes
38	Consider requiring a source of fire protection water, such as cisterns or dry wells when municipal water service is not available for residential or commercial building development	FD	Capability	This is a capability.
39	Consider installing dry hydrants or fire ponds in outlying parts of town where public water is not readily available for firefighting	FD	Capability	This is a capability.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action SAL-01	
Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB, Sustainable CT
Timeframe	2022
Priority	High

Action SAL-02	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action SAL-03	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action SAL-04	
Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action SAL-05	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action SAL-06	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action SAL-07	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action SAL-08	
Perform an outreach campaign to owners of properties in flood-risk areas in Lakeville, in order to inform them of flood risks, flood mitigation options, and sources for technical and financial assistance.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action SAL-09	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action SAL-10	
When replacing or upgrading culverts, review culvert conveyances based on Northeast Regional Climate Center Guidance, in accordance with the findings of the CT DOT climate change pilot study. Additionally, work with HVA to incorporate findings of the stream crossing assessment training.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEEP
Timeframe	2023 – 2025
Priority	High

Action SAL-11	
Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action SAL-12	
Conduct an analysis to determine the costs and benefits, in terms of overall hazard mitigation, of reconstructing Lakeville Lake dam to have a spillway. Construction of a spillway may reduce the risk of dam failure, but may increase the risk of downstream flooding under other conditions.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action SAL-13	
Address scouring at two bridges along Riga Road.	
Lead	DPW
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action SAL-14	
Place above-ground utilities underground as appropriate to reduce impacts from wind and storm damage.	
Lead	P&Z
Cost	More than $500,000
Funding	CIP, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
SAL-01	Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	Sustainable CT	Planning	$0 - $25,000	OB, Sustainable CT	2022	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
SAL-02	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
SAL-03	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
SAL-04	Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
SAL-05	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
SAL-06	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
SAL-07	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
SAL-08	Perform an outreach campaign to owners of properties in flood-risk areas in Lakeville, in order to inform them of flood risks, flood mitigation options, and sources for technical and financial assistance.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
SAL-09	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
SAL-10	When replacing or upgrading culverts, review culvert conveyances based on Northeast Regional Climate Center Guidance, in accordance with the findings of the CT DOT climate change pilot study. Additionally, work with HVA to incorporate findings of the stream crossing assessment training.	NRCC Guidance	DPW	$50,000 - $100,000	OB, CIP, CT DEEP	2023 – 2025	0	1	1	0	0	1	1	0	0	0	0	0	0	0	6
SAL-11	Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
SAL-12	Conduct an analysis to determine the costs and benefits, in terms of overall hazard mitigation, of reconstructing Lakeville Lake dam to have a spillway. Construction of a spillway may reduce the risk of dam failure, but may increase the risk of downstream flooding under other conditions.	Study	DPW	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
SAL-13	Address scouring at two bridges along Riga Road.	Culvert & Bridge Upgrades	DPW	More than $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
SAL-14	Place above-ground utilities underground as appropriate to reduce impacts from wind and storm damage.	Harden Power Lines	P&Z	More than $500,000	CIP, CT DEMHS	2025 – 2027	1	1	0	1	1	0	0	0	-1	0	0	0	-1	0	1

APPENDIX B
RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF SALISBURY BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Salisbury has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Salisbury Board of Selectmen approved the previous version of the Plan in 2014; and

WHEREAS, the Town of Salisbury and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Salisbury; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Salisbury, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Salisbury eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Salisbury;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Salisbury, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Salisbury this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

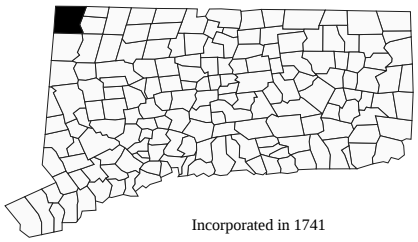
2019 CERC TOWN PROFILE

Salisbury, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
27 Main Street
Salisbury, CT 06068
(860) 435-5170

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1741

Demographics

Population

	Town	County	State
2000	3,977	182,193	3,405,565
2010	3,741	189,927	3,574,097
2013-2017	3,658	184,454	3,594,478
2020	3,368	193,116	3,604,591
'17 - '20 Growth / Yr	-2.9%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	57	921	4,842
Pop./Sq. Mile (2013-2017)	64	200	742
Median Age (2013-2017)	55	47	41
Households (2013-2017)	1,663	74,605	1,361,755
Med. HH Inc. (2013-2017)	$83,217	$76,438	$73,781

	Town	State
Veterans (2013-2017)	354	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	127	3%	300	8%	372	10%	531	15%	1,113	30%	1,215	33%	3,658	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	3,409	164,992	2,446,049
Black Non-Hisp	37	2,843	350,820
Asian Non-Hisp	21	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	20	2,320	84,917
Hispanic or Latino	171	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	5.3%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	435	15%	673,582	27%
Associates Degree	269	9%	188,481	8%
Bachelors or Higher	1,705	60%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	202	2,022
23 - Construction	16	40
31-33 - Manufacturing	NA	NA
44-45 - Retail Trade	16	118
61 - Educational Services	6	629
62 - Health Care and Social Assistance	11	252
72 - Accommodation and Food Services	16	312
Total Government	16	112

Top Five Grand List (2018)

	Amount
Connecticut Light & Power	$10,554,160
Aquarion Water Company	$3,311,840
ITW Insert Molded Products	$1,635,190
Ford Motor Company	$663,390
Salisbury Bank & Trust Company	$590,100
Net Grand List (SFY 2016-2017)	$1,243,678,301

Major Employers (2014)

Hotchkiss School
Lime Rock Park
Salisbury School
Noble Horizons
Camp Sloane

Education

2018-2019 School Year

	Grades	Enrollment
Salisbury School District	PK-8	287
Regional School District 01	9-12	391

Pre-K Enrollment (PSIS)

	2018-2019
Salisbury School District	20

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 01	94.6%	100.0%	90.4%

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	*	53.8%	NA	51.3%	NA	43.0%
ELA	*	53.1%	NA	54.9%	NA	56.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Salisbury School District	7.6%
Regional School District 01	11.9%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	68.7%	84.0%	86.8%
Private	31.3%	16.0%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Salisbury, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$15,495,166	Total Expenditures (2017)	$13,763,667	Annual Debt Service (2017)	$227,992
Tax Revenue	$13,358,057	Education	$9,209,280	As % of Expenditures	1.7%
Non-tax Revenue	$2,137,109	Other	$4,554,387	Eq. Net Grand List (2017)	$1,776,854,716
Intergovernmental	$1,304,240	Total Indebtedness (2017)	$2,883,783	Per Capita	$490,437
Per Capita Tax (2017)	$3,681	As % of Expenditures	21.0%	As % of State Average	324.9%
As % of State Average	125.6%	Per Capita	$796	Moody's Bond Rating (2017)	-
		As % of State Average	31.7%	Actual Mill Rate (2017)	10.70
				Equalized Mill Rate (2017)	7.51
				% of Net Grand List Com/Ind (2017)	4.6%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	2,776	88,068	1,507,711
% Single Unit (2013-2017)	84.0%	73.6%	59.2%
New Permits Auth (2017)	7	142	4,547
As % Existing Units	0.3%	0.2%	0.3%
Demolitions (2017)	0	32	1,403
Home Sales (2017)	66	1,753	21,880
Median Price	$418,400	$250,100	$270,100
Built Pre-1950 share	48.6%	31.2%	29.3%
Owner Occupied Dwellings	1,186	57,330	906,798
As % Total Dwellings	71.3%	76.8%	66.6%
Subsidized Housing (2018)	33	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	1	57	536
$100,000-$199,999	3	563	5,237
$200,000-$299,999	12	538	6,681
$300,000-$399,999	9	315	3,863
$400,000 or More	41	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$1,168	$995	$1,123
Cost-burdened Renters	53.1%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	1,794	101,000	1,827,070
Residents Unemployed	55	4,014	78,242
Unemployment Rate	3.0%	3.8%	4.1%
Self-Employed Rate	22.9%	13.0%	10.0%
Total Employers	202	6,177	122,067
Total Employed	2,022	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Salisbury, CT	653	Salisbury, CT	653
North Canaan, CT	191	North Canaan, CT	94
Sharon, CT	120	Sharon, CT	76
North East, NY	106	Sheffield, MA	40
Torrington, CT	79	North East, NY	36
Amenia, NY	53	Canaan, CT	33
Norfolk, CT	50	Manhattan, NY	27

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	358	1,777
Violent	48	228

Disengaged Youth (2013-2017)

	Town	State
Female	17.2%	4.2%
Male	0.0%	5.6%

	Town
Library circulation per capita	14.01

Distance to Major Cities

	Miles
Hartford	41
New York City	95
Providence	104
Boston	126
Montreal	245

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Aquarion Water Company
(800) 732-9678

Cable Provider
Comcast Lakeville
(800) 266-2278

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

SHARON, CT

August 2021

63 Main Street
Sharon, CT 06069

MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
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global environmental and advisory solutions

SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Sharon and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Sharon is located in western Litchfield County along the New York border and is home to a population of approximately 2,700. Sharon is bordered by the municipalities of Kent to the south, Cornwall to the east, Salisbury to the north and Dutchess County, New York to the west.

Sharon is located in the northwest region of Connecticut in an area known as Litchfield Hills. The topography of the town is characterized by steep slopes, rocky hills, small hills and valleys, and generally rolling terrain. The varying terrain of Sharon makes the town vulnerable to an array of natural hazards.

2.2 Existing Land Use

The land area of Sharon is approximately 58.7 square miles with an additional 0.9 square miles of water. The epicenter of the town is the historic Town Green, which stretches for a mile and a half. Residential areas have been constructed along minor roads that connect to Route 4, Route 41, Route 343, and Route 361, but most of the community is forested. Access to major highways is provided via Route 4 into neighboring communities. The Housatonic State Forest is located in the northeast portion of the town.

Most development is located along Route 41, with the densest development being near the town center, which is situated in the northwest corner of the town. Forests and agricultural uses are primarily located in outlying areas.

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as lawns or golf courses. According to this data, about 69% of Sharon is forested and approximately 6.2% is developed.

Table 2-1: 2015 Land Cover by Area

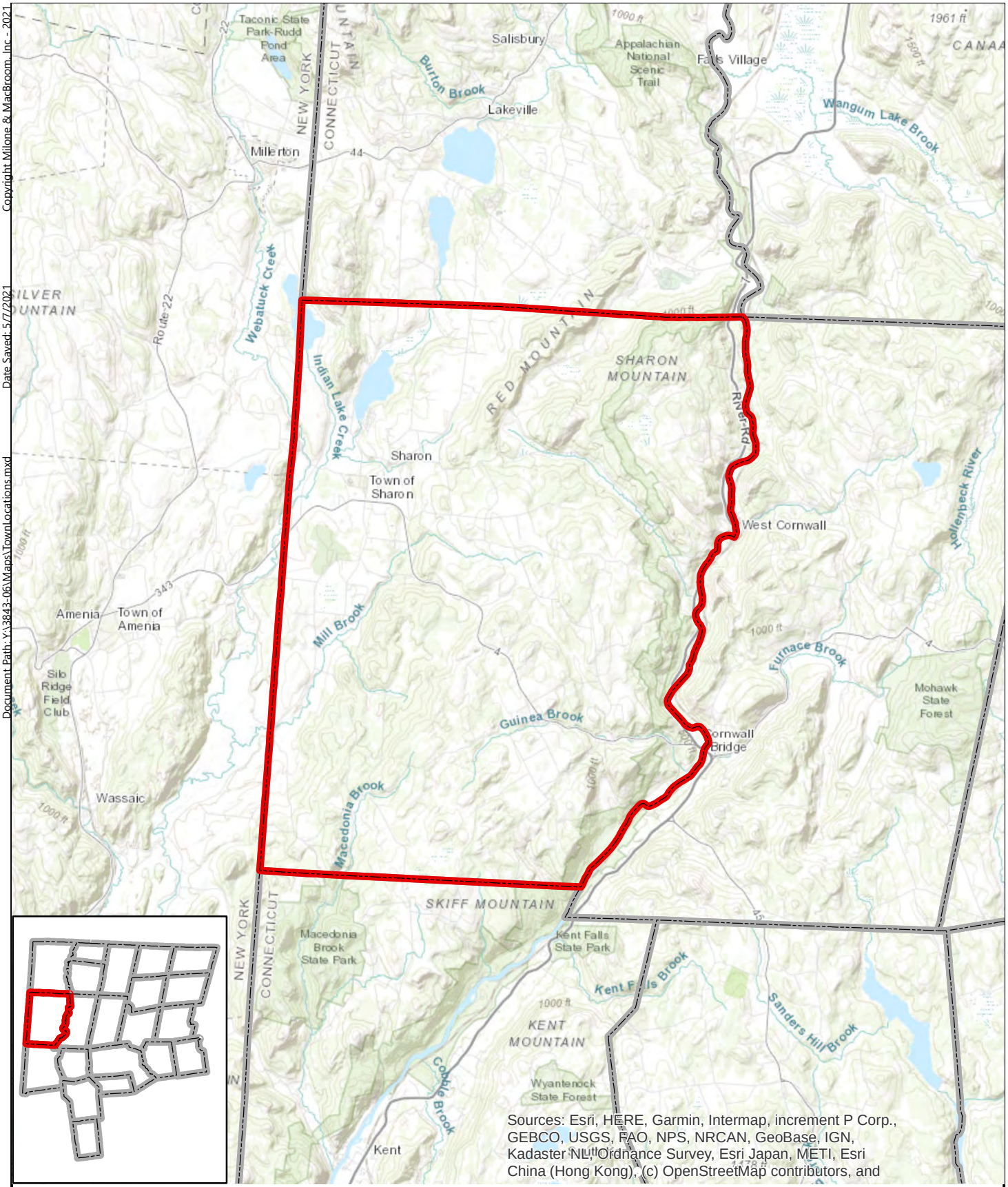
Land Cover	Area (acres)	Percent of Community
Developed	2,377	6.22%
Turf & Grass	982	2.57%
Other Grass	589	1.54%
Agricultural Field	6,561	17.17%
Deciduous Forest	22,784	59.63%
Coniferous Forest	2,528	6.62%
Water	860	2.25%
Non-Forested Wetland	386	1.01%
Forested Wetland	1,127	2.95%
Tidal Wetland	0	0.00%
Barren	10	0.03%
Utility Row	5.7	0.01%
Total	**38,209**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

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Date Saved: 5/7/2021

Document Path: Y:\3843-06\Maps\TownLocations.mxd



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and

MILONE & MACBROOM
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CHESHIRE, CT 06410
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REGIONAL LOCATION: SHARON

HAZARD MITIGATION PLAN UPDATE - SHARON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 5,000 10,000
Feet

SCALE	1 " = 11,005 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-1

2.3 Development Trends

The 2010 U.S. Census reported a population in Sharon of 2,782 individuals. U.S. Census Bureau estimates for 2019 show a population around 2,700 individuals, a decrease from 2010 of 2.9%. The Connecticut State Data Center predicts that population will decrease by 19.1% through 2025 to an estimated population of 2,183 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Sharon remained steady between 2013 and 2017. The number of permits issued in 2013 and 2014 was 5 and 6, respectively, while 3 permits were issued in 2016, and 6 permits were issued in 2017. On average, 5 housing permits were issued each year in Sharon between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Sharon rose by approximately 7.8-percent between 2010 and 2019, from 1,775 units in 2010 to 1,925 units in 2019. In 2019, the housing stock was made up of approximately 92% single-unit structures, 6% two-unit structures, 2% multi-unit structures, and 0% mobile-homes or other types of structures.

According to the Connecticut Office of Policy and Management, Sharon's 2019 Total Equalized Net Grand List was valued at $734,801,807. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Sharon, included as Appendix C.

Residential development pressures are minimal in Sharon. Much of the development that does occur is in the form of single-family homes; reportedly, these are often second homes. Town staff report observing some migration to the Town from urban areas during the COVID pandemic as people move out of high population centers. In addition to these single-family structures, the Town has reviewed and processed a small number of applications for new multifamily dwellings in Town.

Overall, development in Sharon has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the next five years is not expected to increase exposure.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability

- minority status and language
- housing type and transportation

Sharon is considered to have a moderate level of social vulnerability, with a higher vulnerability score for the SVI category of Household Composition & Disability. In other words, a particular challenge in Sharon may include the presence of residents who need additional assistance during a disaster event due to disabilities.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Sharon.

The amount of stratified glacial meltwater deposits present in a community is important as areas of stratified materials are generally coincident with inland floodplains. These materials were deposited at lower elevations by glacial streams, and these valleys were later inherited by the larger of our present day streams and rivers. Oftentimes these deposits are associated with public water supply aquifers or with wetland areas that provide significant floodplain storage. However, the smaller glacial till watercourses throughout Sharon can also cause flooding. The amount of stratified drift also has bearing on the relative intensity of earthquakes.

Sharon is underlain by relatively hard metamorphic and igneous bedrock including a variety of gneiss and schist. The bedrock formations in Sharon generally trend northeast-southwest.

Sharon is covered primarily by glacial till. Tills contain an unsorted mixture of clay, silt, sand, gravel, and boulders deposited by glaciers as a ground moraine. The deposits are generally less than 50 feet thick although deeper deposits of till are scattered across the hillier sections of the town.

2.5 Climate and Climate Change

Over the course of the year, the temperature in Sharon typically varies from 17°F to 81°F and is rarely below 1°F or above 88°F. The warm season lasts from May 28 to September 15, with an average daily high temperature above 71°F. The cold season lasts from December 1 to March 10, with an average daily high temperature below 42°F.

Precipitation falls throughout the year in Sharon. The wetter season lasts from April 9 to August 21, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on May 29. The drier season lasts from August 21 to April 9. The smallest chance of a wet day is 22% on January 29.

The most rain falls during the 31 days centered around September 30, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts for 5.9 months, from October 23 to April 20, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.4 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Sharon as 4.65 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Sharon at 5.11 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.7	5.9	8.3
NOAA Atlas 14	5.1	6.4	8.3

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Sharon can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.0 to 5.5 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

Sharon is divided among the following nine subregional drainage basins: Housatonic River, Salmon Creek, Carse Brook, Guinea Brook, Bog Hollow Brook, Macedonia Brook, Indian Lake Creek, Mill Brook and Webatuck Creek.

The majority of the drainage basins have FEMA-defined Special Flood Hazard Areas (SFHAs) along the primary watercourses. Such areas consist of 1% annual chance storm floodplains without elevations, 1% annual chance storm floodplains with elevations, and 0.2% annual chance floodplains. Refer to Section 3 for more detail regarding SFHAs.

Housatonic River

The Housatonic River drains an area of 1,948 square miles from Pittsfield, Massachusetts to Milford, Connecticut where it empties into Long Island Sound. The river flows a total of 134 miles from its upper reach to the sound with 1,234 square mile of the total drainage area existing in Connecticut. Sections of the Housatonic sub regional drainage basin extend inward along the east edge of the Sharon line draining several small tributaries and intermittent streams directly into the Housatonic River. The route of the Housatonic River makes up the town boundary line between Sharon and Cornwall. Along the Sharon-Cornwall line, one hundred year floodplains run the entire stretch from the channel edge extending further outwards in some locations than others. The headwaters of Pine Swamp Brook are the only other one hundred year floodplains in this section of sub basin designated by FEMA.

Salmon Creek

The Salmon Creek sub basin is approximately 11.8 square miles in size with the majority of the basin area extending north into Salisbury and the lower third in Sharon. White Hollow Brook makes up the section of drainage area located in Sharon running north east before converging with Salmon Creek which then continues its course and drains into the Housatonic River. White Hollow Brook contains some vast sections of 100-year floodplain as well as much of Salmon Creek from the headwaters all the way to the mouths. Along sections of Salmon Creek are also small areas of 500-year floodplain that extend beyond the margin of the 100-year floodplains.

Carse Brook

In the north east section of Sharon is Carse Brook which runs south east intersecting with the Housatonic River. This small 5.4 square mile sub basin is responsible for draining several tributaries as well as Hamlin and Miles Ponds, both with dams rated as a low hazard classification. The upper three quarters of Carse Brook is bordered by 100-year floodplain where the floodplains near the headwaters are more extensive than the lower stretches of river.
Town officials have indicated that Carse Brook has a significant potential to cause flood hazards due to the significant number of beaver dams located along the brook.

Guinea Brook

Guinea Brook is a third order stream that drains tributaries in the central to south east area of Sharon. The drainage is a nine square mile area with the main channel of Guinea Brook running east before joining the Housatonic River. The brook follows along Route 4 for the second half of its extent, before entering the Housatonic south of the Cornwall Bridge. One hundred year floodplains exist primarily in the headwaters and tributaries of the brook and only a small section on the lower half of the main stem.

Bog Hollow Brook

Bog Hollow Brook starts along the edge of the Connecticut-New York border and runs south on the New York side passing through two unnamed ponds and eventually directs southeast across into Kent. A small portion of the brook runs through Sharon along Route 341 and passes underneath before converging with Macedonia Brook.

Macedonia Brook

The headwaters of Macedonia Brook make up the section of sub regional drainage basin located Sharon. Only about one third of the basin is in the Town of Sharon with the rest extending south into Kent, draining several tributaries into the main stem of Macedonia Brook. Peck and Hilltop Ponds are the standing bodies of water that drain into this basin. Just over the border in Kent, the brook proceeds through Macedonia Brook State Park where some small tributaries converge. Further downstream, Pond Mountain Brook enters in flowing from the north out of Fuller Pond proceeded by the Bog Hollow Brook convergence. After a few more minor tributaries, Macedonia pours into the Housatonic River.

Indian Lake Creek

Originating at Indian Lake split by the Connecticut-New York boundary, Indian Lake Creek flows south through Sharon and eventually crosses back over the New York border. In Sharon the creek is joined by Mudge Pond Brook and further north drains from Wononpanook Lake and its surrounding tributaries in Salisbury. Indian Lake Creek is responsible for the drainage of all the smaller tributaries and small ponds in the northwest section of Sharon. Most of the stream channels in this basin are surrounded by 100-year floodplains with some extending much further out from the channel than others. A large area of floodplain exists within the convergence of

Indian Lake Creek, Mudge Pond Brook and Beardsley Pond Brook as well as above Mudge Pond. Sharon's two public water supply reservoirs, Beardsley and Calkinstown are located in this drainage basin.

Mill Brook

Mill Brook is located on the western side of Sharon flowing southwest across the New York border. The basin covers around 12 square miles of area within Sharon and is responsible for draining several tributaries and small ponds including Bog Meadows, Ford, Hatch, Loch Neis, and Eastman Ponds. Mill Brook begins to the north east of Hatch Pond with input from small intermittent streams then drains into Hatch and exits continuing southwest to the border encountering many other inflows. There are several dams within the basin including a high hazard dam below Hatch Pond. Ford Pond is also located within this basin and is classified as a moderate hazard dam.

Webatuck Creek

The sub regional drainage basin of Webatuck Creek resides primarily in New York but skirts in and out along the western border of Salisbury and Sharon. The main creek channel flows through a small section of both towns but the majority of the drainage area collects water from the furthest extents of a few small tributary streams that flow west into New York.

2.7 Governmental Structure and Capabilities

The Town of Sharon is governed by a Board of Finance form of government in which legislative responsibilities are shared by the Board of Selectmen and the Town Meeting. The First Selectman serves as the chief executive.

In addition to Board of Selectmen and the Town Meeting, there are boards, commissions and committees providing input and direction to Town administrators. Also, Town departments provide municipal services and day-to-day administration. Many of these commissions and departments play a role in hazard mitigation, including the Planning and Zoning, Inland Wetland Commission, the Building Official, the Emergency Management Director, the Fire Department, and the Highway Department.

Drainage complaints are routed through the First Selectman's Office and/or the Highway Department. These complaints are usually received via phone, fax, mail, or email and are recorded in a logbook. The complaints are investigated as necessary until remediation surrounding the individual complaint is concluded.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Sharon are concentrated within the Sharon Historic District (including the Calkinstown extension and Oblong Valley extension). Resources near flood sources may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources.
- Implement appropriate mitigation measures for those resources.
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible.
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts.

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

State and federal roads are the major transportation arteries (and therefore evacuation routes) into and out of the town. The main road into Sharon is Route 7, which connects to Interstate 84. Major transportation arteries are integral in transporting patients from Sharon and surrounding communities to the hospital during emergency situations.

The primary transportation routes into and out of the town are Route 7, Routes 41, Route 343, and Route 361. Route 7 runs north-south on the eastern edge of Town along the Housatonic River. Route 41 and Route 361 also runs north-south, while Route 343 and Route 4 run east-west. Other key roads include Mudge Pond Road, and other Town roads reaching some more remote parts of the community. There is no local public transit system in Sharon.

Road closures are the greatest concern for emergency management. Many local roads are unpaved and provide poor access, particularly in the northern and southern portions of the community. In addition, many local roads are narrow and long without significant cross streets.

Road closures due to flooding or fallen trees can result in 15-20 minute detour times for emergency personnel, a potentially fatal delay during emergency situations.

Utilities

Public water in Sharon is provided by the Sharon Water & Sewer Commission, as well as a handful of small Community Water Systems and Non-Community Public Water Systems. Many residents and businesses rely on private well water. The Sharon Water & Sewer Commission also operates the public sewage system in Town, though many residents rely on septic.

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Sharon.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Sharon has identified several critical facilities throughout the town. Table 2-3 identifies those critical facilities in Sharon. Many critical facilities such as fire and governmental buildings as well as utilities are required to ensure that day-to-day management of the town continues. Other facilities such as nursing homes, schools, and emergency supply storage areas are also considered critical facilities since these contain populations that are more susceptible in an emergency or house important supplies. Not all municipal buildings are critical facilities.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Sharon Fire House	24 West Main St	Primary Shelter / EOC	✓	✓	
American Legion Hall	15 New Street	Back-up shelter	✓	✓	
Sharon Hospital	50 Hospital Hill Rd	Emergency Services	✓		
Sharon Health Care Center	27 Hospital Hill Rd	Emergency Services	✓		
Town Hall	63 Main Street	Municipal Facility			
Sharon Center School	80 Hilltop Road	School			
Highway Garage	29 Sharon Station Rd	Municipal Facility	✓		✓
Water Treatment Facility	147 Calkinstown Rd	Municipal Facility	✓*		
Trinity Glen	149 West Cornwall Rd	Substance abuse treatment facility	✓		✓
Silver Lake Conference Center	223 Low Road	Church based camp – year-round operation	✓		
Wastewater Treatment Plant	96 King Hill Road	Municipal Facility	✓*		✓

* The WWTP and Water Treatment Facility have a single mobile generator shared between both facilities; they do not have permanent generators installed. During Tropical Storm Isaias in 2020 a second portable generator was borrowed to power the facilities. Both portable generators failed before power was restored.

Town staff report that a new permanent emergency generator has been installed at Trinity Glen. Trinity Glen is a year-round residential facility.

The Wastewater Treatment Facility has been floodproofed, and an Elevation Certificate completed to identify its elevation relative to base flood elevations.

Sheltering Capabilities

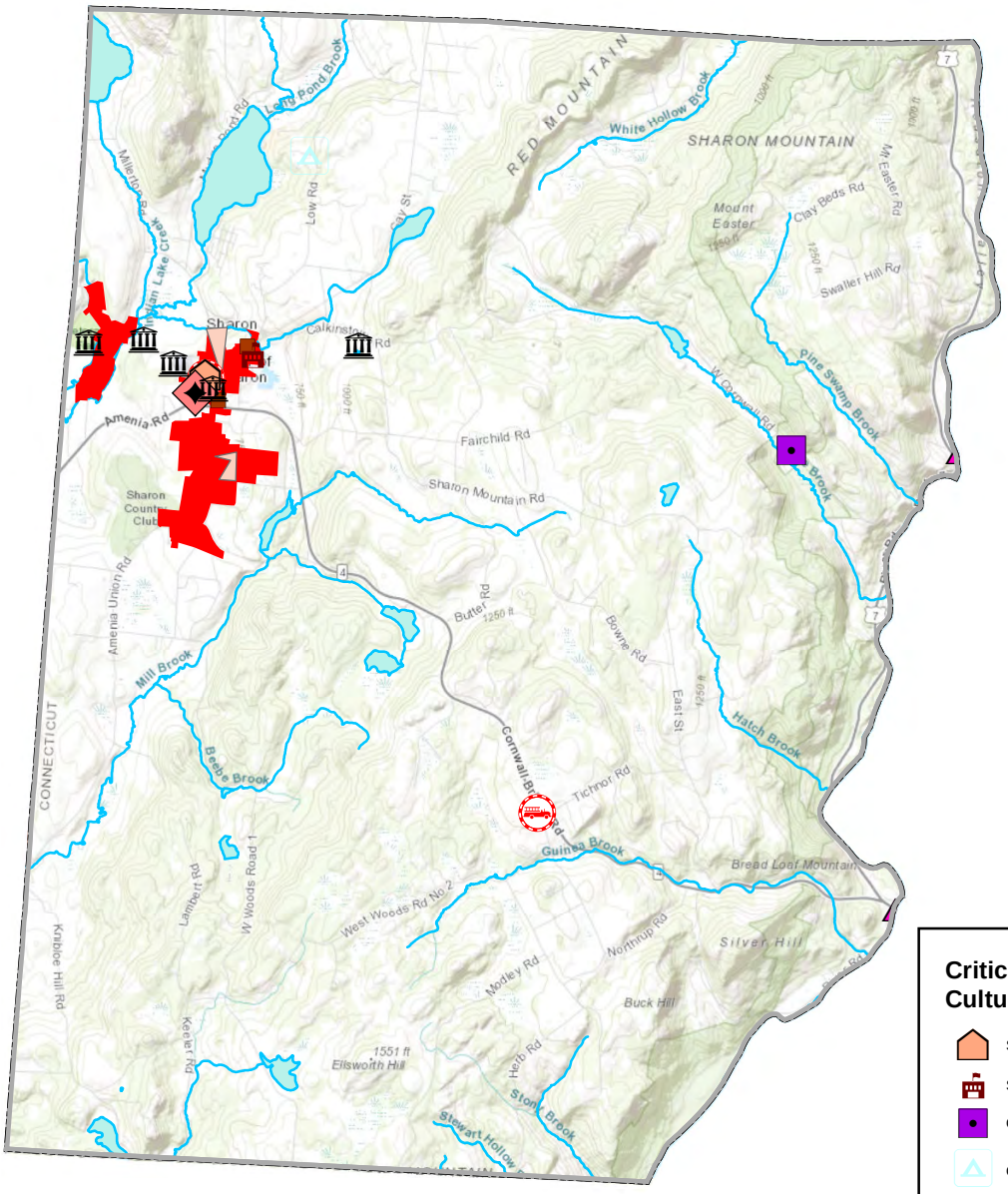
The Sharon Fire House is the primary shelter and has a backup generator. The building can shelter up to 130 people, if needed. The American Legion Hall is the back-up shelter and also has an emergency generator. Prior to Winter Strom Alfred, the shelters had not been open for many years. The Fire House was open for four days and nights and was used as a charging/warming station. The shelters also receive overflow from Sharon Hospital and are therefore regionally important.

In case of a sustained power outage, it is anticipated that 10 to 20% of the population (280 to 380 people) would relocate, although not all of those relocating would necessarily utilize the shelter facilities.

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Critical Facilities & Cultural Resources

- Shelter
- School
- Care Facility
- Church-based camp
- EMS
- Emergency Response
- Fire Station
- Municipal Facility
- National Register Building
- National Register Structure
- National Register Area
- National Register District

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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - SHARON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 2-2

Sharon is part of the Region One School District and has one local school (Sharon Center School). The regional High School (Housatonic Valley Regional High School) is located in Canaan. The high school needs a generator and once acquired it may serve as a regional shelter.

Emergency Response Capabilities

The Sharon Emergency Management Director coordinates emergency preparedness in the Town of Sharon. The Director develops plans, protocols, and procedures that assure the safety of Sharon's citizens. It also provides training for emergency response personnel, supports state and local emergency response exercises, and provides technical assistance to state and local emergency response agencies and public officials. Its goal is to provide citizens with the highest level of emergency preparedness before, during, and after disasters or emergencies.

The Town's Emergency Operations Center (EOC), including its Emergency Communications Center, is located at the Sharon Fire House. The EOC has a generator that can power the entire building.

Sharon Hospital is one of the only hospitals in the region, serving the surrounding towns in NHCOG and part of Dutchess County, New York.

The Town is interested in obtaining a grant to acquire generators capable of providing power to the supermarket and gas station. When power was out at these facilities during Winter Storm Alfred, which is discussed further in Chapter 6, the town utilized some of the food to feed those at the Fire House and others who needed meals that had no electricity. Acquisition of several portable generators would greatly assist the town in providing emergency power when needed.

The Town has an EOP that guides its response to emergencies arising from both natural and anthropogenic hazards. The EOP is reviewed and updated annually. The Town utilizes the statewide CT Alert emergency notification system powered by Everbridge to direct geographically specific emergency notification telephone calls into affected areas.

The Town would also like to utilize a grant to acquire a local emergency notification system similar to the State CodeRED system. The initial cost would be covered by the grant and ongoing maintenance of the system could likely be paid through the Town's operating budget.

Emergency services can also be cut off by fallen trees or washed out culverts during certain emergencies. The Highway Department or the Fire Department will cut up trees that have fallen across roads, but will not interact with fallen trees near power lines. This work is done by Eversource. All other tree work is contracted out.

Local Emergency Planning Committee

Since adoption of the previous HMP, Sharon has formed a Local Emergency Planning Committee (LEPC). The LEPC consists of:

- Civil Preparedness Coordinator
- Chief and EMS Captain of Sharon Fire Department

- Building Official / Fire Marshal
- First Selectman
- Highway Foreman

The Town is also working with Sharon Hospital to add a Sharon Hospital Facilities Management representative to the LEPC.

Weather-Ready Nation Ambassador

The Town of Sharon has been formally designated as a NOAA Weather-Ready Nation Ambassador. As a WRN Ambassador, the Town has committed to:

- Promoting Weather-Ready Nation messages and themes to their stakeholders
- Engaging with NOAA personnel on potential collaboration opportunities
- Sharing their success stories of preparedness and resiliency
- Serving as an example by educating employees on workplace preparedness

Communications

Sharon has good communication capability with all of its neighbors as well as levels of communication redundancy. Radios, cellular phone, electronic mail, and social media are all used to transmit information between personnel. Sharon is a member of DEMHS Region 5 and also party to the Dutchess County, New York Mutual Aid Plan.

The Town's emergency alert capabilities have improved over recent years.

The Town is currently able to send emergency notifications using Constant Contact, the Town website, and Facebook. A link to sign-up for Constant Contact is posted on the Town Website. The Town also participates is the statewide CT Alert system. The Town generally posts information about civil preparedness and sheltering on the Town website.

The Town is also able to utilize the Reverse-911 run through Litchfield County Dispatch in Torrington, which is able to target alerts to specific areas.

3 FLOODING

3.1 Existing Capabilities

The Town discourages new construction and substantial reconstruction within the 1% annual chance floodplain by raising concerns during the floodplain permit process. However, given the historic development patterns of the town, many areas within floodplains were developed before floodplain management was even a consideration. New development is strictly managed through the Town's land use process.

Sharon staff report that new buildings, including accessory structures, must be built outside of any mapped floodplain, or else elevated above the Base Flood Elevation, in order to be permitted. The State Building Code further requires that new or improved structures in floodplains be built with a freeboard buffer above the base flood elevation.

Ordinances, Regulations and Plans

Regulations, codes, and ordinances that apply to flood hazard mitigation in conjunction with and in addition to NFIP regulations include:

- ***Floodplain Ordinance***: The 1996 Floodplain Ordinance is essentially the town's local version of the NFIP regulations. The Ordinance addresses floodplain management, including establishing areas of special flood hazard, restrictions, development permit requirements, permitted uses, and standards for flood hazard reduction.

  New residential and commercial buildings are required to be elevated to or above the base flood elevation.

- ***Zoning Regulations:*** Flood Hazard Overlay Districts are addressed in Section 14 of the 2012 Zoning Regulations. Based upon flood elevation criteria building and structures shall be subject to the following requirements:

  - Residential and non-residential buildings shall have the lowest floor (including basement) elevated at or above the base flood level.

- ***Inland Wetlands and Watercourse Regulations***. The purpose of the 1990 inland wetlands and watercourses regulations is to protect the quality of the inland wetlands and watercourses within the Town of Sharon by making provisions for the protection, preservation, maintenance, and use of inland wetlands and watercourses, including deterring and inhibiting the danger of flood and pollution.

  - Section 2.1 defines "Regulated Activity" means any operation or use of a wetland or watercourse involving removal or deposition of material, or any obstruction, construction, alteration or pollution, of such wetlands or watercourse, and any earth moving, filling, pollution, construction, or clear-cutting of trees within two hundred feet or the ordinary

high water mark of any watercourses and within fifty feet of the margin of any wetlands, but shall not include the specified activities in Section 4 of these regulations.
- Section 4.1.b states that no residential homes will be permitted "as of right" in wetlands and watercourses after July 1, 1987.
- Section 6.1 states that no person may conduct or maintain a regulated activity without obtaining a permit. Section 7 outlines the permit application requirements.

- ***Subdivision Regulations.*** Adopted in 1970 and most recently updated in 2011, the Town's Subdivision Regulations establish reasonable standards of design and procedures for subdivisions; regulate the layout and development of lots and streets; and outline measures to prevent degradation of potable water sources, control erosion and siltation, preserve adequate and convenient open spaces, and retain the natural features of the land.

  - Section 4.03 states that "subdivisions shall be designed and arranged and provision shall be made to preserve natural features, make the best use of natural terrain, prevent the pollution of wetlands, watercourses and waterbodies, protect the quality and quantity of water supplies and minimize flood damage."
  - Section 4.06 states that "the Commission may determine that any parcel of land, regardless of size, shall be unsuitable for building if it is found to be unsuitable for occupancy and building by reason of unsuitable soil, topography, water, flooding or other conditions."
  - Section 4.07 states that "with the exception of subdivision of four lots or less, every subdivision shall provide for the reservation of open space."
  - Section 13 requires the "developer to furnish projections of the increase in stormwater runoff created by the entire proposed subdivision development to show that no impact on abutting or downstream properties will occur."
  - Section 13 requires "peak discharges from the 2-year, 10-year, 25-year, 50 year and 100-year frequency, 24 hour duration, type III distribution storms shall be analyzed. No increases in peak flow from these storms shall be allowed."

The intent of these regulations is to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas of the Town of Sharon by the establishment of standards designed to:

- Protect human life and public health
- Minimize expenditure of money for costly flood control projects
- Minimize the need for rescue and relief efforts associated with flooding
- Minimize prolonged business interruptions
- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone, and sewer lines; and streets and bridges located in floodplains
- Maintain a stable tax base by providing for the sound use and development of floodprone areas in such a manner as to minimize flood blight areas
- Ensure that purchasers of property are notified of special flood hazards
- Ensure the continued eligibility of owners of property in Sharon for participation in the NFIP.

The Town's current building inspector is also its floodplain manager. The building inspector is therefore very knowledgeable about floodplain management and flood mitigation requirements and strategies, and is strict about requiring properties in flood zones to follow the State Building Code with regards to flood mitigation, and to secure elevation certificates.

The Housatonic River Commission

The Housatonic River Commission (HRC) is a watchdog group dedicated to the protection of the Housatonic River. According to the Commission website, the HRC "is a regional planning board responsible for monitoring and advising the towns in Northwest Connecticut on issues that involve the Housatonic River. The Commission was formed in response to the US National Park Service recognizing this section of the Housatonic as one with outstanding scenic, recreational and ecological value in the 1970's. Formed by the towns in response to this recognition, the HRC's first meeting was July of 1979 with representatives from, Canaan, Cornwall, Kent, New Milford, North Canaan, Salisbury and Sharon." The HRC is non-regulatory in nature and provides guidance and recommendations to various Planning and Zoning Boards and Conservation Commissions with respect to the Housatonic River watershed. This group discourages home expansions in the vicinity of the River.

NFIP, Flood Insurance, and Community Rating System

Mr. Stanley MacMillan, the Town Building Inspector is currently the NFIP administrator for the Town and oversees the enforcement of NFIP regulations. The degree of flood protection established by the variety of regulations in the Town meets the minimum reasonable for regulatory purposes under the NFIP.

The Town is not enrolled in the Community Rating System program and since homes in Sharon do not usually flood, it may not be cost effective for the Town to participate.

According to FEMA, there are no flood insurance policies in force in Sharon as of 6/30/2019.

Drainage and Street Flooding

There are areas of minor street flooding throughout the town, and these are addressed by the Highway Department as necessary. These typically relate to small areas and result in limited, if any, property impacts.

The Highway Department is in charge of the maintenance of the town's drainage systems and performs clearing of bridges and culverts and other maintenance as needed. Drainage complaints are routed to the Office of the First Selectman and/or the Highway Garage. The Town uses these reports to identify potential problems and plan for maintenance and upgrades.

Structural Projects

The town has completed structural projects for flood mitigation mainly as needed. A new culvert was recently installed on West Woods Road #1.

In addition, town officials have indicated that the State has identified two scour critical bridges in Sharon Valley. The first bridge identified as 05388 is located on King Hill Road and crosses Indian Pond Creek. The second bridge identified as 05324 is located on Sharon Valley Road and crosses an unnamed creek. The town is actively seeking funding sources to conduct remediation activities on these bridges. Specifically, the town is working with the Housatonic Valley Association and Trout Unlimited to obtain a joint grant that would assist with necessary repairs.

Communications

The Town can access the National Weather Service website at http://www.weather.gov/ to obtain the latest flood watches and warnings before and during precipitation events.

The National Weather Service issues a flood watch or a flash flood watch for an area when conditions in or near the area are favorable for a flood or flash flood, respectively. A flash flood watch or flood watch does not necessarily mean that flooding will occur. The National Weather Service issues a flood warning or a flash flood warning for an area when parts of the area are either currently flooding, highly likely to flood, or when flooding is imminent.

The Town receives regular weather updates through Division of Emergency Management and Homeland Security (DEMHS) Region 5 email alerts as well as watches and warnings through the National Weather Service.

New Capabilities and Completed Actions

Sharon continues to maintain its strong flood mitigation capabilities.

The Town reports that residents have been planting native plants, constructing rain gardens and infiltration systems, and using other infiltration techniques, in order to protect the water quality of the river. These actions have reduced excess runoff into swales and ditches, which have in the past caused flooding problems. In general, maintenance of swales and ditches has not been a challenge for the Town in recent years.

Additionally, collaboration between the Town and the State on maintenance of roads, culverts, and drainage infrastructure has improved.

The Wastewater Treatment Facility has been floodproofed, and an Elevation Certificate completed to identify its elevation relative to base flood elevations.

The Town has identified that the cause of drainage issues at Sharon Hospital had been improperly maintained drainage swales along the Town Road. The Town has taken back from the Hospital responsibility for maintenance of the swales. Additionally, the Hospital has reconstructed a parking area with improved drainage, and has put in place a comprehensive storm management plan.

A new, increased-capacity culvert has been installed on West Woods Road #1, just south of Hoopersfield Road.

The Town has determined that overtopping of the bridge on Clakinston Road, reported as a flood problem in the past, was occurring due to improper maintenance at adjacent properties. The Inland Wetlands & Watercourses Commission instituted a five-year maintenance plan for these properties. Road overtopping has not been an issue since this plan was implemented.

Summary

Sharon mitigates flood damages primarily through regulating development in floodprone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate.

3.2 Vulnerabilities and Risk Assessment

Flooding can impact a variety of river corridors and cause severe damages in the Town of Sharon. Flooding due to poor drainage and other factors is also a persistent hazard in the town and can cause minor infrastructure damage and create nuisance flooding of yards and basements.

Town staff report that they have not had a major rain or flood event in many years. The Town has experienced more minor events; in particular, short, strong bursts of precipitation cause flash-flooding in areas that have not been flooded in the past, away from rivers and streams.

Vulnerability Analysis of Critical Facilities

The list of critical facilities provided by the Town was used with the parcel data to accurately locate each critical facility throughout the town. Three critical facilities were found to lie within the 1% annual chance floodplains of a variety of watercourses in the town. Table 3-1 lists these critical facilities.

Table 3-1: Critical Facilities Located Within the 1% Annual Chance Floodplain

Name or Type	Address	Flooding Source
Highway Garage	29 Sharon Station Road	Webatuck Creek, Indian Lake Creek
Trinity Glen	149 West Cornwall Road	Carse Brook
Wastewater treatment Facility	96 King Hill Road	Mudge Pond Brook, Indian Lake Creek

While these buildings are not known to have experienced serious flooding damage in recent years, the proximity to various watercourses makes them vulnerable to flooding.

Trinity Glen is located along Carse Brook and the town has indicated that significant flooding has occurred along this watercourse as a result of beaver dams. The implementation of the beaver protection measures referenced in Section 3.7 may lower the potential flood risk at this location.

Town staff report that a surveyor has completed an elevation certificate for the Highway Garage and Trinity Glen, determining that the first floors of each structure are elevated above the FEMA base flood elevation.

Vulnerability Analysis of Areas Along Watercourses

The Housatonic River poses the greatest flood risks to people, buildings and infrastructure, but most often occurs in the vicinity of the Carse Brook. The majority of the brooks in the town pose a risk from flooding.

Overbank flooding is common along the Housatonic River, although homes have only been affected once in the past 10 years (maybe October 2005). Homes on Kirk Road, River Road, and Old Route 7 are potentially vulnerable, although yard flooding is most common.

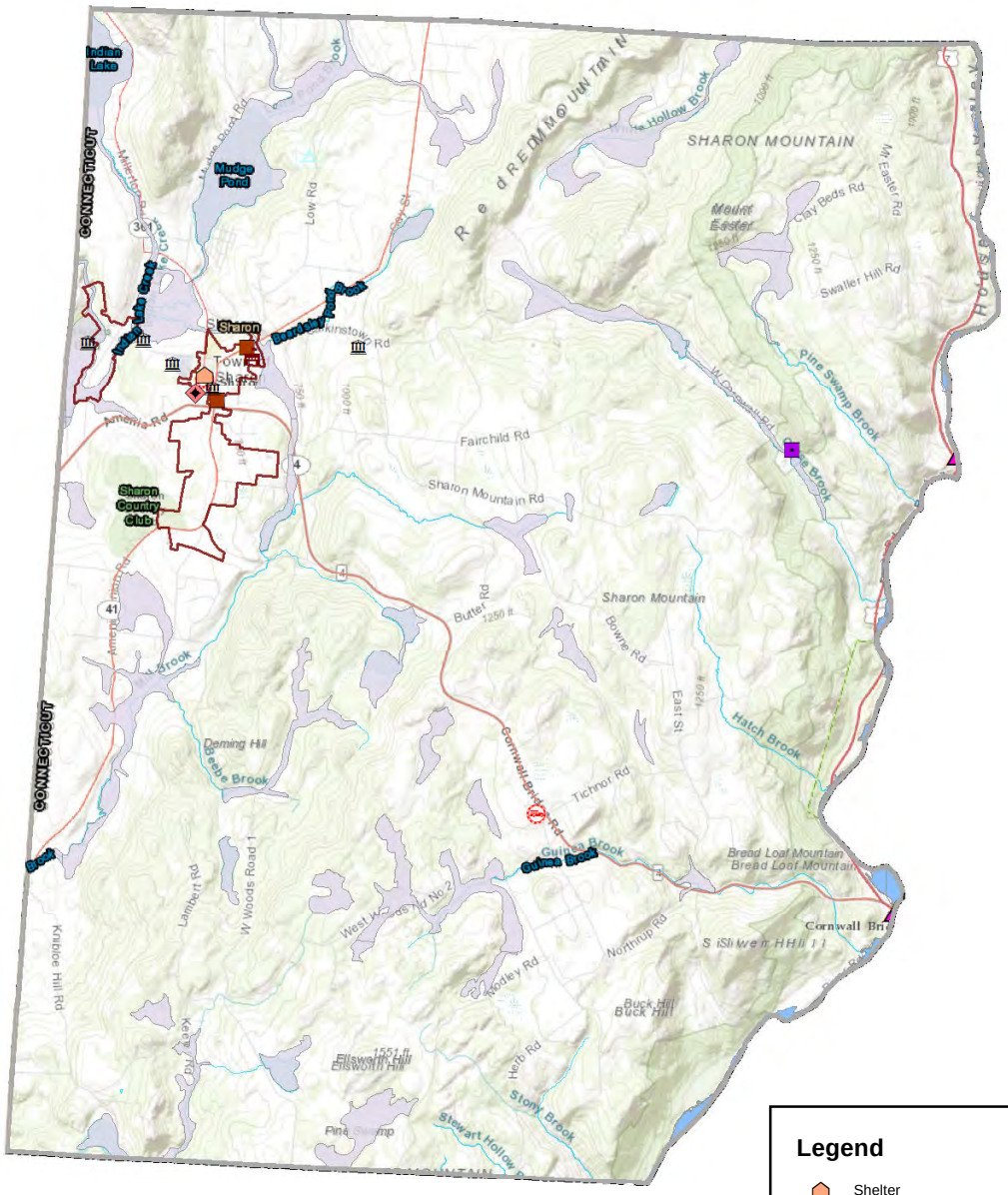
Other problem areas along watercourses include the following:

- ❑ The culvert beneath Kings Hill Road along Guinea Brook needs a headwall installed.
- ❑ A bridge on Calkinstown Road overtops during storms. The July 2013 flash flood piled sediment against the bridge. The Town has mitigated this issue through an upstream stormwater maintenance plan.
- ❑ Overbank flooding is common along the Housatonic River, although homes have only been affected once in the past 10 years (October 2005). Homes on Kirk Road, River Road, and Old Route 7 are potentially vulnerable, although yard flooding is most common.

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Legend

- Shelter
- School
- Care Facility
- Church-based camp
- EMS
- Emergency Response
- Fire Station
- Municipal Facility
- National Register Building
- National Register Structure
- National Register District

Flood Zone

- A
- AE
- FLOODWAY
- X500

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FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - SHARON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 3-1

Vulnerability of Other Areas

In general, flooding problems are widespread throughout Sharon. Known chronic problem areas include:

- ❑ West Cornwall Road.
- ❑ Several undersized culverts are located along State roads.
- ❑ The main business area near Low Road, Murtagh Road and Route 41 (North Main Street). The drainage infrastructure in this area is one long culvert that extends under Murtagh Road, the shopping center, and Route 41. A relatively large swamp upstream of the culvert is reported to serve as flood storage, limiting flooding impacts at the culvert itself. Town staff report that flooding occurred in this area in a recent summer storm when a short, severe precipitation event dropped approximately 5 inches of rain in 45 minutes.
- ❑ West Wood Road #1 and #2. In particular, West Woods Road #1 reportedly needs a new culvert near Sweeney's just south of Hoopersfield Road.
- ❑ Runoff from agricultural fields in the north end of town has been a moderate problem in recent years. The Town has determined that the runoff impacting this area is coming from Salisbury upstream, and is not within Sharon's jurisdiction.
- ❑ Town officials also indicated that development in the community has resulted in the use of swales and drainage systems instead of allowing the flow to run off into the woods. As such, higher peak flows are occurring and flooding is reportedly worse that it has been in 60 years.
- ❑ Sharon Hospital has experienced flooding due to poor drainage. Heavy thunderstorms have overwhelmed the roof drains allowing water to backup and seep into the facility.

In the past, the Town has experienced challenges with excess runoff into swales and ditches, and with maintenance of those ditches. Runoff has been reduced due to improved private landscaping practices, and maintenance is no longer an issue.

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing capabilities appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Sharon is 105 mph for a Category 1 event, 115 mph for a Category 2, and 120 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Parts of tall and older trees may fall during heavy wind events, potentially damaging structures, utility lines, and vehicles. The Town tree warden assists in managing all trees on Town-owned property, including within the street rights-of-way. Sharon has significantly increased its budget for tree maintenance over the last ten years; however, according to town officials the tree maintenance budget is also included in the overall Highway Department budget and therefore may be used for other items as necessary. The Highway Department or the Fire Department will cut up trees that have fallen across roads, but will not interact with fallen trees near wires (Eversource does that work). All other tree work is contracted out.

In the Town of Sharon power was lost during Tropical Storm Irene and Winter Storm Alfred for about eight days each event. Some homes with supply lines down on private property were out longer. Tree damage and damage to power lines were the biggest impact during Irene, Alfred, and Sandy.

Sharon has determined that shutting off downed live wires and clearing roads for emergency purposes is more important than restoring power. Significant isolation is possible when trees fall across roads in a wide area.

Eversource, the local electric utility, provides tree maintenance near its power lines. The town feels that Eversource needs to do a significant amount of trimming in Sharon. One issue is that locals like the forested feel of the community and do not want trees cut back from roads.

The town Subdivision Regulations require new electric, telephone, cable and other utility wires to be installed underground. Above ground wires may be installed where: the lot to be served had frontage on an existing street or highway; the commission determines the utility can be provided from a pole located in an existing street or highway right of way; or the utility service connection can be completed without the need for intermediate pole(s) located outside the street right of way.

During emergencies, the Town currently has two designated emergency shelters available for residents.

During Tropical Storm Irene, the Town used the state CT Alert emergency notification system powered by Everbridge to notify all residents in the SFHA that they may evacuate and use one of the shelters. Prior to severe storm events, the Town ensures that warning/notification systems and communication equipment are working properly and prepares for the possible evacuation of impacted areas.

New Capabilities and Completed Actions

Sharon continues to maintain its strong tropical cyclone mitigation capabilities.

Summary

Sharon mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Storm Isaias

Tropical Storm Isaias in 2020 led to widespread power outages and blocked roads. The Town prepared a report for PURA summarizing Eversource's response to Isaias. Town staff report that local residents tend to be self-reliant and were able to manage through the outage. The main problem was the blocked roads, which prevented residents from accessing fuel for their generators, and hindered emergency response.

During Isaias, power to both the Wastewater Treatment Plant and the Water Treatment facility was lost due to downed power line. The single, shared portable-emergency-generator was used to power one facility, and a second portable generator was borrowed to power the other. Both portable generators failed before power was restored, creating a serious public health challenge.

Tropical Cyclone Vulnerability

The Town of Sharon is vulnerable to hurricane damage from wind and flooding. Wind damage from hurricanes and tropical storms can affect all areas of Town, while areas susceptible to flooding are even more vulnerable. Wind risks include flying debris, damage to trees and utility lines, road blockages, fires started by downed power lines, and direct impacts on structures.

In general, as residents and businesses become more dependent on the internet and mobile communications, the impact of hurricanes on commerce will continue to increase. A major hurricane has the potential of causing complete disruption of power and communications for up to several weeks, rendering electronic devices and those that rely on utility towers and lines inoperative.

Low Road is a common area for downed trees taking out power lines. Many pine trees are located in this area and fall easily when the soil is saturated (such as wintertime).

Town staff note that Ash trees make up about 25% of the tree stock in Litchfield county, and most of those have been killed by the Emerald Ash Borer.

All areas of growth and development increase the town's vulnerability to natural hazards such as hurricanes although new development is expected to mitigate potential damage by meeting the standards of the most recent building code. Most of Sharon's existing housing stock predates the current code, and therefore has an elevated susceptibility to damage from high winds.

Critical Facility Vulnerability

The Town is uncertain whether any Town-owned critical facilities have wind-mitigation measures installed to specifically reduce the effects of wind. Thus, it is believed that nearly all of the critical facilities in the town are as likely to be damaged by hurricane-force winds as any other.

Some critical facilities are more susceptible than others to flooding damage associated with hurricane rainfall. Such facilities susceptible to flooding were discussed in Section 3.

As the Town of Sharon is not affected by storm surge, hurricane sheltering needs have not been calculated by the U.S. Army Corps of Engineers for the town. The Town determines sheltering need based upon areas damaged or needing to be evacuated within the town. Under limited emergency conditions, a high percentage of evacuees will seek shelter with friends or relatives rather than go to established shelters. During extended power outages, it is believed that only 10% to 20% of the affected population of the town will relocate while most will stay in their homes until power is restored. In the case of a major (Category Three or above) hurricane, it is likely that the Town will depend on state and federal aid to assist sheltering displaced populations until normalcy is restored.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Sharon as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

Municipal responsibilities relative to summer storm and tornado mitigation and preparedness include:

- Developing and disseminating emergency public information and instructions concerning tornado, thunderstorm wind, lightning, and hail safety, especially guidance regarding in-home protection and evacuation procedures and locations of public shelters
- Designating appropriate shelter space in the community that could potentially withstand lightning and tornado impact
- Periodically testing and exercising tornado response plans
- Putting emergency personnel on standby at tornado "watch" stage
- Utilizing the CT Alert Emergency notification system to send warnings into potentially affected areas.

Although tornadoes pose a threat to all areas of the state, their occurrence is not considered frequent enough to justify the construction of tornado shelters. Instead, the state has provided NOAA weather radios to all public schools as well as many local governments for use in public buildings. The general public continues to rely on mass media for knowledge of weather warnings. Warning time for tornadoes is very short due to the nature of these types of events, so predisaster response time can be limited. However, the NOAA weather radios provide immediate notification of all types of weather warnings in addition to tornadoes, making them very popular with communities.

New Capabilities and Completed Actions

Sharon continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

Sharon mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2014 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. By virtue of its location in Litchfield County, the Town of Sharon also has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

Thunderstorms are expected to impact Sharon 20 to 30 days each year. The majority of these events do not cause any measurable damage. Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in Sharon is very high during any given thunderstorm, although no one area of Town is at higher risk. The risk of at least one hailstorm occurring in Sharon is considered moderate in any given year.

The EF1 tornado that struck Bridgeport in 2010 raised awareness locally regarding the potential catastrophic damage such storms can cause.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the Town of Sharon is believed to be low for any given year. All areas of the town are susceptible to damage from high winds although more building damage is expected in the town center while more tree damage is expected in the less densely populated areas.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires.

Town personnel note that strong thunderstorms will cause power lines to fall all over the town. Most downed power lines in Sharon are detected quickly, and any associated fires are quickly extinguished. Such fires can be extremely dangerous during the summer months during dry and drought conditions. It is important to have adequate water supply for fire protection to ensure the necessary level of safety is maintained.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

Summary – The entire Town of Sharon is at relatively equal risk for experiencing damage from summer storms and tornadoes. However, more frequent storm damages are relatively site specific and occur to private property (and therefore are paid for by private insurance). For municipal property, the Town budget is generally adequate to handle summer storm damage.

6 WINTER STORMS

6.1 Existing Capabilities

Programs that are specific to winter storms are generally those related to preparing plows and sand and salt trucks, tree trimming to protect power lines, and other associated snow removal and response preparations.

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas. As a result of the winter of 2010-2011, it is anticipated that many communities will develop and utilize programs for roof snow removal.

As it is almost guaranteed that winter storms will occur annually in Connecticut, it is important for municipalities to budget fiscal resources toward snow management. In extreme years, such as the winter of 2010-2011, this budget can be quickly eclipsed and must be supplemented from other budget sources.

CTDOT plows all State roads and Interstates. The Town primarily uses Town staff for plowing operations on the remaining miles of roadway. The Town has six International dump trucks and one Ford F-150 dump truck for plowing. Priority is given to plowing egresses to critical facilities. The town noted that the residents of Sharon are used to snowy winters and have few issues dealing with snow and ice.

Prior to a winter weather event, the Town ensures that all warning/notification and communications systems are ready and ensures that appropriate equipment and supplies, especially snow removal equipment, are in place and in good working order. In some known problem areas, prestorm treatment is applied to roadways to reduce the accumulation of snow. The town uses salt for deicing. The Town also prepares for the possible evacuation and sheltering of some populations that could be impacted by the upcoming storm (especially the elderly and special needs persons).

New Capabilities and Completed Actions

Sharon continues to maintain its strong winter storm mitigation capabilities.

Summary

Sharon mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

The structures and utilities in the Town of Sharon are vulnerable to a variety of winter storm damage. Tree limbs and some building structures may not be suited to withstand high wind and snow loads. Ice can damage or collapse power lines, render steep gradients impassable for motorists, undermine foundations, and cause "flood" damage from freezing water pipes in basements.

Drifting snow can occur after large storms. Town officials have indicated that the most vulnerable areas to snow drift are located along Ellsworth Road, Jackson Hill Road and Skiff Mountain Road. In other areas, the effects are generally mitigated through municipal plowing efforts.

Icing causes difficult driving conditions throughout the hillier sections of the town. Exposed hilltops are more at risk to high winds and snow drifts. Snowfall characteristics can vary widely between the valleys and the hilltops. While many roads in Sharon have significant slopes, roads in the vicinity of Sharon Mountain are particularly prone to icing. The Town's standard of pre-sanding has been helpful in controlling ice in these problem areas.

The elderly population in Sharon, in particular, is susceptible to the impacts created by winter storms due to resource needs (heat, electricity loss, safe access to food, etc.).

The Sharon Audubon Center on Cornwall Bridge Road marks a typical “snow line” for the community. Areas of the community below this line often experience rain during winter events, while areas above this line often receive snow. The topography change along roads leading into Sharon can be a safety concern.

The Town Hall's Slate Roof was noted by Town staff as being at risk of snow accumulation and icing. Additionally, the roof of the shopping center is flat, although the Town is not responsible for clearing that roof.

Summary – The entire Town of Sharon is at relatively equal risk for experiencing damage from winter storms although some areas (such as icing trouble spots and neighborhoods with a high concentration of flat roofs) are more susceptible. Based on the historic record, it is difficult to determine if any winter storms have resulted in costly damages to the Town as damage estimates for severe storms are generally spread over an entire county. Many damages are relatively site specific and occur to private property (and therefore are paid for by private insurance) while repairs for power outages are often widespread and difficult to quantify to any one municipality.

7 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Sharon. The Town has adopted these codes for new construction, and they are enforced by the Building Official. Due to the infrequent nature of damaging earthquakes and landslides, land use policies in the Town do not directly address these hazards. However, various documents do indirectly discuss areas susceptible to earthquake and landslide damage and regulations that help to minimize potential damage:

- ***Zoning Regulations***. Article VII of the Town's 2012 Zoning Regulations address slope and soils management through the Soil Erosion and Sediment Control Standards.

- ***Plan of Conservation and Development.*** The 2006 plan indicates that 12.7% of the total land area in Sharon consists of steep slopes (>25%) and recommends that these areas be excluded from calculations of the minimum building lot size requirement.

- ***Sharon Natural Resource Inventory.*** This 2005 document was prepared by a Natural Resource Inventory Task Force, under the direction of the Sharon Conservation Commission and is incorporated into the town POCD. The report recommends that slopes of greater than 25% should be excluded from calculations of building lot size.

- ***Subdivision Regulations***. Section 3.03 of the 2011 regulations state that it is the intent of the regulations to strictly control development of slopes over 25% in order to protect public health and safety. Section 4.15 requires that soil erosion and sediment control plans be developed for proposed projects.

Landslides, slumps, and retaining wall failures that occur on private properties are considered to be the responsibility of the property owners. When such failures occur on municipal property or affect town utilities, the Highway Department is in charge of repairs.

New Capabilities and Completed Actions

Sharon continues to maintain its earthquake and landslide mitigation capabilities.

Summary

Sharon mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Earthquake Vulnerabilities

Surficial earth materials behave differently in response to seismic activity. Unconsolidated materials such as sand and artificial fill can amplify the shaking associated with an earthquake. In addition, artificial fill material has the potential for liquefaction. When liquefaction occurs, the strength of the soil decreases, and the ability of soil to support building foundations and bridges is reduced. Increased shaking and liquefaction can cause greater damage to buildings and structures and a greater loss of life.

Some areas in the Town of Sharon are underlain by sand and gravel. Structures in these areas are at increased risk from earthquakes due to amplification of seismic energy and/or collapse. The best mitigation for future development in areas of sandy material may be application of the most stringent building codes or possibly the prohibition of new construction. However, many of these areas occur in floodplains associated with the various streams and rivers in Sharon, so they are already regulated. The areas that are not at increased risk during an earthquake due to unstable soils are the areas underlain by glacial till, which includes most of the town.

Areas of steep slopes can collapse during an earthquake, creating landslides. Seismic activity can also break utility lines such as water mains, electric and telephone lines, and stormwater management systems. Damage to utility lines can lead to fires, especially in electric and gas mains. Dam failure can also pose a significant threat to developed areas during an earthquake. For this Plan, dam failure has been addressed separately in Section 9.

According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut is at a low to moderate risk for experiencing an earthquake of a magnitude greater than 3.5 and at a moderate risk of experiencing an earthquake of a magnitude less than 3.0 in the future. No earthquake with a magnitude greater than 3.5 has occurred in Connecticut within the last 30 years, and the USGS currently ranks Connecticut 43rd out of the 50 states for overall earthquake activity.

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Sharon. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Sharon

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

Based on the historic record and the probability maps generated from the USGS database, the state of Connecticut possesses areas of seismic activity. It is likely that Connecticut will continue to experience minor earthquakes (magnitude less than 3.0) in the future. While the risk of an earthquake affecting Sharon is relatively low over the short term, long-term probabilities suggest that a damaging earthquake (magnitude greater than 5.0) could occur within the vicinity of Sharon.

Landslide Vulnerabilities

Landslides can also be triggered by extreme rainfall events, as well as human activities or other events that undermine steep slopes. Although direct landslide damage generally impacts only a small area on and at the base of the slope that has failed, utilities damaged by a landslide can have more of a widespread impact.
Despite steep slopes existing throughout Sharon, the topography is generally stable. However, minor landslides have occurred throughout the town and tend to occur as a result of extreme rainfall or as a result of human activities. According to town officials, approximately two years ago a major landslide occurred along West Cornwall Road, above Downey Road and more recently a mudslide, caused by water from a beaver dam, flowed over Route 7.

Town officials have indicated that particular areas of concern in the town are as follows:

- ❑ Along Route 4 between Butter Road and Joray Road
- ❑ Along Route 4 between West Woods #2 and East Street
- ❑ Along Sharon Valley Road between CT 361 and King Hill Road

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB. The Town's Planning and Zoning Commission is responsible for reviewing all development activities that occur within flood hazard or flood-prone areas.

The high hazard Great Falls Dam in Canaan, upstream of Sharon, is inspected biennially by a licensed professional engineer and weekly by First Light Power Resources.

The Town uses the CT Alert powered by Everbridge system for emergency notification. The dam failure inundation mapping discussed in the next section can be used to help streamline the geographic contact areas if the failure of a major dam is imminent.

The town addresses beaver dam concerns by manually clearing beaver dams in areas where access is permitted. Priority is given to those dams that have the potential to cause the most damage. The town is currently considering the use of PVC piping and underwater drains to reduce flooding. Sharon is currently performing maintenance activities along Surdan Mountain Road to mitigate the flooding impacts of beaver dams.

Actions Completed and New Capabilities

Sharon continues to maintain its capabilities for mitigating and responding to dam failure risks. The Town has identified installation of "Beaver Levelers" as the best management practice that

they will use to address beaver problems. The Town currently uses Beaver Levelers on many town roads and rights-of-way. This technique is reportedly very effective and low-maintenance.

Summary

Sharon mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 17 DEEP-inventoried dams within the Town of Sharon. These dams are listed in Table 8-1 and shown in Figure 8-1.

Table 8-1: DEEP-Inventoried Dams in Sharon

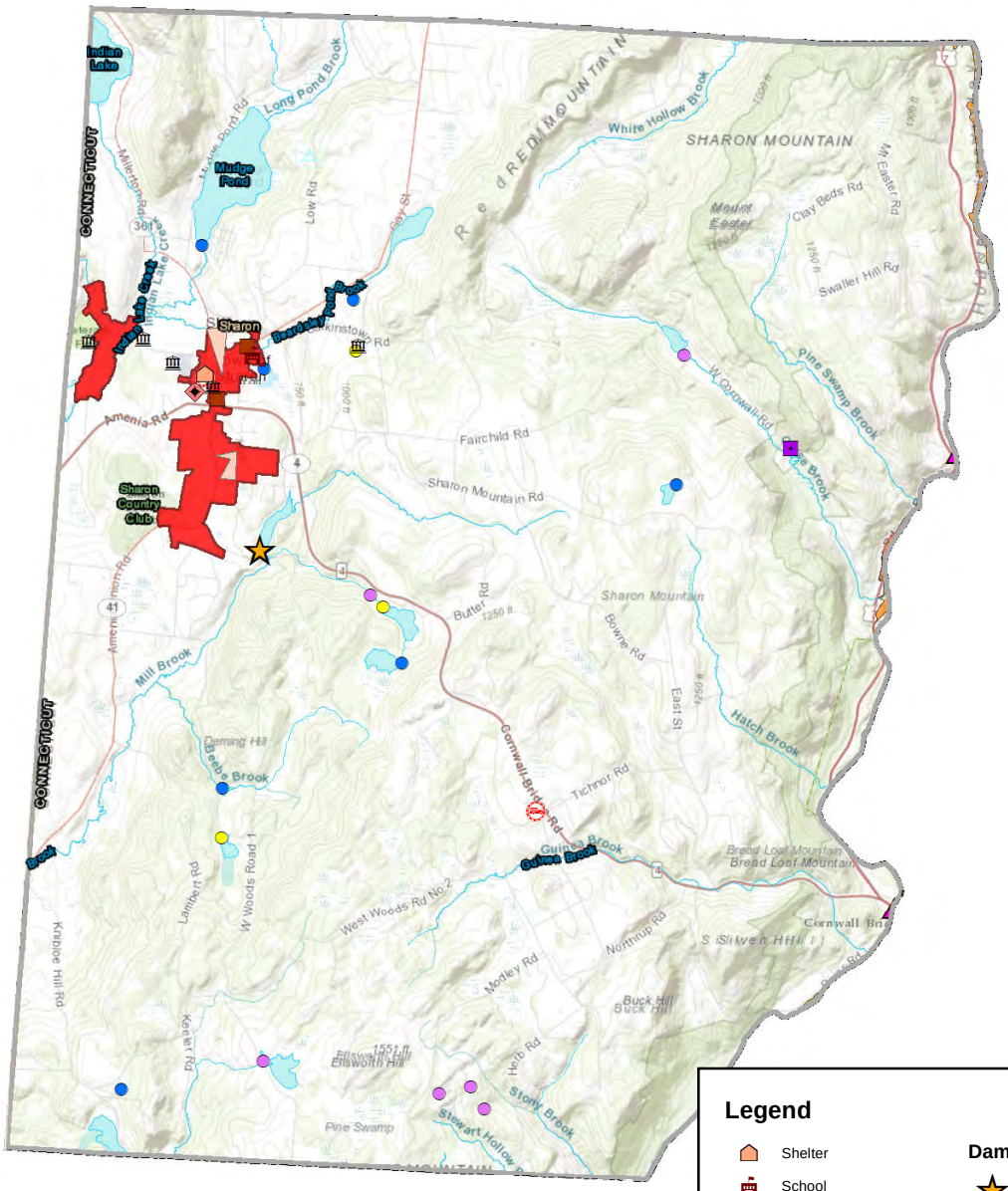
Number	Name	Class
12501	HATCH POND DAM	B
12502	ROGER LEWIS DAM	BB
12503	GROSS DAM	A
12504	MOLLEY DAM / MODLEY LOWER POND	AA
12505	MUDGE POND DAM	A
12506	MILES POND DAM	AA
12507	HAMLIN POND DAM	A
12508	FORD POND DAM	BB
12509	BOG MEADOW POND DAM	A
12510	PECK POND DAM	AA
12511	EASTMAN POND DAM	A
12512	MODLEY UPPER POND #1 DAM	AA
12513	MODLEY UPPER POND DAM #2	AA
12514	CAMP SEELEY POND DAM	A
12516	HERRICK BROOK DAM	AA
12518	CALKINSTOWN RESERVOIR DAM	BB
12519	HART POND DAM	A

High- and Moderate-Hazard dams are also located upstream of Sharon. The following section discusses known vulnerable areas located downstream of Class B and C dams.

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Legend

- Shelter
- School
- Care Facility
- Church-based camp
- EMS
- Emergency Response
- Fire Station
- Municipal Facility
- National Register Building
- National Register Structure
- National Register Area
- National Register District

Dam Hazard Class

- B - Significant Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - SHARON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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SCALE 1 " = 7,932 '
DATE 5/10/2021
3843-06
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FIG. 8-1

Long Pond Dam (Dam No. 12211) – Mudge Pond Brook Tributary, Salisbury

Long Pond Dam in Salisbury (Wononpakook Lake) has historically been a major concern for Sharon, as the dam was degraded and a notable area of Sharon is located in the potential inundation area. However, according to town officials, the dam has been repaired and is no longer a concern.

Hatch Pond Dam (Dam No. 12501) - Mill Brook, Sharon

The Hatch Pond Dam is a Class B dam located at the southern end of Hatch Pond that impounds a storage volume of 270 acre-feet from a contributing watershed of 2.0 square miles. The earthen dam is 31 feet in height and 340 feet in length. It is owned by Metz Family Enterprises, LLC and used to impound a reservoir for recreation.

The dam discharges to Mill Brook, a watercourse that flows to the southwest under Mitchelltown Road, Boland Road, Lambert Road and NY State Route 2, before discharging to the Webatuck Creek in New York State.

Great Falls Dam (Dam No. 2101) - Housatonic River, Canaan

The Great Falls Dam is a run-of-river dam located on the Housatonic River. It is owned by First Light Power Resources and used to impound a reservoir for hydroelectric generation at the Falls Village Hydrostation. The Housatonic River forms the eastern boundary of Sharon, and therefore upstream dam failure would affect a portion of the town. The dam impounds a reservoir with a surface area of 150 acres, and a storage volume of 1,135 acre-feet from a contributing watershed of 634 square miles. The reservoir is located on the southeast flank of Canaan Mountain.

The concrete dam was constructed in 1913 and consists of a concrete ogee spillway that is 14 feet in height and 300 feet in length. The pumped-storage generation utilizes underground components connecting the upper and lower reservoirs. These components include a powerhouse, water tunnel, shafts, and access tunnel. In March 1987, CL&P constructed a fourth hydroelectric generating unit at the dam.

The Inundation Map developed with the dam breach analysis indicates that the extent of impact in Sharon includes a portion of River Road near the Salisbury border, the end of Kirk Road, Lower River Road north of Route 128 and Route 7.

The Emergency Action Plan for the Housatonic Project/Falls Village Development is up to date.

Beaver Dams

The Town of Sharon is also concerned with the potential failures of beaver dams. This is a typical concern in many Connecticut communities.

The Carse Brook is highly problematic for the town due to the presence of beaver dams along the watercourse. Beavers (through their dams) reportedly present the most widespread, recurring flood issue in the community.

Approximately 41 beaver dams exist on Carse Brook along West Cornwall Road – that is nearly two miles of beaver dams. A 20' wide beaver dam forms beneath the bridge on Sharon Valley Road that spans Indian Lake Creek.

One of the potential contributing factors to the prevalence of beaver activity is that mica mining reportedly resulted in numerous depressions in the ground surface in Sharon. Beaver populations are healthy statewide and as beavers moved into these areas, impounded waters flooded the many depressions. The standing water appears to cause minor flooding during small events and exacerbates severe flooding because formerly-dry floodplains are now partly encroached by water and dams.

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

Regulations regarding fire protection are outlined in the *Subdivision Regulations*.

- ***Subdivision Regulations.*** Section 4.1 outlines the following fire protection requirements for the town:
  - Fire protection facilities to protect safety shall be provided at the subdivider's expense for subdivisions of four or more lots.
  - Fire protection facilities shall be sized and constructed in accordance with National Fire Protection Association (NFPA) Standard 1142, 1999 Edition-Standard on Water Supplies for Suburban and Rural Firefighting, as amended.
  - Fire protection facilities including fire ponds and water storage tanks shall be located in areas approved by the Fire Marshal and as may be recommended by the Sharon Fire Department.
  - The Commission may require the use of landscaping or other materials to screen pipes, access drives, or other structures associated with the installation of fire ponds or tanks.
  - Fire protection facilities shall be owned and maintained by a common interest ownership organization.
  - When the fire protection facility and access area are privately owned the Commission may require that they be encumbered by easements.

The Fire Department has some water storage capability in its tanker trucks and storage tanks but primarily relies on the use of the municipal water system to fight fires throughout the town whenever possible. The town has public water supply in the central area of town. The outlying areas are serviced through tanker trucks and approximately 15-20 dry hydrants. The town budgets $1,000 per year for the installation of dry hydrants. In addition, when an inland wetland permit is issued, the town attempts to incorporate the installation of a hydrant into the project, which has been very effective.

Sharon has other equipment for fighting off-road fires as well as mutual aid agreements with neighboring communities for additional support if needed. Overall, fire response in the town is believed to be adequate for the wildfire risk.

The Sharon Fire Department goes to the fires whenever possible. This proactive approach is believed to be effective for controlling wildfires.

Other capabilities for reducing wildfire risk include:

- Encouraging property owners to widen access roads such that fire trucks and other emergency vehicles can access remote locations.
- Continuing intermunicipal cooperation in firefighting efforts.
- Providing outreach programs on how to properly manage burning and campfires on private property.
- Patrolling Town-owned and State-owned open space and parks to prevent unauthorized campfires.
- Enforcing regulations and permits for open burning.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Sharon is compliant with this program and has a designated Burning Official.

Actions Completed and New Capabilities

Sharon continues to maintain its capabilities for mitigating and responding to wildfire risks.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

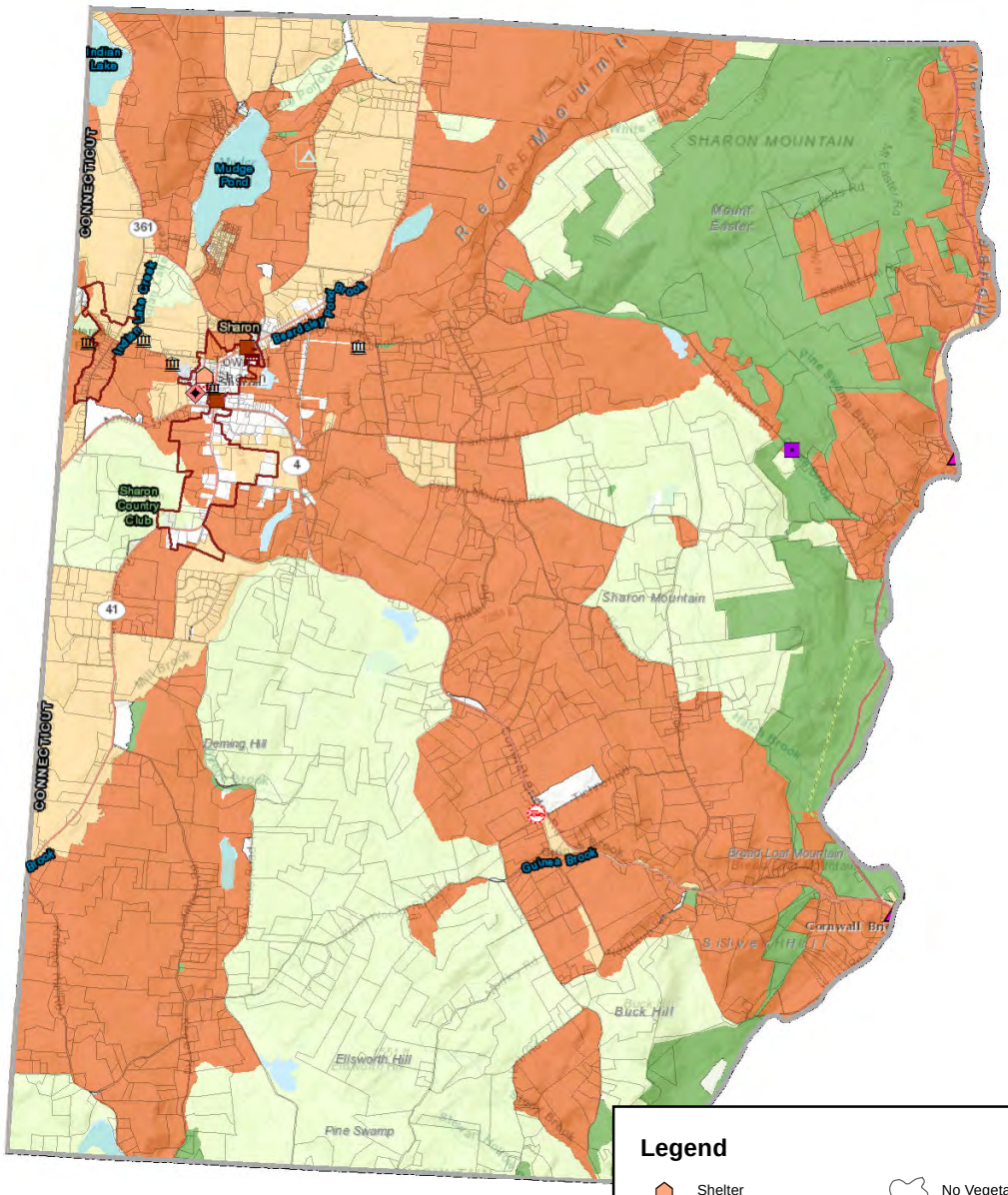
Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

There are many greenways in Sharon that could be at risk to wildfires during drought conditions. Areas at most risk include limited access State Forest lands, and areas along the Appalachian Trail. Sharon is fortunate to have few camping areas along the trail in its borders, so it does not have to respond to nearly as many fire and medical calls as Kent and Salisbury.

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Legend

- Shelter
- School
- Care Facility
- Church-based camp
- EMS
- Emergency Response
- Fire Station
- Municipal Facility
- National Register Building
- National Register Structure
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - SHARON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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Feet

SCALE 1 " = 7,933 '
DATE 5/10/2021
3843-06
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FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

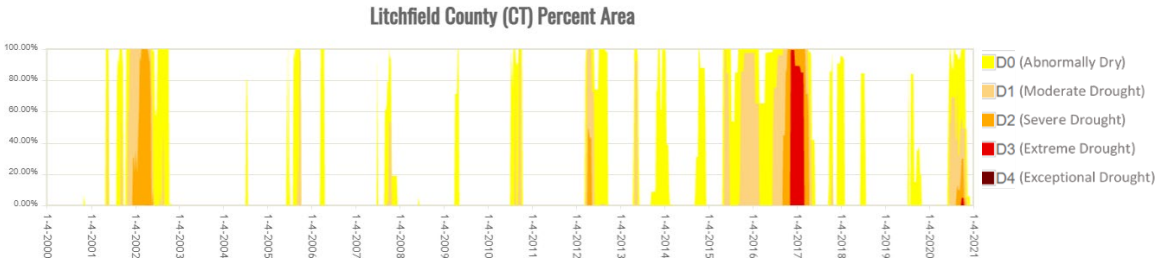


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Description	Dept.	Status	Notes
1	Obtain a grant to acquire a local emergency notification system like CodeRed.	EMD	*Carry Forward with Revisions*	*The Town is currently able to send notifications using Constant Contact, the Town website, and Facebook. A link to sign-up for Constant Contact is posted on the Town Website. The Town also participates is the statewide CT Alert system. The Town is able to utilize the Reverse-911 run through Litchfield County Dispatch in Torrington, which is able to target alerts to specific areas. During Tropical Storm Isaias, the Town utilized Facebook for emergency communications, and found it to be insufficient. The Town has also found coordination with LCD to be burdensome. Thus, while the Town's emergency alert capabilities have improved over recent years, the Town has decided to carry this forward to institute a locally-controlled Reverse-911 system.*
2	Utilize the existing emergency notification system (CT Alert) and email blast emergency notification system to their fullest capabilities	EMD	*Capability*	*This is a capability (see above)*
3	Encourage residents to purchase and use NOAA weather radios with alarm features	EMD	*Carry Forward*	*The town provides information and links about hazard preparedness on their website, but has not prioritized encouraging the purchase of NOAA weather radios. Town is a member of the Weather Ambassadors program with NOAA.*
4	Consider coordinating with local municipalities to obtain a generator for the Housatonic Valley Regional High School. Once acquired, the high school may be operated as a regional shelter.	EMD	*Drop*	*Town staff report that the Torrington Area Regional Health District had considered setting up the HVRHS as an emergency medical center, but they have not pursued. This action is outside of the Town's purview and not necessary, given the two available shelters in Sharon. Action is dropped.*

#	Description	Dept.	Status	Notes
5	Obtain an HMGP grant to acquire portable generators to assist the town, specifically the supermarket and gas station, in providing emergency power when needed.	EMD FS	*Drop*	*Town staff report that the gas station and supermarket have been pursuing backup generation on their own. Both businesses have experienced significant loss of business and product during previous outages. The gas station has a partial generator for refrigeration. Town is open to assisting these businesses but does not believe any direct action is necessary. Action is dropped because a grant is no longer needed.*
6	Develop a plan to review local roads and prioritize improvements in an effort to improve emergency response times.	EMD FS	*Capability*	*The Town Road Crew and the Board of Selectmen have developed a prioritized plan for road improvements extending into future years. In general, the Town considers its local roads to be in good shape and well-maintained.*
7	Ensure that emergency information is available through several different media, such as newspaper, radio, internet and phone.	EMD	*Capability*	*Local NPR Radio station (WSHU) operates out of Sharon, located next to town hall. This station has been very helpful for broadcasting public information. Town also put out information through the Town website and social media as needed. Information is put out through the local newspaper, but the paper only goes out weekly, so it is not as useful for timely information.*
8	Consider adding freeboard requirements to the zoning regulations for new construction and substantial improvements.	P&Z	*Carry Forward*	*Freeboard requirements are now required by the CT Building Code. The Town has not yet updated its floodplain zoning regulations to reflect the State's most recent guidance. It will wait until after FEMA produces new floodplain maps for the region, potentially 2023, at which point it will be required to update its floodplain regulations anyways.*
9	Consider updating the Town floodplain ordinances in order to put additional restrictions on floodplain development.	P&Z	*Drop*	*The Town's floodplain ordinances are based on FEMA requirements, and will be updated to meet Connecticut guidance following adoption of new FEMA flood maps (see above). The Town is already very strict about development within the floodplain, and has successfully required property owners to get Elevation Certificates for their properties. New development is minimal. Putting additional restrictions on floodplain development is not considered necessary.*
10	Consider requiring new buildings constructed in floodprone areas to be protected to the highest recorded flood level regardless of being within a defined SFHA.	P&Z	*Drop*	*Sharon locally applies the CT Building Code, which includes freeboard requirements.*
11	Consider updating the town zoning and subdivision regulations to require detention basin maintenance and drainage swale maintenance.	P&Z	*Complete*	*This is required for all development, parking lots, and multi-use buildings.*

#	Description	Dept.	Status	Notes
12	Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternative.	P&Z	*Capability*	*The Town's subdivision regulations require implementation of best stormwater management practices.*
13	Develop a long-term beaver management plan (refer to additional actions under "Structural Projects" below)	PW	*Completed*	*The Town has identified installation of "Beaver Levelers" as the best management practice that they will use to address beaver problems. The Town currently uses Beaver Levelers on many town roads and rights-of-way. This technique is reportedly very effective and low-maintenance.*
14	Develop a plan to address runoff from agricultural fields in the north end of town to ensure swales and ditches are properly maintained.	PW	*Completed*	*The Town has determined that the runoff impacting this area is coming from Salisbury upstream, and is not within Sharon's jurisdiction. Additionally, maintenance of swales and ditches has not been a challenge in recent years. The Town reports that it had experienced challenges in the past with excess runoff into swales and ditches because there were extensive lawns in that area, but behaviors have changed and residents have been planting native plants, constructing rain gardens and infiltration systems, and so on, in order to protect the water quality of the river. Additionally, collaboration between the Town and the State on maintenance of roads, culverts, and drainage infrastructure has improved.*
15	Provide technical assistance regarding floodproofing measures to interested residents. Pursue funding for home elevations should any residents become interested.	Building	*Capability*	*The Building Inspector provides technical assistance as needed. The Town has not assisted private property owners in securing funding for floodproofing projects, and does not believe this action is necessary. There are three local surveyors who have a lot of experience with elevation certificates and floodplain surveying, and are able to help property owners.*
16	Encourage property owners to purchase flood insurance under the NFIP.	Building	*Drop*	*Town does not believe proactive encouragement about flood insurance is necessary; residents are aware of flood insurance, or are made away by banks when taking out a mortgage.*
17	Consider flood mitigation measures along the Housatonic River. Specifically in the vicinity of Kirk Road, River Road and Old Route 7 where property (yard) repeatedly floods.	PW	*Capability*	*Town reports that many flood mitigation projects have been occurring along the Housatonic.*

#	Description	Dept.	Status	Notes
18	Conduct an evaluation at the main business area near the supermarket (Low Road, Murtagh Road, and Route 41 (North Main Street)) to determine appropriate flood mitigation measures.	PW	*Carry Forward*	*Town has not yet conducted a formal evaluation because of limited funding and staff capabilities. Town staff report that flooding occurred in this area in July during a recent year when a short, severe precipitation event dropped approximately 5 inches of rain in 45 minutes. The drainage infrastructure in this area is one long culvert that extends under Murtagh Road, the shopping center, and Route 41. A relatively large swamp upstream of the culvert is reported to serve as flood storage, limiting flooding impacts at the culvert itself.*
19	Pursue floodproofing for the Highway Garage, if necessary.	PW	*Carry Forward with Revision*	*The Town has secured an Elevation Certificate for the Highway Garage to more accurately identify its elevation relative to base flood elevations.*
20	Pursue floodproofing for the wastewater treatment facility, if necessary.	PW	*Completed*	*The Wastewater Treatment Facility has been floodproofed, and an Elevation Certificate secured to identify its elevation relative to base flood elevations.*
21	Conduct a drainage analysis in the vicinity of Sharon Hospital to determine potential flood damage reduction methods.	PW	*Completed*	*Town identified that the cause of drainage issues had been improperly maintained drainage swales along the Town Road. The Town has taken back from the Hospital responsibility for maintenance of the swales. Additionally, the Hospital has reconstructed a parking area with improved drainage, and has put in place a comprehensive storm management plan.*
22	Compile a checklist that cross-references the bylaws, regulations, and codes related to flood damage prevention that may be applicable to a proposed project and make this list available to potential applicants.	P&Z	*Capability*	*The building inspector completes a full plan review for every development project, ensuring flood damage prevention concerns are addressed.*
23	Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	P&Z	*Capability*	*Building inspector, also the Town floodplain manager, is well trained in flood damage prevention methods.*
24	Consider replacing culverts frequently impacted by beavers with free span bridges.	PW	*Drop*	*Town has identified an effective method of addressing beaver concerns. This action is not considered necessary.*
25	Consider the use of beaver deterrent devices such as beaver stops or beaver bafflers.	PW	*Completed*	*Town has identified "Beaver Levelers" as an effective method of addressing beaver concerns.*
26	Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	PW	*Carry Forward*	*When the Town replaces culverts, they often install a new structure that is considerably larger than the previous one.*

#	Description	Dept.	Status	Notes
27	Several undersized culverts are located along State roads. Sharon could encourage the CT DOT to apply for funding to remediate these areas, since State agencies may apply for grants.	PW	*Capability*	*The State manages its culverts as needed, and the Town coordinates as appropriate.*
28	When replacing or upgrading culverts, work with CT DOT to incorporate findings of the climate change pilot study and work with HVA to incorporate findings of the stream crossing assessment training.	PW	*Drop*	*Redundant with Action 26.*
29	Evaluate overtopping at the bridge on Calkinston Road to determine appropriate flood reduction methods.	PW	*Completed*	*The Town determined that overtopping was occurring due to improper maintenance at adjacent properties. The Inland Wetlands & Watercourses Commission instituted a five-year maintenance plan for these properties. Road overtopping has not been an issue since this plan was implemented. Town will check this language to make sure it accurately reflects progress that has been made on this action.*
30	Replace and increase the capacity of the culvert on West Woods Road #1 near Sweeney's (just south of Hoopersfield Road).	PW	*Completed*	*A new, increased-capacity culvert has been installed.*
31	Install a headwall at the culvert beneath Kings Hill Road along Guinea Brook.	PW	*Carry Forward*	*Action has not yet been completed due to funding limitations.*
32	Continue to seek funding to conduct the necessary repairs on the scour critical bridges within the town.	FS	*Capability*	*Town continually conducts repairs on these bridges. In the last few years the Town has replaced the Keeler and Mitcheltown bridges. Additionally, Town staff have learned improved maintenance practices to cut down on scour at these sites.*
33	Conduct routine maintenance of culverts to prevent blockages.	PW	*Capability*	*This is a capability.*
34	Ensure adequate barricades are available to block flooded streets in floodprone areas	EMD PW FD	*Completed*	*This is completed.*
35	Develop a site specific evacuation plan for Trinity Glen to ensure safe egress prior to floods.	EMD	*Drop*	*Trinity Glen has a full generator, and is fully self-sustaining. Town staff believe that an evacuation of the site is unlikely to be necessary. Action is dropped.*

#	Description	Dept.	Status	Notes
36	Develop a town wide tree limb inspection and maintenance program to ensure that the potential for downed power lines is diminished.	PW	*Capability*	*Town has consistently been updating is tree limb inspection budget and capabilities. Town staff report that Eversource has also done a good job of cutting back trees. Town staff note that Ash trees make up about 25% of the tree stock in Litchfield county, and most of those have been killed by the Emerald Ash Borer. The Town admits that it is not able to catch every tree before it comes down during a storm, but it feels its capabilities are sufficient.*
37	Develop a plan to address weak or unstable trees throughout Sharon.	PW	*Capability*	*This action is redundant with Action 37, above.*
38	Work with CL&P to ensure a more proactive approach is taken in Sharon with regards to tree trimming maintenance.	PW	*Capability*	*The Town works with the local utility provider (currently Eversource). It reports that Eversource has been proactive with tree maintenance.*
39	Ensure that the town maximizes its use of the emergency notification system by subscribing to as many residents as possible.	EMD	*Capability*	*The Town's Constant Contact communication system is advertised on the Town website. The Town is currently pursuing a new Reverse-911 system.*
40	Continue to review and update the currently enacted EOP, evacuation plans, supply distribution plans, and other emergency planning documents for the Town as appropriate. Post general evacuation and shelter information on the Town website and in municipal buildings.	EMD	*Capability*	*This is a capability.* *Shelter information is posted on the Town website. Evacuation is not a primary focus of the Town's Emergency Operations Plan, with sheltering in place being the primary response to disasters. The Town has a supply distribution plan in place.*
41	Building Department to provide literature regarding appropriate design standards for wind.	Building	*Drop*	*Design standards built into the State building code. This action is not considered necessary.*
42	Encourage the use of structural techniques related to mitigation of wind damage in new residential and commercial structures to protect new buildings to a standard greater than the minimum building code requirements. Require such improvements for new municipal critical facilities.	Building EMD	*Drop*	*Updated State building code requirements are considered to be sufficient.*
43	Develop a plan to prioritize snow removal from the roof of critical facilities and other municipal buildings each winter. Ensure adequate funding is available in the Town budget for this purpose.	EMD PW	*Capability*	*Town has a large budget for snow removal. Snow on roofs has not been a significant problem in the past, while icing has been more of an issue. The Town Hall's Slate Roof was noted by Town staff as being at risk of snow accumulation and icing. Additionally, the roof of the shopping center is flat, although the Town is not responsible for clearing that roof.* *Town feels its capabilities in this regard are sufficient.*

#	Description	Dept.	Status	Notes
44	Provide information on the dangers of cold-related hazards to people and property.	EMD	*Carry Forward*	*The Town puts out information about a variety of weather-related dangers as part of its participation in the NOAA Weather Ambassador program. A top concern with regard to cold-weather hazards are those posed by improper maintenance and use of private generators. The Town reaches out to homeowners who have purchased generators to tell them the importance of having a maintenance plan. People with generators that are only 10 years old are getting new ones because they didn't maintain properly.* *Town will carry this action forward to create a more robust plan for warning residents of the dangers of cold-related hazards, including a reminder about generator safety.*
45	Consider posting the snow plowing routes in Town buildings each winter to increase public awareness.	EMD PW	*Drop*	*Will not increase hazard mitigation capabilities.*
46	Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	EMD	*Capability*	*Town constantly keeps track during events of which roads are closed, and identifying alternate routes. This information is relayed to fire and EMS, as well as to other towns because they may be trying to access Sharon Hospital.*
47	Building Department to provide literature regarding appropriate design standards for mitigating icing, insulating pipes, and retrofits for flat-roofed buildings such as heating coils.	Building	*Drop*	*Design standards built into building code.*
48	The town should consider utilizing snow fencing in areas prone to snow drift.	PW	*Drop*	*The Town put up snow fencing for years, but the high maintenance requirements and poor performance led them to stop. The Town instead relies on aggressive plowing and upgraded snow clearing equipment.*
49	Include dam failure innundation areas in the CT Alert emergency notification system contact database	EMD	*Carry Forward with Revisions*	*The Falls Village dam failure inundation area and the dam failure inundation area for a dam in the town of Salisbury (which has recently undergone rehabilitation) are included in the CTAlert system. The Town is not sure whether the dam failure area for Hatch Pond is included in that system. They will carry this action forward to specifically ensure that the Hatch Pond dam failure area is included in the CTAlert system.*

#	Description	Dept.	Status	Notes
50	The Town should continue to require the installation of fire protection water in new developments, and sprinkler systems where access is limited for fire apparatus.	Fd	*Capability*	*This requirement is built into the Town's Subdivision Regulations and the building code, and is enforced by the Building Inspector and Fire Marshal. The Town has had a number of large residential buildings where the owners have agreed to install in fire protection (including sprinklers). The Town has also been successful at encouraging installation of fire protection water, as doing so lowers the cost of insurance for homeowners.*
51	Increase the availability of water sources in the town's areas of high risk, using the historic record (fires exceeding five acres) as a benchmark for locating high risk areas.	FD	*Capability*	*The Town is consistently installing new dry hydrants. This is a capability.*
52	Pursue acquisition of additional municipal open space in SHFAs and set it aside for greenways, parks, etc.	FS	*Capability*	*The Town works with the local Land Trust to acquire and preserve open space. An open space along the Housatonic has been preserved. This is a capability.*
53	Consider preventing residential development in areas prone to collapse (see also action #56 below under Landslides)	P&Z	*Capability*	*The Town has updated its zoning regulations to include new slope requirements for subdivisions, residential buildings, and driveways. Additionally, erosion control is required for any new subdivision or development.*
54	Ensure that municipal departments have adequate backup facilities in case earthquake damage occurs to municipal buildings.	EMD PW	*Drop*	*The Town believes its facilities to be sufficient.*
55	The town may consider bracing systems and assets inside critical facilities. This could help protect IT systems, important records and files.	EMD PW	*Carry Forward with Revisions*	*The Town currently backs its systems up to a local server. They will carry forward a new action to back up its IT data to the cloud, to both ensure it is protected from a local hazard event, and to enable continued remote operations in case the local server is not accessible.*
56	Consider preventing development in sandy areas with steep slopes.	P&Z	*Capability*	*This is covered in the zoning regulations.*
57	Ensure that local utility providers are aware of landslide potential and have responder teams ready to repair damage to their utilities caused by landslides.	EMD	*Capability*	*The Town reports that Eversource, the local utilities provider, has this capability. There are many steep slopes in Town with High Tension wires, and the utility has appropriate equipment to manage these assets.*
58	Maintain education and outreach materials at the Building Department regarding how to identify potential landslide areas	Building	*Capability*	*The Planning Department and Building Official work with potential developers throughout a process to ensure they are not building in dangerous or otherwise problematic areas. This includes avoiding potential landslide areas, flood areas, and areas where septic systems or a well would not be able to be installed.*

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action SHR-01	
Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB, Sustainable CT
Timeframe	2022
Priority	High

Action SHR-02	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action SHR-03	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action SHR-04	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action SHR-05	
Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action SHR-06	
Mitigate the risk of snow accumulation and icing on the Town Hall's Slater Roof through development of snow and ice clearing protocols and/or structural measures (such as installation of heating coils or roof reinforcement.	
Lead	DPW
Cost	$25,000 - $50,000
Funding	OB
Timeframe	2022 – 2024
Priority	Med

Action SHR-07	
Back up IT data to the cloud, to both ensure it is protected from a local hazard event, and to enable continued remote operations in case the local server is not accessible.	
Lead	EMD, IT
Cost	$25,000 - $50,000
Funding	OB
Timeframe	2022 – 2024
Priority	Med

Action SHR-08	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action SHR-09	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action SHR-10	
Provide information on the dangers of cold-related hazards to people and property.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action SHR-11	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action SHR-12	
Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEEP
Timeframe	2023 – 2025
Priority	High

Action SHR-13	
Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action SHR-14	
Conduct an evaluation at the main business area near the supermarket (Low Road, Murtagh Road, and Route 41 (North Main Street)) to determine appropriate flood mitigation measures.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action SHR-15	
Institute a locally-controlled Reverse-911 system (in addition or instead of that managed by LCD).	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action SHR-16	
Encourage residents to purchase and use NOAA weather radios with alarm features	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action SHR-17	
Ensure that the Hatch Pond dam failure area is included in the CTAlert system.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action SHR-18	
Improve emergency power capabilities at the Wastewater Treatment Plant and the Water Treatment Facility (which currently share a single portable generator.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action SHR-19	
Install a headwall at the culvert beneath Kings Hill Road along Guinea Brook.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Med

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
SHR-01	Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	Sustainable CT	Planning	$0 - $25,000	OB, Sustainable CT	2022	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
SHR-02	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
SHR-03	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
SHR-04	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
SHR-05	Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
SHR-06	Mitigate the risk of snow accumulation and icing on the Town Hall's Slater Roof through development of snow and ice clearing protocols and/or structural measures (such as installation of heating coils or roof reinforcement.	Snow Removal	DPW	$25,000 - $50,000	OB	2022 – 2024	0	0.5	1	1	0	1	0	0	0	0	0	0	0	0	5
SHR-07	Back up IT data to the cloud, to both ensure it is protected from a local hazard event, and to enable continued remote operations in case the local server is not accessible.	Data & IT Protection	EMD, IT	$25,000 - $50,000	OB	2022 – 2024	1	1	1	0	0	1	0	0	0	0	0	-1	0	0	5
SHR-08	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
SHR-09	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
SHR-10	Provide information on the dangers of cold-related hazards to people and property.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
SHR-11	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
SHR-12	Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	NRCC Guidance	DPW	$50,000 - $100,000	OB, CIP, CT DEEP	2023 – 2025	0	1	1	0	0	1	1	0	0	0	0	0	0	0	6
SHR-13	Take the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory analysis into consideration when upgrading and replacing infrastructure, including the restoration prioritization results.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
SHR-14	Conduct an evaluation at the main business area near the supermarket (Low Road, Murtagh Road, and Route 41 (North Main Street)) to determine appropriate flood mitigation measures.	Study	DPW	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
SHR-15	Institute a locally-controlled Reverse-911 system (in addition or instead of that managed by LCD).	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
SHR-16	Encourage residents to purchase and use NOAA weather radios with alarm features	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
SHR-17	Ensure that the Hatch Pond dam failure area is included in the CTAlert system.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
SHR-18	Improve emergency power capabilities at the Wastewater Treatment Plant and the Water Treatment Facility (which currently share a single portable generator.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
SHR-19	Install a headwall at the culvert beneath Kings Hill Road along Guinea Brook.	Culvert & Bridge Upgrades	DPW	$100,000 - $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5

APPENDIX B

RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF SHARON BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Sharon has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Sharon Board of Selectmen approved the previous version of the Plan in 2014; and

WHEREAS, the Town of Sharon and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Sharon; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Sharon, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Sharon eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Sharon;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Sharon, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Sharon this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

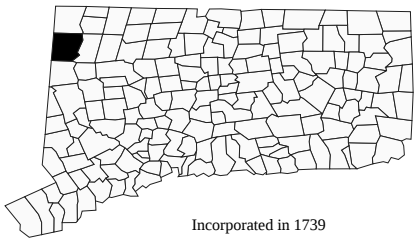
2019 CERC TOWN PROFILE

Sharon, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
63 Main Street
Sharon, CT 06069
(860) 364-5789

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1739

Demographics

Population

	Town	County	State
2000	2,968	182,193	3,405,565
2010	2,782	189,927	3,574,097
2013-2017	2,733	184,454	3,594,478
2020	2,395	193,116	3,604,591
'17 - '20 Growth / Yr	-4.7%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	59	921	4,842
Pop./Sq. Mile (2013-2017)	47	200	742
Median Age (2013-2017)	59	47	41
Households (2013-2017)	1,307	74,605	1,361,755
Med. HH Inc. (2013-2017)	$81,442	$76,438	$73,781

	Town	State
Veterans (2013-2017)	302	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	66	2%	147	5%	141	5%	297	11%	1,098	40%	984	36%	2,733	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	2,520	164,992	2,446,049
Black Non-Hisp	30	2,843	350,820
Asian Non-Hisp	47	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	111	2,320	84,917
Hispanic or Latino	25	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	12.5%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	589	25%	673,582	27%
Associates Degree	253	11%	188,481	8%
Bachelors or Higher	1,162	49%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	148	1,128
23 - Construction	20	48
31-33 - Manufacturing	NA	NA
44-45 - Retail Trade	15	100
56 - Administrative and Waste Services	19	76
62 - Health Care and Social Assistance	28	607
Total Government	8	78

Top Five Grand List (2018)

	Amount
VASSAR HEALTH CONNECTICUT INC	$15,508,950
CONNECTICUT LIGHT AND POWER	$11,500,590
WEATHERSTONE CORP	$8,624,100
JOHNS JASPER TRUSTEE	$6,703,860
HERRICK ROAD LLC	$5,929,820
Net Grand List (SFY 2016-2017)	$733,025,351

Major Employers (2018)

Vassar Health Connecticut
Athena Healthcare
Region #1 School District
Upcountry

Education

2018-2019 School Year

	Grades	Enrollment
Sharon School District	PK-8	115
Regional School District 01	9-12	391

Pre-K Enrollment (PSIS)

	2018-2019
Sharon School District	0

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 01	94.6%	100.0%	90.4%

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	*	53.8%	NA	51.3%	NA	43.0%
ELA	*	53.1%	NA	54.9%	NA	56.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Sharon School District	7.3%
Regional School District 01	11.9%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	83.2%	84.0%	86.8%
Private	16.8%	16.0%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Sharon, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$11,775,625	Total Expenditures (2017)	$11,374,389	Annual Debt Service (2017)	$821,706
Tax Revenue	$10,641,446	Education	$7,365,171	As % of Expenditures	7.2%
Non-tax Revenue	$1,134,179	Other	$4,009,218	Eq. Net Grand List (2017)	$1,041,780,156
Intergovernmental	$762,514	Total Indebtedness (2017)	$6,574,511	Per Capita	$383,289
Per Capita Tax (2017)	$3,893	As % of Expenditures	57.8%	As % of State Average	253.9%
As % of State Average	132.8%	Per Capita	$2,419	Moody's Bond Rating (2017)	Aa2
		As % of State Average	96.2%	Actual Mill Rate (2017)	14.40
				Equalized Mill Rate (2017)	10.16
				% of Net Grand List Com/Ind (2017)	5.8%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	1,942	88,068	1,507,711
% Single Unit (2013-2017)	89.9%	73.6%	59.2%
New Permits Auth (2017)	6	142	4,547
As % Existing Units	0.3%	0.2%	0.3%
Demolitions (2017)	3	32	1,403
Home Sales (2017)	41	1,753	21,880
Median Price	$408,500	$250,100	$270,100
Built Pre-1950 share	50.4%	31.2%	29.3%
Owner Occupied Dwellings	1,064	57,330	906,798
As % Total Dwellings	81.4%	76.8%	66.6%
Subsidized Housing (2018)	36	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	0	57	536
$100,000-$199,999	5	563	5,237
$200,000-$299,999	11	538	6,681
$300,000-$399,999	8	315	3,863
$400,000 or More	17	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$870	$995	$1,123
Cost-burdened Renters	51.1%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	1,474	101,000	1,827,070
Residents Unemployed	43	4,014	78,242
Unemployment Rate	2.8%	3.8%	4.1%
Self-Employed Rate	28.0%	13.0%	10.0%
Total Employers	148	6,177	122,067
Total Employed	1,128	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Sharon, CT	231	Sharon, CT	231
Salisbury, CT	76	Salisbury, CT	120
North Canaan, CT	50	North East, NY	54
North East, NY	50	North Canaan, CT	38
Amenia, NY	46	Torrington, CT	30
Torrington, CT	44	Manhattan, NY	25
Dover, NY	40	Hartford, CT	23

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	480	1,777
Violent	64	228

Disengaged Youth (2013-2017)

	Town	State
Female	0.0%	4.2%
Male	0.0%	5.6%

	Town
Library circulation per capita	5.09

Distance to Major Cities

	Miles
Hartford	39
New York City	86
Providence	104
Boston	129
Montreal	254

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Municipal Provider
Local Contact

Cable Provider
Comcast Lakeville
(800) 266-2278

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

TORRINGTON, CT

140 Main Street
Torrington CT 06790
MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 Torrington Road
Goshen, CT 06756
(860) 491-9884
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Prepared by:
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99 Realty Drive
Cheshire, Connecticut 06410
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www.slrconsulting.com

global environmental and advisory solutions

SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the City of Torrington and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The City of Torrington is the regional center of the Litchfield Hills Region and is bordered on the north by Winchester, on the east by New Hartford, on the south by Harwinton and Litchfield, and on the west by Goshen. As the industrial and economic hub of northwestern Connecticut, Torrington is Litchfield County's largest community with a population of 34,489.

In addition to the regional hub of Downtown Torrington, major facilities in the City include Charlotte Hungerford Hospital, the Torrington Branch of the University of Connecticut. Other features of note include Burr Pond State Park, Sunnybrook State Park, and Paugnut State Forest. Torrington has a total area of 40.4 square miles with 39.8 square miles of land area.

Major highways serving the town include State Routes 4, 8, 183, 202, and 272.

2.2 Existing Land Use

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 60% of Torrington is forested and approximately 23% is developed.

Table 2-1: 2015 Land Cover by Area

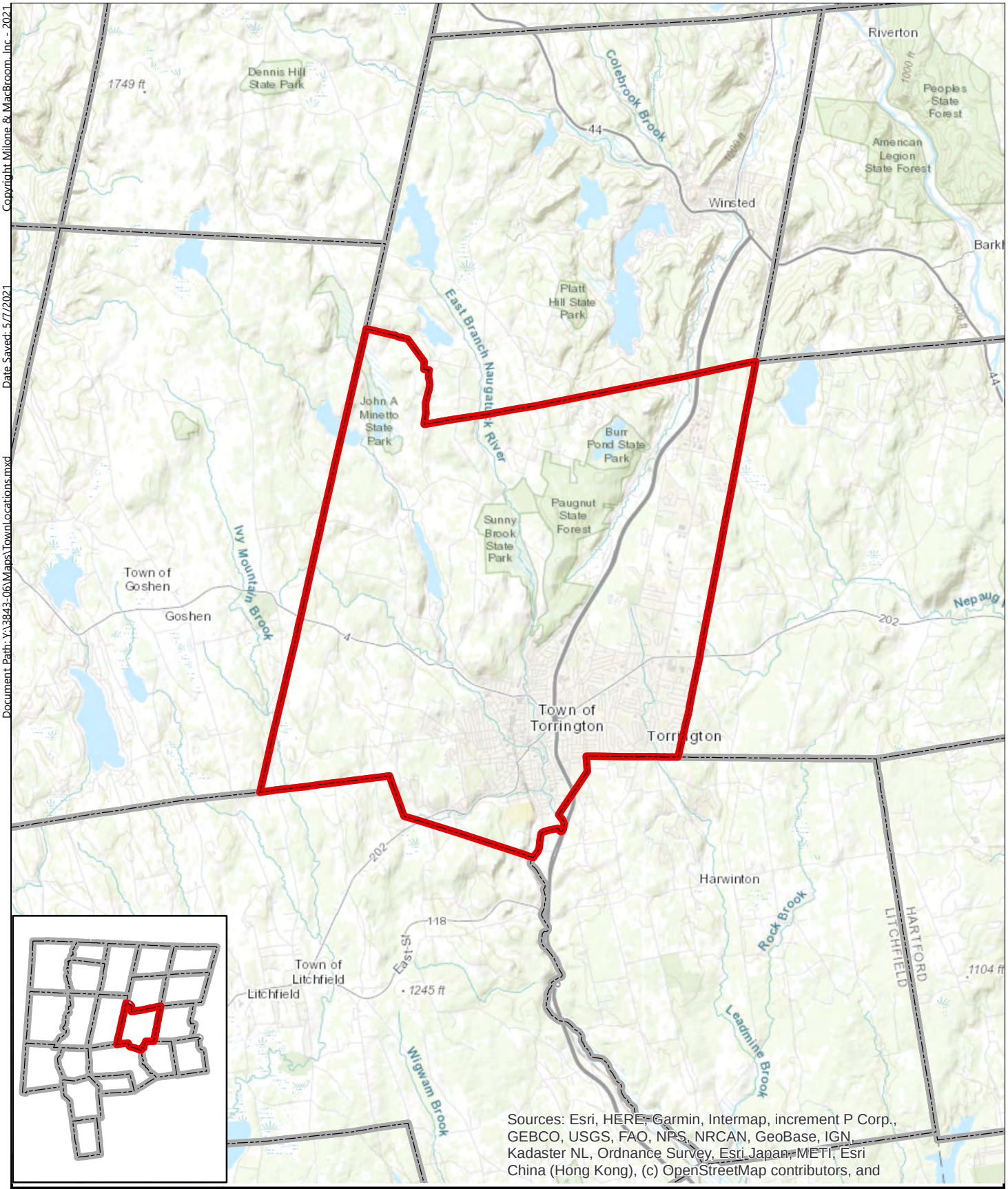
Land Cover	Area (acres)	Percent of Community
Developed	5,883.2	22.81%
Turf & Grass	1,610.7	6.24%
Other Grass	354.9	1.38%
Agricultural Field	1,563.9	6.06%
Deciduous Forest	8,598.4	33.34%
Coniferous Forest	6,091.2	23.62%
Water	433.7	1.68%
Non-Forested Wetland	152.4	0.59%
Forested Wetland	777.4	3.01%
Tidal Wetland	0.0	0.00%
Barren	200.8	0.78%
Utility Row	127.0	0.49%
Total	**25,794**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

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Date Saved: 5/7/2021

Document Path: Y:\3843-06\Maps\TownLocations.mxd



MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

REGIONAL LOCATION: TORRINGTON

HAZARD MITIGATION PLAN UPDATE - TORRINGTON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 5,000 10,000
Feet

SCALE	1 " = 10,818 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-1

2.3 Development Trends

The City was incorporated as a town in 1740. According to the Torrington "Plan of Development", "It was not until 1737 that the first permanent, non-Indian settler arrived. The town's initial growth occurred on the hills of West Torrington and Torringford. The low-lying area surrounding the Naugatuck River was a swamp that acted as a barrier between the eastern and western sections of the town. By 1800, the Town's population had increased to 1,417 persons. It was much smaller than Litchfield with 4,285 persons, and just slightly smaller than the surrounding towns of Harwinton, Goshen, and New Hartford."

In the early 1800's, the Town Plan continues, "The industrialization that began in the U.S. was dependent upon water powered machinery. As this industrialization spread to Torrington, the land along the Naugatuck came to be viewed not as worthless swamp but as a site for factories. In the 1830's, the first brass mill, with equipment and workers imported from England, was established. With the arrival of the railroad in the 1840's, the Town had a reliable means to ship manufactured products to the markets of the East Coast. By the 1850's, manufacturing rather than farming, had become the dominant factor in the Town's economy." By 1920, the Town's population had grown to 22,055 and Torrington had become the largest municipality in Litchfield County. In 1923, the Town became a City.

In the 1960's Route 8 was reconstructed as a limited access highway, enhancing truck movement opportunities.

Since the 1970's Torrington, like many other manufacturing centers in the Northeast, has experienced an out-migration of industry to warmer climates where energy and the cost of doing business is less. In 1970, manufacturing comprised 44% of the jobs in Torrington; by 2005, the percentage of manufacturing jobs had declined to 17%. With nearly one in five jobs still being in manufacturing, however, manufacturing continues to represent a major sector of the City's economy.

According to the US Census data, the population of Torrington increased an average of 127 persons per year from a population of 30,045 persons in 1960 to 36,383 persons in 2010. U.S. Census Bureau estimates for 2019 show a population around 34,489 individuals, a decrease from 2010 of 5.2%. The Connecticut State Data Center predicts that population will increase by 8.1% through 2025 to an estimated population of 37,268 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Torrington decreased slightly between 2013 and 2017. The number of permits issued in 2013 and 2014 was 2 and 7, respectively, while 0 permits were issued in 2016, and 1 permits were issued in 2017. On average, 3 housing permits were issued each year in Torrington between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Torrington rose by approximately 0.1-percent between 2010 and 2019, from 16,761 units in 2010 to 16,773 units in 2019. In 2019, the housing stock was made up of approximately 58% single-unit structures, 15% two-unit structures, 27% multi-unit structures, and 0% mobile-homes or other types of structures.

Approximately two-thirds of the housing in the City is owner occupied, with about one-third of the housing stock occupied by renters.

According to the Connecticut Office of Policy and Management, Torrington's 2019 Total Equalized Net Grand List was valued at $2,038,083,612. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Torrington, included as Appendix C.

The municipality has experienced limited development in recent years. Town officials report that a 92-unit apartment facility (for residents aged 55 and up) is currently under permitting review by the City. Another 60-unit apartment complex was being constructed during plan development on Franklin Street, and was expected to be completed by the end of 2021.

Overall, development in Torrington has not significantly increased exposure to natural hazards over the last five years, as it has primarily consisted of redevelopment of already developed lots. Acceleration of new development may occur over the next five years, potentially increasing exposure.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

The City of Torrington includes areas considered to have Low, Moderate, Medium, and High levels of social vulnerability. The areas with High SVI rankings have highest vulnerability scores for the SVI categories of Socioeconomic Status and Household Composition and Disability. In other words, particular challenges in Torrington may include the limited access to financial resources of some residents, and the presence of residents who need additional assistance during a disaster event due to disabilities.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Torrington.

Torrington is part of the Northeastern Highlands Ecoregion, which is characterized by "hills and mountains, a mostly forested land cover, nutrient-poor frigid and cryic soils (mostly Spodosols), and numerous high-gradient streams and glacial lakes" (as described on the map "Ecoregions of New England").

2.5 Climate and Climate Change

Over the course of the year, the temperature in Torrington typically varies from 17°F to 80°F and is rarely below 2°F or above 88°F. The warm season lasts from May 28 to September 15, with an average daily high temperature above 71°F. The cold season lasts from December 1 to March 11, with an average daily high temperature below 42°F.

Precipitation falls throughout the year in Torrington. The wetter season lasts from May 3 to August 19, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on May 29. The drier season lasts from August 19 to May 3. The smallest chance of a wet day is 21% on January 29.

The most rain falls during the 31 days centered around June 4, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.3 inches.

The snowy period of the year lasts for 5.9 months, from October 24 to April 21, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 23, with an average total liquid-equivalent accumulation of 1.4 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature
Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Torrington as 4.83 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Torrington at 5.74 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.8	6.1	8.6
NOAA Atlas 14	5.7	7.1	9.2

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Torrington can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.2 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

The majority of Torrington is drained by the West Branch Naugatuck River. Tributaries include Gulf Stream, Troy Brook, Nickel Mine Brook, Jakes Brook, Marshall Lake Brook, and the East branch Naugatuck River. The East branch and the West Branch of the Naugatuck River meet in the southern part of the City to form the Naugatuck River mainstem. Significant waterbodies include the Reuben Hart Reservoir and Still Water Pond.

The northeast corner of town is drained by the Still River which flows into the Farmington River watershed. The Southwest corner of town is within the Shepaug River Watershed and is drained by Bantam River.

2.7 Governmental Structure and Capabilities

The City of Torrington has a number of existing authorities, policies, programs and regulations that serve to mitigate the impact of natural hazards. Existing local authorities include the Torrington City Council, Planning and Zoning Commission, Inland Wetlands Commission, Emergency Management Director, Fire Department, and Department of Public Works.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Torrington are concentrated within the downtown Torrington Historic District, the Midgeon Avenue Historic District, the Torringford Street Historic District, and the Water Street Historic District. Many other historic buildings are located throughout the community. Resources near flood sources may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources.
- Implement appropriate mitigation measures for those resources.
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible.
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts.

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

The primary transportation routes into and out of the city are Route 8 and Route 183 (running north-south), Route 4 (running east-west), Route 202 (running across the southeast corner of the City), and Route 272 (running to the northwest).

Northwestern Connecticut Transit District provides a local bus service called the Candystriper (Deviated Flexible Route Service), available in Torrington, Winsted and Litchfield.

Utilities

Public water in Torrington is primarily provided by the Torrington Water Company. A handful of small Non-Community Public Water Systems provide water to more rural areas, and some residents and businesses in those areas rely on private well water.

Eversource is the primary provider in the city for electricity and natural gas. According to geoISP (geoISP.com), there is one DSL provider in Town (AT&T), one Cable Providers (CSC Holdings), three Fiber Internet Providers (Fibertech Networks, LLC, Connecticut Education Network, and Level(3) Communications), and four Mobile Wireless Providers (AT&T, Verizon, Sprint, and T-Mobile).

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Torrington has identified several critical facilities throughout the city, as summarized on Table 2-3 below.

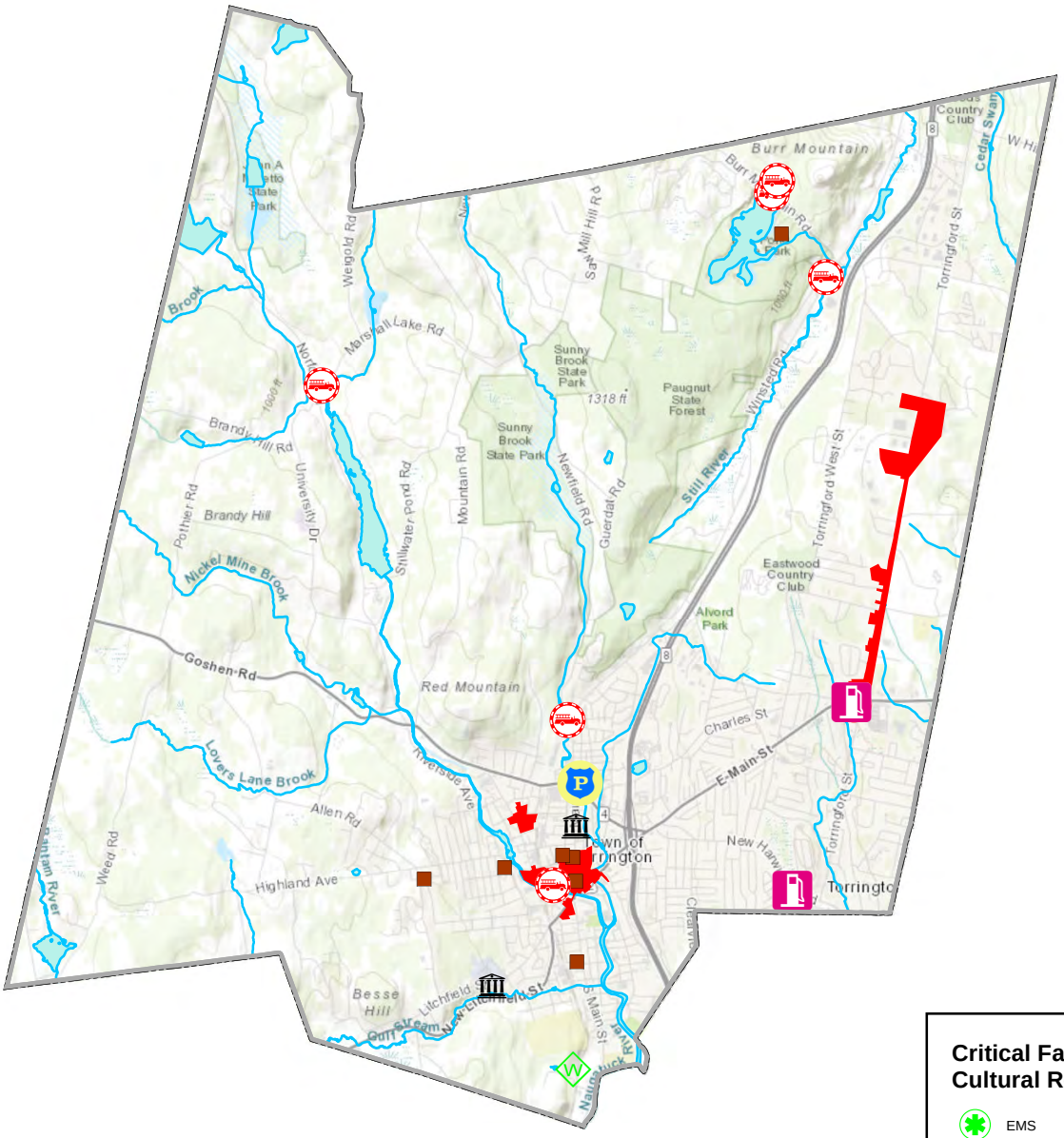
Table 2-3: Critical Facilities

Facility	Location	Comment	Emergency Power	Shelter	SFHA
Torrington City Hall	140 Main St	Administration	✓		
Torrington Fire Department HQ	111 Water St	Fire / PSAP / EOP	✓		
Torringford Volunteer Fire Department	1738 East Main St	Fire			
Drakeville Fire Department	1349 Marshall Lake Rd	Fire			✓
Torrington Fire Department - North End	899 Main St	Fire			✓*
Campion Ambulance	67 Colt Ave	Fire			
Torrington Police Department	576 Main St	Police			
Charlotte Hungerford Hospital	540 Litchfield Street	Hospital	✓		
Torrington Middle School	220 Middle School Dr	Regional Shelter	✓	✓	
Torrington High School	1 Major Besse Dr	Emergency Shelter	✓	✓	

Facility	Location	Comment	Emergency Power	Shelter	SFHA
Sullivan Senior Center	88 E Albert St	Emergency Shelter	✓	✓	✓*
Trinity Church	220 Prospect	Emergency Shelter	✓	✓	
Vogel Wetmore School	68 Church St	Emergency Shelter	✓	✓	
East School	215 Hogan Dr	Municipal Facility			
Torrington Area Health District	350 Main Street	Administration			
Torrington Library	12 Daycoeton Place	Municipal Facility			
Torrington Armory	153 S Main St	Municipal Facility			
Street Department	104 Arthur St	Municipal Services			✓*
Torrington Transfer Station	118 Old Dump Road	Municipal Services			✓*
Torrington Water Company	277 Norfolk Road	Municipal Utility	✓		
Pump Station #1 Cliffside (Lakeridge#2)	115 Cliffside Drive	Wastewater Treatment	✓		
PS #3 Ella Grasso (Ind Park #1)	49 Ella T. Grasso Ave	Wastewater Treatment	✓		
PS #2 Evergreen (Lakeridge #1)	105 Evergreen Drive	Wastewater Treatment	✓		
PS #4 Torringford Vol Fire (Repeater)	1738 E. Main St	Wastewater Treatment	✓		
PS #5 Harris Drive	21 Harris Drive	Wastewater Treatment	✓		✓
PS #6 Industrial Lane (Ind Park #2)	259 Industrial Lane	Wastewater Treatment	✓		
PS #7 King Street:	76 King St	Wastewater Treatment	✓		
PS #8 New Harwinton Rd	1115 New Harwinton Rd	Wastewater Treatment	✓		
PS #9 Middle School:	200 Middle School Drive	Wastewater Treatment	✓		
PS #11 Torringford St:	1788 Torringford St	Wastewater Treatment	✓		
PS #13 Cinnamon Ridge:	22 Clove Court	Wastewater Treatment	✓		
PS #15 Willowbrook:	699 S. Main St	Wastewater Treatment	✓		
PS #16 Torringford Farms:	330 Cedar Lane	Wastewater Treatment	✓		
PS #17 Burr Mt Tower (Repeater):	3278 Winsted Rd	Wastewater Treatment	✓		✓*
PS #18 Winsted Rd:	Winsted Rd	Wastewater Treatment	✓		
PS #19 Felicity Lane	Felicity Ln	Wastewater Treatment	✓		
WPCF	252 Bogue Rd	Wastewater Treatment	✓		✓
Torrington Health and Rehab	225 Wyoming Ave	Convalescent Home			
Torrington Dialysis	780 Litchfield St	Convalescent Home			
Valerie Manor	1360 Torringford St	Convalescent Home			
Concentra Health Center	333 Kennedy Dr	Convalescent Home			
Paradigm Health Care	80 Fern Dr	Convalescent Home			
Wolcott House Extended Care	215 Forest St	Convalescent Home			
Litchfield Woods Extended Care	255 Roberts St	Convalescent Home			
Burrville Regional Fire School	Burr Mountain Road	Emergency Response			
Milo's Apple House Enterprises LLC	1758 E Main St	Private Service Company	✓		
Borla's Service Station LLC	826 New Harwinton Rd	Private Service Company	✓		
Cumberland Farms	207 S Main St	Private Service Company	✓		
Cumberland Farms	1237 E Main St	Private Service Company	✓		
Sunoco	36 Migeon Ave	Private Service Company	✓		

* Partial or immediately adjacent

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CRITICAL FACILITIES AND CULTURAL RESOURCES

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FIG. 2-2

The major facilities at risk in the community in the event of a natural hazard include the Torrington Fire Department, the Torrington Police Department, the City's Middle School, High School and Elementary Schools, Torrington City Hall (which hosts the City's computer server), Public Works Garage, Torrington Fire Station on Migeon Avenue, Torrington Senior Center, the Torrington Armory, the Torrington Water Company Reservoirs, and the Sewer Treatment Plant. These are considered critical facilities in the event of a natural disaster because they might be needed for effective emergency response.

Torrington has also identified a set of privately-owned gas stations that can provide essential services during or following a natural hazard. These are also included on the list of critical facilities above.

All are potentially vulnerable to tornados, winter storms, wildfire, and earthquakes. None of the facilities are located within a floodplain. The high-pressure Tennessee Gas Line, which traverses the City below ground, is also considered a critical at-risk facility in the City.

At the time this HMP was being developed, the Water Pollution Control Facility (WPCF) was undergoing a comprehensive renovation, including floodproofing.

Emergency Response Capabilities

The Torrington Fire Departments, Department of Public Works, and Emergency Management Director all possesses emergency equipment that can be deployed as needed in the event of an emergency. Procedures are also in place to open and maintain the Emergency Operations Center and emergency shelter in town.

The Torrington Fire Department at 11 Water Street hosts the Litchfield County Dispatch, the City's emergency operations center, and some state E-911 equipment.

The Torrington Police Department on East Elm Street serves as the City's back-up dispatch center and emergency operations center.

The Torrington Armory is available as a major drop-off location for supplies.

Torrington has established a trained and equipped hazardous materials team for emergency response.

Sheltering Capabilities

The Torrington Middle School serves as the City's major emergency shelter, and the Torrington High School and Elementary Schools are available for back-up emergency shelters.

Torrington Senior Center serves as a primary emergency shelter for small incidents.

The Town is considering pursuing designation of East School as an additional emergency shelter.

The Torrington Armory has the capacity to provide some comfort station services, including showers; however, the building does not have emergency power and has limited accessibility for handicapped residents. The City is pursuing improvements.

Communications

Torrington continues to implement a public notification system to enhance public notification of emergency events and appropriate emergency response procedures.

Torrington has also been working with other towns in the Litchfield Hills Region through the Northwestern CT/Litchfield Hills Public Safety Task Force to enhance communication and coordination. This has included efforts to standardize communication equipment and the equipment in local emergency operation centers, and also the upgrading of supplies at emergency shelters. Other activities being pursued are a regionally coordinated public notification system, a badging registration system for emergency responders, improved training opportunities, and the development of written mutual aid agreements.

3 FLOODING

3.1 Existing Capabilities

Ordinances, Regulations and Plans

Land use regulations exist to protect natural resources, including erosion and sediment control regulations for new development, stormwater control regulations to minimize drainage problems, and an area of special flood hazard to control development in flood prone areas.

A registered professional engineer or architect is required to design and certify the construction of structures in the floodplain in order to minimize flood damage. Additionally, all attendant utilities or sanitary facilities should be located or designed to avoid infiltration or impairment by flood waters. Manufactured homes that are meant to remain within the flood area for more than 180 days are required have a permanent foundation and have the lowest floor above the base flood elevation.

Torrington's subdivision regulations have detailed standards for the planning, design and construction of storm drainage systems in order to minimize adverse impacts associated with new construction activity. The Torrington Inland Wetlands Commission enforces regulations to direct development away from wetlands, watercourses and floodplains.

A stormwater maintenance plan is required for all new commercial projects, and a report on performance of the stormwater maintenance system is required on an annual basis a report. This is a condition of approval for these projects.

NFIP, Flood Insurance, and Community Rating System

Torrington maintains compliance with NFIP through its use of the Connecticut State Building Code, city ordinances, subdivision regulations, and zoning regulations. In fact, its zoning regulations require that the lowest floor in any residential new construction or substantial improvement must be at least one foot above Base Flood Elevation (BFE). For non-residential, the lowest floor must also be at least one foot above BFE or flood-proofed to one foot above BFE. Torrington also maintains a Flood and Erosion Control Board. Torrington expects to continue participation in NFIP.

According to FEMA, there are 189 flood insurance policies in force in Torrington as of 6/30/2019 with an insurance value of $30,138,200. The previous edition of this HMP noted 200 flood insurance policies in force as of 8/31/15 with an insurance value of $33,430,000.

Drainage and Street Flooding

The Torrington Public Works Department routinely examines and clears public storm drains and catch basins of debris following periods of rainfall, snowfall, or windstorms. The town's DPW also monitors weather reports and maintains loaded trucks in preparation of winter storm events.

Structural Projects

A number of flood control projects have been constructed within the Naugatuck River watershed since the 1955 Flood. These flood control structures include the Hall Meadow Brook Dam on the West Branch of the Naugatuck River, the Newfield Road Dam on the East Branch of the Naugatuck River, selective channelization of the River through Downtown Torrington, and the construction of a network of dikes along the lower Naugatuck River in Torrington to control flow.

New Capabilities and Completed Actions

Torrington continues to maintain its strong flood mitigation capabilities.

The City has worked to address flooding along the Still River at Machuaga Drive and at Pinewoods Road.

The Water Pollution Control Facility (WPCF) was undergoing a comprehensive upgrade at the time this plan was being developed. The upgrade was to include floodproofing, including elevating electric stations and chemical systems above the 0.2% annual-chance flood elevation.

Summary

Torrington mitigates flood damages primarily through regulating development in floodprone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate.

3.2 Vulnerabilities and Risk Assessment

The Flood of 1955 had a devastating impact on the City. The flood took out numerous dams, structures, and bridges in the community, particularly in Downtown Torrington along the Naugatuck River.

Major concerns regarding flood hazards, as identified by Torrington staff, include:

- Drainage problems cause seasonal flooding at Oak Avenue and Albert Street, and at Vista Drive.
- Flooding along the Naugatuck River remains a concern despite flood control dams installed after the flood of 1955.
- The city has a large number of properties requiring flood insurance from FEMA. These properties will become increasingly difficult to maintain if flood insurance premiums increase.

Flood prone areas in the community today, as mapped by FEMA, are presented in

Figure 3-1.

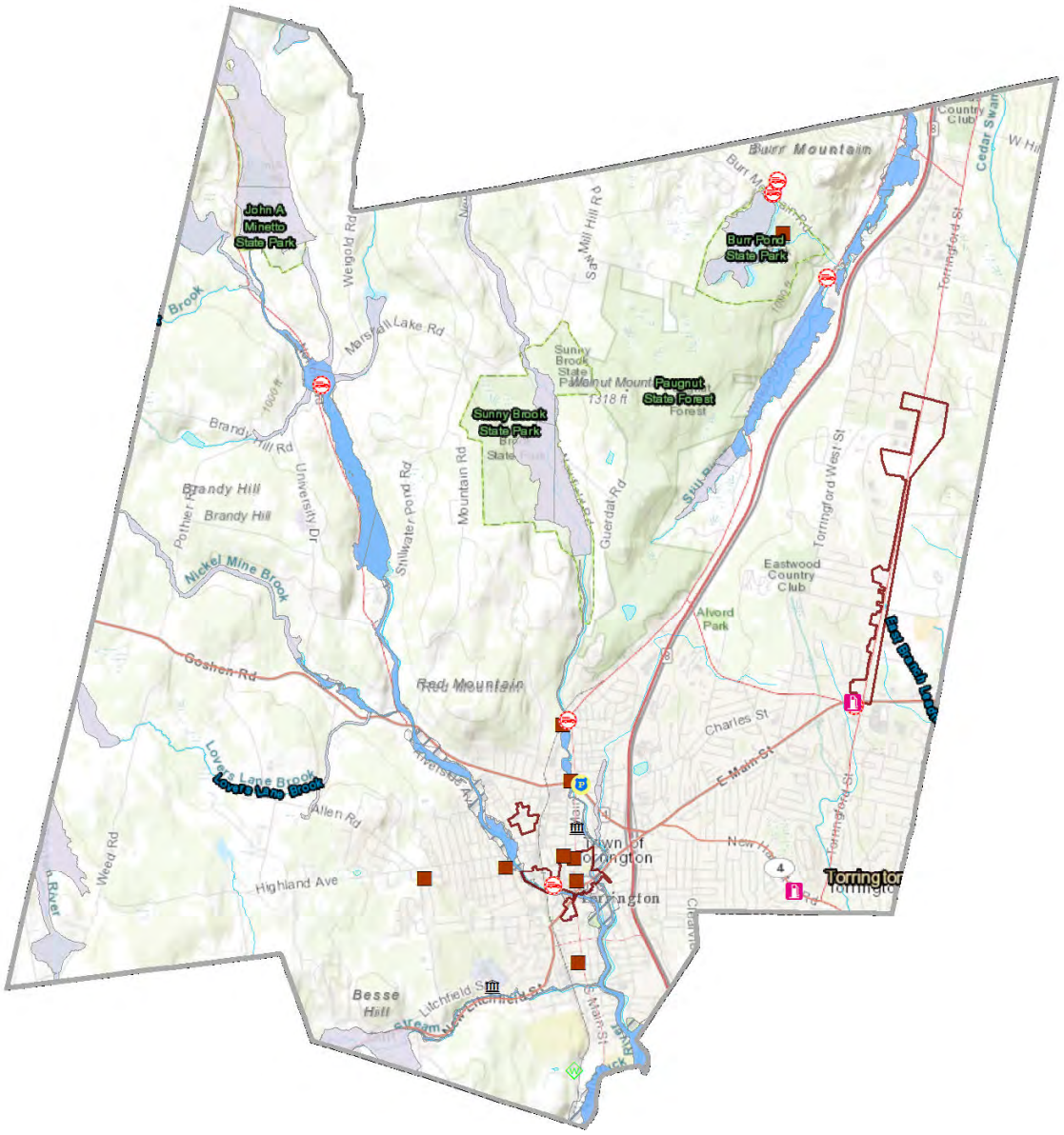
Flooding along the Naugatuck River remains an area of concern during major storm events due to properties located within the floodplain.

Other areas that are prone to frequent flooding include along the Still River at Machuaga Drive and at Pinewoods Road. Seasonal flooding also occurs at Oak Avenue and Albert Street, and at Vista Drive. Summer Street has reportedly experienced flooding problems in the past.

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Legend

- EMS
- Fire Station
- Gas Station with Generator
- Municipal Facility
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District

Flood Zone

- A
- AE
- X500

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FLOOD RISK AREAS

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FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing capabilities appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Torrington is 110 mph for a Category 1 event, 120 mph for a Category 2, and 125 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Eversource, the local electric utility, provides tree maintenance near its power lines.

New Capabilities and Completed Actions

Torrington continues to maintain its strong tropical cyclone mitigation capabilities.

The city requires gas stations have a generator on site, or at a minimum the capability for a hook up in the event of a power outage.

Summary

Torrington mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

Hurricanes have caused wide-spread power outages and could cause significant damage. Torrington suffered hurricane related damage from Storm Irene in August 2011 and Storm Sandy in October 2012. Both of these events caused significant power outages and the storms received Presidential Disaster Declarations. While Hurricane Irene cut-off power to just 12% of the city (a relatively low percentage in the region), that 12% represented 2,176 customers, a high number for the region.

Areas that are most vulnerable are those with greater levels of development.

The impact of Tropical Storm Isaias in August 2020 was significant for the City. Numerous critical facilities were impacted, with the ability for residents to access the facilities hindered, and backup power capabilities strained. There were over 100 roads blocked in the City, and debris removal was the highest-cost item during recovery. Because the storm occurred at the same time as the COVID-19 pandemic, sheltering capacities were already limited to avoid spread of the virus, compounding impacts on sheltering capabilities in the City.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Torrington as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

New Capabilities and Completed Actions

Torrington continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

Torrington mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the City of Torrington has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

The central and southern portions of the United States are at higher risk for lightning and thunderstorms than is the northeast. However, FEMA reports that more deaths from lightning occur on the East Coast than elsewhere. Lightning-related fatalities have declined in recent years due to increased education and awareness.

Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Torrington area is very high during any given thunderstorm although no one area of the city is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Torrington is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the City is believed to be low for any given year. All areas of the City are susceptible to damage from high winds.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Such fires can be extremely dangerous during the summer months during dry and drought conditions.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

An F2 tornado occurred on June 23, 2001, that resulted in over $15,000 in storm related damages and $7,000 in clean-up expenses. The tornado cut a path in the northeastern section of the City approximately 200 yards wide and one mile long. Numerous trees and wires were downed, and facility damage occurred at the Vito Colangelo Sports complex located at the Torrington Middle School.

According to Torrington's Emergency Management Director, there are typically 2-3 tornado warnings year in Torrington.

6 WINTER STORMS

6.1 Existing Capabilities

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas.

The City removes snow from municipally-owned roads. Torrington has a Winter Operations Plan, which includes plans for snow removal downtown. This has been put to use during past events. While some past snow events have adversely taxed the City's resources, the current snow removal capacity is adequate for regular event needs.

New Capabilities and Completed Actions

Torrington continues to maintain its strong winter storm mitigation capabilities.

A project is currently underway to install underdrains in certain areas to help reduce icing incidents.

Summary

Torrington mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

The natural hazard of greatest concern in Torrington is winter ice storms with high winds and power outages. Winter storms are a perennial concern with wide-ranging impacts. Snow covered roads take time and money to clear. Heavy snow, especially when accompanied by ice can cause roofs to collapse. Ice storms can also bring down power lines, causing outages.

A severe snowstorm occurred in March of 1978 that brought close to three feet of heavy snow. The town also suffered a major ice storm in 1978, and again in November 2002, that resulted in downed power lines, extensive tree damage, and expensive clean-up costs. The 2002 ice storm resulted in 98% of the City without power, continuous operation of the City Emergency Operations Center for 61 hours, approximately 61 road closures, declaration of a state of emergency, opening of emergency shelters for several days, and deployment of the National Guard. Total costs to the City as a result of this storm totaled nearly $400,000 according to City records for debris removal, protective measures, shelter operations, and damage to municipal property.

The snow storm of October 2011 left 99% of the town without power at its peak (18,528 customers). At least 90% of the town had no power for two days and at least 2,000 customers had no power for six days.

Areas with higher levels of development are at greater risk of roof collapses due to snow accumulation. Local roads must be plowed by the town and represent a potential cost from a snow storm. In total, Torrington maintains 190 miles of local roads. This is a large percentage of the region's local roads and represents a significant vulnerability.

Torrington personnel have noted that the city contains a dense grid of local roads that must be cleared of snow and ice during winter storms, representing a large potential liability. Icing is often a concern throughout the City. Snow removal is particularly a challenge in the downtown area, as high pedestrian and car traffic typically impact snow removal efforts.

7 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the City of Torrington. The City has adopted these codes for new construction, and they are enforced by the Building Official.

New Capabilities and Completed Actions

Torrington continues to maintain its earthquake and landslide mitigation capabilities.

Summary

Torrington mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the City of Torrington. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Torrington

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

Actions Completed and New Capabilities

Torrington continues to maintain its capabilities for mitigating and responding to dam failure risks.

Summary

Torrington mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential

- *Class C*: high potential hazard

As of 2020, there were 29 DEEP-inventoried dams within the City of Torrington. These dams are listed in Table 8-1 and shown in Figure 8-1.

Table 8-1: DEEP-Inventoried Dams in Torrington

Number	Name	Class	Owner
14301	HALL MEADOW BROOK FLOOD CONTROL DAM	C	State Owned
14302	REUBEN HART RESERVOIR DAM	C	Water Utility
14303	CRYSTAL LAKE DAM	B	Water Utility
14304	STILLWATER POND DAM	C	State Owned
14305	HART BROOK POND DAM	B	Water Utility
14306	OLD BRASS MILL POND DAM	BB	Land Trust
14307	GOODWIN POND DAM	C	Private Club
14308	BURR POND DAM	C	State Owned
14309	MIGEON POND DAM	BB	Institution
14310	ALLEN RESERVOIR DAM	BB	Water Utility
14311	WHIST POND DAM	BB	Water Utility
14312	MEADOW LAKE DAM	A	State Owned
14313	OULEOUT LAKE DAM	BB	Private Corporation
14314	FITZGERALD DAM	A	Private Corporation
14315	EAST PEARL ROAD DAM	A	Private
14316	CATCH DAM	A	Water Utility
14317	PATTERSON POND	-	Private Corporation
14318	PENN POND DAM	A	Water Utility
14319	BESSE POND SPILLWAY	A	Municipal
14320	TRAVIS POND DAM	A	Private Corporation
14321	ZAMPAGLIONE POND	A	Private
14322	EAST BRANCH FLOOD CONTROL DAM	C	State Owned
14323	BANTAM POND DAM	BB	Lake Association
14324	STEIN POND DAMS	BB	Private
14325	SKOKAN POND DAM	A	Private
14326	RICHARD POND DAM	A	Private
14327	MAZZARELLI POND DAM	BB	Private
14328	HERSH POND DAM	BB	Private
14329	WEST BRANCH NAUGATUCK RIVER LEVEE	C	Municipal

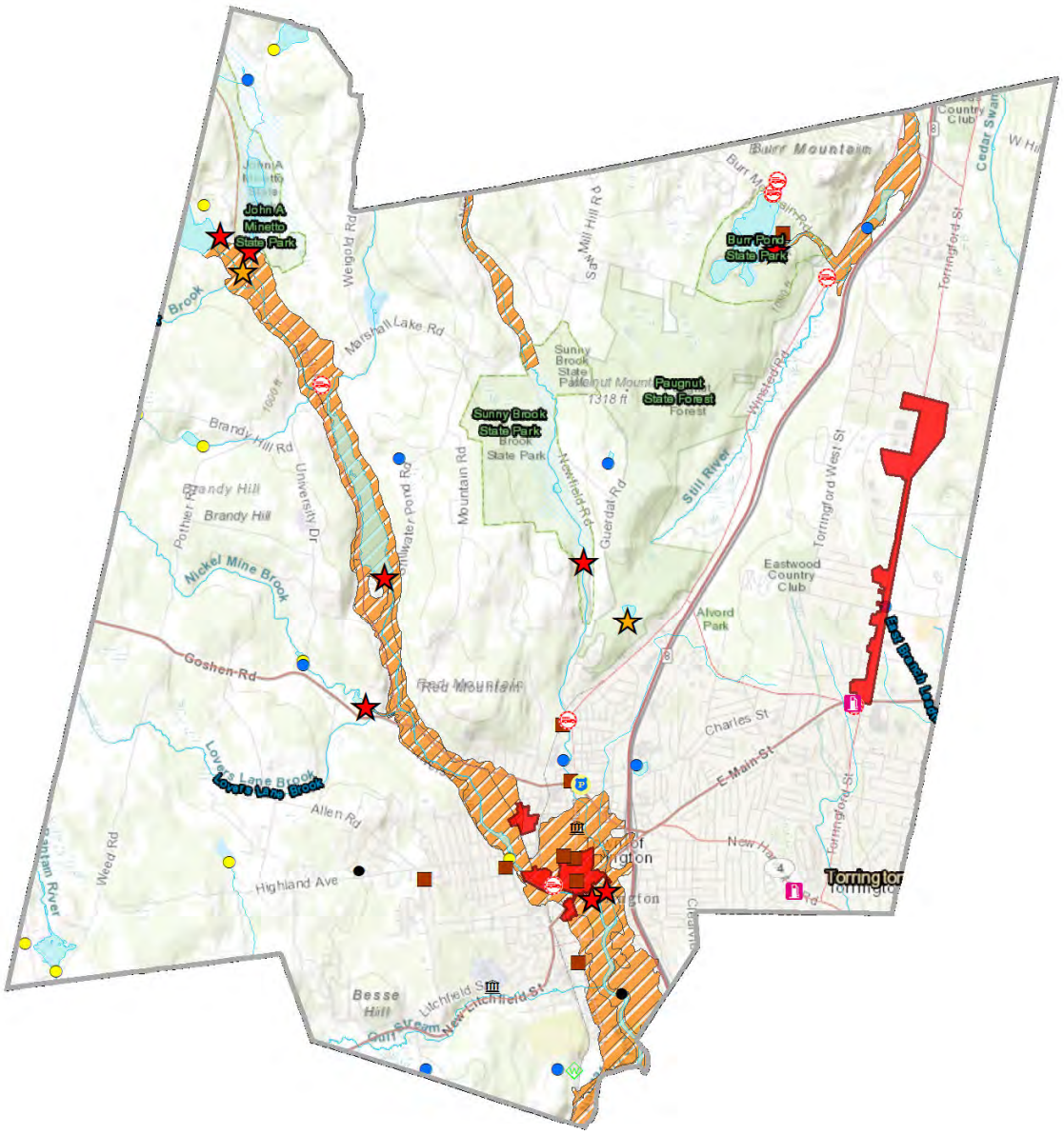
Beaver Dams

Beaver dams also contribute to localized flooding problems on a regular basis. The construction of beaver dams on private properties have proven difficult to remove at times due to the permission that is required from affected property owners.

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DAM FAILURE RISK AREAS

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FIG. 8-1

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the city. The City of Torrington is compliant with this program and has a designated Burning Official.

Torrington has several resources for wildfire capacity, including water tankers and water storage cisterns.

Actions Completed and New Capabilities

Torrington continues to maintain its capabilities for mitigating and responding to wildfire risks.

Summary

The City mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

The extensive forests and fields in the western and northwestern portions of Torrington are prime locations for a wildfire. The many areas of Town where development has occurred adjacent to forestland are at an elevated risk of damage from wildfires. Such areas that are also located far from firefighting water sources are at highest risk.

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Legend

- EMS
- Fire Station
- Gas Station with Generator
- Municipal Facility
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - TORRINGTON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,000 6,000
Feet

SCALE 1 " = 7,032 '
DATE 5/10/2021
3843-06
PROJ. NO.

FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

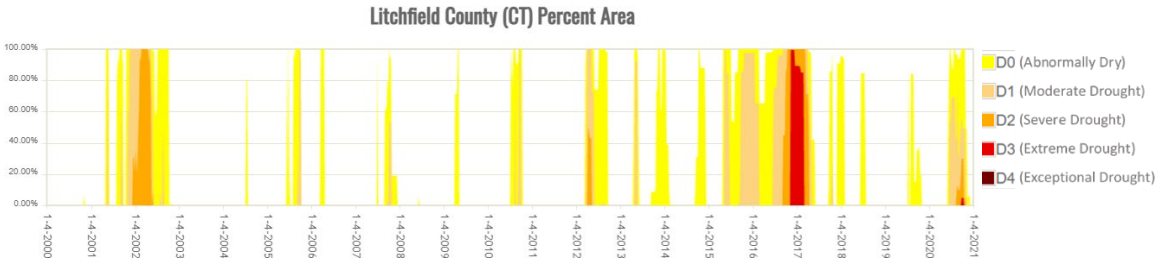


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

City officials are concerned about the future impacts of droughts under worsening climate conditions. During past drought events, some residents have raised concerns regarding their private wells and water availability issues. City officials believe that education about drought and wildfire hazards needs to be improved.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Description	Party	Status	Notes
1.1	Visit schools and educate children about natural hazards and how to prepare for them.	Fire, EMD	Carry Forward with Revision	City is not able to visit schools to implement this action because of staff capacity limits. Revise: Coordinate with Torrington Schools to incorporate natural hazard preparedness education into curriculum.
1.2	Make literature available on natural hazards and preparedness at Torrington City Hall and the City Library.	EMD	Capability	City believes focus on making information available through the city website is more effective; staff is always working to incorporate state resources into the website (this is a capability). New Action: Develop a program to perform education and outreach efforts regarding natural hazards to individuals with special medical needs.
1.3	Maintain local Emergency Operations Plan and continue to coordinate with the Regional Public Safety Task Force and Red Cross on community planning, preparedness, response, and training.	EMD	Capability	There is a bi-annual review and submission. Plans have been put into action on a regular basis considering recent pandemic. City staff is continuously involved in both regional and local plans.
1.4	Continue to invest in the Emergency Notification System to provide emergency information to residents of the entire City or in a specific geographic area. This notice can provide not only warning of an impending situation but also information regarding how to prepare for a particular event.	EMD	Capability	City currently uses the LCD Everbridge system to notify residents. New Action: Investigate opportunities to increase public alert and notification capabilities.
2.1	Routinely inspect emergency response equipment, and train for response to natural disasters.	Fire, EMD	Capability	Capability. Training includes using WebEOC and crisis track across all city departments. Training also includes reviewing pre-storm preparation actions, inspecting generators, pumps, and portable systems.

#	Description	Party	Status	Notes
2.2	Acquire additional emergency response equipment including a generator for City Hall and the Armory, and needed communication equipment.	EMD, Fire	Complete	City has installed a generator ay City Hall. Wastewater pump stations and the WPCF also have backup power. The City owns two trailer-mounted portable generators, and three other small portable generators. The Armory is still in need of a generator. Carry Forward: Install a backup generator at The Armory.
2.3	Pursue funding for an elevator or ramp at the Armory to move emergency equipment to and from the basement, and to facilitate public access	EMD	Carry Forward	This action has not yet been pursued due to funding limitations. City wishes to carry forward.
2.4	Promote the use of interoperable communication equipment, and the development of standard operating procedures for emergency response in the regional area.	EMD, Fire, Police, Mayor	Carry Forward	The City is in the planning phase of transitioning to a State system for emergency communications. This is reportedly a robust and costly system that would allow and promote communication with neighboring towns and cities. This is a high priority to the City.
2.5	Consider developing a Memorandum of Understanding with schools or school bus company to utilize school buses for mass transportation during an emergency.	EMD	Carry Forward with Revision	City staff report that there is currently an informal agreement; the City would like to update and formalize this agreement. Carry forward.
2.6	Continue GIS capabilities as needed for access to aerial photos showing the number and location of properties and structures that could be affected by a natural disaster.	EMD, Fire, Police, Mayor	Capability	The city is continuously updating and improving GIS capabilities. Flooding, public safety infrastructure, and sewer infrastructure are mapped and integrated.
3.1	Implement control measures to mitigate the flooding created by beavers.	PW	Capability	PW has an ongoing program to address the concern.
3.2	Develop clean-out schedules for all catch basins and drainage facilities.	PW	Carry Forward with Revision	The City has informal schedules that it follows; however, it has identified a need to establish and revise schedules in certain districts. Several drainage structures are known to be overgrown and in need of proper maintenance. There are also some catch basins that are not city-owned and need to be inspected or maintained, since property owners are not adequately maintaining them. Revise: Develop a comprehensive storm drainage maintenance plan and procedures. New Action: Develop an outreach and program to educate private property owners about the importance of, and best practices for, storm drainage system maintenance.

#	Description	Party	Status	Notes
3.3	Identify the location of structures that are susceptible to flooding to facilitate risk assessment and potential control measures.	DEMHS or DEEP	Carry Forward with Revision	Identify any critical facilities, or pump stations, roads (Summer St.), infrastructure. *Potentially referring to dams since DEEP is the target responsible party – questioned which structures this refers to.
3.4	Pursue funding to augment the municipal tree trimming program.	EMD, PW	Capability	There is budget for tree removal in the annual operating budget.
3.5	Pursue funding to prepare a roadside tree inventory to better document the health and condition of trees and to facilitate their removal if hazardous.	Tree Warden, PW	Complete	The City is currently in the process of conducting a public tree inventory and incorporating new streetscapes. The City would like to pursue additional funding, if possible, for assistance with this program. The City is also exploring incorporation of tree maintenance efforts into construction projects.
3.6	Establish a 3–5-acre area for the storage of debris resulting from natural hazards such as tornadoes, and for snow from major snow-storms.	EMD, PW	Complete	Three sites have been identified and approved by DEEP. These sites are used for snow and green debris, and have been incorporated as fixed sites. The City is also working on a debris management plan. New Action: Develop a debris management plan.
3.7	Install gauges along the Naugatuck River to better monitor river levels during flooding events.	EMD, PW	Carry Forward with Revision	The city has not yet completed this action due limited funding. Action is carried forward. A new action is added: Install river crest gauges in public locations with high visibility (for example, painted onto bridge abutments), in order to raise public awareness of flood risks, and provide information to city officials about water levels. Additional new action: Investigate Naugatuck River gauge data, and use statistical analysis to update flood crest recurrence levels in local emergency plans.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The City proposed to initiate several new mitigation actions for the upcoming five years.

- Perform a comprehensive inventory of flood-prone roadways and sites throughout Torrington.

- Conduct a public education campaign to improve resident awareness and understanding of water conservation efforts, including landscaping and property maintenance techniques to both reduce water usage and mitigate wildfire risk.
- Expand wildfire-fighting water sources, including through installation of water cisterns or tanks, or acquisition of tanker equipment, in areas not served by public water.
- Develop a program to perform education and outreach efforts regarding natural hazards to individuals with special medical needs.
- Coordinate with Torrington Schools to incorporate natural hazard preparedness education into curriculum.

Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action TOR-01	
Develop a comprehensive storm drainage maintenance plan and procedures.	
Lead	DPW
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Med

Action TOR-02	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action TOR-03	
Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action TOR-04	
Develop a debris management plan.	
Lead	PW
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action TOR-05	
Create an updated and formalized agreement with the local school bus companies to utilize school buses for mass transportation during an emergency.	
Lead	EMD
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action TOR-06	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action TOR-07	
Coordinate with Torrington Schools to incorporate natural hazard preparedness education into curriculum.	
Lead	EMD; School
Cost	$0 - $25,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2023
Priority	Low

Action TOR-08	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action TOR-09	
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, Sustainable CT
Timeframe	2022 – 2024
Priority	High

Action TOR-10	
Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Med

Action TOR-11	
Contact the owners of Repetitive Loss Properties and nearby properties at risk to inquire about mitigation undertaken and suggest options for mitigating flooding in those areas. This should be accomplished with a letter directly mailed to each property owner.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Med

Action TOR-12	
Develop an outreach and program to educate private property owners about the importance of, and best practices for, storm drainage system maintenance.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action TOR-13	
Install river crest gauges in public locations with high visibility (for example, painted onto bridge abutments), in order to raise public awareness of flood risks, and provide information to city officials about water levels.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action TOR-14	
Conduct a public education campaign to improve resident awareness and understanding of water conservation efforts, including landscaping and property maintenance techniques to both reduce water usage and mitigate wildfire risk.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action TOR-15	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action TOR-16	
Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action TOR-17	
Complete a comprehensive inventory of municipally-owned structures, critical facilities, and critical infrastructure sites, that are susceptible to flooding. Include this list in the next HMP update.	
Lead	DPW; EMD
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action TOR-18	
Expand wildfire-fighting water sources, including through installation of water cisterns or tanks, or acquisition of tanker equipment, in areas not served by public water.	
Lead	EMD, Fire
Cost	$50,000 - $100,000
Funding	OB, FEMA Assistance to Firefighters Grant
Timeframe	2023 – 2025
Priority	Med

Action TOR-19	
Promote the use of interoperable communication equipment, and the development of standard operating procedures for emergency response in the regional area.	
Lead	EMD
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action TOR-20	
Investigate opportunities to increase public alert and notification capabilities.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action TOR-21	
Install a backup generator at The Armory.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action TOR-22	
Completed installation of underdrains in areas known to experience icing problems in the winter, in order to remove water from the road before icing can occur.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	Med

Action TOR-23	
Install gauges along the Naugatuck River to better monitor river levels during flooding events.	
Lead	EMD, PW
Cost	$25,000 - $50,000
Funding	CT DEEP, NOAA
Timeframe	2024 – 2026
Priority	Low

Action TOR-24	
Investigate Naugatuck River gauge data, and use statistical analysis to update flood crest recurrence levels in local emergency plans.	
Lead	EMD, PW
Cost	$25,000 - $50,000
Funding	CT DEEP, NOAA
Timeframe	2024 – 2026
Priority	Low

Action TOR-25	
Pursue funding for an elevator or ramp at the Armory to move emergency equipment to and from the basement, and to facilitate public access	
Lead	EMD
Cost	$50,000 - $100,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Low

Action TOR-26	
Complete efforts to designate East School as an emergency shelter.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Low

Action TOR-27	
Complete comprehensive renovation of the Water Pollution Control Facility, including floodproofing elements.	
Lead	DPW
Cost	More than $1 million
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
TOR-01	Develop a comprehensive storm drainage maintenance plan and procedures.	Maintenance	DPW	$0 - $25,000	OB	2022 – 2023	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
TOR-02	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
TOR-03	Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
TOR-04	Develop a debris management plan.	Tree and Debris Management	PW	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	0	1	0	0	0	0	0	0	0	5
TOR-05	Create an updated and formalized agreement with the local school bus companies to utilize school buses for mass transportation during an emergency.	Evacuation Bus	EMD	$0 - $25,000	OB	2022 – 2023	1	0.5	1	0	1	0	0	0	0	0	0	0	0	0	4
TOR-06	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
TOR-07	Coordinate with Torrington Schools to incorporate natural hazard preparedness education into curriculum.	School Education	EMD; School	$0 - $25,000	OB, CT DEMHS	2022 – 2023	1	0	0	1	1	1	0	0	0	-1	0	0	0	0	4
TOR-08	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
TOR-09	Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	Sustainable CT	Planning	$25,000 - $50,000	OB, Sustainable CT	2022 – 2024	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
TOR-10	Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	RLP	Planning	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
TOR-11	Contact the owners of Repetitive Loss Properties and nearby properties at risk to inquire about mitigation undertaken and suggest options for mitigating flooding in those areas. This should be accomplished with a letter directly mailed to each property owner.	RLP	Planning	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
TOR-12	Develop an outreach and program to educate private property owners about the importance of, and best practices for, storm drainage system maintenance.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
TOR-13	Install river crest gauges in public locations with high visibility (for example, painted onto bridge abutments), in order to raise public awareness of flood risks, and provide information to city officials about water levels.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
TOR-14	Conduct a public education campaign to improve resident awareness and understanding of water conservation efforts, including landscaping and property maintenance techniques to both reduce water usage and mitigate wildfire risk.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
TOR-15	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
TOR-16	Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
TOR-17	Complete a comprehensive inventory of municipally-owned structures, critical facilities, and critical infrastructure sites, that are susceptible to flooding. Include this list in the next HMP update.	Study	DPW; EMD	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
TOR-18	Expand wildfire-fighting water sources, including through installation of water cisterns or tanks, or acquisition of tanker equipment, in areas not served by public water.	Wildfire Risk Reduction	EMD, Fire	$50,000 - $100,000	OB, FEMA Assistance to Firefighters Grant	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	0	0	6
TOR-19	Promote the use of interoperable communication equipment, and the development of standard operating procedures for emergency response in the regional area.	Emergency Communication	EMD	$50,000 - $100,000	OB, CIP, CT DEMHS	2023 – 2025	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3
TOR-20	Investigate opportunities to increase public alert and notification capabilities.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4
TOR-21	Install a backup generator at The Armory.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
TOR-22	Completed installation of underdrains in areas known to experience icing problems in the winter, in order to remove water from the road before icing can occur.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
TOR-23	Install gauges along the Naugatuck River to better monitor river levels during flooding events.	Flood Monitoring	EMD, PW	$25,000 - $50,000	CT DEEP, NOAA	2024 – 2026	0	1	1	0	1	0	0	0	0	-1	0	-1	0	0	2
TOR-24	Investigate Naugatuck River gauge data, and use statistical analysis to update flood crest recurrence levels in local emergency plans.	Flood Monitoring	EMD, PW	$25,000 - $50,000	CT DEEP, NOAA	2024 – 2026	0	1	1	0	1	0	0	0	0	-1	0	-1	0	0	2
TOR-25	Pursue funding for an elevator or ramp at the Armory to move emergency equipment to and from the basement, and to facilitate public access	Sheltering Capabilities	EMD	$50,000 - $100,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0	0	1	1	0	0	0	0	0	0	0	0	0	3
TOR-26	Complete efforts to designate East School as an emergency shelter.	Sheltering Capabilities	EMD	$25,000 - $50,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
TOR-27	Complete comprehensive renovation of the Water Pollution Control Facility, including floodproofing elements.	Critical Facility Protection	DPW	More than $1 million	CIP, FEMA Grant, CT DEMHS	2025 – 2027	1	1	0	0	1	0	1	0	0	0	0	0	-1	0	4

APPENDIX B

RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
CITY OF TORRINGTON CITY COUNCIL

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the City of Torrington has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the City of Torrington City Council approved the previous version of the Plan in _____; and

WHEREAS, the City of Torrington and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the City of Torrington; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the City of Torrington, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the City of Torrington eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the City Council:

1. The Plan is hereby adopted as an official plan of the City of Torrington;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the City Council.

Adopted this _____ day of _____, 2021 by the City Council of City of Torrington, Connecticut

_____
Mayor

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the City of Torrington this _____ day of _____, 2021.

_____
City Clerk

APPENDIX C

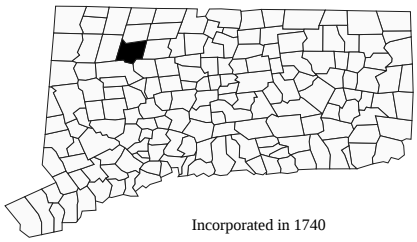
2019 CERC TOWN PROFILE

Torrington, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
140 Main Street
Torrington, CT 06790
(860) 489-2228

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1740

Demographics

Population

	Town	County	State
2000	35,202	182,193	3,405,565
2010	36,383	189,927	3,574,097
2013-2017	35,078	184,454	3,594,478
2020	36,787	193,116	3,604,591
'17 - '20 Growth / Yr	1.5%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	40	921	4,842
Pop./Sq. Mile (2013-2017)	882	200	742
Median Age (2013-2017)	45	47	41
Households (2013-2017)	14,907	74,605	1,361,755
Med. HH Inc. (2013-2017)	$61,313	$76,438	$73,781

	Town	State
Veterans (2013-2017)	2,689	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	1,621	5%	3,806	11%	3,421	10%	8,593	24%	11,163	32%	6,474	18%	35,078	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	28,928	164,992	2,446,049
Black Non-Hisp	879	2,843	350,820
Asian Non-Hisp	1,232	3,516	154,910
Native American Non-Hisp	12	267	5,201
Other/Multi-Race Non-Hisp	648	2,320	84,917
Hispanic or Latino	3,379	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	9.8%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	9,136	35%	673,582	27%
Associates Degree	2,613	10%	188,481	8%
Bachelors or Higher	5,920	23%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	1,066	14,828
23 - Construction	87	832
31-33 - Manufacturing	66	2,294
44-45 - Retail Trade	140	2,605
62 - Health Care and Social Assistance	170	3,507
72 - Accommodation and Food Services	89	947
Total Government	35	1,743

Top Five Grand List (2018)

	Amount
Connecticut Light & Power Co	$45,704,720
Yankee Gas Service Co AU 71	$30,707,390
Torrington Water Company The	$20,772,590
Dudrow Torrington LLC	$17,292,280
GG TORRINGTON LLC 15/16 & TIC (fka) Torrington Triplets LLC	$13,918,460
Net Grand List (SFY 2016-2017)	$1,946,867,839

Major Employers (2014)

Charlotte Hungerford Hospital
VNA Health Care Inc
Valerie Manor
White Flower Farm Inc
Walmart

Education

2018-2019 School Year

	Grades	Enrollment
Torrington School District	PK-12	3912

Pre-K Enrollment (PSIS)

	2018-2019
Torrington School District	97

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Torrington School District	82.8%	85.5%	80.6%

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	49.2%	53.8%	33.4%	51.3%	26.7%	43.0%
ELA	48.7%	53.1%	50.4%	54.9%	48.2%	56.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Torrington School District	13.5%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	91.0%	84.0%	86.8%
Private	9.0%	16.0%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Torrington, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Mayor - Council

Total Revenue (2017)	$137,123,889	Total Expenditures (2017)	$132,304,747	Annual Debt Service (2017)	$3,718,057
Tax Revenue	$87,997,590	Education	$81,823,240	As % of Expenditures	2.8%
Non-tax Revenue	$49,126,299	Other	$50,481,507	Eq. Net Grand List (2017)	$2,798,903,684
Intergovernmental	$43,002,447	Total Indebtedness (2017)	$26,996,654	Per Capita	$81,038
Per Capita Tax (2017)	$2,541	As % of Expenditures	20.4%	As % of State Average	53.7%
As % of State Average	86.7%	Per Capita	$782	Moody's Bond Rating (2017)	Aa3
		As % of State Average	31.1%	Actual Mill Rate (2017)	45.75
				Equalized Mill Rate (2017)	31.35
				% of Net Grand List Com/Ind (2017)	16.9%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	17,094	88,068	1,507,711
% Single Unit (2013-2017)	53.9%	73.6%	59.2%
New Permits Auth (2017)	1	142	4,547
As % Existing Units	0.0%	0.2%	0.3%
Demolitions (2017)	11	32	1,403
Home Sales (2017)	302	1,753	21,880
Median Price	$160,200	$250,100	$270,100
Built Pre-1950 share	37.3%	31.2%	29.3%
Owner Occupied Dwellings	9,975	57,330	906,798
As % Total Dwellings	66.9%	76.8%	66.6%
Subsidized Housing (2018)	1,786	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	29	57	536
$100,000-$199,999	204	563	5,237
$200,000-$299,999	63	538	6,681
$300,000-$399,999	5	315	3,863
$400,000 or More	1	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$896	$995	$1,123
Cost-burdened Renters	44.4%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	18,273	101,000	1,827,070
Residents Unemployed	901	4,014	78,242
Unemployment Rate	4.7%	3.8%	4.1%
Self-Employed Rate	8.8%	13.0%	10.0%
Total Employers	1,066	6,177	122,067
Total Employed	14,828	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Torrington, CT	5,144	Torrington, CT	5,144
Winchester, CT	771	Waterbury, CT	781
Waterbury, CT	555	Hartford, CT	756
Harwinton, CT	457	Litchfield, CT	670
New Hartford, CT	386	Winchester, CT	653
Litchfield, CT	366	Farmington, CT	523
Bristol, CT	353	Bristol, CT	423

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	1,506	1,777
Violent	151	228

Disengaged Youth (2013-2017)

	Town	State
Female	1.8%	4.2%
Male	8.7%	5.6%

	Town
Library circulation per capita	2.27

Distance to Major Cities

	Miles
Hartford	23
Providence	88
New York City	91
Boston	114
Montreal	257

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Gas Provider
Eversource Energy
(800) 989-0900

Water Provider
Municipal Provider
Local Contact

Cable Provider
Cablevision of Litchfield, Inc.
(860) 567-3103

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

WARREN, CT



50 Cemetery Road
Warren, CT 06754

MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 Torrington Road
Goshen, CT 06756
(860) 491-9884
https://northwesthillscog.org

Prepared by:
SLR CONSULTING
99 Realty Drive
Cheshire, Connecticut 06410
(203) 271-1773
www.slrconsulting.com

global **environmental** and **advisory** solutions

SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Warren and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Warren is located in central Litchfield County and is home to a population of approximately 1,457. Warren is bordered by the municipalities of Cornwall to the north, Litchfield to the east, Washington to the south, and to the west by Kent.

The topography of the town is characterized by a generally rolling terrain with high plateaus, steep slopes and river and stream valleys. The town is home to Lake Waramaug, one of Connecticut's most pristine water resources as well as the Upper Shepaug Reservoir and Shepaug Reservoir which are located in the eastern portion of the town. The varying terrain of Warren makes the town vulnerable to an array of natural hazards.

2.2 Existing Land Use

The land area of Warren is approximately 27.6 square miles with 1.2 square miles consisting of water. Warren is characterized as an agricultural community with a low-density population. Since the 1800's the town has remained largely agricultural with minimal commercial and industrial uses. In fact, less than one percent of the land in Warren is used for commercial purposes.

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 78% of Warren is forested and approximately 6.0% is developed.

Table 2-1: 2015 Land Cover by Area

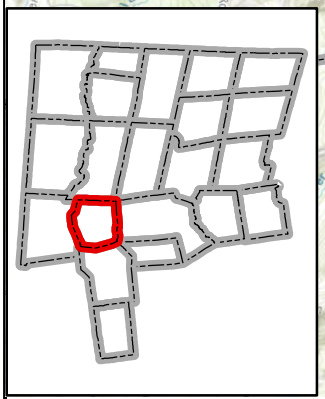
Land Cover	Area (acres)	Percent of Community
Developed	1,051	5.97%
Turf & Grass	312	1.77%
Other Grass	97.8	0.56%
Agricultural Field	1,422	8.08%
Deciduous Forest	11,183	63.55%
Coniferous Forest	1,886	10.72%
Water	910	5.17%
Non-Forested Wetland	123	0.70%
Forested Wetland	605	3.44%
Tidal Wetland	0.0	0.00%
Barren	8.4	0.05%
Utility Row	0.0	0.00%
Total	**17,597**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

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Date Saved: 5/7/2021

Document Path: Y:\3843-06\Maps\TownLocations.mxd



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

REGIONAL LOCATION: WARREN

HAZARD MITIGATION PLAN UPDATE - WARREN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,500 7,000
Feet

SCALE	1 " = 7,893 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-1

2.3 Development Trends

The Town of Warren was settled in 1737 as part of the Town of Kent. In 1750, a separate Parish of East Greenwich was established and in 1786, Warren was incorporated as a separate Town. For most of its history Warren has been an agricultural town and it still boasts working farms.

The 2010 U.S. Census reported a population in Warren of 1,461 individuals. U.S. Census Bureau estimates for 2019 show a population around 1,457 individuals, a decrease from 2010 of 0.3%. The Connecticut State Data Center predicts that population will increase by 9.3% through 2025 to an estimated population of 1,592 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Warren remained steady between 2013 and 2017. The number of permits issued in 2013 and 2014 was 1 and 2, respectively, while 1 permits were issued in 2016, and 0 permits were issued in 2017. On average, 1 housing permits were issued each year in Warren between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Warren rose by approximately 4-percent between 2010 and 2019, from 811 units in 2010 to 845 units in 2019. In 2019, the housing stock was made up of approximately 99% single-unit structures, 0% two-unit structures, 1% multi-unit structures, and 0% mobile-homes or other types of structures.

According to the Connecticut Office of Policy and Management, Warren's 2019 Total Equalized Net Grand List was valued at $381,796,290. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Warren, included as Appendix C.

Development in Warren has historically been limited and typically centered on small residential subdivisions. The "Sandcastle" subdivision was slated to consist of five homes. Of the five, only one home has been built to date. The "Fox Fire" subdivision, which consists of five homes, has been constructed on Countryside Lane. Commercial enterprises in the town are very limited.

Future development within the town may be generated by the needs of the residents. Based on the Town POCD, residents are encouraging the development of a "town center" which would allow them to obtain goods and services locally. This desire for a stronger town center may provide opportunities for future residential and commercial growth within the town.

Warren has a great deal of vacant land throughout the town. According to the 2009 POCD, 44% of the land area of Warren is not developed or committed. "When the 44% undeveloped land is combined with the 29% that is dedicated as open space and the 10% that is used for agricultural purposes, approximately 83% of the town is undeveloped."

While there is certainly acreage in the town for additional growth, it is unlikely that development would occur on much of the land due to unsuitable construction conditions such as steep slopes, wetlands and/or floodplains. The POCD states that "while the land use estimates that there were

7,738 acres which were vacant or uncommitted, not all of this land is easily developable. In fact, about 2,003 acres contain some type of significant physical constraint such as: wetlands, watercourses, slopes >25% or 100-year flood zones."

Future growth within the town will need to be addressed in a manner that is in the best interest of the town by maintaining the overall character and rural feel of the community. Overall, development in Warren has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the next five years is not expected to increase exposure.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Warren is considered to have a low level of social vulnerability in all four SVI categories. The category of Household Composition & Disability has a somewhat higher score than other categories. In other words, a challenge in Warren may include the presence of residents who need additional assistance during a disaster event due to disabilities.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Warren.

The amount of stratified glacial meltwater deposits present in a community is important as areas of stratified materials are generally coincident with inland floodplains. These materials were deposited at lower elevations by glacial streams, and these valleys were later inherited by the larger of our present-day streams and rivers. Oftentimes these deposits are associated with public water supply aquifers or with wetland areas that provide significant floodplain storage. However, the smaller glacial till watercourses throughout Warren can also cause flooding. The amount of stratified drift also has bearing on the relative intensity of earthquakes.

Warren is underlain by relatively hard metamorphic and igneous bedrock including a variety of gneiss, schist, and marble and granite. The bedrock formations trend generally to the south. No mapped fault lines underlie Warren.

Warren is covered primarily by glacial till. Glacial till contains an unsorted mixture of clay, silt, sand, gravel, and boulders deposited by glaciers as a ground moraine. The deposits are generally less than 50 feet thick although deeper deposits of till are scattered across the hillier sections of the town. Stratified glacial meltwater deposits are related to the various water bodies in town, particularly the Shepaug River. These deposits primarily contain stratified sands and gravels.

2.5 Climate and Climate Change

Over the course of the year, the temperature in Warren typically varies from 17°F to 81°F and is rarely below 2°F or above 88°F. The warm season lasts from May 29 to September 15, with an average daily high temperature above 71°F. The cold season lasts from December 1 to March 10, with an average daily high temperature below 42°F.

Precipitation falls throughout the year in Warren. The wetter season lasts from April 9 to August 21, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on May 29. The drier season lasts from August 21 to April 9. The smallest chance of a wet day is 22% on January 29.

The most rain falls during the 31 days centered around June 4, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.4 inches.

The snowy period of the year lasts for 5.8 months, from October 25 to April 19, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.3 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature
Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Warren as 4.72 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Warren at 5.50 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.7	5.9	8.3
NOAA Atlas 14	5.5	6.8	8.9

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Warren can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.0 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

Warren is divided among the following six subregional drainage basins: the Housatonic River, Kent Falls Brook, West Aspetuck River, East Aspetuck River, Shepaug River and West Branch Shepaug.

The majority of the drainage basins have FEMA-defined Special Flood Hazard Areas (SFHAs) along the primary watercourses. Such areas consist of 1% annual chance storm floodplains without elevations, 1% annual chance storm floodplains with elevations, and 0.2% annual chance floodplains. Refer to Section 3 for more detail regarding SFHAs.

Housatonic River

The Housatonic River drains an area of 1,948 square miles from Pittsfield, Massachusetts to Milford, Connecticut where it empties into Long Island Sound. The river flows a total of 134 miles from its upper reach to the sound with 1,234 square mile of the total drainage area existing in Connecticut. Only a very small section of the Housatonic River main stem drainage basin lies in Warren, along its northern boundary with Cornwall.

Kent Falls Brook

Kent Falls Brook originates in Warren at Gritman Pond, where downstream it merges with other tributaries to flow to the west. Gritman Pond Dam is classified as a moderate hazard dam and holds back the flow of the Kent Falls Brook forming the pond. More than halfway through the river course, Kent Falls Brook converges with a branch of several small unnamed tributaries and the main channel then orientates the flow northwest into the Housatonic River. Some of the tributaries in the headwaters are bordered by 100-year floodplains but the primary channel of Kent Falls Brook does not contain 100-year floodplains.

West Aspetuck River

The headwaters of the West Aspetuck River begin just before North and South Spectacle Ponds located in eastern Kent. The outflow of North Spectacle Pond flows east into Beaman Pond and then south with several merging tributaries including a stem joining just below Beaman that drains a section of Warren. Denman and Merryall Brook merge with West Aspetuck River in New Milford and just before pouring into the Housatonic, and then East Aspetuck River merges into the West Aspetuck. The entire sub regional watershed drains an area of approximately 25 square miles, although only a small portion lies within Warren.

East Aspetuck River

Lake Waramaug is located at the Warren-Washington town line. The lake is the origin of the East Aspetuck River and has several input tributaries including Lake Waramaug Brook, which is locally known as Sucker Brook. About a third of Warren drains into Lake Waramaug by means of Sucker Brook. The East Aspetuck River flows out of the lake's southern tip in the neighboring town of Washington with a southerly orientation, running parallel to Route 202 until it reaches the Housatonic River about ten miles from the start.

West Branch Shepaug River

The northeast section of Warren is dominated by the West Branch Shepaug River drainage basin and the Upper Shepaug Reservoir. The headwaters of the West Branch of Shepaug River begin upstream in Cornwall. The river continues for a short stretch in Warren before forming the Upper Shepaug Reservoir. A short distance below the Upper Shepaug Reservoir, the river forms the Shepaug Reservoir with the main stem of the Shepaug River. Out of approximately 10.5 square miles of total drainage area, around three quarters are in Warren, with the rest to the north in Cornwall, all feeding the Upper Shepaug Reservoir.

Shepaug River

Originating at the Shepaug Reservoir on the Warren-Litchfield town line, the Shepaug River flows directly south creating the lower east boarder of Warren. The Shepaug Reservoir is held back by the Shepaug River Dam which is classified as a high hazard dam. The Shepaug River continues to meander south through Washington and Roxbury with input from many streams and rivers including Bantam River, Bee Brook, Mallory Brook and other tributaries. After the rivers 26 mile stretch from its origin, it flows into the Housatonic River. The entire river is bordered by 100-year floodplains generally widening as the channel gets closer to the mouth.

2.7 Governmental Structures and Capabilities

The Town of Warren is governed by a Selectman-Town Meeting form of government in which legislative responsibilities are shared by the Board of Selectmen and the Town Meeting. The First Selectman serves as the chief executive.

In addition to Board of Selectmen and the Town Meeting, there are boards, commissions and committees providing input and direction to Town administrators. Also, Town departments provide municipal services and day-to-day administration. Many of these departments play a role in hazard mitigation, including the Planning, Zoning and Inland Wetland Administrator, Building Official, the Fire Department, Emergency Management, and the Highway Department/Town Garage.

Drainage complaints are routed through the First Selectman's office before being sent to the Town Garage. These complaints are usually received via phone, fax, mail, or email and are recorded in a logbook. The complaints are investigated as necessary until remediation surrounding the individual complaint is concluded.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Warren are concentrated near Warren Center, and include homes, schools, The Academy, the Warren Community center, the Warren Fire Company House, the Old Warren Center Cemetery, and the Warren General Store. Resources near flood sources, including Clover Mill, the Robert A. Cairns Reservoir Dam, and the cemetery, may be particularly susceptible to damage from flooding.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources.
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts.

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

The primary transportation routes into and out of the town are Route 45 traveling north-south, and Route 341 running east-west. Other key roads include Brick School Road and North Kent Road, and other Town roads reaching some more remote parts of the community. There is no local public transit system in Warren.

Utilities

The public water available in Sharon is provided by one Community Water System (Arrow Point Water Company), and a small number of Non-Community Public Water Systems. The vast majority of residents and businesses rely on private well water. No public sewage system operates in Town; residents and businesses rely on septic.

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Warren.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Warren has identified seven critical facilities throughout the town. Table 2-3 identifies those critical facilities. The Town considers its fire, governmental, and major transportation arteries to be its most important critical facilities since these are needed to ensure that emergencies are addressed while day-to-day management of Warren continues.

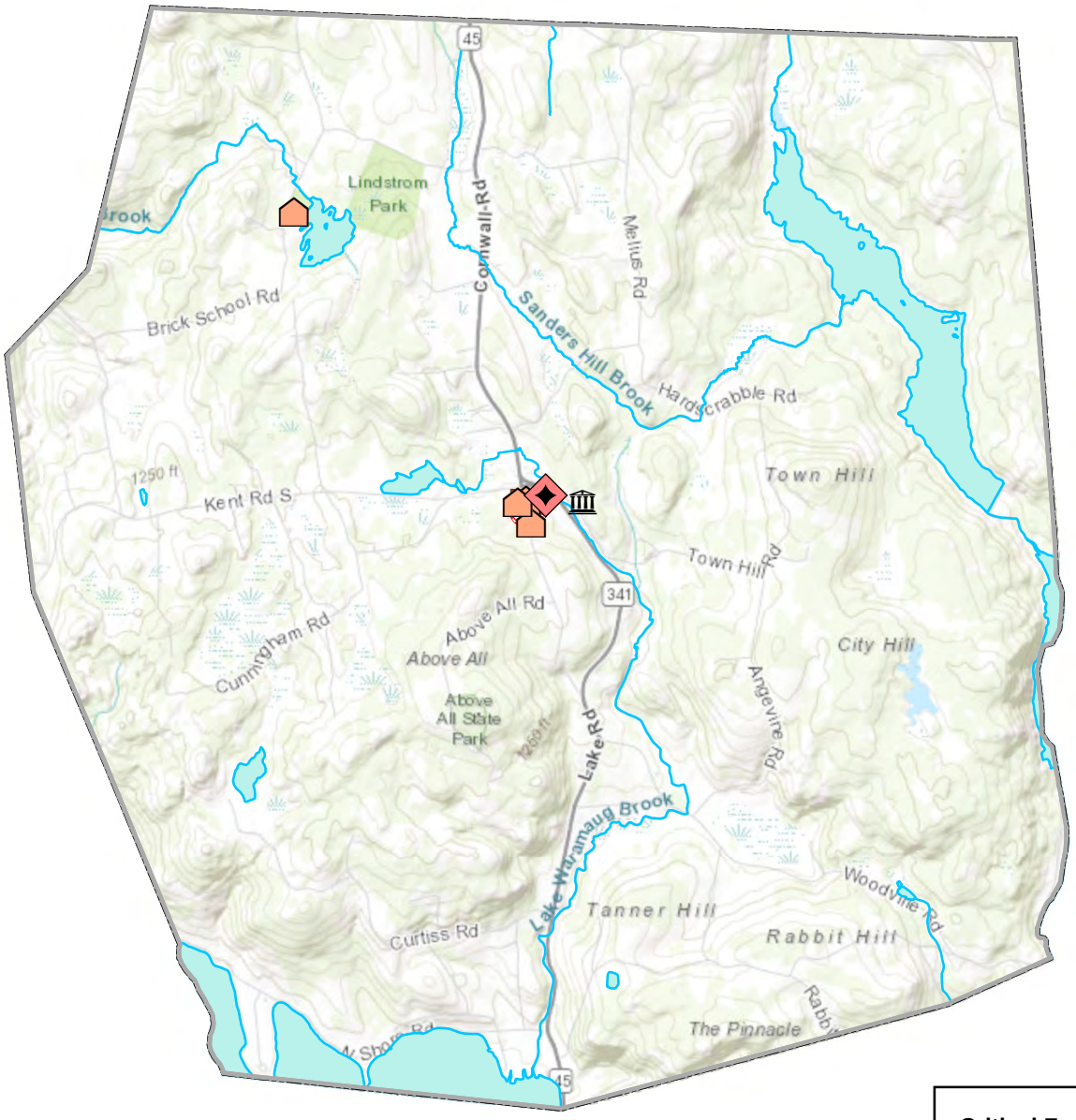
Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Fire Department Headquarters	11 Sackett Hill Road	Emergency Operations Center	✓	✓	
Town Hall	50 Cemetery Road	Critical Records, Backup EOC Secondary Shelter	✓	✓	
Warren Community Center	7 Sackett Hill Road	Primary Shelter	✓	✓	
Warren Academy	8 Sackett Hill Road	Quarantine Shelter	✓	✓	
Warren Woods	251 Brick School Road	Large-Animal Shelter		✓	
Warren Town Garage	18 Lake Road	Emergency Response Assistance	✓		
Warren Elementary School	21 Sackett Hill Road				

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Critical Facilities & Cultural Resources

- Shelter
- EMS
- Emergency Response
- Fire Station
- Municipal Facility
- National Register Building

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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - WARREN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
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GOSHEN, CT 06756

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FIG. 2-2

Emergency Response Capabilities

Emergency response capabilities are overseen by the Emergency Management Director (EMD). The Director develops plans, protocols, and procedures that assure the safety of Warren's citizens. The Director also provides training for emergency response personnel, supports state and local emergency response exercises, and provides technical assistance to state and local emergency response agencies and public officials. The goal is to provide citizens with the highest level of emergency preparedness before, during, and after disasters or emergencies. Warren has hired a new EMD since adoption of the previous HMP.

The Town's Emergency Operations Center (EOC), including its Emergency Communications Center, is located at Fire Department Headquarters. The Town Hall is also a critical facility and acts as the backup EOC if needed.

Emergency services can also be cut off by fallen trees or washed-out culverts during certain emergencies. The Town Garage performs tree and shrub removal and trimming on Town-owned lands and rights-of-way. During emergencies and following storms, the Town Garage, responds to calls related to downed trees.

Warren Social Services coordinates with the Fire Department and EMS to perform wellness checks on certain residents during severe weather events, including extreme cold days. These checks are primarily completed by phone, but personnel will visit residents in-person as needed. This program was utilized during the power outages following Tropical Storm Isaias in 2020. Social Services provides information on its website, including a sign-up form for special needs that would require help in an emergency or evacuation.

Emergency Sheltering

There are three identified shelters in the town. The Warren Community Center on Sackett Hill Road is the primary shelter for the town. The Warren Town Hall is the Town's Secondary Shelter.

Warren Academy on Sackett Hill Road is considered a "quarantine" shelter that can be used to house people in the event that a segment of the population needs to be separated from other shelter uses for health reasons; this type of need was highlighted during natural hazard events that occurred during the COVID-19 pandemic. This shelter is not used during normal emergency operations.

Warren Woods is used as an animal shelter, and the barn on the site is able to house large animals such as cows and horses. This facility does not have standby power and is not used to shelter humans. Warren is interested in installing emergency power at this facility to allow use of its kitchen and dining facilities during an extended power outage.

In previous years, Warren Elementary School has been identified as an overflow shelter; however, this facility has no backup power and therefore cannot be used as a shelter. The Town is interested in installing emergency power at the Warren Elementary School to enable sheltering;

however, this facility is part of a regional school district, complicating the Town's ability to move such a change forward.

Emergency Communications

Litchfield County Dispatch (LCD) is the new primary emergency dispatch center for the Town, and runs a reverse-911 system that the Town can utilize.

Warren also utilizes the State of Connecticut "CT Alert" Emergency Notification System to send geographically specific telephone warnings into areas at risk for natural hazard damage. Information on registering for CT Alert is posted on the front page of the Town website.

Town officials report that communication remains problematic in Warren. Not many people are believed to have subscribed to CTAlert system. The town can send email blasts, but this action is not helpful when power is out.

Warren is working with a telecommunications tower company to install a cellphone tower on Town-owned property, leased to the company. The success of this effort would improve cellphone reception, and therefore emergency alert capabilities, in the Town. At the time of plan adoption, Warren was working on finding cellular providers interested in installing their equipment on the proposed tower.

3 FLOODING

3.1 Existing Capabilities

Warren has *Zoning Regulations* and *Subdivision Regulations* that regulate development, and *Inland Wetland Regulations* that regulate activities near wetlands. While regulations have not been updated to specifically address hazard mitigation, the DEEP's model regulations were used to update the regulations as necessary.

Ordinances, Regulations, and Plans

Regulations, codes, and ordinances that apply to flood hazard mitigation in conjunction with and in addition to NFIP regulations include:

- ***Zoning Regulations***. The 2012 *Town of Warren Zoning Regulations* have been enacted to "lessen congestion in the streets; secure safety from fire, panic, flood and other damages; to promote health and general welfare; to provide adequate light and air; to prevent the overcrowding of land; to avoid undue concentration of the population and to facilitate the provision of transportation, water, sewage, schools, parks and other public requirements."

  Section 11 of the zoning regulations is essentially the town's local version of the NFIP Regulations. Section 11.1.1 requires new residential and commercial buildings are required to be elevated to the base flood elevation plus one foot.

- ***Inland Wetlands and Watercourse Regulations***. The purpose of the 2012 inland wetlands and watercourses regulations is to protect the quality of the inland wetlands and watercourses within the Town of Warren by making provisions for the protection, preservation, maintenance, and use of inland wetlands and watercourses, including deterring and inhibiting the danger of flood and pollution.

  - Section 2 defines "Regulated Activities" "means any operation within or use of a wetland or water course involving removal or deposition of material, or any obstruction, construction, alteration or pollution, of such wetlands or watercourses, but shall not includes the activities in section 22a-40 of the Connecticut General Statues and section 4 of these regulations. Furthermore, any clearing, grubbing, filling, grading, paving, excavating, constructing, depositing, or removing of material and discharging of storm water on the land within the following upland review areas is a regulated activity.
  - Section 4.1 states that no residential homes will be permitted "as of right" in wetlands and watercourses after July 1, 1987.
  - Section 6 states that no person may conduct or maintain a regulated activity without obtaining a permit. Section 7 outlines the permit application requirements.

- ***Plan of Conservation and Development.*** This 2019 document is the Town vision statement for future development.

- Goal 4 calls for protection of natural and water resources town wide. Specific actions include:
  - Develop a Warren=specific Low-Impact Development Manual and incorporate it into regulations.
  - Identify and develop strategies to protect environmentally sensitive land, particularly regional habitat/forests, prime farmland soils, and wetlands.
  - Encourage dedication of open space to allow for public access.
- Goal 6 calls for meeting the needs of older adult residents. Objectives include:
  - Improve communications-related infrastructure in order to facilitate access to both emergency and routine medical care.
  - Ensure adequate transportation offerings are available for the Town's older residents.
- Goal 7 calls for investing in community facilities and recreation. Actions include:
  - Support and encourage recruitment of volunteer fire personnel through the CT "Everyday Hero" program.
  - Continue ongoing maintenance and updates to fire and emergency response apparatus.

- ***Subdivision Regulations.*** Effective in 2006 and last amended in 2010, the Town of Warren's Subdivision Regulations are intended to provide for orderly development within the Town in accordance with the Town POCD. The regulations focus on maintaining the character of the town, providing appropriate utilities, providing a safe and convention road system. Conservation of natural resources, encourage the use of energy efficient methods, provide flood protection and control soil erosion and sedimentation.

  - Section 5.3 requires that land to be subdivided be "of such character that it can be used for building purposes without danger to health or the public safety: proper provision shall be made for water supply, sewage disposal, absence of flood and erosion hazards, open space, vehicular and pedestrian safety and accessibility for emergency services."
  - Section 7.0 requires that the storm water drainage system shall provide for drainage from the entire parcel and shall take into account land outside the parcel that drains across the parcel.

The intent of these regulations is to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas of the Town of Warren by the establishment of standards designed to:

- Protect human life and public health.
- Minimize expenditure of money for costly flood control projects.
- Minimize the need for rescue and relief efforts associated with flooding.
- Minimize prolonged business interruptions.
- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone, and sewer lines; and streets and bridges located in floodplains.
- Maintain a stable tax base by providing for the sound use and development of floodprone areas in such a manner as to minimize flood blight areas.
- Ensure that purchasers of property are notified of special flood hazards.

- Ensure the continued eligibility of owners of property in Warren for participation in the NFIP.

NFIP, Flood Insurance, and Community Rating System

The degree of flood protection established by the variety of regulations in the Town exceeds the minimum reasonable for regulatory purposes under the NFIP because one foot of freeboard is required by Section 11 of the Zoning Regulations. The Town is not enrolled in the Community Rating System program.

According to FEMA, there are 16 flood insurance policies in force in Warren as of 6/30/2019 with an insurance value of $3,141,900.

Drainage and Street Flooding

There are areas of minor street flooding throughout the town, and these are addressed by the Highway Garage as necessary. These typically relate to small areas and result in limited, if any, property impacts.

The Highway Garage is in charge of the maintenance of the town's drainage systems and performs clearing of bridges and culverts and other maintenance as needed. Drainage complaints are routed to the Office of the First Selectman and the Highway Garage. The Town uses these reports to identify potential problems and plan for maintenance and upgrades.

Additionally, the Town maintains an ongoing list of culverts that need replacement, planned out over the coming years. Replacements are primarily upgrades, rather than in-kind replacement. The Town is currently working on upgrading the College Farm Road. The culvert is expected to be replaced with large box culverts or an open-bottomed structure. The project should be completed by 2022.

Communications

The Departments of Fire and Emergency Services are responsible for monitoring local flood warnings. The Town can access the National Weather Service website at http://www.weather.gov/ to obtain the latest flood watches and warnings before and during precipitation events.

The National Weather Service issues a flood watch or a flash flood watch for an area when conditions in or near the area are favorable for a flood or flash flood, respectively. A flash flood watch or flood watch does not necessarily mean that flooding will occur. The National Weather Service issues a flood warning or a flash flood warning for an area when parts of the area are either currently flooding, highly likely to flood, or when flooding is imminent.

New Capabilities and Completed Actions

Warren continues to maintain its strong flood mitigation capabilities.

The Lake Waramaug Task Force (LWTF) is active in assessing and addressing issues, including bank erosion and sediment accumulation, within the Lake Waramaug watershed. The LWTF recently completed a full survey of Sucker Brook (Lake Waramaug Brook) from Lake Waramaug up to the brook's headwaters, and is currently working on Sucker Brook streambank stabilization and collaboration with streamside property owners on limiting erosion into the stream.

The Town reports that one of the two RLPs previously identified in Town has been mitigated; the property was sold, and the new owners tore down the existing structure and constructed a new building at a higher elevation.

Since adoption of the previous HMP, the Town has replaced a number of culverts with upgraded structures, including:

- ❑ The Sanders Hill Brook culvert under Hardscrabble Road
- ❑ The Curtiss Road Culvert
- ❑ The Reed Road Culvert

Summary

In summary, the Town primarily attempts to mitigate future flood damage and flood hazards by restricting building activities in flood prone areas. This process is carried out through both the Planning and Zoning and the Inland Wetlands Commissions. All watercourses are to be encroached minimally or not at all to maintain the existing flood-carrying capacity. These regulations rely primarily on the FEMA-defined 1% annual chance flood elevations to determine flood areas.

Warren also mitigates flood damages by performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate.

3.2 Vulnerabilities and Risk Assessment

This section discusses specific areas at risk to flooding within the Town. As shown in the historic record, flooding can impact a variety of river corridors and cause severe damages in the Town of Warren. Flooding due to poor drainage and other factors is also a persistent hazard in the Town and can cause minor infrastructure damage and create nuisance flooding of yards and basements.

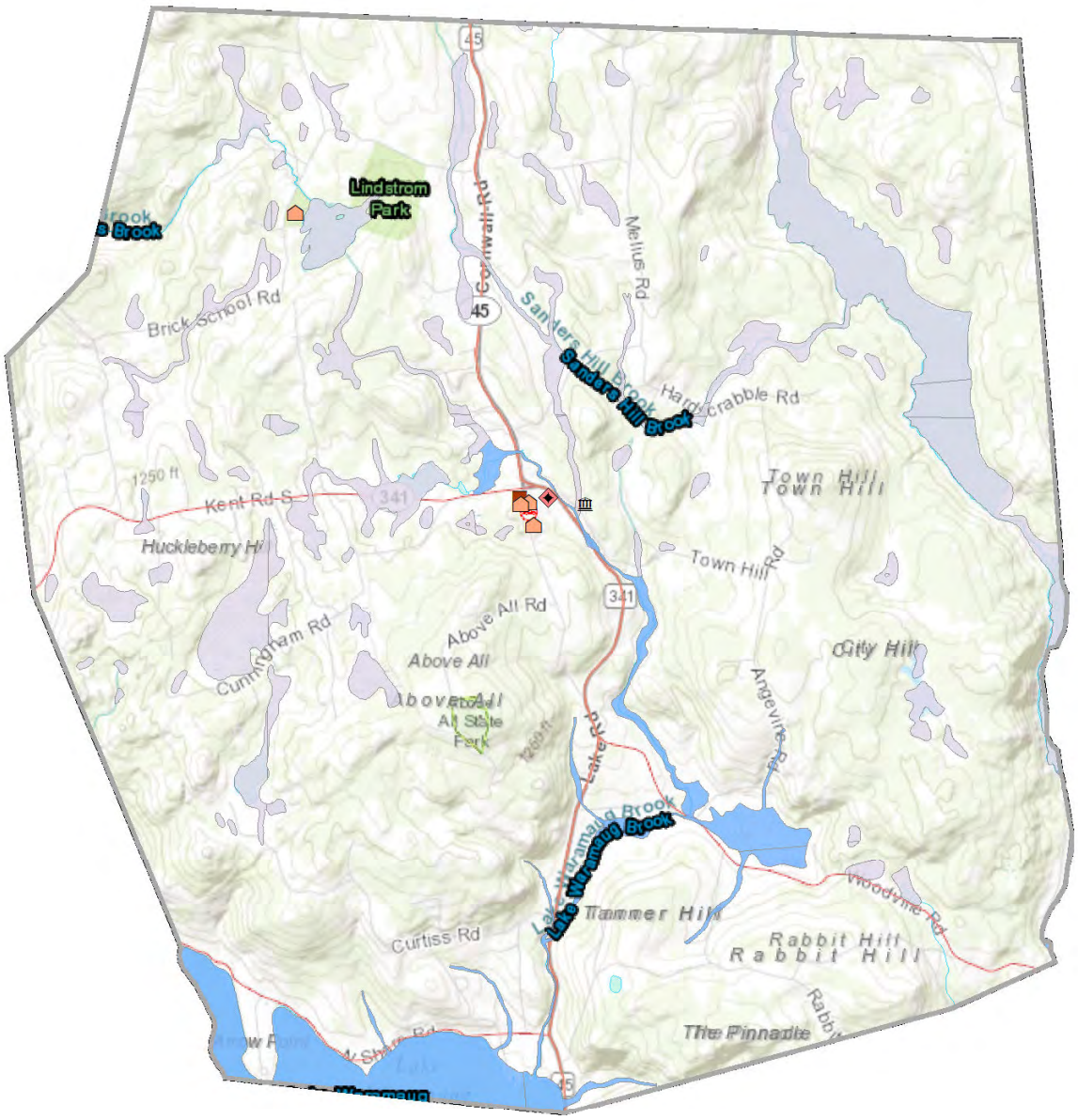
Repetitive Loss Properties

One repetitive loss property (RLP) is located in Warren; previously two properties were listed, but one has since been mitigated. Both properties are listed in the table below.

Table 3-1: Repetitive Loss Properties

Type	Flooding Source	Mapped Floodplain
Residential	Sucker Brook	AE to rear of home
Residential	Unknown – home is near Lake Waramaug	AE to rear of home

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Legend

- Shelter
- EMS
- Emergency Response
- Fire Station
- Municipal Facility
- National Register Building

Flood Zone

- A
- AE
- D

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FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - WARREN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 3-1

The repetitive loss property near Sucker Brook is probably affected by Sucker Brook flooding. This brook flooded during Tropical Storm Irene, for example. A few homes in this stream corridor have flood risk. The repetitive loss property near Lake Waramaug is not familiar to town officials. The home is situated much higher than the lake, but may experience basement or drainage-related flooding.

Vulnerability Analysis of Critical Facilities

The list of critical facilities provided by the Town (Section 2) was compared with the parcel data to accurately locate each critical facility throughout the Town. None of the critical facilities were found to lie within the 1% annual chance floodplains.

Vulnerability Analysis of Areas Along Watercourses

The majority of the brooks in the town pose a risk from flooding. The Shepaug River and the Sucker Brook pose the greatest flood risks to people, buildings and infrastructure. Town staff report that their primary road-stream-crossing related problems occur with the State-road culverts located near Lake Waramaug.

The most frequently flooded areas in the town are adjacent to the Sucker Brook corridor. According to town officials, this brook flooded during tropical storm Irene and a few homes in this area are at risk from flooding.

Siltation in Lake Waramaug has been identified as an issue in the past. A large area has filled in with silt, and municipal officials believe this is potentially reducing the flood storage capacity of the pond. The Town would like to obtain a grant to remove the sediment. It is important to understand that in most cases, sediment removal does not improve the ability of a lake to mitigate flooding unless the impoundment was specifically designed to provide flood abatement (i.e., a flood control impoundment). However, understanding the concerns of the Town of Warren, this plan will support strategies related to siltation in the lake.

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing mitigation measures appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Warren is 105 mph for a Category 1 event, 115 mph for a Category 2, and 125 mph for a Category 3, 4 or 5 hurricane event. Warren has adopted the Connecticut Building Code as its building code.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Parts of tall and older trees may fall during heavy wind events, potentially damaging structures, utility lines, and vehicles. The Town has a tree warden and owns some tree maintenance equipment. The tree warden assists in managing all trees on Town-owned property, including within the street rights-of-way. The Town also hires an arborist on a day-by-day basis to take care of trees and libs. The Town increased its budget in 2020 to enable it to deal with the large number of dead Ash trees (due to the Emerald Ash Borer). After the 2020 Tropical Storm there were a number of oak trees with hanging limbs. Overall, the Town's tree management capabilities are sufficient.

Eversource, the local electric utility, provides tree maintenance near its power lines. In an effort to speed up clean up processed after storms, the Town would like to work closely with Eversource to ensure faster response times to shut off live wires.

During emergencies, the Town currently has four designated emergency shelters available for residents as discussed in Section 2.

During Tropical Storm Irene, the Town used the CT Alert Everbridge system to notify all residents in the SFHA that they may evacuate and use one of the shelters. Prior to severe storm events, the Town ensures that warning/notification systems and communication equipment are working properly and prepares for the possible evacuation of impacted areas.

New Capabilities and Completed Actions

Warren continues to maintain its strong tropical cyclone mitigation capabilities. The Town has significantly increased its tree maintenance budget in recent years, specifically to address the large number of dead ash trees.

The Town has performed significant tree trimming and removal work along Curtiss Road to remove weak or dead ash trees that could have significant impact on utility services when they fell over. This is expected to have mitigated some of the risk along this corridor.

Summary

Warren mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the

frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

The Town of Warren is vulnerable to hurricane damage from wind and flooding. Wind damage from hurricanes and tropical storms can affect all areas of Town, while areas susceptible to flooding are even more vulnerable. Wind risks include flying debris, damage to trees and utility lines, road blockages, fires started by downed power lines, and direct impacts on structures.

In general, as the residents and businesses of the state of Connecticut become more dependent on the internet and mobile communications, the impact of hurricanes on commerce will continue to increase. A major hurricane has the potential of causing complete disruption of power and communications for up to several weeks, rendering electronic devices and those that rely on utility towers and lines inoperative.

All areas of growth and development increase the town's vulnerability to natural hazards such as hurricanes although new development is expected to mitigate potential damage by meeting the standards of the most recent building code. Most of Warren's existing housing stock predates the current code, and therefore has an elevated susceptibility to damage from high winds.

Tropical Cyclone Vulnerability

One of the top natural-hazard issues identified by the Town is the risk posed by its many dead-end roads. These roads can be blocked off by debris following severe storm events, and power to buildings along those roads can be cut off.

The Town has in the past considered the area along Curtiss Road to be a high-risk area during heavy wind events. This was largely due to weak or dead ash trees that have significant impact on utility services when they fall over. Town staff report that significant tree trimming and removal work has been completed along this road, which is expected to have reduced some of the risk.

Critical Facility Vulnerability

The Town is uncertain whether any Town-owned critical facilities have wind-mitigation measures installed to specifically reduce the effects of wind. Thus, it is believed that most of the critical facilities in the town are as likely to be damaged by hurricane-force winds as any other. Many of the Town's older structures may not meet current building code with respect to wind; however, the town hall is relatively new, with modern construction (2010), and is believed more resilient with regard to wind damage. The town hall is pictured to the right.



As the Town of Warren is not affected by storm surge, hurricane sheltering needs have not been calculated by the U.S. Army Corps of Engineers for the town. The Town determines sheltering need based upon areas damaged or needing to be evacuated within the town. Under limited emergency conditions, a high percentage of evacuees will seek shelter with friends or relatives rather than go to established shelters. During extended power outages, it is believed that only 10% to 20% of the affected population of the town will relocate while most will stay in their homes until power is restored. In the case of a major (Category Three or above) hurricane, it is likely that the Town will depend on state and federal aid to assist sheltering displaced populations until normalcy is restored.

Tropical Storm Isaias

The most significant recent natural hazard event to impact Warren was Tropical Storm Isaias in 2020. This high wind event caused significant damage to trees and utility lines, but no private property damage was reported.

The primary challenge the Town faced was the presence of downed, live power lines that Town personnel were unable to address; the Town had to wait for Eversource to arrive and "make safe" these wires, and this often took a very long time. The Town also experienced disagreements with Eversource regarding prioritization of power line repairs. Town staff reported one example of this disagreement: an elderly resident who lives on a dead-end road (and has had multiple instances in the past in which emergency health services were required) was identified as Priority 1 by the Town, but as Priority 2 by Eversource; this resident's road was completely blocked off by downed power lines for four days following Isaias, presenting a major health risk to the resident.

On September 21 of 2020, Town staff reported that there was still one property with a downed tree on the power line connecting the house to the grid, which had not yet been addressed by Eversource. Town staff reported that they were waiting to see what PURA would decide with regards to the Eversource response to this storm, and how that may change the utility's operations in the future.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Warren as explained in Section 4.0. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

Municipal responsibilities relative to summer storm and tornado mitigation and preparedness include:

- ❑ Developing and disseminating emergency public information and instructions concerning tornado, thunderstorm wind, lightning, and hail safety, especially guidance regarding in-home protection and evacuation procedures and locations of public shelters
- ❑ Designating appropriate shelter space in the community that could potentially withstand lightning and tornado impact.
- ❑ Periodically testing and exercising tornado response plans
- ❑ Putting emergency personnel on standby at tornado "watch" stage
- ❑ Utilizing the CT Alert notification system to send warnings into potentially affected areas.

Although tornadoes pose a threat to all areas of the state, their occurrence is not considered frequent enough to justify the construction of tornado shelters. Instead, the state has provided NOAA weather radios to all public schools as well as many local governments for use in public buildings. The general public continues to rely on mass media for knowledge of weather warnings. Warning time for tornadoes is very short due to the nature of these types of events, so predisaster response time can be limited. However, the NOAA weather radios provide immediate notification of all types of weather warnings in addition to tornadoes, making them very popular with communities.

New Capabilities and Completed Actions

Warren continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates with Eversource on protecting power lines.

Summary

Warren mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

Eversource trims trees along powers lines. The town tree warden can remove dead and diseased trees in rights-of-way or town land. Town-owned equipment is used except for complex situations, which would call for the use of a contractor.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. By virtue of its location in Litchfield County, the Town of Warren also has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

Thunderstorms are expected to impact Warren 20 to 30 days each year. The majority of these events do not cause any measurable damage. Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in Warren is very high during any given thunderstorm, although no one area of Town is at higher risk. The risk of at least one hailstorm occurring in Warren is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the town is believed to be low for any given year. All areas of the town are susceptible to damage from high winds although more building damage is expected in the town center while more tree damage is expected in the less densely populated areas.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires.

Town personnel note that strong thunderstorms will cause power lines to fall all over the town. Most downed power lines in Warren are detected quickly, and any associated fires are quickly extinguished. Such fires can be extremely dangerous during the summer months during dry and drought conditions. It is important to have adequate water supply for fire protection to ensure the necessary level of safety is maintained.

No critical facility is believed to be more susceptible to summer storm damage than any other, though the Town Hall is considered to be less susceptible because of its relatively new construction. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

Summary – The entire Town of Warren is at relatively equal risk for experiencing damage from summer storms and tornadoes. However, more frequent storm damages are relatively site specific and occur to private property (and therefore are paid for by private insurance). For municipal property, the Town budget for tree removal and minor repairs is generally adequate to handle summer storm damage.

6 WINTER STORMS

6.1 Existing Capabilities

Programs that are specific to winter storms are generally those related to preparing plows and sand and salt trucks, tree trimming to protect power lines, and other associated snow removal and response preparations.

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas. As a result of the winter of 2010-2011, it is anticipated that many communities will develop and utilize programs for roof snow removal.

As it is almost guaranteed that winter storms will occur annually in Connecticut, it is important for municipalities to budget fiscal resources toward snow management. In extreme years, such as the winter of 2010-2011, this budget can be quickly eclipsed and must be supplemented from other budget sources.

CTDOT plows all State roads and Interstates. The Town primarily uses Town staff for plowing operations on the remaining miles of roadway. The Town has several trucks for plowing.

Prior to a winter weather event, the Town ensures that all warning/notification and communications systems are ready and ensures that appropriate equipment and supplies, especially snow removal equipment, are in place and in good working order. In some known problem areas, prestorm treatment is applied to roadways to reduce the accumulation of snow. The town uses sand and salt for deicing. The Town also prepares for the possible evacuation and sheltering of some populations that could be impacted by the upcoming storm (especially the elderly and special needs persons).

New Capabilities and Completed Actions

Warren continues to maintain its strong winter storm mitigation capabilities.

Summary

Warren mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

The structures and utilities in the Town of Warren are vulnerable to a variety of winter storm damage. Tree limbs and some building structures may not be suited to withstand high wind and snow loads. Ice can damage or collapse power lines, render steep gradients impassable for motorists, undermine foundations, and cause "flood" damage from freezing water pipes in basements.

The elderly population in Warren, in particular, is susceptible to the impacts created by winter storms due to resource needs (heat, electricity loss, safe access to food, etc.).

Drifting snow can occur after large storms, but the effects are generally mitigated through municipal plowing efforts. The Town has indicated that Jack Corner Road and Tanner Hill Road have a higher risk of drifting snow than other areas (Town staff note that Jack Corner Road tends to experience more snowdrift challenges than Tanner Hill Road).

No critical facilities are believed to be more susceptible to winter storm damage than any other.

Summary – the entire Town of Warren is at relatively equal risk for experiencing damage from winter storms although some areas (such as icing trouble spots or roads with frequent snow drafts) are more vulnerable. Based on the historic record, it is difficult to determine if any winter storms have resulted in costly damages to the Town as damage estimates for severe storms are generally spread over an entire county. Many damages are relatively site specific and occur to private property (and therefore are paid for by private insurance) while repairs for power outages are often widespread and difficult to quantify to any one municipality.

7 EARTHQUAKES

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Warren. The Town has adopted these codes for new construction, and they are enforced by the Building Official. Due to the infrequent nature of damaging earthquakes, land use policies in the Town do not directly address earthquake hazards. However, various documents do indirectly discuss areas susceptible to earthquake damage and regulations that help to minimize potential earthquake damage:

- ***Subdivision Regulations***. The 2010 regulations do not explicitly address the issue of construction on steep slopes. However, Section 5.5 states that "in reviewing the potential for further subdivision, the Commission shall consider the location of wetlands, steep slopes, sight lines and factors associated with potential building lots, driveway access and roads. The regulations also require that soil erosion and sediment control plans be developed for proposed projects.

- ***Zoning Regulations***. The Town's Zoning Regulations address slope and soils management through the Excavation and Grading standards (Section 25).

New Capabilities and Completed Actions

Warren continues to maintain its earthquake mitigation capabilities.

Summary

Warren mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Surficial earth materials behave differently in response to seismic activity. Unconsolidated materials such as sand and artificial fill can amplify the shaking associated with an earthquake. In addition, artificial fill material has the potential for liquefaction. When liquefaction occurs, the strength of the soil decreases, and the ability of soil to support building foundations and bridges is reduced. Increased shaking and liquefaction can cause greater damage to buildings and structures and a greater loss of life.

Some areas in the Town of Warren are underlain by sand and gravel, particularly in the northern sections of the town. Structures in these areas are at increased risk from earthquakes due to amplification of seismic energy and/or collapse. The best mitigation for future development in areas of sandy material may be application of the most stringent building codes or possibly the prohibition of new construction. However, many of these areas occur in floodplains associated

with the various streams and rivers in Warren, so they are already regulated. The areas that are not at increased risk during an earthquake due to unstable soils are the areas underlain by glacial till, which includes most of the town.

Areas of steep slopes can collapse during an earthquake, creating landslides. Seismic activity can also break utility lines such as water mains, electric and telephone lines, and stormwater management systems. Damage to utility lines can lead to fires, especially in electric and gas mains. Dam failure can also pose a significant threat to developed areas during an earthquake. For this Plan, dam failure has been addressed separately in Section 9.0.

According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut is at a low to moderate risk for experiencing an earthquake of a magnitude greater than 3.5 and at a moderate risk of experiencing an earthquake of a magnitude less than 3.0 in the future. No earthquake with a magnitude greater than 3.5 has occurred in Connecticut within the last 30 years, and the USGS currently ranks Connecticut 43rd out of the 50 states for overall earthquake activity.

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Warren. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Warren

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

Based on the historic record and the probability maps generated from the USGS database, the state of Connecticut possesses areas of seismic activity. It is likely that Connecticut will continue to experience minor earthquakes (magnitude less than 3.0) in the future. While the risk of an earthquake affecting Warren is relatively low over the short term, long-term probabilities suggest that a damaging earthquake (magnitude greater than 5.0) could occur within the vicinity of Warren.

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

> Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.
>
> Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB. The Town's Planning and Zoning Commission is responsible for reviewing all development activities that occur within flood hazard or flood-prone areas.

Section 4.1.e of Warren's *Inland Wetlands and Watercourse Regulations* notes that the state regulates the construction or modification of any dam.

The City of Waterbury maintains EAPs for each of its Class C dams located in the Town of Warren. These include the Shepaug Reservoir Dam and Upper Shepaug Reservoir Dam. The Waterbury-owned water supply dams are inspected biennially by a licensed engineer. The Connecticut DEEP routinely performs inspections and prepares summary reports.

The Town uses the CT Alert system for emergency notification. The dam failure inundation mapping discussed in the next section can be used to help streamline the geographic contact areas if the failure of a major dam is imminent.

Actions Completed and New Capabilities

Warren continues to maintain its capabilities for mitigating and responding to dam failure risks.

The Town sent an updated list of local dams to DEEP a few years ago, indicating that Robert Scull Pond and Strobel Pond are beaver dams and should be updated on the DEEP list. Robert Scull

Pond dam appears to have been updated by the State, though Strobel Pond dam continues to be listed.

Summary

Warren mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 15 DEEP-inventoried dams within the Town of Warren. These dams are listed in Table 8-1 and shown in Figure 8-1. Note that Strobel Dam, though listed below, has been determined to be a natural or dug pond and is not a true dam. Town officials also indicate that the Robert Scull Pond dam is actually a beaver dam.

Table 8-1: DEEP-Inventoried Dams in Warren

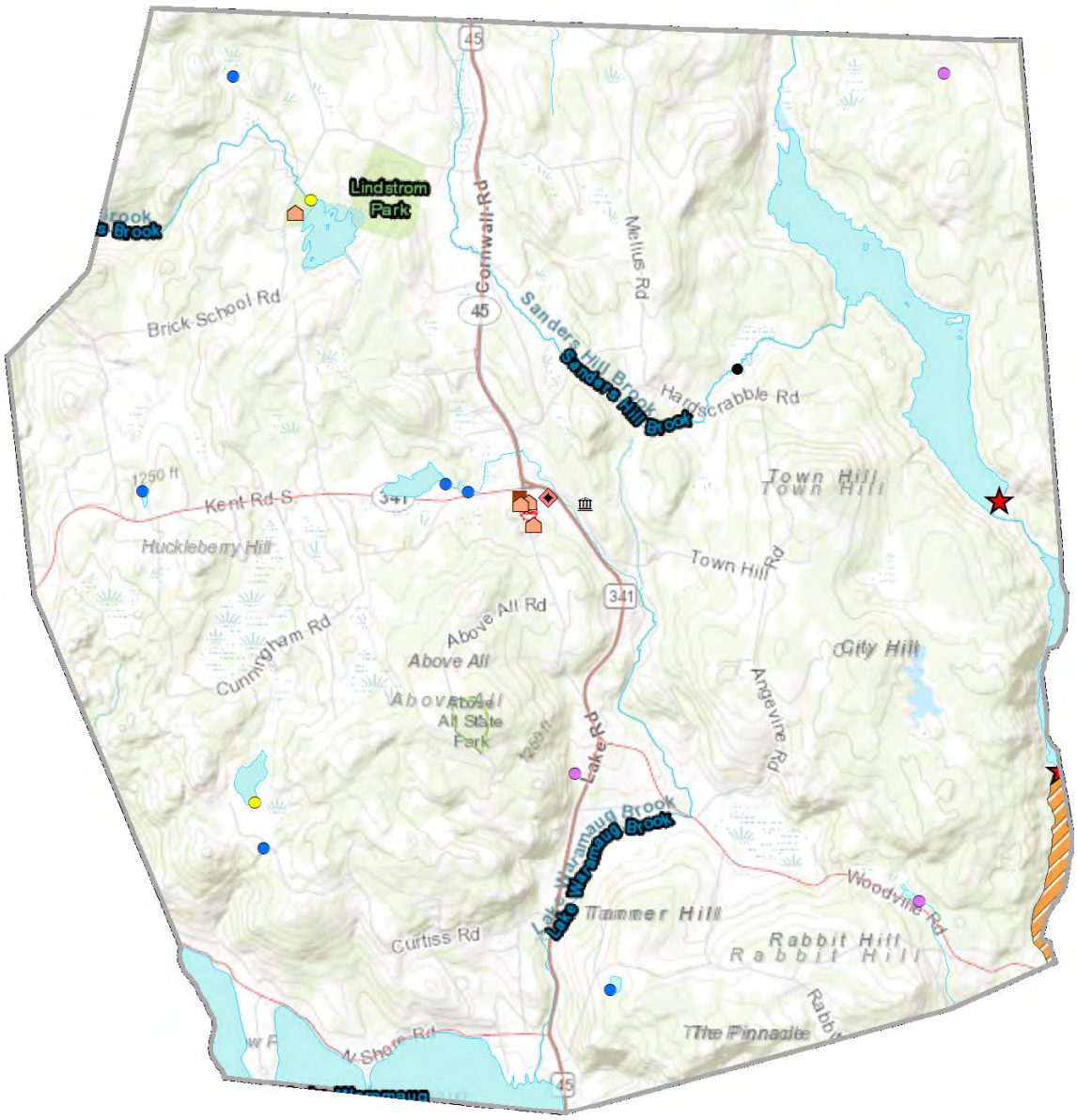
Number	Name	Class
14901	UPPER SHEPAUG RESERVOIR DAM	C
14902	STRAITS POND DAM / MOUNTAIN LAKE DAM	BB
14903	GRITMAN POND DAM	BB
14904	EEL POND DAM	A
14905	STROBEL DAM	Unclassified
14906	BROMLEY DAM	A
14907	ROBERT SCULL POND DAM	A
14908	BATES POND DAM	A
14909	LYNCH DAM	A
14910	HERETH POND DAM	A
14911	MOUNTAIN POND DAM / AQUATIC POND	A
14912	SHEPAUG RESERVOIR DAM	C
14913	WYANTENOCK WILDLIFE POND DAM	AA
14915	LYMAN FARM POND DAM	AA
14916	MCMAHON POND DAM	AA

The following section primarily discusses known vulnerable areas located downstream of Class B and C dams.

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Legend

- Shelter
- EMS
- Emergency Response
- Fire Station
- Municipal Facility
- National Register Building

Dam Hazard Class

- C - High Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - WARREN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 8-1

Upper Shepaug Reservoir (Dam No. 14901) - West Br Shepaug River, Warren

The Upper Shepaug Reservoir Dam, also known as the Cairns Dam, is a Class C dam located at the southern end of Cairns Reservoir and impounds a storage volume of 13,942 acre-feet from a contributing watershed of 10.4 square miles. The earthen dam was constructed in 1965 and is 87 feet in height and 1,000 feet in length. A 96" RCP diversion pipe through center of dam acts as a secondary outlet. It is owned by the City of Waterbury and used to impound a reservoir for public water supply. The structure was modified for flow monitoring in 2007 by the City of Waterbury (installation of a meter with phone/electric lines). In June 2008, the Waterbury Water Department installed release structures and gate valves in two existing 48" gates that serve the dam, as well as an automated gate valve control system.

An Emergency Operation Plan and Operation and Maintenance Manual were developed for the City of Waterbury in June 1989 by HRP Associates and revised in February 1991. The June 1989 plan includes a dam breach analysis. The analysis notes that the first significant downstream features are the Shepaug Reservoir and Dam. The model indicates that the Shepaug River Dam (described below) would begin breaching approximately 25 minutes after the Upper Shepaug Reservoir Dam breach begins.

Two bridges would be flooded to 10 to 44 feet above their decks, including Dugway Road and Valley Road. Population centers would be at risk from a flood wave. Woodville would be reached first at the 30-minute mark. The peak flood wave passage would occur approximately 30 minutes after the initial flood wave hits the area.

Shepaug Reservoir (Dam No. 14912) - Shepaug River, Warren

The Shepaug Reservoir Dam is a Class C dam located at the southern end of the Lower Shepaug Reservoir and impounds a storage volume of 2,937 acre-feet from a contributing watershed of 38.2 square miles. It is owned by the City of Waterbury and used to impound a reservoir for public water supply. The concrete gravity dam was constructed in 1933 and is 65 feet in height and 500 feet in length. The crest is approximately 8.5-feet above the spillway. A gate chamber discharges through the Shepaug Aqueduct to Fitch Reservoir or through two 48" blowoffs to Shepaug River. The Shepaug River downstream of the dam is contained within stone masonry walls.

The structure was inspected on April 23, 1997, and no major repair issues were noted. The structure was modified for flow monitoring in 2007. Repairs were permitted in February 2013 that included the restoration of downstream masonry training walls that had collapsed after TS Irene. The repairs were made possible using FEMA funds and were completed as of September 2013.

An EAP for the Shepaug Reservoir Dam was prepared in 2001 addressing actions to be taken during an emergency. The City of Waterbury is responsible for notifying all emergency response personnel. A 1982 Management Plan by HRP Associates includes the results of the dam breach analysis documented in the Upper Shepaug Reservoir EOP. The analysis indicates that Valley Road (from Shepaug River Dam to Warren/Washington Town Line would be inundated by a flood wave.

Town officials noted that no emergency action plans are on file for any dams in Warren. This appears to be correctable, as Waterbury maintains EOPs for its two dams.

Other Dams

Town officials noted one dam (Gritman Pond Dam) is owned by the town. This is a Class BB dam (moderate hazard). Town officials also indicated that two of the DEEP-registered dams (Robert Scull Pond and Strobel) are really beaver dams. DEEP has updated the record for the Strobel Dam, but the Robert Scull Pond dam is still listed (as hazard class A).

9 WILDFIRE & DROUGHT

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

Warren has mutual aid agreements with Kent and Washington for firefighting support. They borrow Washington's Gator and Kent's off-road vehicle if needed. Because of the number of State forests in Warren, DEEP personnel are often at forest fires and have a significant amount of experience.

The Town does not have an ordinance specifically requiring a source of fire protection water, such as cisterns or dry wells when municipal water service is not available for residential or commercial building development. However, the subdivision regulations state that the Commission "may require" cisterns or tanks for fire protection. The town has many dry hydrants. The Fire Department tests these sources twice a year and supplies fittings to ensure new hydrants are compatible with their equipment.

The Warren Fire Department goes to the fires whenever possible. This proactive approach is believed to be effective for controlling wildfires. The Fire Department has some water storage capability in its tanker trucks and storage tanks.

Other capabilities for reducing wildfire risk include:

- ❑ Encouraging property owners to widen access roads such that fire trucks and other emergency vehicles can access remote locations.
- ❑ Continuing intermunicipal cooperation in firefighting efforts.
- ❑ Providing outreach programs on how to properly manage burning and campfires on private property.
- ❑ Patrolling Town-owned open space and parks to prevent unauthorized campfires.
- ❑ Enforcing regulations and permits for open burning.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Warren is compliant with this program and has a designated Burning Official.

Actions Completed and New Capabilities

Warren continues to maintain its capabilities for mitigating and responding to wildfire risks. New dry hydrants have installed in recent years; as an example, a dry hydrant was installed in 2019 on North Shore Road at Arrow Point Road.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

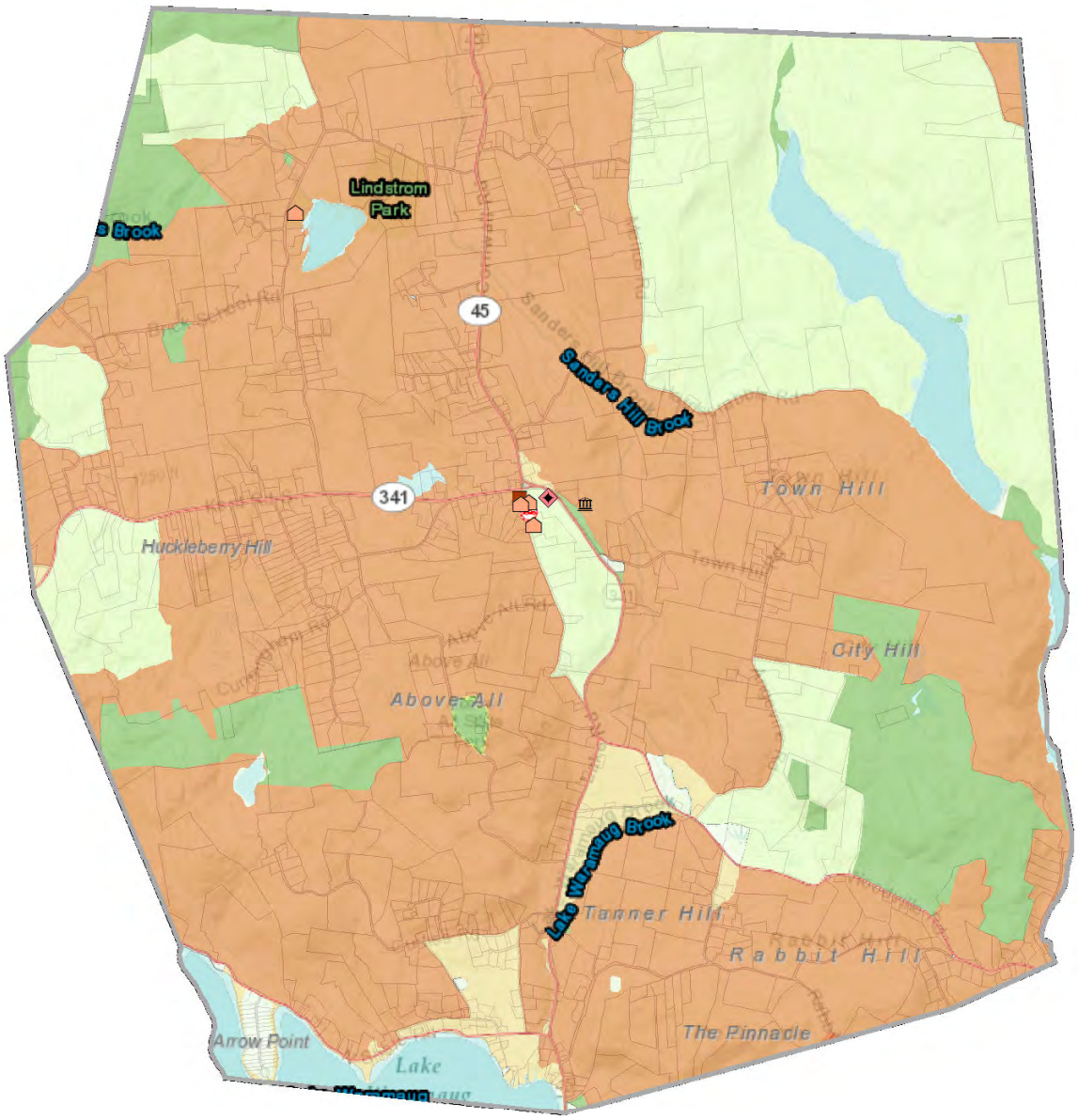
Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

Warren has experienced a few five-acre wildfires over the last decade. One notable fire was behind Brick School Road. The town has some high-risk areas where Mountain Laurel and brush are found.

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Legend

- Shelter
- EMS
- Emergency Response
- Fire Station
- Municipal Facility
- National Register Building
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - WARREN ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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DATE 5/10/2021
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FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

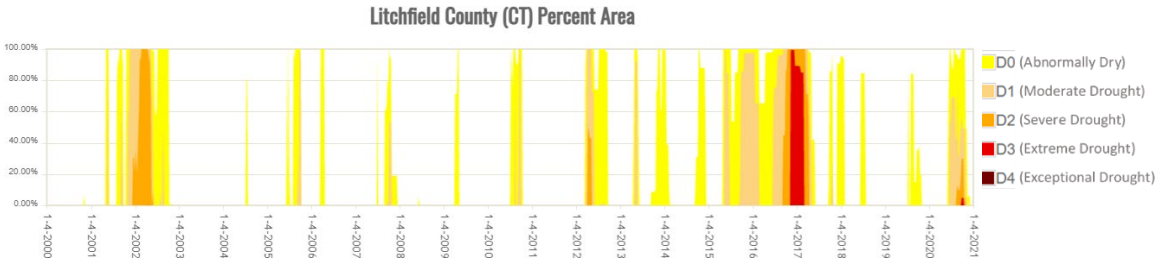


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Description	Dept.	Status	Notes
1	Utilize the existing CT Alert emergency notification system to its fullest capabilities with as many residents participating as possible.	EM	Capability	Town utilizes CT Alert as needed. Town participates in the Litchfield County Dispatch center, which runs Reverse-911 alerts. The Town primarily relies on that service. This is a capability.
2	Encourage residents to purchase and use NOAA weather radios with alarm features.	EM	Drop	Town does not believe this action is necessary.
3	Identify opportunities to work with utilities to increase mobile phone coverage in Warren.	PW	Carry Forward / Capability	Town leased some Town-owned property to a tower company, but the tower company has not yet been able to find carriers interested in leasing tower space. The land lease stands, but there is no tower or carrier there yet.
4	Review and update the Town EOP at least once annually.	EM	Capability	This is a capability
5	Provide standby power supply to Warren Woods.	PW	Carry Forward	Town has not yet completed this project due to limited funding.
6	Compile a checklist cross referencing flood-related ordinances and regulations and make this available to development applicants	P&Z	Drop	Town staff report that the floodplain zone is very small, only encompassing about 5 houses, and with no new development. All relevant ordinances are included in the Zoning Regulations, and permits are reviewed by the building department. A cross-reference checklist is not necessary.
7	Consider requiring new buildings constructed in flood prone areas to be protected to the highest recorded flood level regardless of being within a defined SFHA.	P&Z	Drop	Local enforcement of State Building Code requires freeboard. This action is not necessary.
8	Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternative.	P&Z	Capability	This is required.

#	Description	Dept.	Status	Notes
9	Consider conducting a Sucker Brook flood mitigation study to identify appropriate methods of reducing flood risks.	PW	Drop	Town has considered this action in the timeframe since the initial HMP was developed, and determined it to be unnecessary at this time. The brook has not posed a significant flood risk to the Town, has a limited floodplain area (the Town reports that the only significant floodplain of the brook is located at its mouth, where it enters Lake Waramaug), and has few structures or assets located near it. The Town reports that the last notable flood event from the brook occurred in the 1955 hurricane, when only a handful of homes were flooded. Other work being done on Sucker Brook by the Lake Waramaug Task Force is addressing erosion issues posed by the brook.
10	Conduct an evaluation of Lake Waramaug to determine the cause of siltation within the lake and characterize the impact to flood storage.	PW	Completed	The Lake Waramaug Task Force has completed a full survey of Sucker Brook up to its source, identifying sediment sources. The Task Force has completed some bank stabilization projects and is currently working with landowners to continue to alleviate problems.
11	Obtain funding to remove sediment from Lake Waramaug.	PW	Underway	The LWTF is currently exploring funding options for sediment removal. Carry forward to completion.
12	Reach out to owners of repetitive loss properties and provide technical assistance to reduce flood risks and NFIP claims.	P&Z	Carry Forward with Revisions	One RLP is Town has reportedly been mitigated, and only one RLP remains.
13	Evaluate flood prone properties on Sucker Brook to determine potential flood damage reduction methods for these properties.	P&Z PW	Drop	There are reportedly few private properties prone to flooding from Sucker Brook (none owned by the Town). Town staff report that flooding from the Brook has not been a problem since 1955. This action is not believed necessary.
14	Encourage property owners to purchase flood insurance under the NFIP.	P&Z	Drop	P&Z hasn't done anything. Very few properties in Warren are in flood zones. This is achieved through banks giving mortgages.
15	Provide technical assistance regarding floodproofing measures to interested residents. Pursue funding for home elevations.	P&Z PW	Capability	This is a capability, found within the Building Department.
16	Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	FS	Drop	Town has limited staffing capabilities, and reports that there are very few homes in Town that are at risk of flooding, and those that are located in floodplains tend to be second homes that are frequently rebuilt and are up to code. The Town does not believe this action is a cost-effective way to mitigate hazards.

#	Description	Dept.	Status	Notes
17	Provide outreach regarding home elevation and relocation, flood barriers, dry floodproofing, wet floodproofing, and other home improvement techniques to private homeowners and businesses with flooding problems.	P&Z	Drop	See previous action.
18	Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	PW	Capability	Town maintains an ongoing list of culverts that need replacement, planned out over the coming years. Replacements are primarily upgrades, rather than in-kind replacement.
19	When replacing or upgrading culverts, work with CT DOT to incorporate findings of the climate change pilot study and work with HVA to incorporate findings of the stream crossing assessment training.	PW	Drop	This action is redundant with the previous action.
20	Increase the capacity of the culverts at College Farm Road, Curtiss Road and Reed Road.	PW	Complete and Underway	Curtiss Road Culvert has been upgraded. Reed Road Culvert has been upgraded. The Town is currently working on upgrading the College Farm Road. The culvert is expected to be replaced with large box culverts or an open-bottomed structure. The project should be completed by 2022. Carry this action forward.
21	Pursue riverbank stabilization along Sucker Brook.	PW	Complete	The LWTF is working with Private Property Owners on this project. A number of stabilization projects have been completed.
22	Ensure adequate barricades are available to block flooded streets in flood prone areas	EM	Capability	The Town has sufficient barricades through the Fire Department, Public Works, and Emergency Management.
23	The Building Department should provide literature regarding appropriate design standards for wind.	Building	Capability	The building department has literature displayed in its office at the counter. Additionally, design standards are found in the State Building Code.
24	Encourage the use of structural techniques related to mitigation of wind damage in new residential and commercial structures to protect new buildings to a standard greater than the minimum building code requirements. Require such improvements for new municipal critical facilities.	EMS	Drop	State Building Code requirements are sufficient.
25	Develop town wide tree limb inspection / maintenance program to ensure that the potential for downed power lines is diminished.	PW	Capability	This is a capability. The Town hires an arborist on a day-by-day basis to take care of trees and libs. The Town increased its budget in 2020 to enable it to deal with the large number of dead Ash trees (due to the Emerald Ash Borer). After the 2020 Tropical Storm there were a number of oak trees with hanging limbs. Overall, the Town's tree management capabilities are sufficient.

#	Description	Dept.	Status	Notes
26	Remove weak or dead ash trees on Curtiss road in an effort to prevent utility damage during heavy wind events.	PW	Completed	This action has been completed.
27	Develop a plan to prioritize snow removal from the roofs of critical facilities and other municipal buildings each winter. Ensure adequate funding is available in the Town budget for this purpose.	PW	Carry Forward	Town has not yet completed this action due to financial and staffing limitations. There are two buildings in Town that the Town has had to clean off: the Salt Shed and the Fire House. Carry Forward.
28	Provide information on the dangers of cold-related hazards to people and property.	PW	Carry Forward	Town has a number of capabilities in this regard but has not specifically instituted a program to provide cold-weather hazard information to the public. This action is carried forward under the purview of Social Services.
29	Consider posting the snow plowing routes in Town buildings each winter to increase public awareness.	EM	Drop	Will not increase hazard mitigation capabilities
30	Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	EM	Capability	Capability Town Foreman, Fire Department, and EMS coordinate on this action. They review problem areas after storms.
31	The Building Department should provide literature regarding appropriate design standards for mitigating icing, insulating pipes, and retrofits for flat-roofed buildings such as heating coils.	Building	Drop	Standards are found within the building code.
32	Develop a plan to address snowdrift concerns in the vicinity of Jack Corner Road and Tanner Hill Road. Snow fencing and certain vegetation buffers may be helpful to reduce drifting.	PW	Completed	Town has determined that snow fencing is not a preferable strategy for addressing snowdrift concerns. Instead, the Town has acquired a large plow truck that is able to clear the road even in high snow drift conditions. Town staff report that Jack Corner Road tends to have more snowdrift problems than Tanner Hill Road.
33	Consider preventing new residential development in areas most prone to collapse or liquefaction.	P&Z	Capability	Remaining developable land in the Town is reportedly dominated by ledge (bedrock) and swamps, and construction is prohibited in swampy areas; thus, this is an incidental capability.
34	Ensure that municipal departments have backup plans and adequate backup facilities such as portable generators in place in case earthquake damage occurs to critical facilities, particularly the water and wastewater treatment facilities.	EM	Capability	Town owns a couple of portable generators that can be used in an emergency. Town does not have any public water or wastewater facilities.

#	Description	Dept.	Status	Notes
35	Consider bracing systems and assets inside critical facilities. This could help protect IT systems, important records and files, libraries.	EM PW	Carry Forward with Revisions	Data security is a primary concern of the Town, primarily with regard to hacking and other attacks (rather than natural hazards) The Town looked into software for automatic backup of records to the cloud and found it to be cost prohibitive. Now they do it on hard drive instead. Once a week. Not the best way to do it. Acquiring software or some other service to automatically backup municipal IT systems to the cloud will be an action going forward, under the First Selectman.
36	Work with DEEP to update the registered dams list to indicate that Robert Scull Pond and Strobel Pond are beaver dams.	PW	Completed	The Town sent an updated list of local dams to DEEP a few years ago, indicating this change. The Town does not know whether DEEP has updated its internal list. This action is complete from the perspective of the Town. In general, the Town has not coordinated with DEEP about local dam management in many years. All of the dams in Warren, except one, are located on private property. The Town owns the one non-private dam. The Town performed an engineering study on the dam in 2018.
37	Ensure that EOPs/EAPs are on file for all high hazard dams located in Warren, including the two owned by the City of Waterbury.	PW	Carry Forward with Revisions	The EAP for the Warren-owned dam is located in Town Hall in the Land Use office. The Town does not know whether the EAPs of the two Waterbury dams are held locally. Reportedly, failure of the Waterbury dams would affect a few houses in Warren along Valley Road. The flood waters would then move into Washington Depot. Waterbury reportedly does send Warren updates when they work on their dams; Waterbury has performed significant work in the last few years. An action to secure up-to-date EAPs for the Waterbury dams is carried forward.
38	Include dam failure inundation areas in the CT Alert emergency contact database.	EM	Carry Forward with revisions	Town primarily utilizes Litchfield County Dispatch for emergency alerts.
39	Continue to require the installation of fire protection water in new developments, and sprinkler systems where access is limited for fire apparatus.	P&Z	Drop	Warren works with private landowners to install additional dry hydrants as needed; home insurance rates are lowered significantly if a dry hydrant is located on the property.

#	Description	Dept.	Status	Notes
40	Increase the availability of water sources in the town's areas of high risk, using the historic record (fires exceeding five acres) as a benchmark for locating high risk areas.	EM FD	Capability	Town uses fire ponds and dry hydrants to provide firefighting water. The Fire Department tests these sources twice a year and supplies fittings to ensure new hydrants are compatible with their equipment. New dry hydrants have installed in recent years; as an example, a dry hydrant was installed in 2019 on North Shore Road at Arrow Point Road.
41	Revise and enhance the town's website concerning the local regulatory requirements concerning Open Burning.	EM FD	Completed	Open Burning information has been loaded onto the Town website. The website also has a link to a state website showing whether it is a good day for open burning; applicants still have to call the Fire Marshal to see if it's ok locally. Individuals must go into town hall in person to get a permit.
42	Pursue acquisition of additional municipal open space in SFHAs and set it aside for greenways, parks, etc.	FS	Capability	The Town acquires open space as opportunities arise, and acquired a farm recently. Additionally, the very active local land trust pursues acquisitions and conservation easements. The Land Trust works closely with the Eastern Greenway and Housatonic Greenway groups to preserve open space, and tends to focus on preservation of wildlife corridors. The Land Trust is currently looking at two large properties and is waiting on grants to acquire them. One of these properties is a farm located in a floodplain; the Land Trust is applying for a grant through farm preservation and OSWA.
43	Selectively pursue conservation recommendations listed in the Plan of Conservation and Development and other studies and documents	FS	Capability	This is a capability. No specific locations are listed in the POCD.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action WRN-01	
Identify opportunities to work with utilities to increase mobile phone coverage in Warren; in particular, complete installation of a cellphone tower on Town-owned property and develop agreements with cellular providers to install their equipment on the tower.	
Lead	DPW
Cost	$0 - $25,000
Funding	OB
Timeframe	2022
Priority	High

Action WRN-02	
Work with Eversource to develop improved protocols for making-safe downed power lines and enabling municipal services to clear roads, focusing on ensuring that Eversource's prioritization is in line with the Town's.	
Lead	DPW
Cost	$0 - $25,000
Funding	OB
Timeframe	2022
Priority	High

Action WRN-03	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action WRN-04	
Secure up-to-date EAPs for the Waterbury dams located upstream of Warren.	
Lead	PW
Cost	$0 - $25,000
Funding	OB, CT DEEP
Timeframe	2022 – 2023
Priority	Low

Action WRN-05	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action WRN-06	
Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action WRN-07	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action WRN-08	
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, Sustainable CT
Timeframe	2022 – 2024
Priority	High

Action WRN-09	
Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Med

Action WRN-10	
Contact the owners of Repetitive Loss Properties and nearby properties at risk to inquire about mitigation undertaken and suggest options for mitigating flooding in those areas. This should be accomplished with a letter directly mailed to each property owner.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Med

Action WRN-11	
Develop a plan to prioritize snow removal from the roofs of critical facilities and other municipal buildings each winter. Ensure adequate funding is available in the Town budget for this purpose.	
Lead	DPW
Cost	$25,000 - $50,000
Funding	OB
Timeframe	2022 – 2024
Priority	Med

Action WRN-12	
Acquire software or some other service to automatically backup municipal IT systems to the cloud (First Selectman).	
Lead	EMD, IT
Cost	$25,000 - $50,000
Funding	OB
Timeframe	2022 – 2024
Priority	Med

Action WRN-13	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action WRN-14	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action WRN-15	
Provide information on the dangers of cold-related hazards to people and property.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action WRN-16	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action WRN-17	
Complete the Sucker Brook (Lake Waramaug Brook) streambank stabilization projects initiated by the Lake Waramaug Task Force.	
Lead	LWTF
Cost	$50,000 - $100,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2023 – 2025
Priority	High

Action WRN-18	
Collaborate with the Lake Waramaug Task Force on collaboration with Sucker Brook (Lake Waramaug Brook) streamside property owners on limiting erosion into the stream.	
Lead	LWTF
Cost	$50,000 - $100,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2023 – 2025
Priority	High

Action WRN-19	
Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action WRN-20	
Coordinate with Litchfield County Dispatch to include dam failure inundation areas in the LCD emergency contact database.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action WRN-21	
Provide standby power supply to Warren Woods.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action WRN-22	
Coordinate with the Regional School District to install emergency power at the Warren Elementary School to enable sheltering.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action WRN-23	
Complete work on upgrading the College Farm Road culvert. The culvert is expected to be replaced with large box culverts or an open-bottomed structure. The project should be completed by 2022.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action WRN-24	
Obtain funding to remove sediment from Lake Waramaug.	
Lead	PW
Cost	$50,000 - $100,000
Funding	CIP, CT DEMHS
Timeframe	2026 – 2027
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
WRN-01	Identify opportunities to work with utilities to increase mobile phone coverage in Warren; in particular, complete installation of a cellphone tower on Town-owned property and develop agreements with cellular providers to install their equipment on the tower.	Coordinate with Utilities	DPW	$0 - $25,000	OB	2022	1	1	1	1	1	1	0	0	0	-1	0	0	0	0	7
WRN-02	Work with Eversource to develop improved protocols for making-safe downed power lines and enabling municipal services to clear roads, focusing on ensuring that Eversource's prioritization is in line with the Town's.	Coordinate with Utilities	DPW	$0 - $25,000	OB	2022	1	1	1	1	1	1	0	0	0	-1	0	0	0	0	7
WRN-03	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
WRN-04	Secure up-to-date EAPs for the Waterbury dams located upstream of Warren.	Dam EAP	PW	$0 - $25,000	OB, CT DEEP	2022 – 2023	0	1	1	0	1	0	0	0	0	0	0	0	0	0	4
WRN-05	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
WRN-06	Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
WRN-07	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
WRN-08	Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	Sustainable CT	Planning	$25,000 - $50,000	OB, Sustainable CT	2022 – 2024	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
WRN-09	Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	RLP	Planning	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
WRN-10	Contact the owners of Repetitive Loss Properties and nearby properties at risk to inquire about mitigation undertaken and suggest options for mitigating flooding in those areas. This should be accomplished with a letter directly mailed to each property owner.	RLP	Planning	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
WRN-11	Develop a plan to prioritize snow removal from the roofs of critical facilities and other municipal buildings each winter. Ensure adequate funding is available in the Town budget for this purpose.	Snow Removal	DPW	$25,000 - $50,000	OB	2022 – 2024	0	0.5	1	1	0	1	0	0	0	0	0	0	0	0	5
WRN-12	Acquire software or some other service to automatically backup municipal IT systems to the cloud (First Selectman).	Data & IT Protection	EMD, IT	$25,000 - $50,000	OB	2022 – 2024	1	1	1	0	0	1	0	0	0	0	0	-1	0	0	5
WRN-13	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
WRN-14	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
WRN-15	Provide information on the dangers of cold-related hazards to people and property.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
WRN-16	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
WRN-17	Complete the Sucker Brook (Lake Waramaug Brook) streambank stabilization projects initiated by the Lake Waramaug Task Force.	River Restoration	LWTF	$50,000 - $100,000	CIP, FEMA Grant, CT DEEP	2023 – 2025	1	1	0	1	1	1	1	0	0	0	0	-1	0	0	7
WRN-18	Collaborate with the Lake Waramaug Task Force on collaboration with Sucker Brook (Lake Waramaug Brook) streamside property owners on limiting erosion into the stream.	River Restoration	LWTF	$50,000 - $100,000	CIP, FEMA Grant, CT DEEP	2023 – 2025	1	1	0	1	1	1	1	0	0	0	0	-1	0	0	7
WRN-19	Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
WRN-20	Coordinate with Litchfield County Dispatch to include dam failure inundation areas in the LCD emergency contact database.	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
WRN-21	Provide standby power supply to Warren Woods.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
WRN-22	Coordinate with the Regional School District to install emergency power at the Warren Elementary School to enable sheltering.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
WRN-23	Complete work on upgrading the College Farm Road culvert. The culvert is expected to be replaced with large box culverts or an open-bottomed structure. The project should be completed by 2022.	Culvert & Bridge Upgrades	DPW	$100,000 - $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
WRN-24	Obtain funding to remove sediment from Lake Waramaug.	Dredge	PW	$50,000 - $100,000	CIP, CT DEMHS	2026 – 2027	1	1	0	1	0	0	0	0	-1	0	0	-1	0	-1	1

APPENDIX B
RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF WARREN BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Warren has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Warren Board of Selectmen approved the previous version of the Plan in 2014; and

WHEREAS, the Town of Warren and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Warren; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Warren, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Warren eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Warren;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Warren, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Warren this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

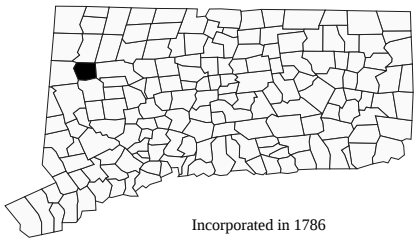
2019 CERC TOWN PROFILE

Warren, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
7 Sackett Hill Road
Warren, CT 06754
(860) 868-0090

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1786

Demographics

Population

	Town	County	State
2000	1,254	182,193	3,405,565
2010	1,461	189,927	3,574,097
2013-2017	1,467	184,454	3,594,478
2020	1,582	193,116	3,604,591
'17 - '20 Growth / Yr	2.4%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	26	921	4,842
Pop./Sq. Mile (2013-2017)	56	200	742
Median Age (2013-2017)	50	47	41
Households (2013-2017)	613	74,605	1,361,755
Med. HH Inc. (2013-2017)	$98,750	$76,438	$73,781

	Town	State
Veterans (2013-2017)	101	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	37	3%	192	13%	93	6%	291	20%	544	37%	310	21%	1,467	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	1,360	164,992	2,446,049
Black Non-Hisp	0	2,843	350,820
Asian Non-Hisp	21	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	21	2,320	84,917
Hispanic or Latino	65	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	5.6%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	291	25%	673,582	27%
Associates Degree	67	6%	188,481	8%
Bachelors or Higher	519	45%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	37	152
23 - Construction	8	19
31-33 - Manufacturing	NA	NA
44-45 - Retail Trade	NA	NA
56 - Administrative and Waste Services	6	19
81 - Other Services (except Public Administration)	6	14
Total Government	2	44

Top Five Grand List (2016)

	Amount
City of Waterbury	$9,947,910
Vance Lee G & Cynthia King	$7,171,710
Calatrava Santiago Trust	$4,426,030
Samgold LLC	$3,541,580
Bliss Road LLC	$3,530,380
Net Grand List (SFY 2016-2017)	$354,268,354

Major Employers (2016)

Hopkins Inn
Arbor Services of CT
Hopkins Vineyard
Siddal Heating & Cooling

Education

2018-2019 School Year

	Grades	Enrollment
Regional School District 06	PK-12	912

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	77.8%	53.8%	75.0%	51.3%	58.7%	43.0%
ELA	75.9%	53.1%	81.8%	54.9%	68.1%	56.1%

Pre-K Enrollment (PSIS)

	2018-2019
Regional School District 06	58

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 06	97.2%	100.0%	94.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Regional School District 06	9.9%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	74.8%	84.0%	86.8%
Private	25.2%	16.0%	13.2%

profiles.ctdata.org

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Warren, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$5,422,537	Total Expenditures (2017)	$5,265,135	Annual Debt Service (2017)	$225,563
Tax Revenue	$5,123,979	Education	$3,323,019	As % of Expenditures	4.3%
Non-tax Revenue	$298,558	Other	$1,942,116	Eq. Net Grand List (2017)	$522,128,521
Intergovernmental	$78,863	Total Indebtedness (2017)	$2,916,130	Per Capita	$370,304
Per Capita Tax (2017)	$3,620	As % of Expenditures	55.4%	As % of State Average	245.3%
As % of State Average	123.5%	Per Capita	$2,068	Moody's Bond Rating (2017)	Aa2
		As % of State Average	82.3%	Actual Mill Rate (2017)	14.35
				Equalized Mill Rate (2017)	9.78
				% of Net Grand List Com/Ind (2017)	1.1%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	856	88,068	1,507,711
% Single Unit (2013-2017)	97.7%	73.6%	59.2%
New Permits Auth (2017)	0	142	4,547
As % Existing Units	0.0%	0.2%	0.3%
Demolitions (2017)	0	32	1,403
Home Sales	NA	1,753	21,880
Median Price	$368,500	$250,100	$270,100
Built Pre-1950 share	34.0%	31.2%	29.3%
Owner Occupied Dwellings	546	57,330	906,798
As % Total Dwellings	89.1%	76.8%	66.6%
Subsidized Housing (2018)	0	4,817	167,879

Distribution of House Sales

	Town	County	State
Less than $100,000	NA	57	536
$100,000-$199,999	NA	563	5,237
$200,000-$299,999	NA	538	6,681
$300,000-$399,999	NA	315	3,863
$400,000 or More	NA	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$2,181	$995	$1,123
Cost-burdened Renters	71.4%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	780	101,000	1,827,070
Residents Unemployed	25	4,014	78,242
Unemployment Rate	3.1%	3.8%	4.1%
Self-Employed Rate	26.1%	13.0%	10.0%
Total Employers	37	6,177	122,067
Total Employed	152	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Warren, CT	49	Litchfield, CT	59
Torrington, CT	11	New Milford, CT	56
Washington, CT	9	Warren, CT	49
New Milford, CT	8	Kent, CT	47
Cornwall, CT	6	Danbury, CT	45
Danbury, CT	5	Torrington, CT	31
South Windsor, CT	5	Waterbury, CT	28

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	379	1,777
Violent	0	228

Disengaged Youth (2013-2017)

	Town	State
Female	0.0%	4.2%
Male	0.0%	5.6%

	Town
Library circulation per capita	4.47

Distance to Major Cities

	Miles
Hartford	34
New York City	80
Providence	100
Boston	127
Montreal	263

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Municipal Provider
Local Contact

Cable Provider
Charter Comm. of Western CT - Cablevision
(800) 827-8288

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

WASHINGTON, CT

2 Bryan Plaza
Washington Depot, CT 06794

MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
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Goshen, CT 06756
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global environmental and advisory solutions

SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Washington and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Washington is located in the southern portion of Litchfield County in northwestern Connecticut, approximately 35 miles northwest of New Haven. It is bordered by New Milford to the west, Kent to the northwest, Warren to the North, Litchfield to the southeast, Morris and Bethlehem to the east and Roxbury to the south.

2.2 Existing Land Use

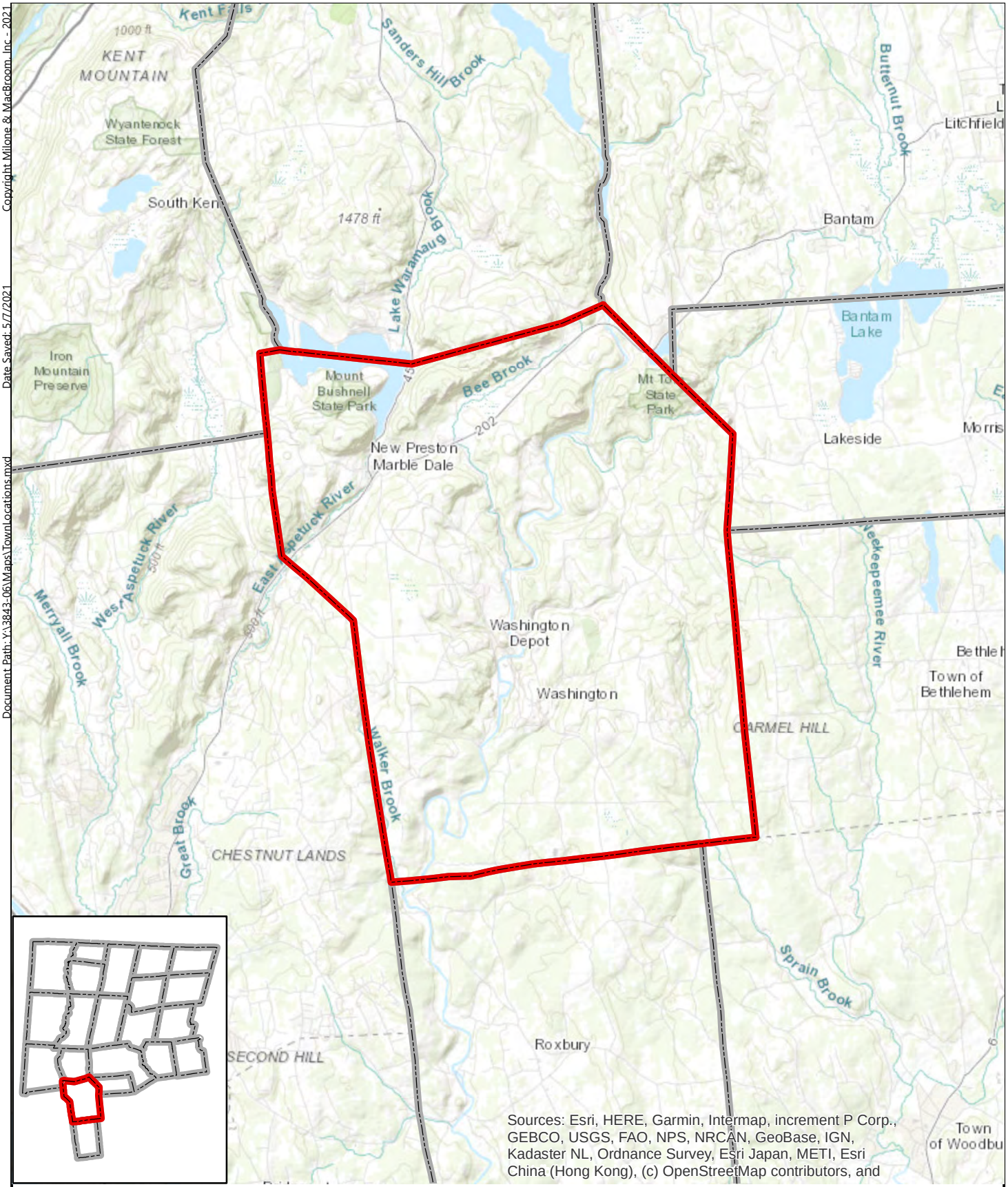
The land area of Washington is approximately 38 square miles with an additional 0.5 square miles of water. Washington is a rural residential community that is bisected by the Shepaug River. The town is well-known for its bustling village centers (Washington Depot and New Preston) and three prestigious boarding schools (Rumsey Hall, The Gunnery, and Devereux Glenholme School). The two village centers enjoy a combination of residential homes, shops, businesses, and restaurants. Another point of interest in Washington includes the southern shore of Lake Waramaug.

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 65% of Washington is forested and approximately 8.8% is developed.

Table 2-1: 2015 Land Cover by Area

Land Cover	Area (acres)	Percent of Community
Developed	2,167.8	8.77%
Turf & Grass	973.1	3.94%
Other Grass	328.4	1.33%
Agricultural Field	4,333.8	17.53%
Deciduous Forest	14,341.0	57.99%
Coniferous Forest	1,308.2	5.29%
Water	652.0	2.64%
Non-Forested Wetland	26.9	0.11%
Forested Wetland	478.7	1.94%
Tidal Wetland	0.0	0.00%
Barren	24.3	0.10%
Utility Row	94.3	0.38%
Total	**24,729**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)



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CHESHIRE, CT 06410
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WWW.MMINC.COM

REGIONAL LOCATION: WASHINGTON

HAZARD MITIGATION PLAN UPDATE - WASHINGTON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 4,500 9,000
Feet

SCALE	1 " = 9,454 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-1

2.3 Development Trends

The 2010 U.S. Census reported a population in Washington of 3,578 individuals. U.S. Census Bureau estimates for 2019 show a population around 3,450 individuals, a decrease from 2010 of 3.6%. The Connecticut State Data Center predicts that population will decrease by 8.3% through 2025 to an estimated population of 3,162 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Washington remained relatively steady between 2013 and 2017. The number of permits issued in 2013 and 2014 was 5 and 8, respectively, while 4 permits were issued in 2016, and 4 permits were issued in 2017. On average, 5 housing permits were issued each year in Washington between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Washington dropped by approximately 0.4-percent between 2010 and 2019, from 2,124 units in 2010 to 2,115 units in 2019. In 2019, the housing stock was made up of approximately 90% single-unit structures, 6% two-unit structures, 4% multi-unit structures, and 0% mobile-homes or other types of structures.

According to the Connecticut Office of Policy and Management, Washington's 2019 Total Equalized Net Grand List was valued at $1,225,840,759. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Washington, included as Appendix C.

Residential development pressures are minimal in Washington, as the town strives to maintain a rural character with its busy village centers. Three of 13 homes in the Myfield Subdivision off Mygatt Road have been completed and the Strawman Subdivision is in the early planning stages at Bee Brook Road and Juniper Meadow Road. A former school on Wykeham Road has received approval to convert to an Inn but this project is on hold.

There are currently no pending subdivision approvals. However, the Building Department has been reviewing plans for tear-downs and rebuilds. The town's flood damage prevention regulations are included in the municipal code of ordinances. The town has recently updated its Plan of Conservation and Development. A draft update of the Zoning Regulations recommends that utilities be placed underground in new developments, but this is not required.

Overall, development in Washington has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the next five years is not expected to increase exposure.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those

populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Washington is considered to have a low level of social vulnerability across all four SVI categories. The vulnerability score for Housing Type & Transportation is somewhat higher than those of other categories; in other words, a particular challenge in Washington may include the presence of lower quality housing, and a lack of public transportation options.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Washington.

The amount of stratified glacial meltwater deposits present in a community is important as areas of stratified materials are generally coincident with inland floodplains. These materials were deposited at lower elevations by glacial streams, and these valleys were later inherited by the larger of our present day streams and rivers. Oftentimes these deposits are associated with public water supply aquifers or with wetland areas that provide significant floodplain storage. However, the smaller glacial till watercourses throughout Washington can also cause flooding. The amount of stratified drift also has bearing on the relative intensity of earthquakes.

Washington is underlain by relatively hard metamorphic and igneous bedrock including a variety of gneiss, schist, and marble. The bedrock formations trend generally north to south.

Washington is covered primarily by glacial till. Tills contain an unsorted mixture of clay, silt, sand, gravel, and boulders deposited by glaciers as a ground moraine. The deposits are generally less than 50 feet thick although deeper deposits of till are scattered across the hillier sections of the town.

2.5 Climate and Climate Change

Over the course of the year, the temperature in Washington typically varies from 18°F to 80°F and is rarely below 2°F or above 88°F. The warm season lasts from May 29 to September 15, with an average daily high temperature above 71°F. The cold season lasts from December 1 to March 11, with an average daily high temperature below 42°F.

Precipitation falls throughout the year in Washington. The wetter season lasts from April 9 to August 19, with a greater than 30% chance of a given day being a wet day. The chance of a wet

day peaks at 38% on May 29. The drier season lasts from August 19 to April 9. The smallest chance of a wet day is 22% on January 29.

The most rain falls during the 31 days centered around June 4, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.5 inches.

The snowy period of the year lasts for 5.8 months, from October 26 to April 19, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.3 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Washington as 4.84 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Washington at 5.52 inches.

These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.8	6.1	8.5
NOAA Atlas 14	5.5	6.8	8.8

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Washington can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.0 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

Washington is divided among the following six sub-regional drainage basins: Shepaug River East Aspetuck River, Sprain Brook, Bantam River, Weekeepeeme River and the West Aspetuck River.

The majority of the drainage basins have FEMA-defined Special Flood Hazard Areas (SFHAs) along the primary watercourses. Such areas consist of 1% annual chance storm floodplains without elevations, 1% annual chance storm floodplains with elevations, and 0.2% annual chance floodplains. Refer to Section 3 for more detail regarding SFHAs.

Shepaug River

Originating at the Shepaug Reservoir, the Shepaug River flows directly south creating the lower east boarder of Warren. Small tributaries extend to the west into Cornwall that feed the East Branch of Shepaug River into the Shepaug Reservoir. The Shepaug River enters Washington just east of Route 341 and continues to meander south through Washington Depot and into neighboring Roxbury, just south of Tunnel Road. The river receives input from many streams and rivers including Bantam River, Bee Brook, Mallory Brook and other tributaries. After the rivers 26 mile stretch from its origin, it flows into the Housatonic River. The entire river from start to finish is bordered by 100-year floodplains generally widening as the channel gets closer to the mouth. The Shepaug Reservoir is held back by the Shepaug River Dam which is classified as a high hazard dam.

East Aspetuck River

Lake Waramaug is located at the Warren-Washington line. The lake has several input tributaries including Lake Waramaug Brook which is the origin of the East Aspetuck River. In Washington, the East Aspetuck begins at the lakes southern edge near Tinker Hill Road and East Shore Drive. The River continues in a southerly direction running parallel to Route 202 until it reaches the Housatonic River about ten miles from the start. Many tributaries enter the river between the lake and the Housatonic with most of the tributaries bordered with 500-year floodplains. The main river channel is primarily edged with 100-year floodplains and 500-year floodplains on some of the outer extents. Located at the head of the East Aspenuck River is the Lake Waramaug Dam and just downstream is Woodruff Pond Dam, both classified as significant hazard dams.

Sprain Brook

Starting off as a small pond, Sprain Brook flows south from Washington into Woodbury. The main channel flows through several ponds and has many tributary inputs before it reaches the Weekeepeemee River. A consistent 100-year floodplain borders the channel from just below the headwaters to the mouth of the river.

Bantam River

The Bantam River drainage covers an area of around 71 square miles and drains flow from five different towns including Washington, Morris, Litchfield, Goshen and Torrington. Bantam River begins in Goshen flowing south to Litchfield through Little Pond and then into the north bay of Bantam Lake. The river flows out of the lake heading north and then east along Route 202 before heading south into Morris. The river enters Washington along the northeast border and flows in westerly direction. The confluence of the Bantam and Shepaug Rivers is located southwest of Mt. Tom State Park.

Weekeepeemee River

Originating in Bethlehem west of Long Meadow Pond, a few of the northern tributaries that converge into Weekeepeemee drain a small portion of Washington. Of the 16 square mile drainage basin, the majority serves the purpose of Bethlehem's drainage, then making its way into Woodbury and slightly extending west into Washington.

West Aspetuck River

The headwaters of the West Aspetuck River begin just before North and South Spectacle Ponds located in eastern Kent. The outflow of North Spectacle Pond flows east into Beaman Pond and then south with several merging tributaries including a stem joining just below Beaman that drains a section of Warren. Denman and Merryall Brook merge with West Aspetuck River in New Milford and just before entering the Housatonic. Only a small portion of the basin is located in Washington.

2.7 Governmental Structure

The Town of Washington is governed by a Selectman-Town Meeting form of government in which legislative responsibilities are shared by the Board of Selectmen and the Town Meeting. The First Selectman serves as the chief executive.

In addition to Board of Selectmen and the Town Meeting, there are boards, commissions and committees providing input and direction to Town administrators. Also, Town departments provide municipal services and day-to-day administration. Many of these commissions and departments play a role in hazard mitigation, including the Planning, Zoning, Inland Wetland and Conservation Commission, the Building Official, the Fire Department, Emergency Management, and the Highway Department.

Drainage and flooding, and tree and debris complaints, are routed through the Highway Department. These complaints are usually received via phone or email and are recorded in a logbook. The complaints are investigated as necessary until remediation surrounding the individual complaint is concluded.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Warren are concentrated in the Washington Green Historic District, Sunny Ridge Historic District, and Calhoun Street – Ives Road Historic District.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible

- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

State and federal roads are the major transportation arteries (and therefore evacuation routes) into and out of the town.

The primary transportation routes into and out of the town are Route 202 traveling east-west across the northern end of Town, Route 109 traveling east-west through the center of Town, and Routes 47 and 199 traveling north-south. Other key roads include are municipal roads throughout Town. There is no local public transit system in Warren.

Major transportation arteries are integral in transporting patients to the hospital during emergency situations. The Town of Washington does not have any hospitals. Instead, residents use the nearby facilities in Waterbury or Danbury.

Town staff report that Green Hill Road (State Route 47) is structurally degraded. Continued degradation, or more acute damage during a storm event, could lead to the road becoming impassible.

Utilities

Public water in Washington is provided by Aquarion Water Company, New Preston Water Company, and a number of Community Water Systems, and Non-Community Public Water Systems. Many residents and businesses rely on private well water. No public sewage system operates in Town; residents and businesses rely on septic.

Eversource is the primary provider in Town for electricity. There is no natural gas infrastructure in Town; residents rely on oil, propane, and wood.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Washington.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Washington has identified several critical facilities throughout the town. Table 2-3 identifies those critical facilities in Washington. The Town considers its fire, governmental, and major transportation facilities to be its most important critical facilities, for these are needed to ensure that emergencies are addressed while day-to-day management of Washington continues.

The three boarding schools in the town (The Gunnery, Rumsey Hall and Deveraux Glenholme School) are considered critical facilities because of the large resident populations. Each school has approximately 300 students, many of whom are from other states or overseas. The power transmission line to Rumsey Hall is reportedly vulnerable to damage and the school lacked power for a few days after Hurricane Irene.

Washington Primary School is not considered a critical facility. However, it is located in the Shepaug River flood zone and options may need to be explored to protect the facility from damage.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	In 1% Floodplain
Washington Transfer Station & Landfill	57 Clark Road	Municipal facility			
Town Hall	2 Bryan Plaza	Municipal facility	✓	✓	✓
Washington State Trooper	2 Bryan Plaza	Law Enforcement	✓		✓
Washington Volunteer Fire Department	109 Bee Brook Road	EMS/Fire	✓	✓	✓
Town of Washington Depot Health Department	2 Bryan Plaza	Health Dept.	✓		✓
Highway Department	10 Blackbill Road	Municipal Facility			
Cell Tower	10 Blackbill Road	Communications			
Deveraux Glenholme School	81 Sabbaday Ln	Boarding School	✓		

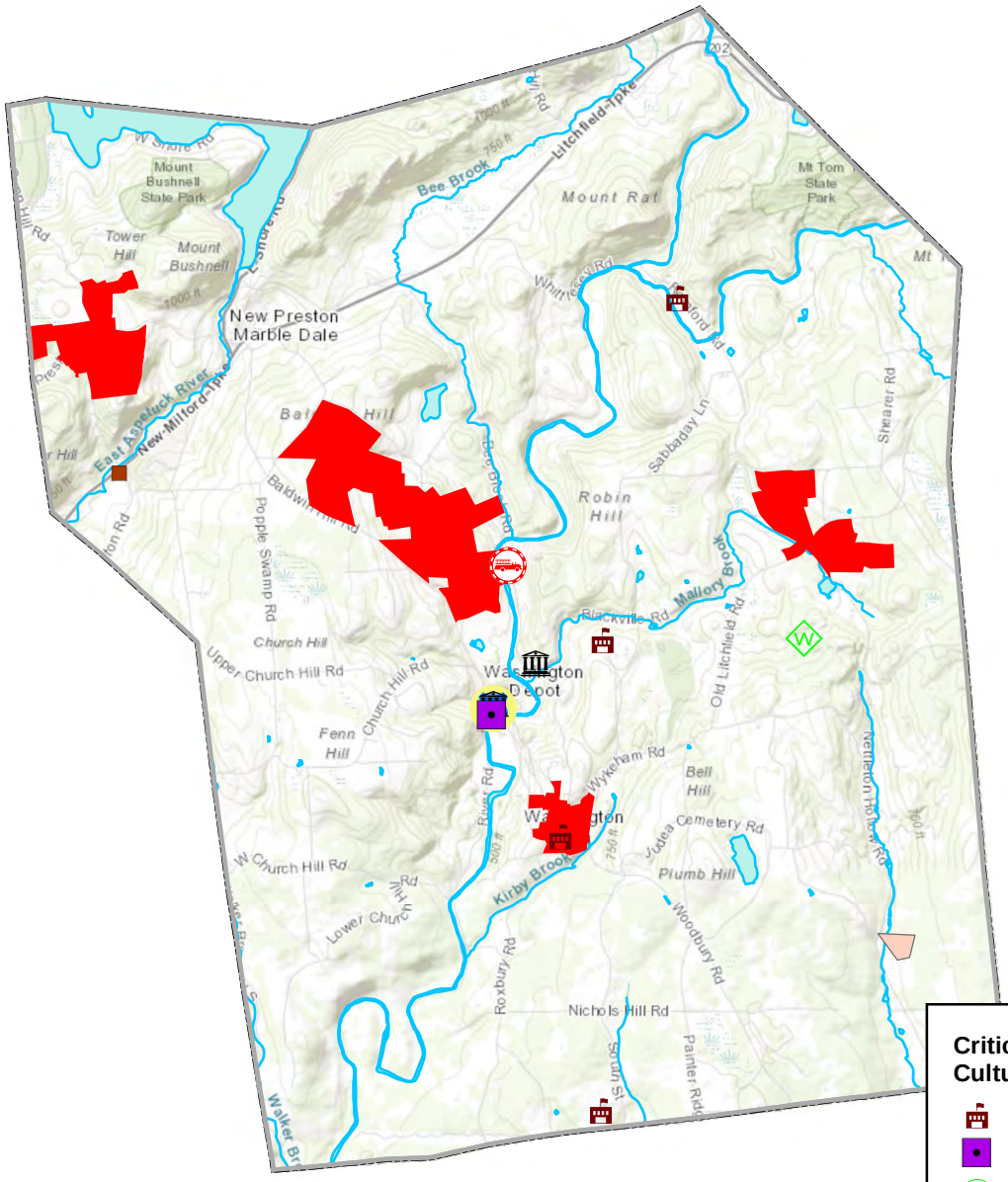
The Town Highway Department is a relatively new facility, built to modern building codes, and is therefore considered to be relatively less susceptible to damages from natural hazard events. The Highway Department lost six plow dump trucks, most of its fleet, to a fire in 2012; it therefore has a relatively new fleet of vehicles.

Emergency Generators have been installed at the Volunteer Fire Department and Highway Department in the last five years.

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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - WASHINGTON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 2-2

Shelters

The Town of Washington has designated the Town Hall and the Volunteer Fire Department facilities as emergency shelters for the community. Both facilities have standby power. Both facilities are also located in FEMA-mapped 1% annual-chance flood zones, creating a risk of isolation or direct damage to these shelters; Town staff have reported that the Volunteer Fire Department has become isolated during previous flood events, and has had to be evacuated during flooding events in the past.

The Deveraux Glenholme School can also be used as a town shelter. The school has full standby power for the whole campus and also houses the town's back-up radio communications system.

The regional High School is not designated as a shelter but could be used for showers as necessary.

The senior center/American Legion Hall is a facility with a commercial kitchen and would therefore be a good shelter. However, the facility does not have a generator.

The town's fire houses serve as important emergency supply distribution centers.

In case of a power outage, it is anticipated that 10-20% of the population would relocate, although not all of those relocating would necessarily utilize the shelter facilities

Emergency Response Capabilities

The Emergency Management Department coordinates emergency preparedness in the Town of Washington. That department develops plans, protocols, and procedures that assure the safety of Washington's citizens. It also provides training for emergency response personnel, supports state and local emergency response exercises, and provides technical assistance to state and local emergency response agencies and public officials. Its goal is to provide citizens with the highest level of emergency preparedness before, during, and after disasters or emergencies.

The Emergency Management Director also maintains open communication with the Waterbury Water Bureau regarding conditions upstream at the Shepaug Reservoir. This communication is invaluable during storm events such as Hurricane Irene.

The Town's Emergency Operations Center (EOC), including its Emergency Communications Center, is located at the Washington Volunteer Fire House. This facility is also considered a shelter for families of first responders. The Fire House has an old generator that needs to be replaced since the existing generator failed during winter storm Alfred. The fire house is located near the Shepaug River, partly in the flood zone and was almost evacuated during Hurricane Irene due to floodwaters encroaching the yard. The Town Hall is the back-up EOC.

Town officials have indicated that the Highway Garage could be used as a back-up EOC. However, it only has a portable generator which is not sufficient in emergency situations. The town would like to obtain a fixed in place generator for this facility. In addition, the Highway

Garage maintains a three-day supply of emergency fuel to power generators in the event of an emergency. The town would like to increase their reserves.

Emergency services can also be cut off by fallen trees or washed out culverts during certain emergencies. The Town performs routine maintenance trimming. During emergencies and following storms, the Highway Department responds to calls related to downed trees.

Washington has good communication capability with all of its neighbors as well as levels of communication redundancy. Radios, cellular phone, electronic mail, and social media are all used to transmit information between personnel. In addition, a relatively new cell tower in Washington has improved overall coverage.

The Town utilizes Alert Now/Blackboard Connect, which has been acquired by Blackboard Connect to direct geographically specific emergency notification telephone calls into affected areas. This system provides emergency notifications to phones (text messages or calls) but can be used for non-emergency messages too. The town can also send email blasts. The town also uses the State's CT Alert/Everbridge system and the regional school district also uses Blackboard.

Washington is in the process of upgrading their radio communication system. The project is currently in phase 1 and will likely need additional funding to complete phases 2 and 3.

3 FLOODING

3.1 Existing Capabilities

The Town of Washington has *Ordinances, Zoning Regulations* and *Subdivision Regulations* that regulate development, and *Inland Wetland Regulations* that regulate activities near wetlands. While regulations have not been updated to specifically address hazard mitigation, the DEEP's model regulations were used to update the regulations as necessary.

Ordinances, Regulations, and Plans

Regulations, codes, and ordinances that apply to flood hazard mitigation in conjunction with and in addition to NFIP regulations include:

- ***Chapter 150 –Flood Plain Management Ordinance:*** The Floodplain Management Ordinance was passed in 1988 and is essentially the town's local articulation of the NFIP regulations. This Ordinance promotes the public health, safety and general welfare and minimizes public and private losses due to flood conditions by establishing standards and elevations for construction and renovations in flood hazard areas.
    - Section 150.40(a) outlines the general standards for development in SFHA's.
    - Section 150.40(b) states that in A-Zones, where base flood elevations have been determined, but before a floodway is designated, require that no new construction, substantial improvement or other development (including fill) be permitted which would increase base flood elevations more than one foot at any point along the watercourse when all anticipated development is considered cumulatively with the proposed development.
    - Section 150.41(1) requires that construction, new construction or substantial improvement of any commercial, industrial or other non-residential structure and other structure for other human occupancy shall either have the lowest flood, including basement, elevated at least to one foot plus/minus above the base flood elevation or shall be flood proofed below the base flood elevation.
    - Section 150.14(2) states that new residential structures or substantial improvement of any structure shall have the lowest floor, including basement, elevated at least one foot above the base flood elevation.
    - Section 150.14(3) states that no fully-enclosed areas below base flood elevation shall be allowed.

- ***Zoning Regulations:*** The 2005 Town of Washington Zoning Regulations have been enacted to " to promote the health, safety and welfare of the community; to encourage the most appropriate use of land; to prevent overcrowding of land; to lessen congestion in the streets; to secure safety from flood; to protect the ecology and prevent pollution and defilement; and to promote the general welfare of this rural community by sustaining harmonious residential development and encouraging the construction of safe, convenient business buildings attractively and conveniently located with adequate provision for parking."
    - Section 12 states that no structure shall be located within 50 feet of any waterbody, watercourse or wetland or within 150 feet of a floodplain boundary line unless

erosion and sedimentation remediation measures have been approved by the Inland Wetlands Commission. Exceptions are also made for boat docks on Lake Waramaug.
    - Section 12 also states that no building, paved surface, street, sewage disposal system, excavation quarry, or refuse disposal shall be located within 200 feet of the streambanks of the Shepaug and Bantam Rivers or Bee Brook as defined by the Northwest Conservation District, or within 100 feet of the streambanks of the East Aspetuck River.
    - Section 13.8 outlines the conditions regarding for all excavation activities including, required plans, reclamation and restoration standards, slopes, soil cover and revegetation.

- ***Subdivision Regulations:*** Adopted in 2000, the Town's Subdivision Regulations establish reasonable standards of design and procedures for subdivisions; regulate the layout and development of lots and streets; and outline measures to prevent degradation of potable water sources, control erosion and siltation, preserve adequate and convenient open spaces, and retain the natural features of the land.
    - Section 5.3 – suitable land calls for the applicant to show that the property can provide safe and healthy conditions, including flood and erosion hazards.
    - Section 7.0 – calls for adequate storm drainage systems to be installed with each subdivision.
    - Section 7.1.2 – states that "the overall stormwater drainage system shall be designed so that the peak runoff rate at all points where the stormwater leaves the property does not exceed the rate existing prior to the development".

- ***Inland Wetlands and Watercourses Regulations***. This document defines in detail the Town of Washington's regulations regarding development near wetlands, watercourses, and water bodies.
    - Section 2 defines "Regulated Activities" covered by the Regulations. Section 6 states that no person may conduct or maintain a regulated activity without obtaining a permit.
    - Section 7.6 outlines the supporting documentation required to determine the amount of impact, including excavation, filling, grading, drainage, or hydraulic modifications, of the proposed project.
    - Section 8.06 outlines the application requirements.

- ***Plan of Conservation and Development:*** The POCD was updated in 2014 at the same time as the development of this hazard mitigation plan and the two plans are generally consistent with one another. Consider the following excerpts:
    - Goal: Washington must mitigate the constraints inherent with residing in a FEMA floodplain while maximizing Washington Depot's strengths and opportunities. Strategies include "Review new design opportunities for limited residential and commercial uses within a floodplain" and "Utilize the Depot's riverscape as a recreational enhancement of the village image; view the Shepaug River as a scenic asset and not a threat. Increase access to more portions of the river for passive and active recreational use."
    - Goal: Continue to maintain and protect natural resource areas. One strategy is "Continue to pursue the Town's plan of achieving 30% permanently preserved open

space. Coordinate the Conservation Commission's efforts with other Town agencies to ensure a seamless approach."

Overall, the intent of these regulations is to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas of the Town of Washington by the establishment of standards designed to:

- Protect human life and public health;
- Minimize expenditure of money for costly flood control projects;
- Minimize the need for rescue and relief efforts associated with flooding;
- Ensure that purchasers of property are notified of special flood hazards;
- Ensure that all land approved for subdivision shall have proper provisions for water, drainage, and sewerage and in areas contiguous to brooks, rivers, or other bodies of water subject to flooding, and that proper provisions be made for protective flood control measures;
- Ensure that property owners are responsible for their actions;
- Ensure the continued eligibility of owners of property in Washington for participation in the National Flood Insurance Program.

NFIP, Flood Insurance, and Community Rating System

The NFIP administrator for the Town oversees the enforcement of NFIP regulations. The degree of flood protection established by the variety of regulations in the Town exceeds the minimum reasonable for regulatory purposes under the NFIP. The Town is not enrolled in the Community Rating System program.

According to FEMA, there are 52 flood insurance policies in force in Washington as of 6/30/2019 with an insurance value of $15,516,700.

Drainage and Street Flooding

There are areas of street flooding throughout the town, and these are addressed by the Highway Department as necessary. The Town Highway Department is in charge of the maintenance of the town's drainage systems and performs clearing of bridges and culverts and other maintenance as needed. Drainage complaints are routed to the Town Highway Department. The Town uses these reports to identify potential problems and plan for maintenance and upgrades.

Communications

The Town can access the National Weather Service website at http://www.weather.gov/ to obtain the latest flood watches and warnings before and during precipitation events.
The National Weather Service issues a flood watch or a flash flood watch for an area when conditions in or near the area are favorable for a flood or flash flood, respectively. A flash flood watch or flood watch does not necessarily mean that flooding will occur. The National Weather Service issues a flood warning or a flash flood warning for an area when parts of the area are either currently flooding, highly likely to flood, or when flooding is imminent.

The town and the regional school district utilize Alert Now which has been acquired by Blackboard Connect to direct geographically specific emergency notification telephone calls into affected areas. The town also utilizes the statewide Reverse 9-1-1 program known as CT Alert/Everbridge. In addition, a new cell tower is being constructed in Washington, which may improve overall coverage.

New Capabilities and Completed Actions

Washington continues to maintain its strong flood mitigation capabilities. The Town had two culvert replacement projects underway at the time of this Plan update. In 2020, Cardinal Engineer Associates was hired to evaluate the condition of several bridges and culverts in town. The outcome of this evaluation will likely lead to recommended upgrades and replacements.

The Town would like to develop a permanent flood protection system around the elementary school property.

Washington has Low Impact Development regulations in place.

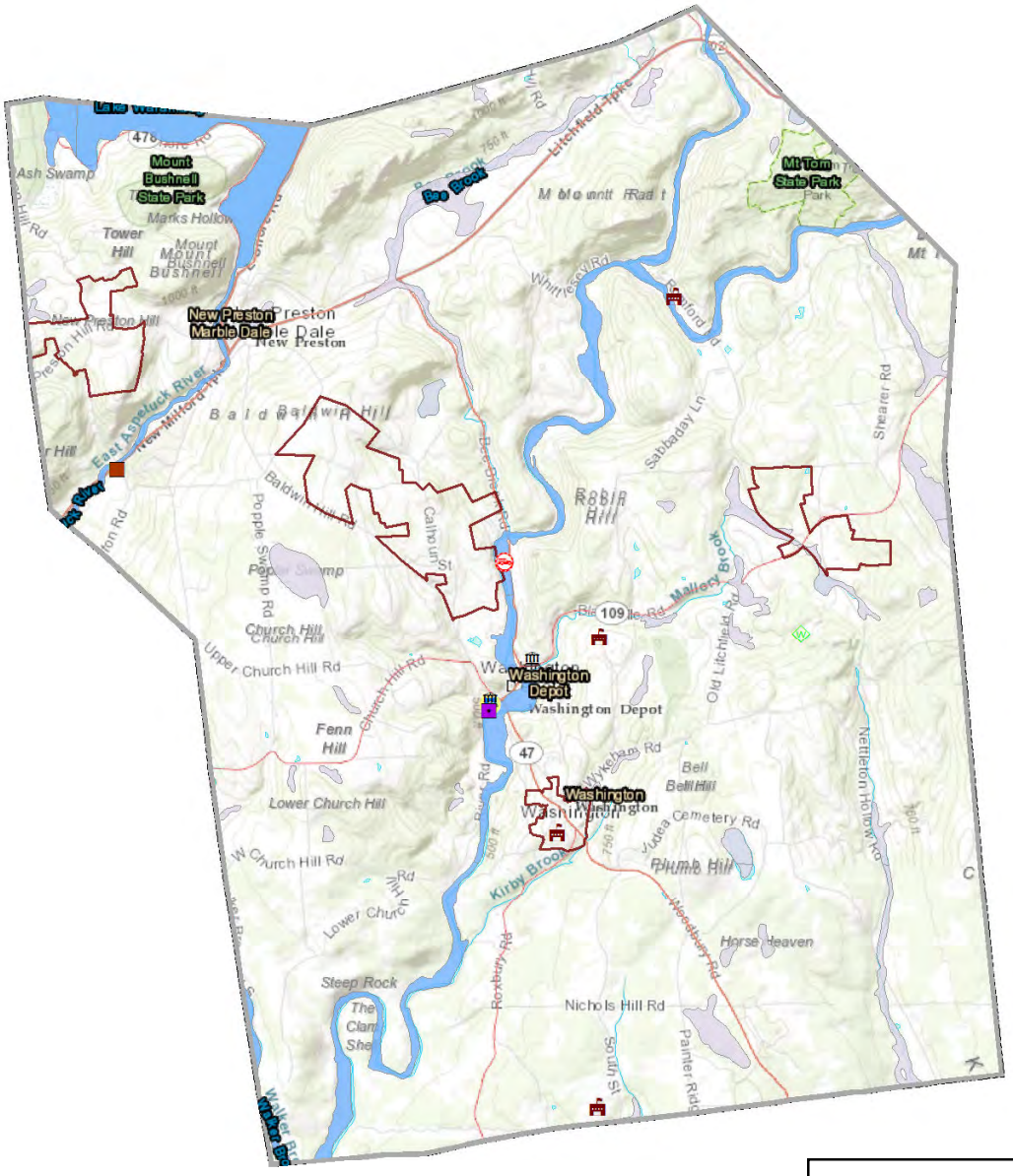
Summary

In summary, the Town primarily attempts to mitigate future flood damage and flood hazards by restricting building activities in floodprone areas. This process is carried out through both the Planning and Zoning and the Inland Wetlands Commissions. All watercourses are to be encroached minimally or not at all to maintain the existing flood-carrying capacity. These regulations rely primarily on the FEMA-defined 1% annual chance flood elevations to determine flood areas.

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Legend

- School
- Care Facility
- EMS
- Fire Station
- Municipal Facility
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District

Flood Zone

- A
- AE

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FLOOD RISK AREAS

HAZARD MITIGATION PLAN UPDATE - WASHINGTON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
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GOSHEN, CT 06756

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FIG. 3-1

3.2 Vulnerabilities and Risk Assessment

Flooding can impact a variety of river corridors and cause severe damages in the town of Washington but most often occurs in the vicinity of the Shepaug River. Flooding due to poor drainage and other factors is also a persistent hazard in the town and can cause minor infrastructure damage and create nuisance flooding of yards and basements.

Repetitive Loss Properties

Two repetitive loss properties (RLPs) are located in Washington.

Table 3-1: Repetitive Loss Properties

Street	Associated Watercourse	Flood Zone	Type
School Street	Shepaug River	A	Non-residential
Shinar Mountain Road	Shepaug River	A	Residential

The Town of Washington completed drainage improvements in the vicinity of Washington Primary School (the repetitive loss property on School Street) that have helped to address flooding during minor storm events but the improvements will not prevent flooding from the Shepaug River. Constructing a dike or berm has also been discussed; however, the drainage system will not work when the outlet is submerged by river flooding. Therefore, this may not be the most effective method of minimizing flooding.

3.2.1 Vulnerability Analysis of Areas of Critical Facilities

The list of critical facilities provided by the town was used with the parcel data to accurately locate each critical facility throughout the town. A total of two critical facilities were found to lie within the 1% annual chance floodplains of a variety of watercourses in the town. Table 3-2 lists these critical facilities and they are described in more detail below.

Table 3-2: Critical Facilities Located Within the 1% Annual Chance Floodplain

Name or Type	Address	Flooding Source
Rumsey Hall	201 Romford Road	Shepaug River
Fire Department	109 Bee Brook Road	Shepaug River

The Washington Volunteer Fire Department is located on Bee Brook Road, adjacent to the Shepaug River. While this building has not experienced serious flooding damage in recent years, it has historically been impacted by flooding, rendering it inaccessible during emergency events. In fact, the building was almost evacuated during Irene due to floodwaters encroaching the yard. The facility is partially located in the 1% annual chance floodplain of the Shepaug River.

Rumsey Hall, which houses a large population of out of state and overseas residents, is located off Romford Road. The facility is located in the 1% annual chance floodplain of the Shepaug River.

Washington Primary School is also susceptible to flooding, as discussed above, but is not listed as a critical facility.

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing mitigation measures appropriate for flooding were discussed in Section 3. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. In addition, various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Washington is 105 mph for a Category 1 event, 120 mph for a Category 2, and 125 mph for a Category 3, 4 or 5 hurricane event. Washington has adopted the Connecticut Building Code as its building code.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Parts of tall and older trees may fall during heavy wind events, potentially damaging structures, utility lines, and vehicles. Eversource, the local electric utility, provides tree maintenance near its power lines. The Town has a tree warden responsible for identifying trees in need of trimming or removal. The Town contracts a tree company with a bucket truck to conduct trimming. The Town has a significant tree maintenance budget.

Town staff report a positive relationship with Eversource, facilitated in part by the utility company's municipal liaison, who works directly with Town staff. The Town has ongoing conversations with Eversource about utility resilience for critical facilities. Town staff report that Eversource has been extremely proactive with tree maintenance.

Town Zoning Regulations encourage the burying of utilities for new developments, but this is not required or encouraged in the existing regulations. The subdivision regulations do not require underground utilities either.

During Tropical Storm Irene, the Town used the Everbridge system to notify all residents in the SFHA that they may evacuate and use one of the shelters. The Board of Education used its notification system to notify people on its list of emergency procedures. Prior to severe storm

events, the Town ensures that warning/notification systems and communication equipment are working properly and prepares for the possible evacuation of impacted areas.

New Capabilities and Completed Actions

Washington continues to maintain its strong tropical cyclone mitigation capabilities. The Town has improved its tree maintenance and debris clearing capabilities, and increased communication and collaboration with the electric utility company.

Summary

Washington mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

In general, as the residents and businesses of the state of Connecticut become more dependent on the internet and mobile communications, the impact of hurricanes on commerce will continue to increase. A major hurricane has the potential of causing complete disruption of power and communications for up to several weeks, rendering electronic devices and those that rely on utility towers and lines inoperative.

Debris such as signs, roofing material, and small items left outside become flying missiles in hurricanes. Extensive damage to trees, towers, aboveground and underground utility lines (from uprooted trees or failed infrastructure), and fallen poles cause considerable disruption for residents. Streets may be flooded or blocked by fallen branches, poles, or trees, preventing egress. Downed power lines from heavy winds can also start fires during hurricanes with limited rainfall. As mentioned in Section 2.9, town officials have noted that the power transmission line to Rumsey Hall is reportedly vulnerable to damage and the school lacked power for a few days after Hurricane Irene.

Wind damage in Washington is relatively uniform. However, Ash trees are more vulnerable to damage. Also, many trees are damaged near open areas such as Lake Waramaug and disturbed areas tend to be correlated with damage because the removal of small trees allows the larger trees to be more easily damaged. Baldwin Hill Road is identified as an area of vulnerability to wind and a microburst reportedly hit this area last year.

All areas of growth and development increase the town's vulnerability to natural hazards such as hurricanes although new development is expected to mitigate potential damage by meeting the standards of the most recent building code. Since most of the existing housing stock in the town predates the recent code changes, many structures are highly susceptible to roof and window damage from high winds. Homes located within SFHAs are also at risk from flooding as a result of the heavy rainfall that typically occurs during tropical storms and hurricanes.

As the Town of Washington is not affected by storm surge, hurricane sheltering needs have not been calculated by the U.S. Army Corps of Engineers for the town. The Town determines sheltering need based upon areas damaged or needing to be evacuated within the town. Under limited emergency conditions, a high percentage of evacuees will seek shelter with friends or relatives rather than go to established shelters. During extended power outages, it is believed that only 10% to 20% of the affected population of the town will relocate while most will stay in their homes until power is restored. In the case of a major (Category Three or above) hurricane, it is likely that the Town will depend on state and federal aid to assist sheltering displaced populations until normalcy is restored.

5 SUMMER STORMS & TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Warren as explained in Section 4.0. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

Although tornadoes pose a threat to all areas of the state, their occurrence is not considered frequent enough to justify the construction of tornado shelters. Instead, the State has provided NOAA weather radios to all public schools as well as many local governments for use in public buildings. The general public continues to rely on mass media for knowledge of weather warnings. Warning time for tornadoes is very short due to the nature of these types of events, so pre-disaster response time can be limited. However, the NOAA weather radios provide immediate notification of all types of weather warnings in addition to tornadoes, making them very popular with communities.

Municipal responsibilities relative to summer storm and tornado mitigation and preparedness include:

- Developing and disseminating emergency public information and instructions concerning tornado, thunderstorm wind, lightning, and hail safety, especially guidance regarding in-home protection and evacuation procedures and locations of public shelters.
- Designating appropriate shelter space in the community that could potentially withstand lightning and tornado impact.
- Periodically testing and exercising tornado response plans.
- Putting emergency personnel on standby at tornado "watch" stage.

New Capabilities and Completed Actions

Washington continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates with Eversource on protecting power lines.

Summary

Washington mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

Eversource trims trees along powers lines. The town tree warden can remove dead and diseased trees in rights-of-way or town land. Town-owned equipment is used except for complex situations, which would call for the use of a contractor.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Washington has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

Thunderstorms are expected to impact Washington 20 to 30 days each year. The majority of these events do not cause any measurable damage. Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in Washington is very high during any given thunderstorm, although no one area of Town is at higher risk. The risk of at least one hailstorm occurring in Warren is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the town of Washington is believed to be low for any given year. All areas of the town are susceptible to damage from high winds although more building damage is expected in the town center while more tree damage is expected in the less densely populated areas.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires.

Most downed power lines in Washington are detected quickly, and any associated fires are quickly extinguished. Such fires can be extremely dangerous during the summer months during dry and drought conditions. It is important to have adequate water supply for fire protection to ensure the necessary level of safety is maintained.

There are no critical facilities believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms. Such facilities susceptible to flooding damage were discussed in Section 3.6.

The Town estimates that the costs associated with the 1998 tornado were likely on the order of $13,000 to $15,000 for cleanup and recovery. Buildings were not damaged during this event. The cost to respond to a typical thunderstorm with a few trees down and minor road washout is approximately $600 to $750 in labor and $600 to $750 in equipment and materials.

Summary – The entire community is at relatively equal risk for experiencing damage from summer storms and tornadoes. Based on the historic record, only a few severe thunderstorms have resulted in costly damages in Washington. Most damages are relatively site-specific and occur to private property (and therefore are paid for by private insurance). For municipal property, the budget for tree removal and minor repairs may need to be adjusted from time to time to address storms. Given the limited historic record for damaging tornado events, an estimate of several million dollars in damage may be reasonable for an EF2 tornado striking Washington, and with a greater damage amount to be expected should an EF3 or stronger tornado strike.

6 WINTER STORMS

6.1 Existing Capabilities

Programs that are specific to winter storms are generally those related to preparing plows and sand and salt trucks, tree trimming to protect power lines, and other associated snow removal and response preparations.

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 35 psf for all other areas. As a result of the winter of 2010-2011, it is anticipated that many communities will develop and utilize programs for roof snow removal.

As it is almost guaranteed that winter storms will occur annually in Connecticut, it is important for municipalities to budget fiscal resources toward snow management. In extreme years, such as the winter of 2010-2011, this budget can be quickly eclipsed and must be supplemented from other budget sources.

CTDOT plows all state roads and Interstates. The Town primarily uses Town staff for plowing operations on the remaining roadways. The Town has eleven routes for plowing 90 miles of town roads. They use treated salt for paved roads and a sand/salt mixture for unpaved roads.

Prior to a winter weather event, the Town ensures that all warning/notification and communications systems are ready and ensures that appropriate equipment and supplies, especially snow removal equipment, are in place and in good working order. In some known problem areas, prestorm treatment is applied to roadways to reduce the accumulation of snow. The Town also prepares for the possible evacuation and sheltering of some populations that could be impacted by the upcoming storm (especially the elderly and special needs persons).

New Capabilities and Completed Actions

Washington continues to maintain its strong winter storm mitigation capabilities.

Summary

Washington mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

The structures and utilities in Washington are vulnerable to a variety of winter storm damage. Tree limbs and some building structures may not be suited to withstand high wind and snow loads. Ice can damage or collapse power lines, render steep gradients impassable for motorists, undermine foundations, and cause "flood" damage from freezing water pipes in basements.

The elderly population in Washington, in particular, is susceptible to the impacts created by winter storms due to resource needs (heat, electricity loss, safe access to food, etc.).

Drifting snow can occur after large storms, but the effects are generally mitigated through municipal plowing efforts. The Town has indicated that Two Rod Highway, West Mountain Road, West Church Hill Road, Baldwin Hill Road and Painter Ridge Road have a higher risk of drifting snow than other areas of town. The town may consider the use of snow fencing when necessary.

Cook Street, June Road, Gunn Hill Road and Tinker Hill Road are prone to icing due to poor drainage. The Town may consider conducting a drainage analysis of these areas to identify ways to reduce icing.

No critical facilities are believed to be more susceptible to winter storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to winter storms.

A barn collapsed in Washington in February 2014 due to heavy snow. The assessed value of the barn was $15,630 and it was not replaced. A few outbuildings in the town also were damaged and likely had replacement costs of $800 to $1,200.

Summary – the entire Town of Washington is at relatively equal risk for experiencing damage from winter storms although some areas (such as icing trouble spots and neighborhoods with a

high concentration of flat roofs) are more susceptible. Based on the historic record, it is likely that some winter storm events have costly consequences for the town. Nevertheless, many damages are relatively site specific and occur to private property (and therefore are paid for by private insurance) while repairs for power outages are often widespread and difficult to quantify to any one municipality. For municipal property, the Town budget is generally adequate to handle winter storm damage.

7 EARTHQUAKES

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Washington. The Town has adopted these codes for new construction, and they are enforced by the Building Official. Due to the infrequent nature of damaging earthquakes, land use policies in the Town do not directly address earthquake hazards. However, various documents do indirectly discuss areas susceptible to earthquake damage and regulations that help to minimize potential earthquake damage:

- ***Plan of Conservation and Development.*** The 2003 Plan of Conservation and Development identifies steep slopes (> 25%) as resources so important to environmental quality or community character that alterations to these areas should be avoided to the extent feasible. The plan also recommends update the zoning and subdivision regulations to ensure compliance with the State of Connecticut DEEP Guidelines for Soil Erosion and Sedimentation Control.

- ***Subdivision Regulations***. Section 5.5 of the 2000 regulations states that "where one or more lots are created with the potential for further subdivision within the parcel, the initial subdivision shall not prevent or unduly restrict the convenient subdivision of the remaining land. Access to the remaining land shall allow for the extension or creation of roads. In reviewing the potential for further subdivision, the Commission shall consider the location of wetlands, steep slopes, sight lines, and factors associated with potential roads."

The regulations also require that soil erosion and sediment control plans be developed for proposed projects.

- ***Zoning Regulations***. The Town's 2005 Zoning Regulations address slope and soils management through the Soil Erosion and Sediment Control Standards.

New Capabilities and Completed Actions

Washington continues to maintain its earthquake mitigation capabilities.

Summary

Washington mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Surficial earth materials behave differently in response to seismic activity. Unconsolidated materials such as sand and artificial fill can amplify the shaking associated with an earthquake. In

addition, artificial fill material has the potential for liquefaction. When liquefaction occurs, the strength of the soil decreases, and the ability of soil to support building foundations and bridges is reduced. Increased shaking and liquefaction can cause greater damage to buildings and structures and a greater loss of life.

Some areas in the Town of Washington are underlain by sand and gravel. Structures in these areas are at increased risk from earthquakes due to amplification of seismic energy and/or collapse. The best mitigation for future development in areas of sandy material may be application of the most stringent building codes or possibly the prohibition of new construction. However, many of these areas occur in floodplains associated with the various streams and rivers in Washington, so they are already regulated. The areas that are not at increased risk during an earthquake due to unstable soils are the areas underlain by glacial till, which includes most of the town.

Areas of steep slopes can collapse during an earthquake, creating landslides. Seismic activity can also break utility lines such as water mains, electric and telephone lines, and stormwater management systems. Damage to utility lines can lead to fires, especially in electric and gas mains. Dam failure can also pose a significant threat to developed areas during an earthquake. For this Plan, dam failure has been addressed separately in Section 9.0.

According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut is at a low to moderate risk for experiencing an earthquake of a magnitude greater than 3.5 and at a moderate risk of experiencing an earthquake of a magnitude less than 3.0 in the future. No earthquake with a magnitude greater than 3.5 has occurred in Connecticut within the last 30 years, and the USGS currently ranks Connecticut 43rd out of the 50 states for earthquake activity.

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the town of Washington. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Washington

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

Based on the historic record and the probability maps generated from the USGS database, the state of Connecticut possesses areas of seismic activity. It is likely that Connecticut will continue to experience minor earthquakes (magnitude less than 3.0) in the future. While the risk of an earthquake affecting Washington is relatively low over the short term, long-term probabilities suggest that a damaging earthquake (magnitude greater than 5.0) could occur within the vicinity of Washington.

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB. The Town's Planning Commission is responsible for reviewing development activities within the town to ensure flood protection.

The City of Waterbury-owned water supply dams are inspected biennially by a licensed engineer and weekly by city personnel. These include the two dams on the Shepaug River in Warren. The Connecticut DEEP routinely performs the inspections and prepares summary reports.

The Town uses the Alert Now/Blackboard Connect system for emergency notification. The dam failure inundation mapping discussed in the next section can be used to help streamline the geographic contact areas if the failure of a major dam is imminent.

Actions Completed and New Capabilities

Washington continues to maintain its capabilities for mitigating and responding to dam failure risks.

Summary

Washington mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 39 DEEP-inventoried dams within the Town of Washington. These dams are listed in Table 8-1 and shown in Figure 8-1. Note that, while they are included in this list, the Popple Swamp Dam and Mallory Pond Dam have both been breached. Additionally, the Kirby Brook Dam is listed as being removed, but continues to be included in the DEEP list as an active class AA dam. The status of the Brown Dam is unknown.

Table 8-1: DEEP-Inventoried Dams in Washington

Number	Name	Class
15001	RIVERDANCE MILL DAM	B
15002	ROMFORD POND DAM	BB
15003	ROBIN HILL DAM	BB
15004	RAINER POND DAM	BB
15005	CLUNDE POND DAM	BB
15006	WYANT DAM / RODERICK WYANT POND DAM	BB
15007	GUNTHER DAM / JIM'S DAM	BB
15008	LAKE WARAMAUG DAM	B
15009	PECKERMAN DAM	A
15010	ANDERSON DAM	A
15011	MAYFLOWER DAM	A
15012	MILLER POND DAM	A
15013	BELL HILL POND DAM	A
15014	HULLS POND DAM	A
15015	POPPLE SWAMP DAM	Unclassified
15016	HASLER POND DAM	A
15017	WORCESTER POND DAM	A
15018	KIRBY BROOK DAM - (Removed)	AA
15019	S A HESSEL DAM	A
15020	KIRK POND DAM	A
15021	SPRAIN BROOK DAM	A
15022	NETTLETON DAM / SPRAIN BROOK #1	A
15023	EMERSON POND DAM	A
15024	GRIFFITH POND DAM	A
15025	NEY POND DAM	A
15026	BLACKVILLE DAM	A
15027	MALLORY POND DAM	Unclassified
15028	WASHINGTON POND DAM / POTTER POND	A

Number	Name	Class
15029	HINKLE POND DAM / CHALICE POND	A
15030	FRISBLE POND DAM	A
15031	CHURCH HILL DAM	A
15032	MOUNT RAT POND DAM	A
15033	QUIST POND DAM	BB
15034	WALLIS PRIVATE POND DAM	A
15035	SWIGART POND DAM	AA
15036	MIDDLEBROOK'S POND DAM	A
15037	RANIERI POND DAM	A
15038	RANIERI POND #2 DAM	AA
15039	BROWN DAM	Unclassified

The following section primarily discusses known vulnerable areas located downstream of Class B and C dams. Note that, in addition to the two high hazard dams in Washington, two dams located in Warren have the potential to affect Washington: the Upper Shepaug Reservoir Dam and the Shepaug Reservoir Dam.

Upper Shepaug Reservoir (Dam No. 14901) – West Br. Shepaug River, Warren

The Upper Shepaug Reservoir Dam, also known as the Cairns Dam, is a Class C dam located at the southern end of Cairns Reservoir and impounds a storage volume of 13,942 acre-feet from a contributing watershed of 10.4 square miles. The earthen dam was constructed in 1965 and is 87 feet in height and 1,000 feet in length. A 96" RCP diversion pipe through center of dam acts as a secondary outlet. It is owned by the City of Waterbury and used to impound a reservoir for public water supply. The structure was modified for flow monitoring in 2007 by the City of Waterbury (installation of a meter with phone/electric lines). In June 2008, the Waterbury Water Department installed release structures and gate valves in two existing 48" gates that serve the dam, as well as an automated gate valve control system.

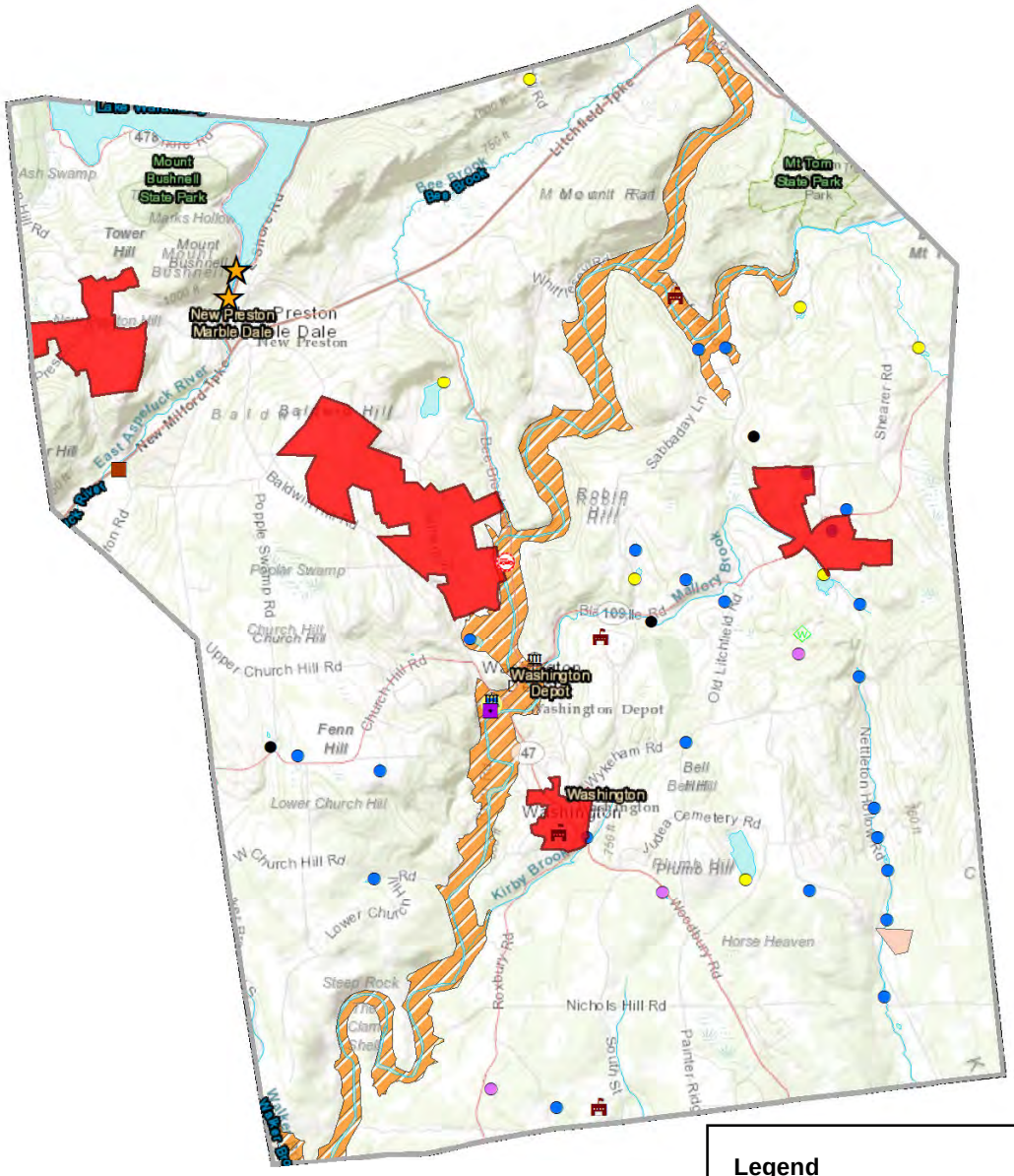
An Emergency Operation Plan and Operation and Maintenance Manual were developed for the City of Waterbury in June 1989 by HRP Associates and revised in February 1991. The June 1989 plan includes a dam breach analysis. The analysis notes that the first significant downstream features are the Shepaug Reservoir and Dam. The model indicates that the Shepaug River Dam would begin breaching approximately 25 minutes after the Upper Shepaug Reservoir Dam breach begins.

The Route 202 Bridge in Washington would be overtopped by 0.1-foot. An additional four bridges would be flooded to 10-44 feet above their decks. These include Romford Road, Whittlesey Road, Rte 47 crossings, and West Church Hill Road in Washington. Population centers would be at risk from a flood wave, with Washington Depot North and Washington Depot Center affected approximately one hour after failure. The peak flood wave passage would occur approximately 30 minutes after the initial flood wave hits the area.

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Legend

- School
- Care Facility
- EMS
- Fire Station
- Municipal Facility
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register Area
- National Register District

Dam Hazard Class

- B - Significant Hazard
- BB - Moderate Hazard
- A - Low Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - WASHINGTON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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FIG. 8-1

Shepaug Reservoir (Dam No. 14912) – Shepaug River, Warren

The Shepaug Reservoir Dam is a Class C dam located at the southern end of the Lower Shepaug Reservoir and impounds a storage volume of 2,937 acre-feet from a contributing watershed of 38.2 square miles. It is owned by the City of Waterbury and used to impound a reservoir for public water supply. The concrete gravity dam was constructed in 1933 and is 65 feet in height and 500 feet in length. The crest is approximately 8.5-feet above the spillway. A gate chamber discharges through the Shepaug Aqueduct to Fitch Reservoir or through two 48" blowoffs to Shepaug River. The Shepaug River downstream of the dam is contained within stone masonry walls.

The structure was inspected on April 23, 1997, and no major repair issues were noted. The structure was modified for flow monitoring in 2007. Repairs were permitted in Februrary 2013 that included the restoration of downstream masonry training walls that had collapsed after TS Irene. The repairs were made possible using FEMA funds and were completed as of September 2013.

An EAP for the Shepaug Reservoir Dam was prepared in 2001 addressing actions to be taken during an emergency. The City of Waterbury is responsible for notifying all emergency response personnel. A 1982 Management Plan by HRP Associates includes the results of the dam breach analysis documented in the Upper Shepaug Reservoir EOP. The analysis indicates that the following streets and roads in Washington would be inundated by a flood wave:

- Rt. 341/Warren Rd. (from Town Line to Route 202)
- Route 202/Litchfield Turnpike (0.15 miles west of Rt. 341 to 0.15 miles east of Rt. 341)
- Valley Road (from Town Line to Route 341)
- Wilbur Road (from Route 341 to Route 202)
- Romford Road (from Route 202 to 0.2 miles north of West Morris Road)
- Whittlesey Road (from Romford Road to 0.5 miles west of Romford Rd.)
- Rt. 47/Bee Brook Rd./Green Hill Rd. (from 0.6 miles south of Buffum Rd. to 0.1 miles south of School Rd.)
- Rt. 109/Church Rd./Blackville Rd. (0.1 mile north of Bryan Plaza to 0.1 mile east of Wyant
- Rd.)
- Wyant Road (private)(entire length)
- Bryan Plaza (entire length)
- Titus Road (entire length)
- Main Road (entire length)
- Cook Street (Main Rd. to .20 mile south of Rt. 109)
- School Street (entire length)
- Barnes Road (Moody Bridge Rd. to 0.1 south of Moody Bridge Rd.)
- Moody Bridge Road (from River Road to the Shepaug River)
- Ferry Bridge Road (from West Church Hill Rd: to 0.2 miles east of West Churciff Hill Rd.)
- West Church Hill Road (from 0.15 mile west of Tunnel Road to Tunnel Road)
- Tunnel Road (from West Church Hill Road to 0.5 miles south of Curtis Street; 0.5 miles
- south of Curtis Street to Town Line, west side only)
- Spring Hill Road (from Tunnel Road to .15 mile east of Tunnel Rd.)

- Kirby Brook Road (from Tunnel Rd. to .15 mile east of Tunnel Rd.)
- Curtis Road (from Tunnel Road to 0.1 mile east of Tunnel Rd.)
- River Road (entire length)

Lake Waramaug (Dam No. 15008) – East Aspetuck River, Washington

The Lake Waramaug Dam is a Class B dam located at the southern end of Lake Waramaug and impounds a 642-acre reservoir (the lake) from a contributing watershed of 14.4 square miles. It is owned by the Town of Washington.

The masonry dam is three feet in height and 50 feet in length, and includes a spillway constructed of large cut stone blocks with stone training walls and gate house. The walls tie into West Shore Road embankments. Water passes under West Shore Road and travels 50 feet to the spillway crest, discharging to the East Aspetuck River. The discharge channel is 15-feet wide and continues to flow south 1,100 feet downstream adjacent to East Shore Road (Rte 45) to the Riverdance Mill Pond and towards Route 202. Downstream hazards include the downstream Riverdance Mill dam, New Preston and residences on East Shore Road which may be affected by the flood wave.

Riverdance Mill Dam (Dam No. 15001) – East Aspetuck River, Washington

The Riverdance Mill Dam is a Class B dam located at the southern end of the Woodruff Sawmill Pond. The dam is located approximately 1,100 feet downstream of the Lake Waramaug Dam along the East Aspetuck River. The masonry dam is 14 feet in height and 75 feet in length. It is privately owned and used to impound a reservoir for aesthetic purposes. The dam would be affected by failure of the upstream Lake Waramaug Dam.

According to town officials, this dam was reconstructed immediately after the October 2005 flood.

9 WILDFIRE & DROUGHT

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

Regulations regarding fire protection are outlined in the Washington *Subdivision Regulations*:

- Subdivision Regulations, Section 10 outlines the following:
  - All fire protection measures shall be completed prior to the issuance of a certificate of occupancy.
  - Fire hydrants must be installed in subdivisions served by a public water supply system.
  - Fire hydrants shall be spaced so that each potential residential building shall be within 1,000 feet of a hydrant.
  - The Commission may require the construction of fire ponds, dry hydrants and/or cisterns, in areas not served by a public supply system. A fire pond, dry hydrant and/or cistern shall be accessible to an emergency vehicle.
  - The Commission may require the construction of an access way capable of supporting emergency vehicles in order to provide access to fire ponds of hydrants.
  - The Commission may require an easement for the use of the pond, hydrant and the access way by the local fire department.

Subdivision applications are reviewed for turning radius and other public safety factors. However, fire protection is not required for single family homes. The Washington Fire Department goes to the fires whenever possible. This proactive approach is believed to be effective for controlling wildfires.

The Town does not have an ordinance specifically requiring a source of fire protection water, such as cisterns or dry wells when municipal water service is not available, for residential or commercial building development. The previous attempt to incorporate these potential methods of fire protection into the regulations was in the 1990's. However, the fire department has made significant progress installing dry hydrants throughout the town.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Washington is compliant with this program and has a designated Burning Official. Open burning is allowed by permit and the fire department has mutual aid agreements with neighboring communities for additional support if needed.

Other capabilities for reducing wildfire risk include:

- Encouraging property owners to widen access roads such that fire trucks and other emergency vehicles can access remote locations.

- Continuing intermunicipal cooperation in firefighting efforts.
- Providing outreach programs on how to properly manage burning and campfires on private property.
- Patrolling Town-owned open space and parks to prevent unauthorized campfires.
- Enforcing regulations and permits for open burning.

Actions Completed and New Capabilities

Washington continues to maintain its capabilities for mitigating and responding to wildfire risks.

Summary

Overall, fire response in the town is believed to be adequate for the wildfire risk. The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

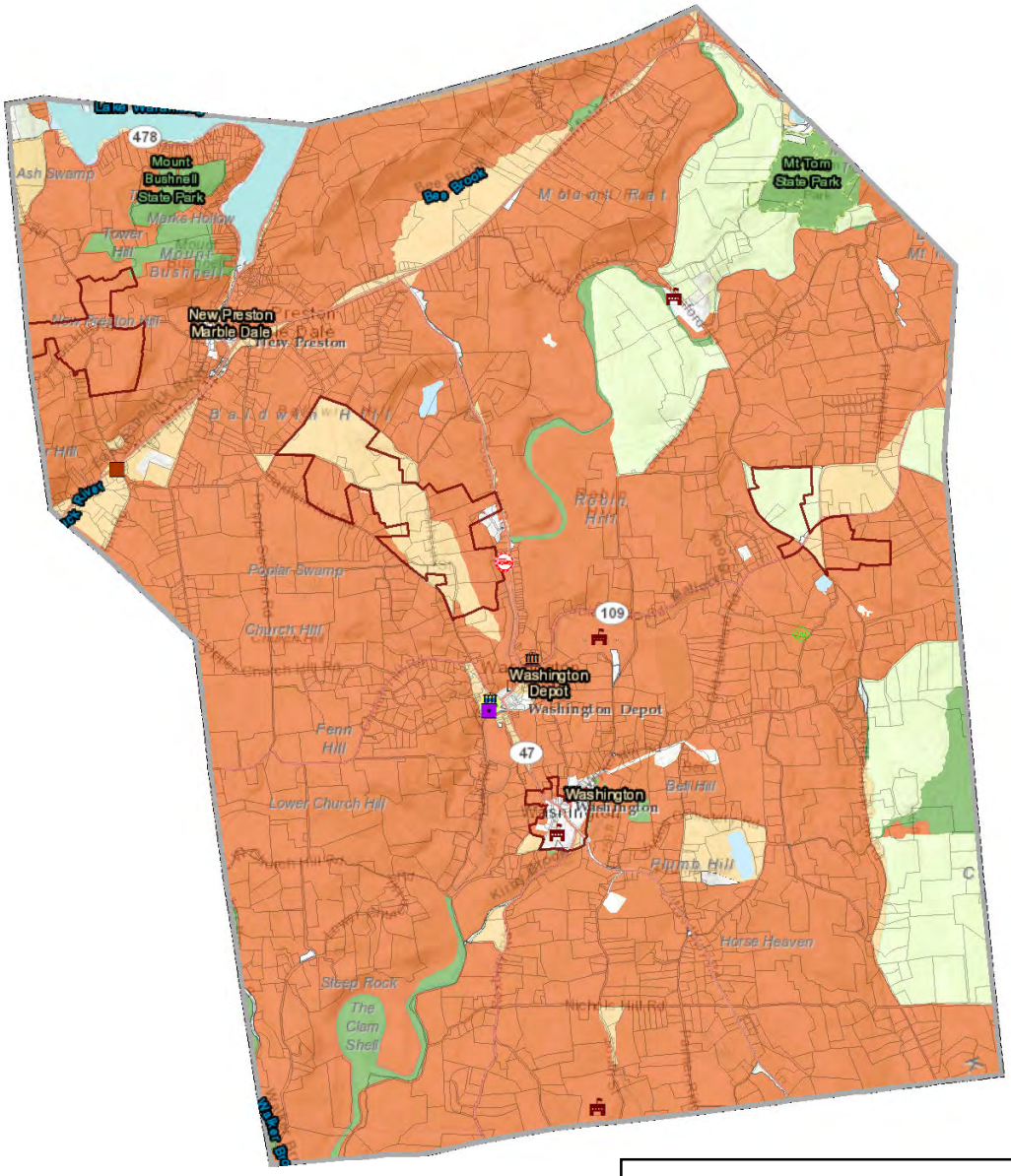
The extensive forests in Washington are prime locations for a wildfire. The many areas of Town where development has occurred adjacent to forestland are at an elevated risk of damage from wildfires. Such areas that are also located far from firefighting water sources are at highest risk.

While there is a lot of open space in Washington, there is not much camping in the town, which lowers the risk for accidental fires. However, town officials believe that Washington has a relatively high wildfire risk. The Hidden Valley and Steep Rock areas may have the highest risk.

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Legend

- School
- Care Facility
- EMS
- Fire Station
- Municipal Facility
- Law Enforcement
- Municipal Solid Waste
- National Register Building
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

HAZARD MITIGATION PLAN UPDATE - WASHINGTON ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

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SCALE	1 " = 6,701 '
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PROJ. NO.	3843-06

FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

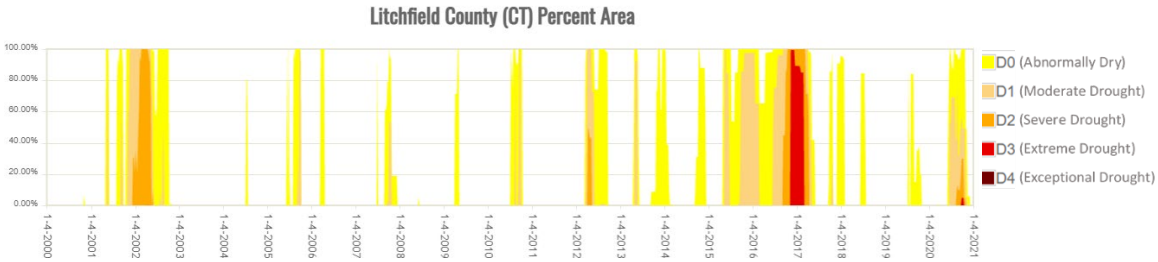


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Strategy	Dept.	Status	Notes
1	Obtain emergency generators for the Washington Volunteer Fire Department, the Town Garage and the Senior Center/American Legion.	PW, EMD	Carry Forward with Revision	Installed at FD and Town Garage. Carry forward for Senior Center.
2	Consider making the Senior Center/American Legion a designated shelter once standby power is received	EMD	Drop	Town hall and VFD are current shelters; Town's shelter capacity is sufficient.
3	Utilize the existing Alert Now notification system to its fullest capabilities	EMD	Capability	This is a capability
4	Encourage residents to purchase and use NOAA weather radios with alarm features	EMD	Capability	This info is promoted by other sources and the town feels it is adequately addressed.
5	Review and update the Town EOP at least once annually	EMD	Capability	Ongoing capability
6	Consider developing a Micro Grid in an effort to ensure back-up power is available in the business district during emergency situations.	FS	Carry Forward with Revision	Town has been exploring possibilities for improving the energy resilience of the business district. It has determined that installation of portable generator hookups at the market and American Legion buildings should be pursued. Action is revised to include generator hook ups, and carried forward.
7	Develop a plan to obtain and store fuel for back-up generators to ensure availability during emergency situations.	EMD	Capability	Town has adequate backup supply from when upgrades were made
8	Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternative.	LU	Capability	Regulated by IWWR. Design guidelines are in place. Also addressed in zoning regulations. Additionally, the Town has stringent guidelines for development around the lake.
9	Develop a plan to remove debris from rivers and streams in an effort to prevent obstructions of bridges and culverts.	PW	Capability	Public Works is always working to identify and remove debris

#	Strategy	Dept.	Status	Notes
10	Encourage property owners to purchase flood insurance under the NFIP and to report claims when flooding damage occurs.	LU Building	Carry Forward with Revision	Town staff believe they have minimal impact on personal property insurance; revise action to be a more general education action.
11	Provide technical assistance regarding floodproofing measures to interested residents. Pursue funding for home elevations should any residents become interested.	LU Building	Drop	Town does not believe this action is necessary given local conditions.
12	Evaluate the possibility of acquiring and/elevating/floodproofing residences or businesses that are prone to flooding.	PW Building	Capability	Town evaluates acquisitions on a case-by-case basis.
13	Encourage flood proofing of businesses along Titus Road.	PW Building	Carry Forward with Revisions	Town has not yet pursued this action due to funding limitations. Action is revised to include Bee Brook Road as well.
14	Evaluate the possibility of relocating the elementary school.	FS	Drop	Town has determined that this action is not feasible.
15	Consider constructing a flood wall or berm around the elementary school.	PW	Carry Forward with Revisions	Drainage work has been performed at the property, mitigating some risk. Additional action has not been pursued due to funding limitations, and the possibility of alternative solutions. Action is carried forward, revised to more generally call for a permanent flood protection system.
16	If the school district constructs a new elementary school and gives the town the existing building, ensure that the building is re-used in accordance with floodplain development regulations.	LU Building	Drop	Action is no longer feasible
17	Compile a checklist that cross-references the bylaws, regulations, and codes related to flood damage prevention that may be applicable to a proposed project and make this list available to potential applicants.	LU	Drop	Town does not believe this action is necessary; it has been successful at enforcing development codes.
18	Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	LU Building	Drop	Town does not believe this action is necessary.
19	Provide outreach regarding home elevation and relocation, flood barriers, dry floodproofing, wet floodproofing, and other home improvement techniques (Section 3.6.2) to private homeowners and businesses with flooding problems.	LU Building	Drop	Town shares links and information on its website. Action is dropped and replaced by a more general action to develop a natural hazard outreach and education program.
20	Pursue the acquisition of additional municipal open space inside SFHAs and set it aside as greenways, parks, or other nonresidential, noncommercial, or nonindustrial use.	FS	Capability	Town evaluates acquisitions on a case-by-case basis.

#	Strategy	Dept.	Status	Notes
21	Selectively pursue conservation recommendations listed in the Plan of Conservation and Development and other studies and documents	FS	Capability	This is a capability
22	Evaluate drainage problems in the town and develop a list of culverts to replace and increase capacities.	PW	Capability	This type of evaluation is done on a regular basis, and preventative maintenance is performed as needed. This action is a capability. A new action is included in this plan to perform necessary bridge and culvert upgrades and replacements as identified in the Cardinal Engineering Associates evaluation.
23	When replacing or upgrading culverts, work with CT DOT to incorporate findings of the climate change pilot study and work with HVA to incorporate findings of the stream crossing assessment training.	PW	Capability	This is an ongoing capability. Town currently has two projects that are underway.
24	Ensure adequate barricades are available to block flooded streets in floodprone areas	PW	Complete	Town has acquired barricades.
25	Evaluate flooding concerns in the vicinity of the Washington Volunteer Fire House. Potential mitigation actions may include constructing a berm or floodwall, floodproofing the building or relocating facilities on the site.	EMD PW	Carry Forward	This action has not yet been completed due to funding limitations. Town staff note this action may be related to actions taken to mitigate Titus Road flooding.
26	Work with Rumsey Hall to develop a flood emergency plan that defines actions to be taken to protect students and staff from floods and to prevent facility damage.	EMD	Complete	Rumsey Hall has an emergency plan that covers flooding. Town has good communication with the school.
27	Consider the hardening of utilities in the vicinity of Rumsey Hall to minimize power outages during storm events	PW	Carry Forward	Town has ongoing conversations with Eversource about utility resilience for Rumney Hall and other facilities.
28	Develop a town wide tree limb inspection and maintenance program to ensure that the potential for downed power lines is diminished. Continue to encourage property owners to trim branches located over structures and power lines.	PW	Capability	The town has tree warden and a significant tree maintenance budget. The tree warden works with PW to address issues, and remove limbs and debris after storms. Additionally, Town staff report that Eversource has been extremely proactive with tree maintenance.
29	Work with a Eversource liaison to ensure a more proactive approach is taken in Washington with regards to tree trimming maintenance and to ensure appropriate response times following storm events.	PW	Capability	Town has an Eversource liaison that works directly with town.
30	Develop a plan to address weak or unstable trees, especially in the vicinity of Baldwin Hill Road.	PW	Capability	Ongoing effort with Eversource and PW

#	Strategy	Dept.	Status	Notes
31	Require the location of utilities underground in new developments or during redevelopment whenever possible. Pursue funding to place them underground in existing developed areas.	LU	Drop	Town encourages underground utilizes in new developments, and has Low Impact Development regulations in place that address utility construction. Requiring underground utilities is not considered necessary.
32	Adopt the draft revision to the town zoning regulations which will encourage the burying of utilities for new developments. Consider adding this to the subdivision regulations as well.	LU	Completed	Town zoning regulations encourage burying utilities. Town does not believe adding to the Subdivision Regulations is necessary.
33	Continue to review and update the currently enacted EOP, evacuation plans, supply distribution plans, and other emergency planning documents for the Town as appropriate. Post general evacuation and shelter information on the Town website and in municipal buildings.	EMD	Capability	This is an ongoing practice for all of these plans. Information is not public prior to events to ensure it is accurate during an event.
34	The Building Department should provide literature regarding appropriate design standards for wind.	Building	Capability	Town enforces state building code locally, which includes design standards for wind.
35	Encourage the use of structural techniques related to mitigation of wind damage in new residential and commercial structures to protect new buildings to a standard greater than the minimum building code requirements. Require such improvements for new municipal critical facilities.	PW Building	Drop	Town enforces state building code locally, which includes design requirements for wind. This action is not considered necessary.
36	Develop a plan to prioritize snow removal from the roof of critical facilities and other municipal buildings each winter. Ensure adequate funding is available in the Town budget for this purpose.	PW	Capability	PW has plans in place, and there is adequate funding
37	Provide information on the dangers of cold-related hazards to people and property.	EMD	Remove	Capability, Town utilizes state resource such as information and 211
38	Consider posting the snow plowing routes in Town buildings each winter to increase public awareness.	PW	Drop	Town does not believe this action will increase hazard mitigation capabilities.
39	Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	EMD PW	Capability	Town reviews difficult to access areas following every storm, and holds pre-meetings before the next storm to discuss those areas.
40	The Building Department should provide literature regarding appropriate design standards for mitigating icing, insulating pipes, and retrofits for flat-roofed buildings such as heating coils.	Building	Capability	Town enforces state building code locally, which includes design standards for cold.
41	The town should consider utilizing snow fencing in areas prone to snow drift.	PW	Capability	Town utilizes snow fencing as needed.

#	Strategy	Dept.	Status	Notes
42	Conduct drainage studies along Cook Street, June Road, Gunn Hill Road and Tinker Hill Road in order to identify measures that may reduce icing due to poor drainage.	PW	Carry Forward	Town has begun to conduct studies in some of these areas, but has not completed all of them due to funding limitations. Action is carried forward.
43	Consider preventing residential development in areas prone to collapse	LU	Capability	Town discourages development in high hazard areas, including steep areas.
44	Ensure that municipal departments have adequate backup facilities in case earthquake damage occurs to municipal buildings.	PW EMD	Capability	Town has capabilities and facilities to move equipment, etc. for all types of hazard events.
45	Consider bracing vulnerable systems and assets inside critical facilities. This could help protect IT systems, important records and files.	PW EMD	Completed	Town has performed some improvements to Fenn Hill and the Town Hall to harden IT systems. A new action is presented in this plan to ensure municipal IT systems are backed up to the cloud and accessible offsite.
46	File EOPs/EAPs with town department and emergency personnel	EMD	Capability	This is a capability.
47	Develop EAPs for Riverdance Mill Dam and the Lake Waramaug Dam in accordance with new DEEP requirements	EMD	Carry Forward	Some progress has been made, but the EAPs have not yet been completed due to funding limitations. Action is carried forward.
48	Include dam failure inundation areas in the Alert Now emergency contact database	EMD	Carry Forward	Town has not yet pursued this action due to funding limitations. Carry Forward.
49	Continue to require the installation of fire protection water in new developments where other sources of water are distant, and installation of sprinkler systems where access is limited for fire apparatus.	FD	Carry Forward with Revisions	Town encourages but does not require installation of fire protection water sources. Town has an extensive inventory of dry hydrants that have been installed throughout Town. Action is carried forward under the authority of the Fire Marshal.
50	The Fire Department should coordinate with the Water Department to identify areas where fire-fighting capacity may be limited due to lack of water pressure or storage. Deficiencies should be addressed as they are identified, and funding allows.	FD	Capability	As part of the pre-planning process for water system improvements, the FD provides a list of available water sources for consideration.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years. These new actions include:

- Develop a permanent flood mitigation system around the elementary school property.
- Complete phases 2 and 3 of the radio communication system upgrade.
- Complete bridge and culvert upgrades and replacements as recommended by the consultant currently evaluating the conditions of several structures.
- Create a formal sheltering plan to ensure sufficient capacity in the event that the Town Hall or Volunteer Fire Department facilities are inaccessible or flooded while residents are in need of sheltering.
- Evaluate alternatives for structural (or other large-scale) mitigation actions to protect businesses along Titus Road and Bee Brook Road from flooding.

Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action WAS-01	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action WAS-02	
Develop EAPs for Riverdance Mill Dam and the Lake Waramaug Dam in accordance with new DEEP requirements	
Lead	EMD
Cost	$0 - $25,000
Funding	OB, CT DEEP
Timeframe	2022 – 2023
Priority	Low

Action WAS-03	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action WAS-04	
Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action WAS-05	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action WAS-06	
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, Sustainable CT
Timeframe	2022 – 2024
Priority	High

Action WAS-07	
Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Med

Action WAS-08	
Contact the owners of Repetitive Loss Properties and nearby properties at risk to inquire about mitigation undertaken and suggest options for mitigating flooding in those areas. This should be accomplished with a letter directly mailed to each property owner.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Med

Action WAS-09	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action WAS-10	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action WAS-11	
Develop a public outreach and education program to increase awareness of flood risks and mitigation options, including flood insurance.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action WAS-12	
Encourage flood proofing of businesses along Titus Road and Bee Brook Road.	
Lead	EMD; First Selectman
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action WAS-13	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action WAS-14	
Create a formal sheltering plan to ensure sufficient capacity in the event that the Town Hall or Volunteer Fire Department facilities are inaccessible or flooded while residents are in need of sheltering.	
Lead	EMD
Cost	$0 - $25,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action WAS-15	
Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action WAS-16	
Conduct an analysis to identify appropriate flood mitigation measures to implement at the Elementary School.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action WAS-17	
Evaluate flooding concerns in the vicinity of the Washington Volunteer Fire House. Potential mitigation actions may include constructing a berm or floodwall, floodproofing the building or relocating facilities on the site.	
Lead	DPW; EMD
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action WAS-18	
Conduct drainage studies along Cook Street, June Road, Gunn Hill Road and Tinker Hill Road in order to identify measures that may reduce icing due to poor drainage.	
Lead	DPE
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action WAS-19	
Evaluate alternatives for structural (or other large-scale) mitigation actions to protect businesses along Titus Road and Bee Brook Road from flooding.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, FEMA Grant
Timeframe	2023 – 2025
Priority	Med

Action WAS-20	
Establish requirement that fire protection water be established in new developments where other sources of water are distant, and sprinkler systems be installed where access is limited for fire apparatus. Fire Marshal will be responsible party.	
Lead	EMD, Fire
Cost	$50,000 - $100,000
Funding	OB, FEMA Assistance to Firefighters Grant
Timeframe	2023 – 2025
Priority	Med

Action WAS-21	
Include dam failure inundation areas in the Alert Now emergency contact database	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action WAS-22	
Advance efforts to improve the energy resilience of the business district by installing portable generator hookups at the Washington Food Market and the Senior Center/American Legion buildings. Over the long term, consider developing a microgrid for the district.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action WAS-23	
Complete bridge and culvert upgrades and replacements as recommended by the consultant currently evaluating the conditions of several structures.	
Lead	DPW
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEEP
Timeframe	2024 – 2026
Priority	Low

Action WAS-24	
Complete phases 2 and 3 of the radio communication system upgrade.	
Lead	EMD
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEMHS
Timeframe	2024 – 2026
Priority	Low

Action WAS-25	
Develop a permanent flood mitigation system around the elementary school property.	
Lead	First Selectman; School
Cost	More than $1 million
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

Action WAS-26	
Consider the hardening of utilities in the vicinity of Rumsey Hall to minimize power outages during storm events	
Lead	PW
Cost	More than $500,000
Funding	CIP, CT DEMHS
Timeframe	2026 – 2027
Priority	Low

APPENDIX A

STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria													Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
WAS-01	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
WAS-02	Develop EAPs for Riverdance Mill Dam and the Lake Waramaug Dam in accordance with new DEEP requirements	Dam EAP	EMD	$0 - $25,000	OB, CT DEEP	2022 – 2023	0	1	1	0	1	0	0	0	0	0	0	0	0	0	4
WAS-03	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
WAS-04	Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
WAS-05	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
WAS-06	Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives: 1. Disseminate a toolkit for pre-disaster business preparedness. 2. Revise regulations to promote Low Impact Development. 3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.	Sustainable CT	Planning	$25,000 - $50,000	OB, Sustainable CT	2022 – 2024	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
WAS-07	Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.	RLP	Planning	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
WAS-08	Contact the owners of Repetitive Loss Properties and nearby properties at risk to inquire about mitigation undertaken and suggest options for mitigating flooding in those areas. This should be accomplished with a letter directly mailed to each property owner.	RLP	Planning	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	0	1	1	0	1	1	0	0	0	0	0	0	0	0	6
WAS-09	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
WAS-10	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
WAS-11	Develop a public outreach and education program to increase awareness of flood risks and mitigation options, including flood insurance.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
WAS-12	Encourage flood proofing of businesses along Titus Road and Bee Brook Road.	Public Education	EMD; First Selectman	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	1	0	1	1	0	1	0	0	0	-1	0	0	0	0	4
WAS-13	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
WAS-14	Create a formal sheltering plan to ensure sufficient capacity in the event that the Town Hall or Volunteer Fire Department facilities are inaccessible or flooded while residents are in need of sheltering.	Sheltering Capabilities	EMD	$0 - $25,000	CIP, FEMA Grant, CT DEMHS	2022 – 2024	1	0	1	1	0	0	0	0	0	0	0	0	0	0	3
WAS-15	Refer to the Housatonic Valley Association (HVA) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
WAS-16	Conduct an analysis to identify appropriate flood mitigation measures to implement at the Elementary School.	Study	DPW	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
WAS-17	Evaluate flooding concerns in the vicinity of the Washington Volunteer Fire House. Potential mitigation actions may include constructing a berm or floodwall, floodproofing the building or relocating facilities on the site.	Study	DPW; EMD	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
WAS-18	Conduct drainage studies along Cook Street, June Road, Gunn Hill Road and Tinker Hill Road in order to identify measures that may reduce icing due to poor drainage.	Study	DPE	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
WAS-19	Evaluate alternatives for structural (or other large-scale) mitigation actions to protect businesses along Titus Road and Bee Brook Road from flooding.	Study	DPW	$50,000 - $100,000	OB, CIP, FEMA Grant	2023 – 2025	1	1	1	1	1	0	0	0	0	0	0	0	0	0	6
WAS-20	Establish requirement that fire protection water be established in new developments where other sources of water are distant, and sprinkler systems be installed where access is limited for fire apparatus. Fire Marshal will be responsible party.	Wildfire Risk Reduction	EMD, Fire	$50,000 - $100,000	OB, FEMA Assistance to Firefighters Grant	2023 – 2025	1	1	0	0	1	1	1	0	0	0	-1	0	0	0	6
WAS-21	Include dam failure inundation areas in the Alert Now emergency contact database	Emergency Alerts	EMD	$25,000 - $50,000	OB, CT DEMHS	2023 – 2025	1	0.5	1	1	1	0	0	0	0	-1	0	0	0	0	4

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
WAS-22	Advance efforts to improve the energy resilience of the business district by installing portable generator hookups at the Washington Food Market and the Senior Center/American Legion buildings. Over the long term, consider developing a microgrid for the district.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
WAS-23	Complete bridge and culvert upgrades and replacements as recommended by the consultant currently evaluating the conditions of several structures.	Culvert & Bridge Upgrades	DPW	More than $500,000	CIP, FEMA Grant, CT DEEP	2024 – 2026	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
WAS-24	Complete phases 2 and 3 of the radio communication system upgrade.	Emergency Communication	EMD	$50,000 - $100,000	OB, CIP, CT DEMHS	2024 – 2026	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3
WAS-25	Develop a permanent flood mitigation system around the elementary school property.	Critical Facility Protection	First Selectman; School	More than $1 million	CIP, FEMA Grant, CT DEMHS	2025 – 2027	1	1	0	0	1	0	1	0	0	0	0	0	-1	0	4
WAS-26	Consider the hardening of utilities in the vicinity of Rumsey Hall to minimize power outages during storm events	Harden Power Lines	PW	More than $500,000	CIP, CT DEMHS	2026 – 2027	1	1	0	1	1	0	0	0	-1	0	0	0	-1	0	1

APPENDIX B
RECORD OF MUNICIPAL ADOPTION

APPENDIX C

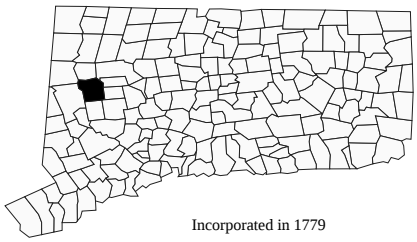
2019 CERC TOWN PROFILE

Washington, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
2 Bryan Plaza
P.O. Box 383
Washington Depot, CT 06794
(860) 868-2259

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1779

Demographics

Population

	Town	County	State
2000	3,596	182,193	3,405,565
2010	3,578	189,927	3,574,097
2013-2017	3,489	184,454	3,594,478
2020	3,347	193,116	3,604,591
'17 - '20 Growth / Yr	-1.4%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	38	921	4,842
Pop./Sq. Mile (2013-2017)	92	200	742
Median Age (2013-2017)	56	47	41
Households (2013-2017)	1,444	74,605	1,361,755
Med. HH Inc. (2013-2017)	$93,975	$76,438	$73,781

	Town	State
Veterans (2013-2017)	193	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	126	4%	264	8%	454	13%	492	14%	1,177	34%	976	28%	3,489	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	3,186	164,992	2,446,049
Black Non-Hisp	51	2,843	350,820
Asian Non-Hisp	81	3,516	154,910
Native American Non-Hisp	0	267	5,201
Other/Multi-Race Non-Hisp	24	2,320	84,917
Hispanic or Latino	147	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	6.2%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	355	13%	673,582	27%
Associates Degree	182	7%	188,481	8%
Bachelors or Higher	1,517	57%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	227	1,612
23 - Construction	20	56
31-33 - Manufacturing	6	23
44-45 - Retail Trade	26	132
61 - Educational Services	5	289
72 - Accommodation and Food Services	16	292
Total Government	14	240

Top Five Grand List (2018)

	Amount
EVERSOURCE	$13,717,960
MFINN2013 LLC	$2,750,740
AQUARION WATER COMPANY OF CONNECTICUT	$795,490
RICHARDS CORPORATION	$671,020
ALTORELLI ALPHONSE D MD PC	$528,090
Net Grand List (SFY 2016-2017)	$1,111,257,892

Major Employers (2018)

The Gunnery School
Region 12 School
Washington Supply Company
The Glenholme School
Rumsey Hall School

Education

2018-2019 School Year

	Grades	Enrollment
Regional School District 12	PK-12	685

Pre-K Enrollment (PSIS)

	2018-2019
Regional School District 12	41

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Regional School District 12	92.3%	96.0%	90.0%

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	78.6%	53.8%	*	51.3%	67.9%	43.0%
ELA	*	53.1%	89.7%	54.9%	76.8%	56.1%

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Regional School District 12	8.8%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	43.4%	84.0%	86.8%
Private	56.6%	16.0%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Washington, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Selectman - Town Meeting

Total Revenue (2017)	$17,165,357	Total Expenditures (2017)	$14,818,817	Annual Debt Service (2017)	$0
Tax Revenue	$16,018,541	Education	$10,117,932	As % of Expenditures	0.0%
Non-tax Revenue	$1,146,816	Other	$4,700,885	Eq. Net Grand List (2017)	$1,797,628,194
Intergovernmental	$119,733	Total Indebtedness (2017)	$436,860	Per Capita	$520,599
Per Capita Tax (2017)	$4,594	As % of Expenditures	2.9%	As % of State Average	344.9%
As % of State Average	156.7%	Per Capita	$127	Moody's Bond Rating (2017)	-
		As % of State Average	5.1%	Actual Mill Rate (2017)	14.25
				Equalized Mill Rate (2017)	8.83
				% of Net Grand List Com/Ind (2017)	4.4%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	2,207	88,068	1,507,711
% Single Unit (2013-2017)	89.0%	73.6%	59.2%
New Permits Auth (2017)	4	142	4,547
As % Existing Units	0.2%	0.2%	0.3%
Demolitions (2017)	2	32	1,403
Home Sales (2017)	51	1,753	21,880
Median Price	$465,900	$250,100	$270,100
Built Pre-1950 share	42.9%	31.2%	29.3%
Owner Occupied Dwellings	1,143	57,330	906,798
As % Total Dwellings	79.2%	76.8%	66.6%
Subsidized Housing (2018)	44	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	0	57	536
$100,000-$199,999	1	563	5,237
$200,000-$299,999	9	538	6,681
$300,000-$399,999	14	315	3,863
$400,000 or More	27	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$1,336	$995	$1,123
Cost-burdened Renters	36.9%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	2,034	101,000	1,827,070
Residents Unemployed	50	4,014	78,242
Unemployment Rate	2.4%	3.8%	4.1%
Self-Employed Rate	27.3%	13.0%	10.0%
Total Employers	227	6,177	122,067
Total Employed	1,612	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Washington, CT	372	Washington, CT	372
New Milford, CT	197	New Milford, CT	175
Torrington, CT	77	Danbury, CT	105
Litchfield, CT	75	Roxbury, CT	37
Woodbury, CT	63	Waterbury, CT	29
Watertown, CT	36	Litchfield, CT	29
Morris, CT	34	Torrington, CT	29

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	423	1,777
Violent	0	228

Disengaged Youth (2013-2017)

	Town	State
Female	4.3%	4.2%
Male	0.0%	5.6%

	Town
Library circulation per capita	11.57

Distance to Major Cities

	Miles
Hartford	34
New York City	76
Providence	99
Boston	127
Montreal	269

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Water Provider
Municipal Provider
Local Contact

Cable Provider
Charter Communications of Western CT
(800) 827-8288

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Northwest Hills Council of Governments
Hazard Mitigation Plan Update
2022 – 2027

Municipal Annex
for

WINCHESTER, CT

338 Main Street
Winsted, CT 06098

MMI #3843-06

Prepared for:
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 Torrington Road
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global environmental and advisory solutions

SLR

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1 INTRODUCTION

1.1 Purpose of Annex

This Hazard Mitigation Plan (HMP) annex provides a community-specific hazard risk assessment, capability analysis, and evaluation and prioritization of hazard mitigation measures and projects.

Background information and the regional effects of pertinent natural hazards are discussed in the main body of the Northwest Hills Council of Governments (NHCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for the Town of Winchester and is not to be considered a standalone document.

The primary goal of this HMP, including this Municipal Annex, is to identify natural hazard risks and mitigation opportunities in order to reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

2 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Winchester is an economic hub for the northern portion of the Litchfield Hills Region. The town is bordered on the north by Colebrook, on the east by Barkhamsted, on the south by Torrington, and on the west by Goshen and Norfolk. Winchester is the second largest town in the Region with a population estimate of 10,730 persons as of 2019.

In addition to serving as the regional hub of the northern Litchfield Hills Region, major facilities in the City include the Northwestern CT Community College, Platt Hill State Park, and the Winsted Health Center.

Other notable characteristics of the municipality include Highland Lake (one of Connecticut's largest lakes at over three miles in length) and the Mad and Still Rivers. Winchester has a total area of 33.8 square miles with a land area of 32.3 square miles. Major highways serving the town include State Routes 8, 20, 44, and 183.

2.2 Existing Land Use

Table 2-1 summarizes 2015 land cover data which was derived from satellite imagery. Areas shown as turf and grass are maintained grasses such as residential and commercial lawns or golf courses. According to this data, about 73% of Winchester is forested and approximately 12% is developed.

Table 2-1: 2015 Land Cover by Area

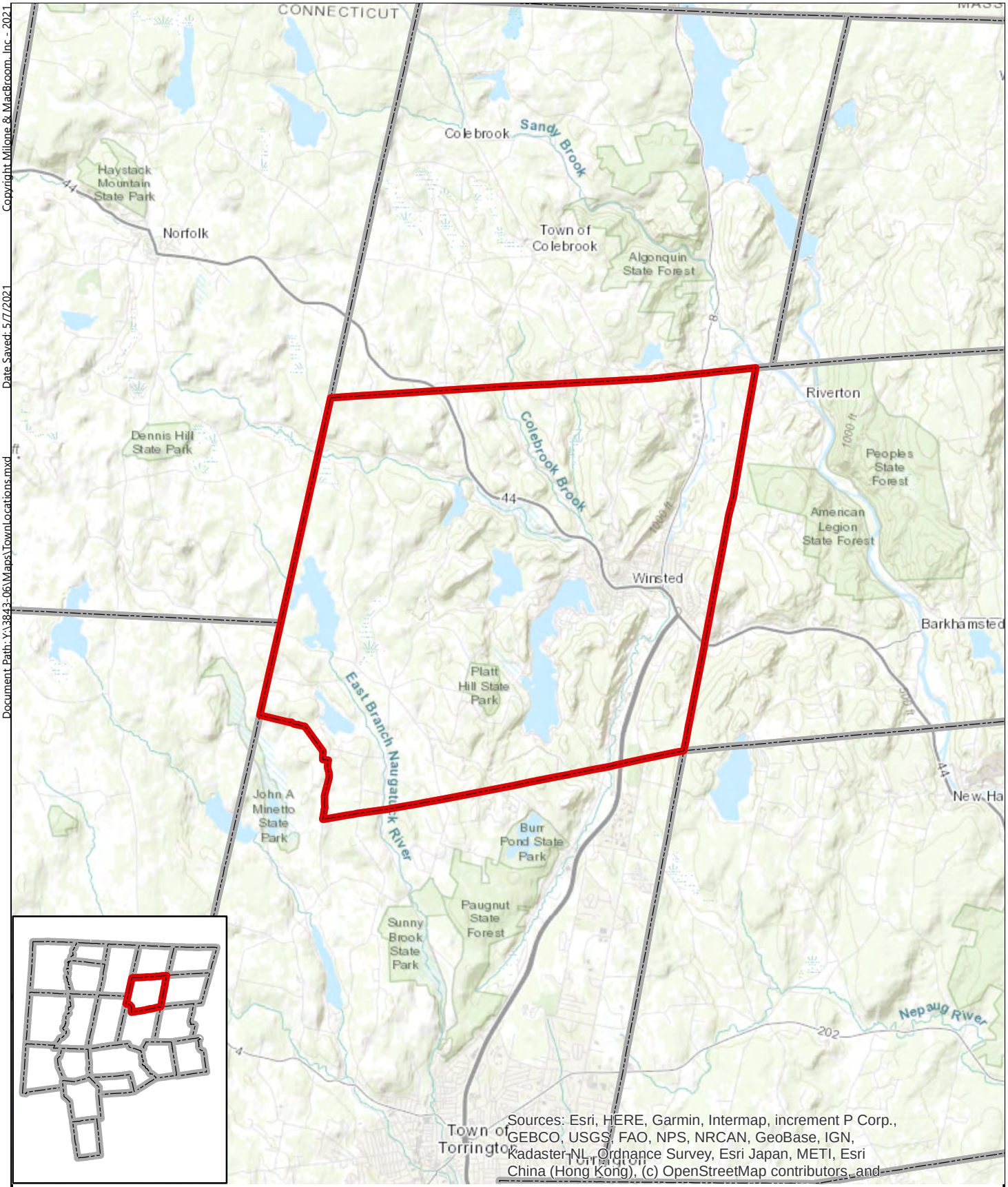
Land Cover	Area (acres)	Percent of Community
Developed	2,599.0	11.99%
Turf & Grass	780.5	3.60%
Other Grass	254.3	1.17%
Agricultural Field	837.2	3.86%
Deciduous Forest	7,521.4	34.70%
Coniferous Forest	7,634.6	35.22%
Water	1,192.2	5.50%
Non-Forested Wetland	87.0	0.40%
Forested Wetland	613.1	2.83%
Tidal Wetland	0.0	0.00%
Barren	117.0	0.54%
Utility Row	38.7	0.18%
Total	**21,675**	**100%**

Source: UCONN Center for Land Use Education and Research (CLEAR)

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REGIONAL LOCATION: WINCHESTER

HAZARD MITIGATION PLAN UPDATE - WINCHESTER ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 4,500 9,000
Feet

SCALE	1 " = 9,942 '
DATE	5/7/2021
PROJ. NO.	3843-06

FIG. 2-1

2.3 Development Trends

Winchester was first settled in 1732 and incorporated as a town in 1771. It shares a similar history with other towns in the regional area with agricultural land use dominating in the 18th and 19th century, and the rise of manufacturing during the late 19th and early 20th century.

As stated in the Town Plan of Conservation and Development for Winchester, "The two major land use changing events over the past fifty years have been the 1955 flood which altered forever the face and economy of Winchester and the opening of Route 8 expressway which put Winchester closer to Torrington and Waterbury. The '55 flood left over 400 residents homeless and destroyed 170 retail stores and 90% of the Town's industries… The expressway changed land use patterns by effecting the economy and the demand for housing and related services."

Since the 1970's Winchester, like many other manufacturing centers in the Northeast, has experienced an out-migration of industry. In 1970, manufacturing comprised 45% of the jobs in Winchester; by 2005 the percentage of manufacturing jobs had declined to 29%. With nearly one in three jobs still being in manufacturing, however, manufacturing continues to represent a major sector of the town's economy.

According to the US Census, the population of Winchester increased very little, from 10,496 in 1960 and 11,242 in 2010. U.S. Census Bureau estimates for 2019 show a population around 10,730 individuals, a decrease from 2010 of 4.6%. The Connecticut State Data Center predicts that population will increase by 6.0% through 2025 to an estimated population of 11,373 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Winchester decreased between 2013 and 2017. The number of permits issued in 2013 and 2014 was 27 and 3, respectively, while 0 permits were issued in 2016, and 1 permits were issued in 2017. On average, 6 housing permits were issued each year in Winchester between 2013 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Winchester rose by approximately 0.6-percent between 2010 and 2019, from 5,613 units in 2010 to 5,647 units in 2019. In 2019, the housing stock was made up of approximately 61% single-unit structures, 16% two-unit structures, 24% multi-unit structures, and 0% mobile-homes or other types of structures. Just over half of the housing in the town is owner occupied, with about one-third of the housing stock occupied by renters, and six percent held for seasonal, recreational or occasional use (second homes).

According to the Connecticut Office of Policy and Management, Winchester's 2019 Total Equalized Net Grand List was valued at $728,714,521. The equalized net grand list is an estimate of the market value of all taxable property in the municipality, and gives some indication of the value of property at risk in the event of a major natural disaster.

Additional information can be found in the 2019 Connecticut Economic Resource Center profile for Winchester, included as Appendix C.

Town staff report that there have not been any significant developments in recent years. Overall, development in Winchester has not significantly increased exposure to natural hazards over the last five years. Continuation of these trends in the next five years is not expected to increase exposure.

Social Vulnerability Index

By evaluating local social vulnerabilities, a community can identify populations that may be more vulnerable to natural hazards, and implement actions to better respond to the needs of those populations. The Center for Disease Control and Prevention (CDC) uses 15 factors extracted from census data to calculate a Social Vulnerability Index (SVI) for communities. The SVI factors fall into four categories:

- socioeconomic status
- household composition and disability
- minority status and language
- housing type and transportation

Winchester is considered to have a Moderate level of social vulnerability, with a higher vulnerability score for the SVI category of Socioeconomic Status. In other words, a particular challenge in Winchester may include the presence of residents with limited financial capacity.

The City of Winsted, within Winchester, is considered to have a High level of social vulnerability. Here, higher vulnerability scores are found for Housing Type and Transportation, Socioeconomic Status, and to a lesser extent Household Composition and Disability. This indicates that challenges within the City of Winsted may include lower-quality housing that is susceptible to hazard impacts, lack of access to transportation for emergency evacuation, the limited financial capacity of some residents, and the presence of residents with mobility or health challenges.

2.4 Geology

Geology is important to the occurrence and relative effects of natural hazards such as floods and earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in Winchester.

Winchester is part of the Northeastern Highlands Ecoregion, which is characterized by “hills and mountains, a mostly forested land cover, nutrient-poor frigid and cryic soils (mostly Spodosols), and numerous high-gradient streams and glacial lakes” (as described on the map “Ecoregions of New England”).

2.5 Climate and Climate Change

Over the course of the year, the temperature in Winchester typically varies from 16°F to 80°F and is rarely below -0°F or above 87°F. The warm season lasts for 3.6 months, from May 28 to September 15, with an average daily high temperature above 70°F. The hottest day of the year is July 19, with an average high of 80°F and low of 61°F. The cold season lasts for 3.3 months, from

December 1 to March 11, with an average daily high temperature below 40°F. The coldest day of the year is January 29, with an average low of 16°F and high of 31°F.

Precipitation falls throughout the year in Winchester. The wetter season lasts 4.5 months, from April 9 to August 25, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 38% on May 29. The drier season lasts 7.5 months, from August 25 to April 9. The smallest chance of a wet day is 21% on January 29.

Rain falls throughout the year in Winchester Center. The most rain falls during the 31 days centered around September 30, with an average total accumulation of 4.0 inches. The least rain falls around January 24, with an average total accumulation of 1.2 inches.

The snowy period of the year lasts for 6.1 months, from October 21 to April 24, with a sliding 31-day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 24, with an average total liquid-equivalent accumulation of 1.5 inches.

Climate data was sourced from Weather Spark based on analysis of the years 1980 to 2016.

Climate Change

Climate change projections for Connecticut were sourced from the 2019 Connecticut Physical Climate Science Assessment Report, which was developed by the University of Connecticut (UConn) Atmospheric Sciences Group, commissioned by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) with funding from the Department of Energy and Environmental Protection (DEEP). All projections are based on the IPCC high CO_2 emission scenario (RCP8.5).

Temperature

Annual temperatures have been increasing throughout Connecticut and is projected to continue to do so in the future. By mid-century, average annual temperature is projected to increase by 5°F. Seasonal average temperatures are also expected to rise, with the greatest increase (6°F) experienced in summer (June to August). The number of nights over which temperature remains above 68°F will quadruple from 10 days per year to more than 40 days, and the number of extremely hot days will increase from above 4 a year to 48 per year.

Precipitation

Rainfall data in "Technical Paper No. 40" by the U.S. Weather Bureau (now the National Weather Service) (Hershfield, 1961) dates from the years 1938 through 1958. According to these data, the 24-hour rainfall amount for a 10% annual-chance storm in Litchfield County is 4.7 inches.

The continued increase in precipitation only heightens the need for hazard mitigation planning as the occurrence of floods may change in accordance with the greater precipitation.

The Northeast Regional Climate Center (NRCC) has partnered with the Natural Resources Conservation Service (NRCS) to provide a consistent, current regional analysis of rainfall extremes (http://precip.eas.cornell.edu/). In 2020 this dataset listed the 24-hour rainfall amount for a 10% annual-chance storm in Winchester as 4.75 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Winchester at 5.72 inches.
These precipitation amounts, and more details, are summarized in Table 2-2, below.

Table 2-2: 24-Hour Rainfall Amounts by Annual-Chance Occurrence

Source	24-Hour Rainfall Amount (inches) by Annual-Chance Occurrence		
	10%	4%	1%
Technical Paper No. 40	4.7	5.5	7.0
NRCC	4.8	6.0	8.5
NOAA Atlas 14	5.7	7.1	9.2

Annual precipitation has been increasing statewide and is projected to continue to increase. By mid-century, annual precipitation is projected to increase by 8.5%, with the greatest increase (13.4%) occurring in the winter months. Extreme precipitation events are projected to increase in both frequency and magnitude. Based on this increase and the precipitation figures above, by 2050 Winchester can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.1 to 6.2 inches or greater.

Despite overall increases in precipitation, drought risk is projected to increase, especially during summer, due to changing precipitation patterns and projected increases in potential evapotranspiration (plants taking up more water in hotter temperatures and longer growing seasons).

2.6 Drainage Basins and Hydrology

Winchester is dominated by the Mad River Subregional Watershed, which drains the majority of the Town until its confluence with the Still River in Winsted. Major streams in this watershed include Taylor Brook and Sucker Brook flowing into Highland Lake, Rug Brook, Mill Brook, Colebrook Brook, Indian Meadow Brook, and the Mad River itself.

The eastern side of Town is drained by the Still River, which flows northward into Sandy Brook in Colebrook. A sliver of Winchester in the northeast falls within the Sandy Brook watershed, and small areas in the southeast part of Town are within the Morgan Brook and Nepaug River watersheds.

A large portion of the western side of Town is drained by the East Branch Naugatuck River, as well as tributaries including Fox Book and Riley Swamp Brook. Meadow Lake is within this watershed. Other Subregional Watersheds covering the southwestern corner of Winchester are the West Branch Naugatuck River and Hall Meadow Brook.

2.7 Governmental Structure and Capabilities

The Town of Winchester has a number of existing authorities, policies, programs and regulations that serve to mitigate the impact of natural hazards. Existing local authorities include the Winchester Board of Selectmen, Planning and Zoning Commission, Inland Wetlands Commission, Emergency Management Director, Fire Department, and Department of Public Works.

Winchester updated its Emergency Operations Plan in 2020.

2.8 Historic and Cultural Resources

Historic and cultural resources include sites, structures, and objects that are significant in history, architecture, archaeology, engineering, and culture. These resources grow economies and enhance community character, and following a natural disaster they can help to reinforce neighborhood connections and reestablish a sense of community and normalcy. Consideration of these resources in this HMP is critical.

Historic preservation planning helps protect historic properties and cultural resources from demolition or alteration. **Hazard mitigation planning** helps protect life and property from damage caused by natural and manmade hazards. **Integrating** these two planning processes helps create safe and sustainable historic communities.
- Paraphrased from FEMA Report 386-6

Historic buildings and structures may be particularly susceptible to natural hazards because they were built prior to the establishment of more recent construction standards. Additionally, some of the structural integrity of these resources may have been degraded over the decades or centuries since their original construction. Structural retrofits and hazard mitigation methods may be challenging or restricted in cases where alteration of a resource will also diminish its cultural or historical aesthetic and value. Finally, miscommunications or lack of knowledge may lead to historic resources being damaged during the disaster recovery process.

Historic resources in Winchester are concentrated within the Winsted Green Historic District, but also are present throughout the Town. They include historic homes, churches, mill buildings, and schoolhouses. Many of these resources are located near flood sources and may be damaged during flooding or other hazard events.

Steps to incorporate historical and cultural preservation into hazard mitigation planning include:

- Inventory and survey historic and cultural resources
- Implement appropriate mitigation measures for those resources
- Take steps to move portable resources, such as artwork or documents, to safe locations prior to the occurrence of a hazard, if possible
- Consider these resources in emergency operations plans to prevent accidental damages during recovery efforts

Specific actions to mitigate natural hazard risks to historic resources are listed at the end of this Annex.

2.9 Infrastructure

Transportation

The primary transportation routes into and out of the town are Route 263 and Route 44 running east-west, and Route 8 and Route 183 running north-south. Other key roads include Newfield Road, South/Hollow/Taylor Brook Road, Torrington Road, Spencer Hill Road, Smith Hill Road, and

Old North Road. There is no local public transit system in Winchester, although the Town does operate a senior van service.

Utilities

Public water in Winchester is provided by Winsted Water Works, a town-operated public water service that serves the City of Winsted and some surrounding areas, as well as a handful of Non-Community Public Water Systems. Residents and businesses in rural parts of Town rely on private well water.

Eversource is the primary provider in Town for electricity and natural gas.

According to geoISP (geoISP.com), access to Broadband Internet and Mobile Broadband (cellular) service is very limited in Winchester.

2.10 Emergency Services, Critical Facilities, Sheltering, and Evacuation

Winchester has identified several critical facilities throughout the town, as summarized on Table 2-3 below.

Table 2-3: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Winchester Town Hall	338 Main St	EOC	✓		
Blanche McCarthy Senior Center	80 Holabird Ave	Senior Center	✓	✓	
Winchester Grange Hall	110 Newfield Road	Shelter	✓	✓	
Pearson School	2 Wetmore Ave	Secondary Shelter		✓	
Gilbert School	200 Williams Ave	Secondary Shelter		✓	
Municipal Public Works Garage	189 Rowley St	Municipal Services			
Winsted Fire Station #1	27 Elm St	Emergency Response	✓		
Winsted Fire Station #2	187 Prospect St	Emergency Response	✓		
Winsted Fire Station #3	215 Holabird Ave	Emergency Response	✓		
Winchester Center Vol. Fire Dept.	110 Newfield Road	Backup EOC	✓		
The Civil Defense Building	72 Waldron Street	Emergency Response	✓		
Winsted Medical Associates	80 S Main Street	Medical Services	✓		
Winchester Police Station	338 Main St	Emergency Response			
Litchfield County Dispatch	111 Water Street, Torrington	Emergency Dispatch Services			
Rugg Brook Reservoir	177 Rugg Brook Rd	Water Source			
Crystal Lake Reservoir	Winchester Road	Water Source			
Crystal Lake Water Treatment Plant	Winchester Road	Municipal Services			
Winsted Sewer Treatment Plant	470 N Main St	Municipal Services			

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
Carriage Maker Place Apartments	19 Gay Street	Senior Housing			
Chestnut Street Elderly Housing	80 Chestnut Street	Senior Housing			
The Glenn Apartments	130 Willow Street	Senior Housing	✓		
Susan M.B. Perry Senior Housing	117 Spencer Street	Senior Housing	✓		
Winchester Area Child Center	185 Prospect St	Care Facility			

The major facilities at risk in the community in the event of a natural hazard include the Winchester Town Hall, Pearson School, Gilbert School, Municipal Public Works Garage, Winchester Fire Station, Winchester Police Station, Rugg Brook and Crystal Lake Reservoirs, the Winsted Water Treatment Plant, the Winsted Sewer Treatment Plant. These are considered critical facilities in the event of a natural disaster because they might be needed for effective emergency response.

Other critical facilities with regard to emergency response include the Laurel Healthcare Nursing Home, the elderly housing complexes, at Gay Street and Chestnut Street, and the Winchester Area Child Centers. All are potentially vulnerable to tornados, winter storms, wildfire, and earthquakes. None of the facilities are located within a floodplain.

Emergency Response Capabilities

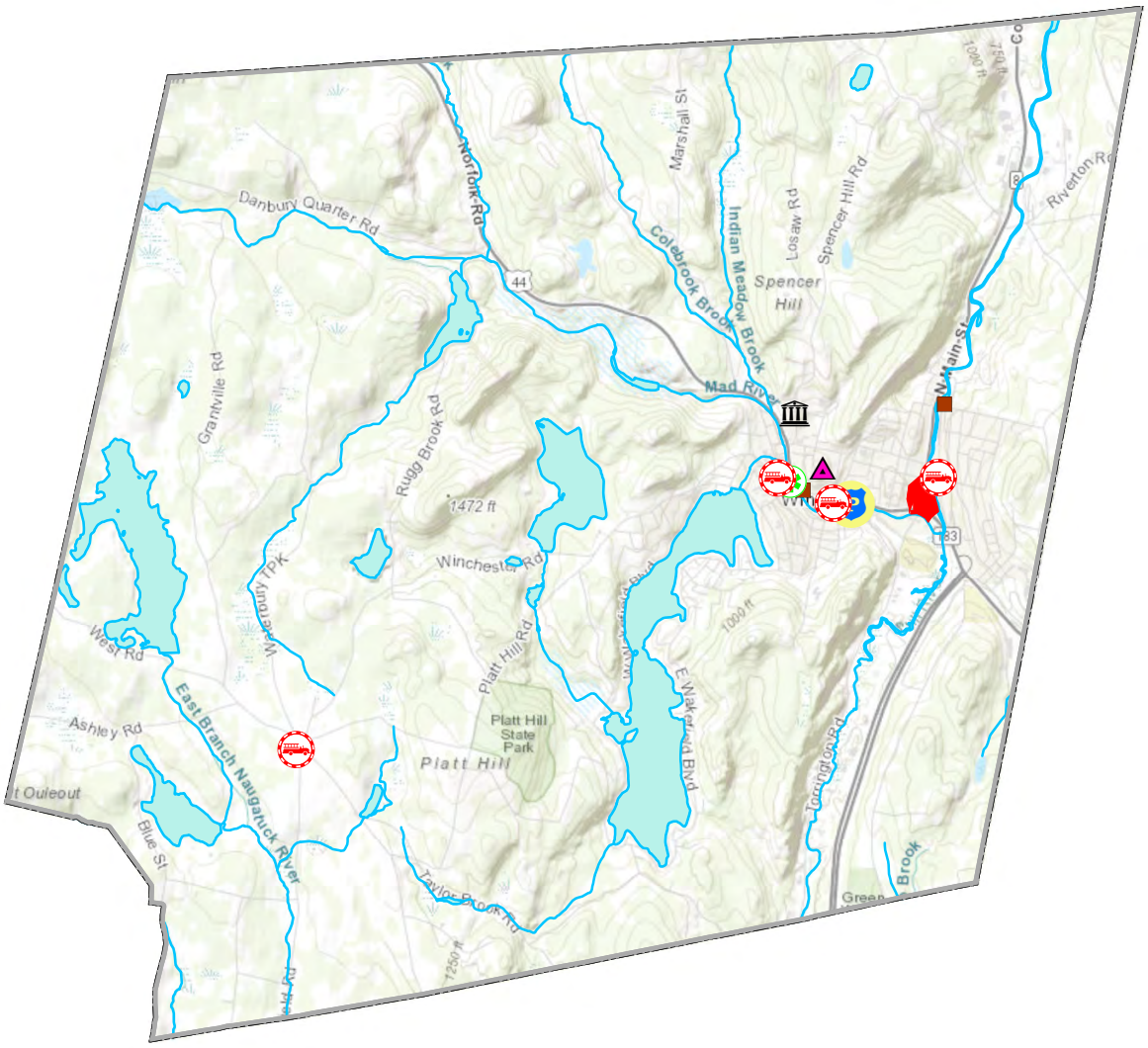
Winchester Town Hall serves as the town emergency operations center. The community also maintains a civil preparedness building on Waldron Street.

The Winchester Volunteer Fire Department, the Winsted Fire Department, Department of Public Works, and Emergency Management Director all possesses emergency equipment that can be deployed as needed in the event of an emergency. Procedures are also in place to open and maintain the Emergency Operations Center and emergency shelter in town.

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Critical Facilities & Cultural Resources

- EMS
- Fire Station
- Municipal Facility
- Law Enforcement
- National Register Building
- National Register Structure
- National Register District

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CRITICAL FACILITIES AND CULTURAL RESOURCES

HAZARD MITIGATION PLAN UPDATE - WINCHESTER ANNEX
NORTHWEST HILLS COUNCIL OF GOVERNMENTS
59 TORRINGTON ROAD, SUITE A-1
GOSHEN, CT 06756

N

0 3,000 6,000
Feet

SCALE 1 " = 6,213 '
DATE 5/7/2021
3843-06
PROJ. NO.

FIG. 2-2

Winchester has a verbal agreement with the school bus company to utilize school buses for mass transportation during an emergency.

Winchester has contracted a third-party company to manage its municipal GIS capabilities. They have not yet utilized the GIS data or platform for hazard mitigation planning.

The region has made the Crisis-Track program available to municipalities, including Winchester. This program allows municipal staff to enter geo-located photos of storm damage into a database through their mobile devices, facilitating damage reporting.

Sheltering Capabilities

The Blanche McCarthy Senior Center and the Winchester Grange Hall both serve as primary shelters. The Pearson School and Gilbert School are secondary shelters; neither has an emergency generator.

Communications

Winchester has implemented the Everbridge public notification system to enhance public notification of emergency events and appropriate emergency response procedures.

The Litchfield County Dispatch has taken over emergency dispatch services for Winchester from the Winchester Police Station.

Litchfield County Dispatch now serves as the emergency center the region. LCD runs the Everbridge emergency alerts system. When the Town needs an alert to be sent out, they contact LCD.

Through the Regional Emergency Planning Team, the town obtained a highway sign-board for displaying public alert information on roads, as well as a portable light trailer. These are regional assets stored in Winchester.

The Town is part of a regional group that received a large grant to implement a new emergency radio communications system for the region. The grant pays for new equipment which will be interoperable between communities in the region. This project will be implemented in the fall and winter of 2020-2021.

The Town distributes FEMA informational pamphlets to Town Hall, Schools, The Senior Center, and the Library.

3 FLOODING

3.1 Existing Capabilities

Ordinances, Regulations and Plans

Land use regulations exist to protect natural resources, including erosion and sediment control regulations for new development, stormwater control regulations to minimize drainage problems, and an area of special flood hazard to control development in flood prone areas.

The area of special flood hazard provides that any new construction or substantial improvement of any residential structure shall have the lowest floor, including the basement, elevated to at least the base flood elevation. Substantial improvement is defined as cumulative over a ten-year period.

Nonresidential construction is required to have the lowest floor, including basement, elevated to at least the base flood elevation or be flood-proofed to the base flood elevation. Additionally, all attendant utilities or sanitary facilities should be located or designed to avoid infiltration or impairment by flood waters.

Winchester's subdivision regulations have detailed standards for the planning, design and construction of storm drainage systems in order to minimize adverse impacts associated with new construction activity. The Winchester Inland Wetland and Water Course Agency enforces regulations to direct development away from wetlands, watercourses and floodplains.

NFIP, Flood Insurance, and Community Rating System

Winchester maintains compliance with NFIP through its use of the Connecticut State Building Code and city ordinances. Winchester expects to continue participation in NFIP.

According to FEMA, there are 42 flood insurance policies in force in Winchester as of 6/30/2019 with an insurance value of $7,597,900. The previous edition of this HMP noted 48 flood insurance policies were in force as of 8/31/2015 with an insurance value of $10,178,800.

Drainage and Street Flooding

The Winchester Public Works Department routinely examines and clears public storm drains and catch basins of debris following periods of rainfall, snowfall, or windstorms.

Structural Projects

Flood protection has been afforded to Winchester through the construction of the Mad River Dam and Sucker Brook Dam, dry reservoirs constructed by the Army Corps of Engineers following the 1955 flood. Both of these facilities were tested during Hurricane Gloria in 1985 where heavy

rains resulted in a substantial impoundment of water behind the two dams. The two dams functioned as designed, however, and no downstream flooding occurred.

New Capabilities and Completed Actions

Winchester continues to maintain its strong flood mitigation capabilities.

Drainage improvements to Pratt Street have been completed, mitigating some flood concerns for that site. The Town has also completed drainage improvements on Woodland Ave and on Hicks Street.

The Town has completed bridge replacements on West Road, Holabird Avenue, Lanson Drive, and Sucker Brook Road.

Town is waiting on delivery a new machine that performs street sweeping and basin cleaning together; it is expected that this new piece of equipment will improve the Town's drainage maintenance capabilities.

Summary

Winchester mitigates flood damages primarily through regulating development in flood prone areas, performing maintenance and upgrades of drainage infrastructure, and performing structural projects when appropriate.

3.2 Vulnerabilities and Risk Assessment

One of the natural hazards of greatest concern in Winchester is localized flooding. Floods have wide ranging impacts. They damage buildings, they block roads, they spread debris, and they interrupt businesses.

The Flood of 1955 had a catastrophic impact on the Town of Winchester, destroying much of the Town Center. According to an illustrated publication entitled "The Great Disaster" by John Slocum and William Simmers Jr. of Winsted, CT,

> *"The 14-inch downpour sent the Mad River flowing over its banks shortly before midnight. In fact, by 1:00 a.m. on August 19, there was already two feet of water coming down Main Street. Shortly thereafter, Still River in the east and north end section of the city went into a rampage."*

Ultimately, seven people lost their lives in town from the flood, millions of dollars of damage occurred, about 400 families were left homeless, and it "wiped out the establishments of 170 out of 200 merchants and businessmen" according to the above referenced publication.

Flood prone areas in the community today, as mapped by FEMA, are presented in Figure 3-1.

While major flooding of the Mad River no longer appears to be a major concern at the present time due to the flood control structures at Mad River Dam and Sucker Brook Dam, there are still

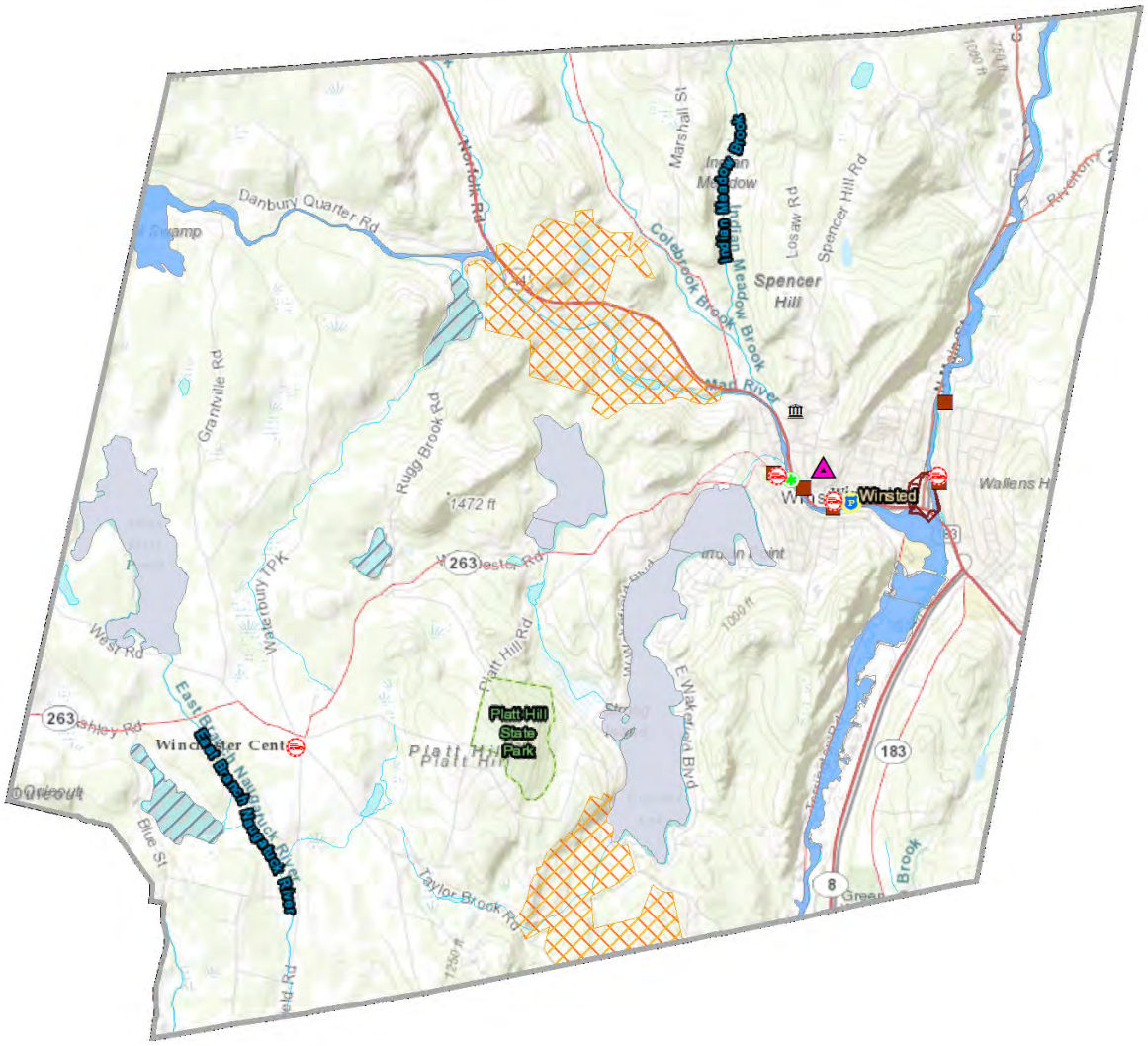
several localized areas which experience flooding on a regular basis due to inadequate drainage facilities. Pratt Street had previously been listed as a top concern for the Town; drainage improvements to that street have been completed.

Another location prone to periodic flooding is the area of Gay Street, Case Avenue and Center Street. Here again, the flooding occurs on a regular basis due to inadequate storm drainage facilities.

Another area of concern with regard to flooding is the Highland Lake outlet control structure. The flood control gates at this facility need replacement according to the Public Works Director in order to ensure adequate control during a large storm event.

Additionally, the Public Works Garage continues to be at risk from flooding from the Still River.

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Legend

- EMS
- Fire Station
- Municipal Facility
- Law Enforcement
- National Register Building
- National Register Structure
- National Register District

Flood Zone

- A
- AE
- ANI
- X500

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FLOOD RISK AREAS

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FIG. 3-1

4 HURRICANES AND TROPICAL STORMS

4.1 Existing Capabilities

Flooding

Existing capabilities appropriate for flooding were discussed in Section 3.0. These include the ordinances, codes, and regulations that have been enacted to minimize flood damage. Various structures exist to protect certain areas, including dam and local flood protection projects.

Wind

Wind loading requirements are addressed through the state building code. The State Building Code has been amended several times in the past two decades. The 2005 Code was amended in 2009, 2011, and 2013. The code was then updated and amended in 2016, with the current code having been updated and effective as of October 1, 2018. The code specifies the design wind speed for construction in all the Connecticut municipalities. Effective October 1, 2018 the design wind speed for Winchester is 105 mph for a Category 1 event, 120 mph for a Category 2, and 125 mph for a Category 3, 4 or 5 hurricane event.

Connecticut is located in FEMA Zone II regarding maximum expected wind speed. The maximum expected wind speed for a three-second gust is 160 mph. This wind speed could occur as a result of either a hurricane or a tornado in western Connecticut and southeastern New York. The American Society of Civil Engineers recommends that new buildings be designed to withstand this peak three-second gust.

Eversource, the local electric utility, provides tree maintenance near its power lines.

New Capabilities and Completed Actions

Winchester continues to maintain its strong tropical cyclone mitigation capabilities.

Summary

Winchester mitigates hurricane and tropical storm damages through tree and limb maintenance, public alert and communications procedures, and enforcement of building code requirements related to high winds.

4.2 Vulnerabilities and Risk Assessment

NOAA has utilized the National Hurricane Center Risk Analysis Program (HURISK) to determine return the frequency at which a certain intensity or category of hurricane can be expected with 75 nautical miles of a given location. Table 4-1 presents these return periods for various category hurricanes to impact Connecticut. The nearest two HURISK analysis points were New York City

and Block Island, Rhode Island. For this analysis, these data are assumed to represent western Connecticut and eastern Connecticut, respectively.

Table 4-1: Return Period (in Years) for Hurricanes to Strike Connecticut

Category	New York City (Western Connecticut)	Block Island, Rhode Island (Eastern Connecticut)
One	17	17
Two	39	39
Three	68	70
Four	150	160
Five	370	430

NOAA estimates that the return period for a Category Two or Category Three storm to strike Litchfield County to be 39 years and 68 years, respectively. Category One Hurricane Earl in 2010, Tropical Storm Irene in 2011, Hurricane Sandy in 2012, and Tropical Storm Isaias in 2020 are reminders that hurricanes do track close to Connecticut.

Some researchers have suggested that the intensity of tropical cyclones has increased over the last 35 years. While most climate simulations agree that greenhouse warming enhances the frequency and intensity of tropical storms, models of the climate system are still limited by resolution and computational ability. It is prudent to prepare for hurricanes impacting Connecticut to be more frequent and intense in the future.

Tropical Cyclone Vulnerability

Impacts from hurricanes and other strong winds have been felt in Winchester, but not to the extent as in other regions. The majority of damage from past events was caused by flooding as a result of hurricanes and tropical storms. For example, Hurricanes Connie and Diane caused the flood of 1955, which caused widespread damage in Winchester. As noted above, significant progress has been made in reducing the town's vulnerability to flooding, and thus to hurricanes.

Winchester also suffered Hurricane related damage from Storm Irene in August 2011 and Storm Sandy in October 2012. Both of these events caused significant power outages and the storms received Presidential Disaster Declarations. In 2011, at the peak of the impacts felt by Hurricane Irene, nearly 2,000 customers were without power. While that is only 32% of the municipality, it is the third highest number in the region.

Areas that are most vulnerable are those with greater levels of development. As one of the most densely settled municipalities in the region, Winchester is more vulnerable than others.

Tropical Storm Isaias caused high winds in Town, taking down trees and powerlines and causing widespread power outages. The Winsted Sewer Treatment Plant (WSTP) lost power and had to run on a generator for about five days. The WSTP generator for the plant is sufficient to maintain basic function and prevent a critical failure for a short period of time, but is not able to sustain a meaningful level of operations for an extended period. The Town had to get creative to prevent an emergency discharge during this outage; such a discharge would have exceeded permitted limits designed to protect the river from pollution. The outage caused significant operational challenges.

5 SUMMER STORMS AND TORNADOES

5.1 Existing Capabilities

Warning is the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively.

Aside from warnings, several other methods of mitigation for wind damage are employed in Winchester as explained in Section 4. In addition, the Connecticut State Building Code includes guidelines for the proper grounding of buildings and electrical boxes.

New Capabilities and Completed Actions

Winchester continues to maintain its summer storm mitigation capabilities. Its tree and limb removal procedures continue to be adequate, and it coordinates closely with Eversource on protecting power lines.

Summary

Winchester mitigates summer storm risks primarily through tree, limb, and debris management, emergency communications, and coordination with Eversource.

5.2 Vulnerabilities and Risk Assessment

Setting

According to the 2019 *Natural Hazard Mitigation Plan Update*, Litchfield County has a high risk of tornado activity based on historical occurrences. Therefore, by virtue of its location in Litchfield County, the Town of Winchester has a high potential to experience tornado damage. In addition, NOAA states that climate change has the potential to increase the frequency and intensity of tornadoes, so it is possible that the pattern of occurrence in Connecticut could change in the future.

The central and southern portions of the United States are at higher risk for lightning and thunderstorms than is the northeast. However, FEMA reports that more deaths from lightning occur on the East Coast than elsewhere. Lightning-related fatalities have declined in recent years due to increased education and awareness.

Although lightning is usually associated with thunderstorms, it can occur on almost any day. The likelihood of lightning strikes in the Winchester area is very high during any given thunderstorm although no one area of the town is at higher risk of lightning strikes. The risk of at least one hailstorm occurring in Winchester is considered moderate in any given year.

Vulnerabilities and Risk

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Straight-line winds occur as the first gust of a thunderstorm or from a downburst from a thunderstorm and have no associated rotation. The risk of downbursts occurring during such storms and damaging the Town is believed to be low for any given year. All areas of the Town are susceptible to damage from high winds.

Secondary damage from falling branches and trees is more common than direct wind damage to structures. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Such fires can be extremely dangerous during the summer months during dry and drought conditions.

No critical facility is believed to be more susceptible to summer storm damage than any other. Some critical facilities are more susceptible than others to flooding damage due to summer storms.

6 WINTER STORMS

6.1 Existing Capabilities

The amended Connecticut Building Code specifies that a pressure of 40 pounds per square foot (psf) be used as the base "ground snow load" for computing snow loading for different types of roofs. The International Building code specifies the same pressure for habitable attics and sleeping areas, and specifies a minimum pressure of 40 psf for all other areas.

The town's DPW also monitors weather reports and maintains loaded trucks in preparation of winter storm events.

New Capabilities and Completed Actions

Winchester continues to maintain its strong winter storm mitigation capabilities.

The Town has purchased a very large snowblower that can be secured to the front of a loader. This piece of equipment will help the Town clear snow from high drift areas, as well as from roads for which there is not enough space to plow the snow to the roadsides. The Town hasn't had to use the machine yet.

Summary

Winchester mitigates snow damages through implementation of road and building clearing protocols, enforcement of the State Building Code, and through the mitigation measures previously discussed for high wind events.

6.2 Vulnerabilities and Risk Assessment

Setting

Connecticut experiences at least one major nor'easter every four years although a variety of minor and moderate snow and ice storms occur nearly every winter. According to the 2019 *Connecticut Natural Hazard Mitigation Plan Update*, Connecticut residents can expect at least two or more severe winter weather events per season, including heavy snowstorms, potential blizzards, nor'easters, and potential ice storms.

Recent climate change studies predict a shorter winter season for Connecticut (as much as two weeks) and less snow-covered days with a decreased overall snowpack. These models also predict that fewer, more intense precipitation events will occur with more precipitation falling as rain rather than snow. This trend suggests that future snowfalls will consist of heavier (denser) snow, and the potential for ice storms will increase. Such changes will have a large impact on how the state and its communities manage future winter storms and will affect the impact such storms have on the residents, roads, and utilities in the state.

Vulnerabilities and Risk

Winter storms cause damage in a number of ways. They bring down trees and limbs, causing power outages; they block roads, causing delays for travelers and commuters; the roads must be cleared of ice and snow, costing the municipality; and they can cause buildings to collapse when snow and ice accumulate on roofs. Road closures due to snow cover can close businesses, costing them sales, employee time, and in some cases, product.

One of the natural hazards of greatest concern in Winchester is winter ice storms with high winds and power outages. A severe snowstorm occurred in March of 1978 that brought close to three feet of heavy snow. The town also suffered major ice and/or snow storms in 1978, 2002, and 2011, that resulted in downed power lines, extensive tree damage, and expensive clean-up costs. The snow storm of October 2011 left 100% of the town without power at its peak (6,146 customers). At least half of the town had no power for five days and 90% had no power for four days.

Vulnerability to the effects of severe winter storms is primarily limited to developed areas, where snow and ice accumulations can cause buildings to collapse. In Winchester, 16% of the land is developed. Another factor in the town's vulnerability is the road network. Municipalities are only required to clear local roads, so this will be the primary source of their cleanup costs. Winchester has 92 miles of local roads to clear.

7 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each municipality as adopted by the Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in the Town of Winchester. The Town has adopted these codes for new construction, and they are enforced by the Building Official.

New Capabilities and Completed Actions

Winchester continues to maintain its earthquake and landslide mitigation capabilities.

Summary

Winchester mitigates geological hazards through enforcement of zoning and subdivision regulations preventing development in higher risk areas. Other mitigation measures consist of general emergency response capabilities.

7.2 Vulnerabilities and Risk Assessment

Earthquake Vulnerabilities

A series of earthquake probability maps was generated using the 2009 interactive web-based mapping tools hosted by the USGS. These maps were used to determine the probability of an earthquake of greater than magnitude 5.0 or greater than magnitude 6.0 damaging the Town of Winchester. Results are presented in Table 7-1 below.

Table 7-1: Probability of a Damaging Earthquake in the Vicinity of Winchester

Time Frame (Years)	Probability of the Occurrence of an Earthquake Event > Magnitude 5.0	Probability of the Occurrence of an Earthquake Event > Magnitude 6.0
50	1%	< 1%
100	2% to 3%	< 1%
250	6% to 8%	1% to 2%
350	8% to 10%	2% to 3%

8 DAM FAILURE

8.1 Existing Capabilities

The Dam Safety Section of the Connecticut DEEP Inland Water Resources Division is responsible for administration and enforcement of Connecticut's dam safety laws. Dam safety laws are codified in Sections 22a-401 through 22a-411 of the Connecticut General Statutes. The statutes require that permits be obtained to construct, repair, or alter dams and that existing dams be inventoried and periodically inspected to assure that their continued operation does not constitute a hazard.

Dams regulated by the Connecticut DEEP must be designed to pass the 1% annual chance rainfall event with one foot of freeboard, a factor of safety against overtopping.

Significant and high hazard dams are required to meet a design standard greater than the 1% annual chance rainfall event.

Effective October 1, 2013, the owner of any high or significant hazard dam (Class B and C) must develop and implement an Emergency Action Plan (EAP). The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency. The EAP must include inundation zone mapping, procedures for monitoring the structure during periods of heavy rainfall and runoff, and a system to alert local officials in the event of an emergency.

The CT DEEP also administers the Flood and Erosion Control Board (FECB) program, which can provide noncompetitive state funding for repair of municipality-owned dams. State statute Section 25-84 allows a municipality to form an FECB.

Actions Completed and New Capabilities

Winchester continues to maintain its capabilities for mitigating and responding to dam failure risks. The Town hired an engineer to update the Emergency Action Plans for the two municipally-owned dams: Highland Lake and Crystal Lake. Those EAPs are available at the town EOC and have been approved by CT DEEP.

Summary

Winchester mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally.

8.2 Vulnerabilities and Risk Assessment

While flooding from a dam failure generally has a moderate geographic extent, the effects are potentially catastrophic. The Connecticut DEEP administers the statewide Dam Safety Program and designates a classification to each state-inventoried dam based on its potential hazard.

- *Class AA*: negligible hazard potential
- *Class A*: low hazard potential
- *Class BB*: moderate hazard potential
- *Class B*: significant hazard potential
- *Class C*: high potential hazard

As of 2020, there were 20 DEEP-inventoried dams within the Town of Winchester. These dams are listed in Table 8-1 and shown in Figure 8.1.

Table 8-1: DEEP-Inventoried Dams in Winchester

Dam#	Dam Name	Class	Owner Type
16201	MAD RIVER FLOOD CONTROL DAM	C	State Owned
16202	RUGG BROOK RESERVOIR DAM	BB	Municipal
16203	CRYSTAL LAKE RESERVOIR DAM	B	Municipal
16204	WINCHESTER LAKE DAM	B	State Owned
16205	PARK POND DAM	C	State Owned
16206	MORIN POND DAM	BB	Private
16207	HIGHLAND LAKE DAM	C	Municipal
16208	WINCHESTER CLUB POND DAM	BB	Private Club
16209	CAMP DELAWARE DAM	B	Private Corporation
16210	MORIN POND DAM	BB	Private
16211	SUCKER BROOK FLOOD CONTROL DAM	C	State Owned
16212	RUG BROOK RESERVOIR SOUTHEAST DIKE	BB	Municipal
16213	LOST POND DAM	B	State Owned
16214	BEECHER POND DAM	AA	Private Corporation
16215	HURLBUT POND	BB	Private Corporation
16216	LITTLE BLACK DRUM LAKE DAM	--	Private
16217	RUGG BROOK RESERVOIR NORTHEAST DIKE	BB	Municipal
16218	CASTELLAS POND DAM	A	Private
16219	PLATT HILL ROAD DAM	--	Private
16220	TATROS POND DAM	BB	Municipal

Significant and High Hazard dams are:

- Mad River Flood Control Dam
- Crystal Lake Reservoir Dam
- Winchester Lake Dam
- Park Pond Dam
- Highland Lake Dam
- Camp Delaware Dam
- Sucker Brook Flood Control Dam
- Lost Pond Dam

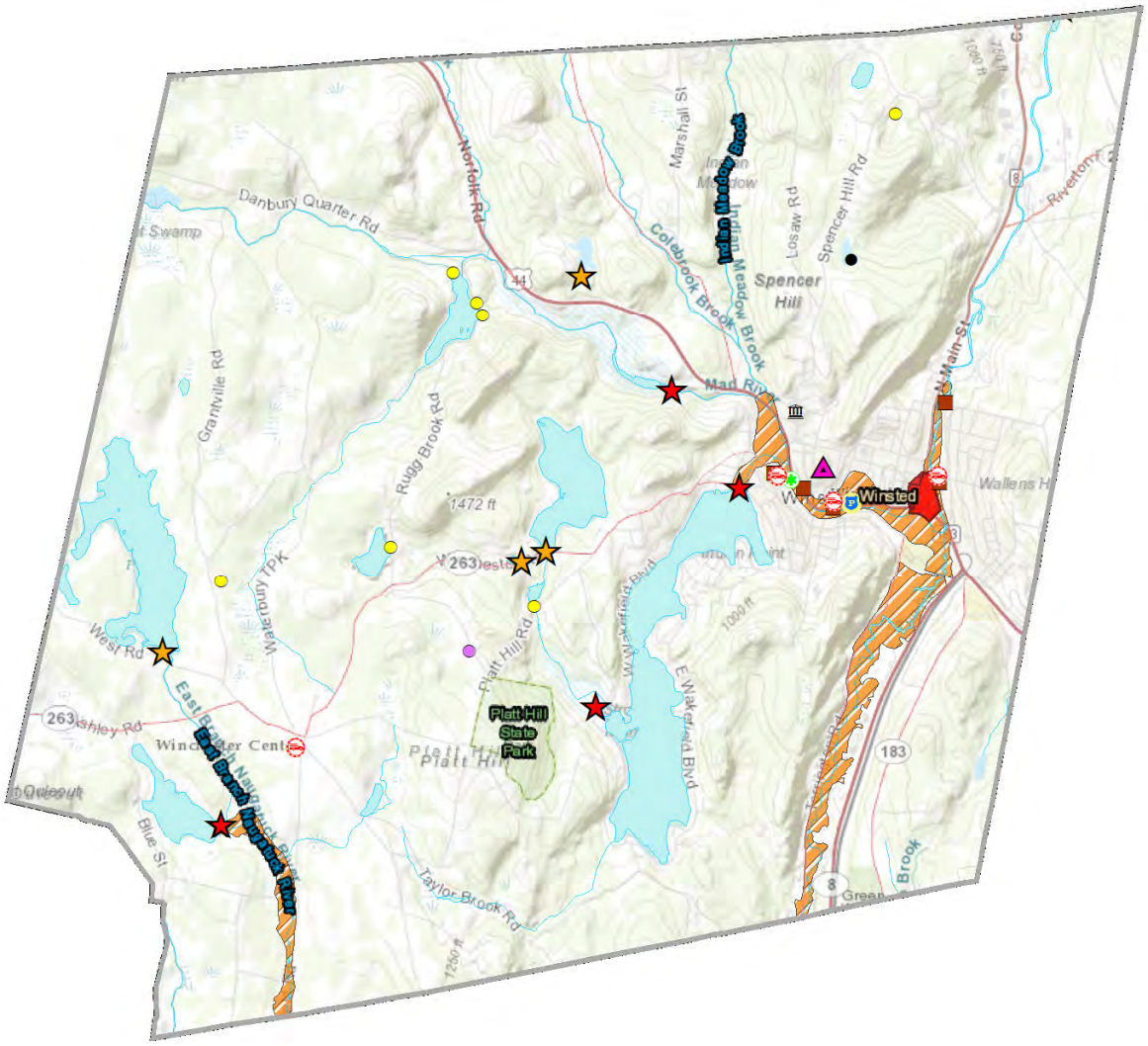
Major concerns identified with regard to dam hazards include:

- Flood control gates at the Highland Lake outlet control structure need to be replaced.
- Beaver dams frequently result in plugged culverts on local streets such as along the Old Waterbury Turnpike near Rugg.
- Brook Reservoir. The town has actually needed to close a section of this road due to a recurring problem with water ponding and road washout.

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Legend

- EMS
- Fire Station
- Municipal Facility
- Law Enforcement
- National Register Building
- National Register Structure
- National Register District

Dam Hazard Class

- C - High Hazard
- B - Significant Hazard
- BB - Moderate Hazard
- AA - Negligible Hazard
- Unclassified
- Dam Failure Inundation

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DAM FAILURE RISK AREAS

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FIG. 8-1

9 WILDFIRES

9.1 Existing Capabilities

The Connecticut DEEP Division of Forestry monitors the weather each day during nonwinter months as it relates to fire danger. Forest fire danger levels are classified as low, moderate, high, very high, or extreme. In addition, the National Weather Service issues a Red Flag warning when conditions can cause wildfires to quickly spread from their source area.

The Connecticut DEEP Open Burning Program requires designated "Open Burning Officials" in every community to oversee open burning within the town. The Town of Winchester is compliant with this program and has a designated Burning Official.

Actions Completed and New Capabilities

Winchester continues to maintain its capabilities for mitigating and responding to wildfire risks.

Summary

The Town mitigates wildfire hazards by implementing the state's Open Burning Program locally, installing dry hydrants and firefighting-water sources in remote areas, and training its fire department to fight wildfires.

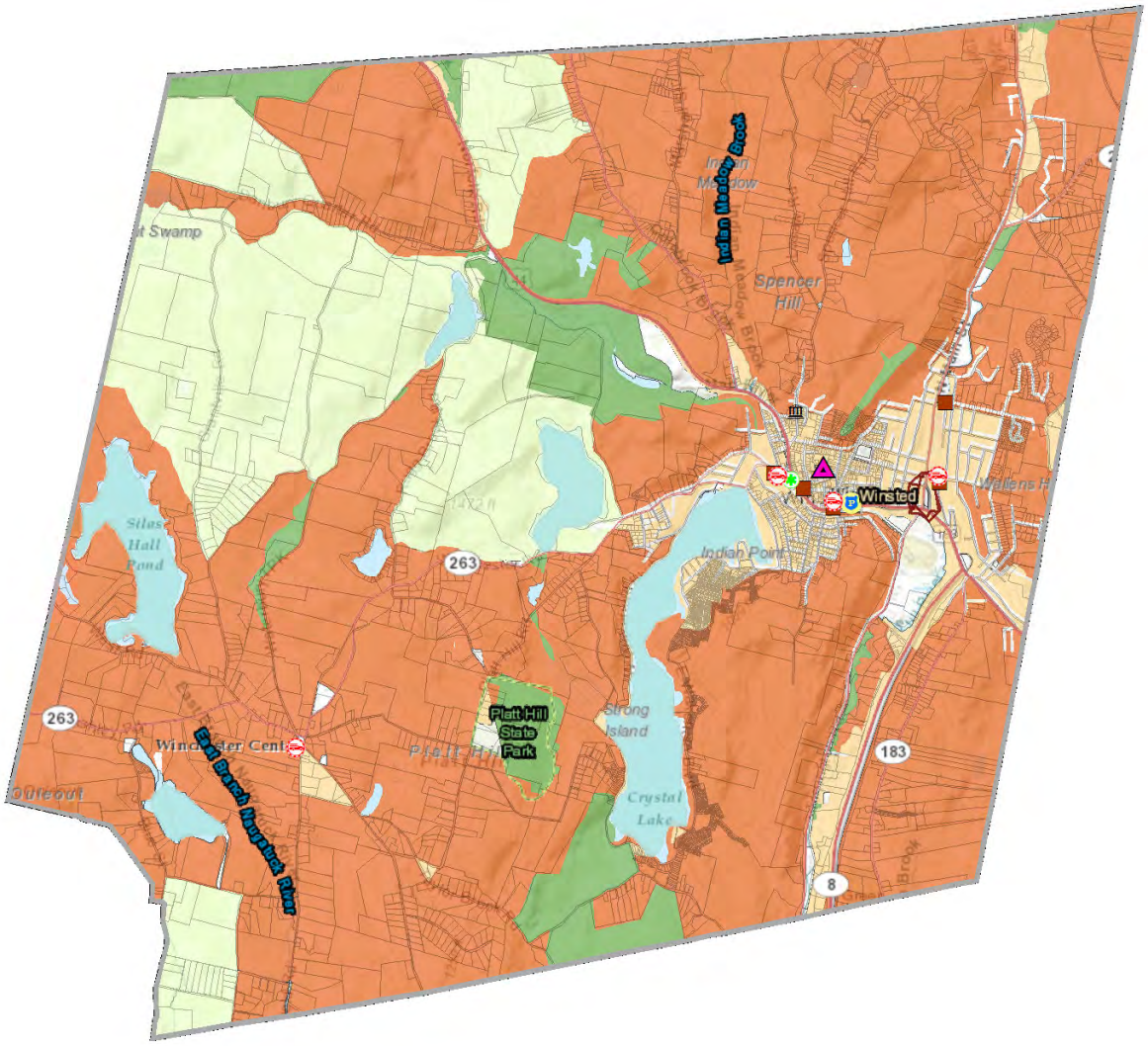
9.2 Vulnerabilities and Risk Assessment

Wildfire Vulnerabilities and Risk

Common causes of wildfires include campfires that are left unattended, the outdoor burning of debris that becomes out of control, sparks from vehicles and equipment, discarded cigarettes, downed electrical lines, intentional acts of arson, and lightning strikes. Wildfires have the potential to occur in both undeveloped and lightly developed areas. Particularly at-risk are areas that fall along the "urban/wild interface," where human development intersects undeveloped land. It is at this interface that the most damage to buildings and infrastructure occurs.

Forest fires and brush fires have the potential to create a significant problem for local emergency response personnel. However, past events have generally been brought under control fairly quickly due to the accessibility provided by woods roads and other natural breaks in the forest cover.

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Legend

- EMS
- Fire Station
- Municipal Facility
- Law Enforcement
- National Register Building
- National Register Structure
- National Register District
- No Vegetation
- Interface
- Intermix
- Low Density Development Vegetation
- Uninhabited Vegetation

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WILDFIRE RISK AREAS

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FIG. 9-1

Drought Vulnerabilities and Risk

The U.S. Drought Monitor (USDM), which has been monitoring nationwide drought conditions since 2000, estimates that over the past two decades Connecticut experienced its longest drought of 46 weeks beginning June 21, 2016 and lasting until May 2, 2017. It was estimated that the most intense period of this extended drought occurred the week of November 15, 2016, where approximately 44.5% of Connecticut lands were impacted.

Figure 9-2 depicts the various drought conditions in Litchfield County since 2000, where the warmer colors represent more advanced drought stages.

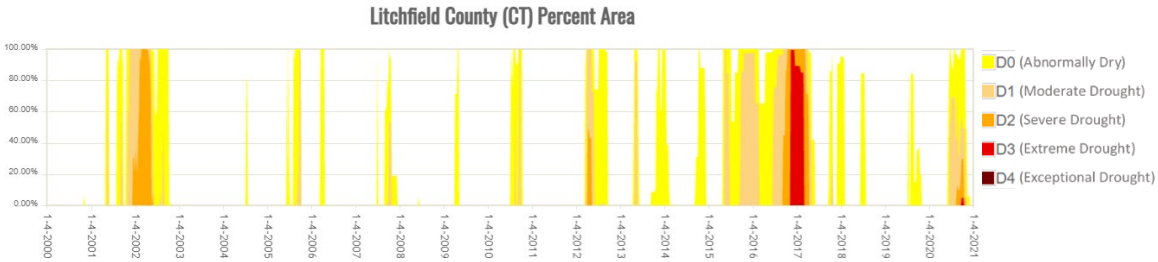


Figure 9-2: USDM Drought Time Series for Litchfield County

The 2019 Connecticut Natural Hazard Mitigation Plan assumes that the State of Connecticut has a medium probably of future drought events. This assumption is based on climate change projections anticipating hotter and wetter conditions in the near future. Climate forecasts often suggest that while precipitation may increase, the overall pattern will generally be higher intensity storms, with longer than average dry periods between events. The State Plan also identifies that Litchfield County accounts for roughly 20.19% of the state's total number of farms, with a market value of over $46 million in product sold from these farms.

10 MITIGATION STRATEGIES AND ACTIONS

10.1 Goals and Objectives

Municipal goals and objectives have been made consistent regionally and are presented in the Multi-Jurisdictional Plan document.

10.2 Status of Mitigation Strategies and Actions from Previous HMP

The table below lists the mitigation actions developed in the previous HMP and the status of each. Actions to be carried forward are noted as such. Actions that have been institutionalized as capabilities are not carried forward.

#	Description	Dept.	Status	Notes
1.1	Continue to provide information to schools to help educate children about natural hazards and how to prepare for them.	VFD and EMD	Capability	This is a capability. Town has informational FEMA pamphlets that are provided to schools.
1.2	Continue to make literature available on natural hazards and preparedness at Winchester Town Hall.	EMD	Capability	Town has informational FEMA pamphlets that are available at schools, at town hall, the senior center, and the library.
1.3	Maintain local Emergency Operations Plan and continue to coordinate with the Regional Public Safety Task Force and Red Cross on community planning, preparedness, response, and training.	EMD and Town Manager	Capability	This is a capability. Updated plan from last year.
1.4	Maintain Emergency Notification System (e.g., Everbridge system) to provide emergency information to residents in the entire town or in a specific geographic area. This notice can provide not only warning of an impending situation but also information regarding how to prepare for a particular event.	EMD and Town Manager	Capability	Litchfield County Dispatch is now the primary emergency dispatch center for the Town. The LCD runs an Everbridge/reverse 911 system. The Town coordinates with them to send out information and alerts.
2.1	Routinely inspect emergency response equipment, and train for response to natural disasters.	VFD and EMD	Capability	This is a capability.

#	Description	Dept.	Status	Notes
2.2	Acquire additional emergency response equipment such as a generator for the emergency shelter at Pearson School and needed communication equipment.	EMD, Fire Chief	Underway	There is not yet a generator at Pearson School. The Mary P Hinsdale School is scheduled to be renovated beginning in 2021; as part of renovations an emergency generator will be installed. Through the REPT the Town obtained a highway sign-board that can display alerts, and a "light trailer" to help with emergency response. These equipment are intended to serve all of the towns in the region, and are stored at the Winchester Public Works garage.
2.3	Promote the use of interoperable communication equipment, and the development of standard operating procedures for emergency response in the regional area.	EMD, Fire Chief, Town Manager	Underway	Fire and Police coordinate through the Litchfield County Dispatch. Additionally, the Town is part of a recently awarded FEMA Grant for Firefighters to develop a new regional, interoperable emergency response radio system, to be implemented 2020-2021. Town staff note that the Public Works radios are different from Police and Fire; they are aged and in poor shape, and posed a challenge during the 2020 tropical storm recovery. Updating the DPW system and making it interoperable with the emergency response radio system will be a new action to carry forward.
2.4	Pursue a verbal agreement with schools or school bus company to utilize school buses for mass transportation during an emergency.	EMD and Town Manager	Completed	Town has established a verbal agreement. Town is now interested in establishing a written MOU with the school bus company.
2.5	Develop basic GIS capabilities as needed for access to aerial photos showing the number and location of properties and structures that could be affected by a natural disaster.	EMD, Fire Chief, and Town Manager	Completed	Town has hired a contractor to manage its GIS data, increasing its capabilities. The Town has yet to utilize its GIS capabilities to assist with hazard mitigation planning. A new action to do so will be carried forward. Additionally, the Crisis-Track program has been made available regionally for local emergency managers by DEMHS. This program enables municipal staff to take geo-located photos of damage following a disaster. The geographic distribution of damage can be mapped and analyzed with this system. Town will work on pre-loading the necessary information for the program, installing it onto staff devices, and training staff to use it.

#	Description	Dept.	Status	Notes
3.1	Pursue funding to implement control measures to mitigate the flooding created by beavers.	PWD	Carry Forward with Revisions	Town has reviewed beaver-prone areas, and determined that techniques such as beaver deceivers will not be effective. Currently the Town traps and removes beavers as needed. Old Waterbury Turnpike continues to be partially closed because of downstream beaver activity. While beavers are an ongoing nuisance, the Town does not consider them to be a high priority. A new action should be identified to carry forward.
3.2	Develop and implement clean-out schedules for all catch basins and drainage facilities	PWD	Underway	Catch-basin and drainage maintenance continue to be a challenge. Town has acquired a new piece of equipment that is able to perform both street sweeping and catch-basin cleaning at the same time. The Town is hopeful that this improved capacity will help reduce their maintenance challenges.
3.3	Review floodplain regulations and ordinances and update as necessary based on guidance from DEEP.	PZC	Carry Forward	The Town has not yet updated its floodplain regulations due to funding and staffing limitations. Action is carried forward. Town staff noted that FEMA is in the process of updating its Flood Insurance Rate Maps for the Farmington River. FEMA officials met with Winchester staff last year. It appears this project is mostly focused on the lower Farmington River, and it's unclear whether or not updates will be made to the Still River's floodplain.
3.4	Identify the location of structures that are susceptible to flooding to facilitate risk assessment and potential control measures.	DEHMS or CT DEEP	Completed	The Town has identified municipal assets susceptible to flooding. The two most flood prone locations identified by the Town are New Street and Lanson Drive where they cross the Still River. This action will be carried forward within the action to utilize the Town's updated GIS capabilities to assist with Hazard Mitigation.
3.5	Implement drainage improvements at flood-prone areas of Lanson Bridge Rd, Pratt St, Gay St, Case Ave., and Center St. to address localized flooding problems.	PWD	Underway	Lanson Bridge has been redone, but there continue to be problems of backflooding from downstream. Pratt Street drainage has been improved. Gay St., Case Ave., and Center St drainage improvements have not yet been completed. These will be carried forward as individual actions.

#	Description	Dept.	Status	Notes
3.6	Conduct a feasibility study on relocating the Winchester Public Works Garage to avoid the problems created by the frequent flooding at the current location. Pursue funding for relocation if feasible.	Town Manager, PWD	Carry Forward	Town has not made progress on this action due to funding limitations, but is still interested in this project in the long term. In the short-term, the Town is considering building a mechanics garage at a higher elevation. This will be carried forward as a new action.

10.3 Prioritization of Strategies and Actions

The STAPLEE method, described in the Multi-Jurisdictional document, was used to score mitigation activities. The STAPLEE matrix in Appendix A provides the total scores. Actions have been further prioritized based on implementation cost, project urgency, and municipal and public input. The strategies below are presented in priority order, with qualitative priority levels listed for each.

10.4 Mitigation Strategies and Actions Implementation Table

The Town proposed to initiate several new mitigation actions for the upcoming five years:

- Pursuing drainage improvements on Case Avenue.
- Town has begun drainage repairs on Marshall Street, and expects that work to be done by 2021.
- The Town is pursuing drainage repairs on Wakefield Boulevard; within the next five years it should have begun development of engineering plans.
- Install an emergency generator at the Pearson School, to utilize the site as an emergency shelter. The site is currently used as a distribution center during disasters; supplies from the State are delivered to the school and distributed to residents from there. Emergency power would help facilitate this service.
- Upgrade or install a new generator for the WSTP that would be able to maintain a reasonable level of operations during an extended outage.
- Winchester's Public Works Department relies on aged radio communications equipment that is losing quality over time, and which is not interoperable with other departments (such as police and fire). The Town is interested in upgrading the equipment to be interoperable with emergency response equipment.
- Pursue a written MOU with the school bus company to utilize their buses for mass transportation during an emergency.
- Pre-load necessary information into Crisis-Track program, install in local municipal staff devices, and complete trainings to that municipal staff are prepared to utilize the service when a storm hits.
- As a relatively short-term mitigation measure for the Winchester Public Works Garage, a new mechanics garage may be built at the current site at a higher elevation, to protect its contents from flooding.

Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Action WIN-01	
Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB, Sustainable CT
Timeframe	2022
Priority	High

Action WIN-02	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action WIN-03	
Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Planning
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action WIN-04	
Pursue a written MOU with the school bus company to utilize their buses for mass transportation during an emergency.	
Lead	EMD
Cost	$0 - $25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action WIN-05	
Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	
Lead	Planning, DPW, ConCom
Cost	$0 - $25,000
Funding	OB, NCD
Timeframe	2022 – 2023
Priority	Low

Action WIN-06	
Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022 – 2024
Priority	High

Action WIN-07	
Conduct a feasibility study on relocating the Winchester Public Works Garage to avoid the problems created by the frequent flooding at the current location. Pursue funding for relocation if feasible.	
Lead	DPW
Cost	$25,000 - $50,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action WIN-08	
Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action WIN-09	
Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	
Lead	Planning
Cost	$25,000 - $50,000
Funding	OB, CT SHPO
Timeframe	2022 – 2024
Priority	Low

Action WIN-10	
Pre-load necessary information into Crisis-Track program, install in local municipal staff devices, and complete trainings to that municipal staff are prepared to utilize the service when a storm hits.	
Lead	EMD
Cost	$25,000 - $50,000
Funding	OB, CT DEMHS
Timeframe	2022 – 2024
Priority	Low

Action WIN-11	
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	
Lead	Planning; Chamber
Cost	$25,000 - $50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action WIN-12	
Develop a beaver management plan that addresses hazard mitigation and ecological conservation considerations. Management approaches may include structural improvements such as culvert upsizing, installation and maintenance of beaver control devices, and beaver trapping and relocation activities (in coordination with the State).	
Lead	DPW
Cost	$0 - $25,000
Funding	OB, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action WIN-13	
Refer to the Housatonic Valley Association (Housatonic Valley Association (HVA)) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	
Lead	DPW
Cost	$50,000 - $100,000
Funding	OB, HVA
Timeframe	2023 – 2025
Priority	Med

Action WIN-14	
Install an emergency generator at the Pearson School, to utilize the site as an emergency shelter. The site is currently used as a distribution center during disasters; supplies from the State are delivered to the school and distributed to residents from there. Emergency power would help facilitate this service.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action WIN-15	
The Mary P Hinsdale School is scheduled to be renovated beginning in 2021; as part of renovations, install an emergency generator.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action WIN-16	
Upgrade or install a new generator for the WSTP that would be able to maintain a reasonable level of operations during an extended outage.	
Lead	DPW; EMD
Cost	More than $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Med

Action WIN-17	
Implement drainage improvements at flood-prone areas of Gay St.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	Med

Action WIN-18	
Implement drainage improvements at flood-prone areas of Case Ave.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	Med

Action WIN-19	
Implement drainage improvements at flood-prone areas of Center St.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	Med

Action WIN-20	
Complete drainage repairs on Marshall Street.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	Med

Action WIN-21	
Develop engineering plans for drainage repairs on Wakefield Boulevard.	
Lead	DPW
Cost	More than $500,000
Funding	CIP
Timeframe	2024 – 2026
Priority	Med

Action WIN-22	
As a relatively short-term mitigation measure for the Winchester Public Works Garage, a new mechanics garage may be built at the current site at a higher elevation, to protect its contents from flooding.	
Lead	DPW
Cost	$100,000 - $500,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2024 – 2026
Priority	Low

Action WIN-23	
Upgrade Public Works Department communications equipment to be interoperable with emergency response equipment. Winchester's Public Works Department relies on aged radio communications equipment that is losing quality over time, and which is not interoperable with other departments (such as police and fire).	
Lead	EMD; DPW
Cost	$50,000 - $100,000
Funding	OB, CIP, CT DEMHS
Timeframe	2024 – 2026
Priority	Low

APPENDIX A
STAPLEE MATRIX

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
WIN-01	Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	Sustainable CT	Planning	$0 - $25,000	OB, Sustainable CT	2022	1	0	1	1	0	1	1	0	0	0	0	0	0	0	6
WIN-02	Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
WIN-03	Remain engaged with FEMA and the State during the Farmington River Watershed flood map updates. Review draft maps and provide comments to FEMA.	Flood Map Updates	Planning	$0 - $25,000	OB	2022 – 2023	1	0	1	1	1	1	0	0	0	-1	-1	0	0	0	4
WIN-04	Pursue a written MOU with the school bus company to utilize their buses for mass transportation during an emergency.	Evacuation Bus	EMD	$0 - $25,000	OB	2022 – 2023	1	0.5	1	0	1	0	0	0	0	0	0	0	0	0	4
WIN-05	Refer to the Morris Low Impact Sustainable Development Design Manual, created to be a regional resource by the Northwest Conservation District and the Northwest Hills Council of Governments, to incorporate LID guidance and regulations into the local Zoning Regulations or Ordinances	Low Impact Development	Planning, DPW, ConCom	$0 - $25,000	OB, NCD	2022 – 2023	0	1	0	0	1	0	1	0	0	0	0	0	0	0	4
WIN-06	Fully incorporate the provisions of the DEEP model flood regulations into the local flood damage prevention regulations (or ordinance), including but not limited to the required design flood elevations for the first floor, building electrical systems, and building mechanical systems.	Flood Regulations	Planning	$25,000 - $50,000	OB, FEMA Grant, CT DEEP	2022 – 2024	1	1	1	0	1	1	1	0	0	-1	-1	0	0	0	6
WIN-07	Conduct a feasibility study on relocating the Winchester Public Works Garage to avoid the problems created by the frequent flooding at the current location. Pursue funding for relocation if feasible.	Critical Facility Protection	DPW	$25,000 - $50,000	CIP, FEMA Grant, CT DEMHS	2022 – 2024	1	1	0	0	1	0	1	0	0	0	0	0	0	0	5
WIN-08	Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
WIN-09	Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.	Historic & Cultural Resources	Planning	$25,000 - $50,000	OB, CT SHPO	2022 – 2024	1	1	1	0	0	1	0	0	0	-1	0	0	0	0	5
WIN-10	Pre-load necessary information into Crisis-Track program, install in local municipal staff devices, and complete trainings to that municipal staff are prepared to utilize the service when a storm hits.	Other Emergency Response	EMD	$25,000 - $50,000	OB, CT DEMHS	2022 – 2024	0	0	1	1	1	1	0	0	0	0	0	0	0	0	5
WIN-11	Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.	Small Business Chemicals	Planning; Chamber	$25,000 - $50,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	1	0	0	-1	0	0	0	0	5
WIN-12	Develop a beaver management plan that addresses hazard mitigation and ecological conservation considerations. Management approaches may include structural improvements such as culvert upsizing, installation and maintenance of beaver control devices, and beaver trapping and relocation activities (in coordination with the State).	Beaver Management	DPW	$0 - $25,000	OB, CT DEEP	2022 – 2024	1	0	1	0	1	1	0	-1	0	0	0	0	0	-1	3
WIN-13	Refer to the Housatonic Valley Association (Housatonic Valley Association (HVA)) Road-Stream Crossing Inventory resources for best management practices when upgrading and replacing infrastructure.	HVA Road-Stream Crossing	DPW	$50,000 - $100,000	OB, HVA	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	-1	0	5
WIN-14	Install an emergency generator at the Pearson School, to utilize the site as an emergency shelter. The site is currently used as a distribution center during disasters; supplies from the State are delivered to the school and distributed to residents from there. Emergency power would help facilitate this service.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
WIN-15	The Mary P Hinsdale School is scheduled to be renovated beginning in 2021; as part of renovations, install an emergency generator.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
WIN-16	Upgrade or install a new generator for the WSTP that would be able to maintain a reasonable level of operations during an extended outage.	Critical Facility Backup Power	DPW; EMD	More than $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5
WIN-17	Implement drainage improvements at flood-prone areas of Gay St.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6
WIN-18	Implement drainage improvements at flood-prone areas of Case Ave.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6
WIN-19	Implement drainage improvements at flood-prone areas of Center St.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6
WIN-20	Complete drainage repairs on Marshall Street.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6
WIN-21	Develop engineering plans for drainage repairs on Wakefield Boulevard.	Road Drainage	DPW	More than $500,000	CIP	2024 – 2026	0	1	0	1	1	1	1	0	0	0	0	0	-1	0	6
WIN-22	As a relatively short-term mitigation measure for the Winchester Public Works Garage, a new mechanics garage may be built at the current site at a higher elevation, to protect its contents from flooding.	Critical Facility Protection	DPW	$100,000 - $500,000	CIP, FEMA Grant, CT DEMHS	2024 – 2026	1	1	0	0	1	0	1	0	-1	0	0	0	0	0	4

#	Action Description	Regional Theme	Lead Department	Cost Estimate	Potential Funding Sources	Timeframe for Completion	Weighted STAPLEE Criteria														Total STAPLEE Score
							Benefits							Costs							
							Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	Social	Technical (x2)	Administrative	Political	Legal	Economic (x2)	Environmental	
WIN-23	Upgrade Public Works Department communications equipment to be interoperable with emergency response equipment. Winchester's Public Works Department relies on aged radio communications equipment that is losing quality over time, and which is not interoperable with other departments (such as police and fire).	Emergency Communication	EMD; DPW	$50,000 - $100,000	OB, CIP, CT DEMHS	2024 – 2026	0	0.5	1	0	1	0	0	0	0	0	0	0	0	0	3

APPENDIX B
RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
TOWN OF WINCHESTER BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE NORTHWEST HILLS COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Winchester has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Winchester Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Winchester and Northwest Hills Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Winchester; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Winchester, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Winchester eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Winchester;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this _____ day of _____, 2021 by the Board of Selectmen of Town of Winchester, Connecticut

_____
First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Winchester this _____ day of _____, 2021.

_____
Town Clerk

APPENDIX C

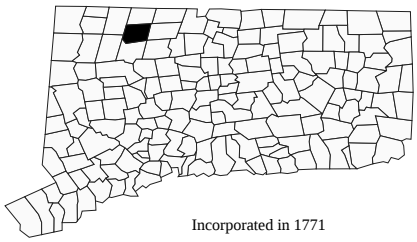
2019 CERC TOWN PROFILE

Winchester, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

Town Hall
338 Main Street
Winchester, CT 06098
(860) 738-6962

Belongs To
Litchfield County
LMA Torrington - Northwest
Northwest Hills Planning Area



Incorporated in 1771

Demographics

Population

	Town	County	State
2000	10,664	182,193	3,405,565
2010	11,242	189,927	3,574,097
2013-2017	10,894	184,454	3,594,478
2020	11,356	193,116	3,604,591
'17 - '20 Growth / Yr	1.4%	1.5%	0.1%

	Town	County	State
Land Area (sq. miles)	33	921	4,842
Pop./Sq. Mile (2013-2017)	335	200	742
Median Age (2013-2017)	48	47	41
Households (2013-2017)	4,787	74,605	1,361,755
Med. HH Inc. (2013-2017)	$57,468	$76,438	$73,781

	Town	State
Veterans (2013-2017)	809	180,111

Age Distribution (2013-2017)

	0-4		5-14		15-24		25-44		45-64		65+		Total	
Town	429	4%	845	8%	1,659	15%	2,077	19%	3,579	33%	2,305	21%	10,894	100%
County	7,668	4%	20,218	11%	21,158	11%	38,329	21%	61,693	33%	35,388	19%	184,454	100%
State	186,188	5%	432,367	12%	495,626	14%	872,640	24%	1,031,900	29%	575,757	16%	3,594,478	100%

Race/Ethnicity (2013-2017)

	Town	County	State
White Non-Hisp	9,648	164,992	2,446,049
Black Non-Hisp	239	2,843	350,820
Asian Non-Hisp	83	3,516	154,910
Native American Non-Hisp	144	267	5,201
Other/Multi-Race Non-Hisp	151	2,320	84,917
Hispanic or Latino	629	10,510	551,916

	Town	County	State
Poverty Rate (2013-2017)	17.1%	6.8%	10.1%

Educational Attainment (2013-2017)

	Town		State	
High School Graduate	2,950	37%	673,582	27%
Associates Degree	732	9%	188,481	8%
Bachelors or Higher	1,931	24%	953,199	38%

Economics

Business Profile (2018)

Sector	Units	Employment
Total - All Industries	326	3,225
23 - Construction	25	68
31-33 - Manufacturing	35	802
44-45 - Retail Trade	39	279
62 - Health Care and Social Assistance	31	324
81 - Other Services (except Public Administration)	58	207
Total Government	19	638

Top Five Grand List (2018)

	Amount
Connecticut Light	$487,897
Winrock LLc	$310,345
Yankee Gas	$229,361
Litchfield Gardens Assoc	$126,417
Electric Motion	$106,045
Net Grand List (SFY 2016-2017)	$693,792,298

Major Employers (2018)

Town Of Winchester
Electric Motion
Foothills Visiting Nurse
Howmet Corporation
NW CT Community College

Education

2018-2019 School Year

	Grades	Enrollment
Winchester School District	PK-12	554

Smarter Balanced Test Percent Above Goal (2017-2018)

	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	58.7%	53.8%	39.0%	51.3%	*	43.0%
ELA	53.1%	53.1%	37.7%	54.9%	*	56.1%

Pre-K Enrollment (PSIS)

	2018-2019
Winchester School District	36

4-Year Cohort Graduation Rate (2017-2018)

	All	Female	Male
Connecticut	88.3%	91.8%	85.1%
Winchester School District	NA	NA	NA

Rate of Chronic Absenteeism (2017-2018)

	All
Connecticut	10.7%
Winchester School District	8.7%

Public vs Private Enrollment (2013-2017)

	Town	County	State
Public	87.5%	84.0%	86.8%
Private	12.5%	16.0%	13.2%

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

Winchester, Connecticut

CERC Town Profile 2019

Connecticut Economic Resource Center

Government

Government Form: Council - Manager

Total Revenue (2017)	$35,136,489	Total Expenditures (2017)	$33,333,289	Annual Debt Service (2017)	$683,366
Tax Revenue	$23,531,260	Education	$21,758,694	As % of Expenditures	2.1%
Non-tax Revenue	$11,605,229	Other	$11,574,595	Eq. Net Grand List (2017)	$1,035,239,070
Intergovernmental	$10,740,242	Total Indebtedness (2017)	$3,269,067	Per Capita	$96,400
Per Capita Tax (2017)	$2,164	As % of Expenditures	9.8%	As % of State Average	63.9%
As % of State Average	73.8%	Per Capita	$304	Moody's Bond Rating (2017)	-
		As % of State Average	12.1%	Actual Mill Rate (2017)	33.54
				Equalized Mill Rate (2017)	22.45
				% of Net Grand List Com/Ind (2017)	10.0%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	5,642	88,068	1,507,711
% Single Unit (2013-2017)	57.0%	73.6%	59.2%
New Permits Auth (2017)	1	142	4,547
As % Existing Units	0.0%	0.2%	0.3%
Demolitions (2017)	0	32	1,403
Home Sales (2017)	102	1,753	21,880
Median Price	$164,600	$250,100	$270,100
Built Pre-1950 share	45.9%	31.2%	29.3%
Owner Occupied Dwellings	2,981	57,330	906,798
As % Total Dwellings	62.3%	76.8%	66.6%
Subsidized Housing (2018)	618	4,817	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than $100,000	13	57	536
$100,000-$199,999	49	563	5,237
$200,000-$299,999	22	538	6,681
$300,000-$399,999	9	315	3,863
$400,000 or More	9	280	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	$1,002	$995	$1,123
Cost-burdened Renters	53.2%	47.3%	52.3%

Labor Force

	Town	County	State
Residents Employed	5,857	101,000	1,827,070
Residents Unemployed	274	4,014	78,242
Unemployment Rate	4.5%	3.8%	4.1%
Self-Employed Rate	10.7%	13.0%	10.0%
Total Employers	326	6,177	122,067
Total Employed	3,225	61,496	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Winchester, CT	670	Torrington, CT	771
Torrington, CT	653	Winchester, CT	670
Barkhamsted, CT	136	New Hartford, CT	310
New Hartford, CT	105	Hartford, CT	224
Bristol, CT	67	Farmington, CT	190
Colebrook, CT	62	Waterbury, CT	144
Harwinton, CT	58	North Canaan, CT	121

Quality of Life

Crime Rates (per 100,000 residents) (2017)

	Town	State
Property	1,078	1,777
Violent	98	228

Disengaged Youth (2013-2017)

	Town	State
Female	10.6%	4.2%
Male	17.5%	5.6%

	Town
Library circulation per capita	3.37

Distance to Major Cities

	Miles
Hartford	24
Providence	87
New York City	97
Boston	111
Montreal	251

Residential Utilities

Electric Provider
Eversource Energy
(800) 286-2000

Gas Provider
Eversource Energy
(800) 989-0900

Water Provider
Municipal Provider
Local Contact

Cable Provider
Charter Communications of Western CT
(800) 827-8288

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