

Naugatuck Valley Council of Governments Hazard Mitigation Plan Update 2021 – 2026

Municipal Annex
for
SHELTON, CT



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MMI #3211-29

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1.0 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 Naugatuck Valley Council of Governments (NVCOG) Multi-Jurisdictional Hazard Mitigation Plan. This annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific local detail, 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.

1.2 Planning Process

A meeting was held with Shelton representatives on November 05, 2020 for the purposes of initial data collection and review of necessary updates for this document. The meeting was convened by the HMP local coordinator, Michael Maglione.

Additional input was provided at the two regional municipal staff workshops, held on November 18, 2020, and February 3, 2021.

Public input collected at public workshops and through an online survey have also informed development of this HMP update.

1.3 Physical Setting

Shelton was first settled by the English in 1639 as part of the town of Stratford and subsequently split from Stratford in 1789.

The City of Shelton is often associated with its fellow communities of Fairfield County given the suburban nature of much of the city. Nevertheless, the downtown area of Shelton has much in common with the Lower Naugatuck Valley communities.

In general, the topography of the region increases in elevation moving from the shorelines of the major rivers (the Housatonic and Naugatuck Rivers, which are nearly at sea level) to the east and/or west of either river. Within the region, elevations of 500 feet or greater are found along western and southwestern Seymour and western Shelton while there are a few other smaller, more concentrated areas of this elevation in northern and eastern Seymour and northeastern Ansonia.

1.4 Land Cover

A high-density industrial center developed in the 19th and 20th centuries in downtown Shelton, and remains one of the highest-density parts of the City. A decrease in developed land cover is evident with greater distance from either river. The majority of the rural and farmland cover is found in northwest Shelton. Smaller pockets of open space and rural land cover are found in other sections of the City.

Despite its urban core, the City is suburban on the whole, with populations that flourished during the last century as Connecticut's highway network was superimposed on its historical industrial centers. Shelton is predominantly forested, but agricultural land use is densely concentrated in the northern section. A few areas in southeastern Shelton are covered by agricultural land as well. Although residential land uses are interspersed throughout the City, higher density residential and nonresidential land uses are situated near the Housatonic River and the Route 8 corridor as previously mentioned.

Table 1-1 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 42% of Shelton is forested and approximately 33% is developed.

Table 1-1: 2015 Land Cover by Area

Land Cover	Area (acres)	Percent of Community
Developed	6,678.6	32.73%
Turf & Grass	2,781.2	13.63%
Other Grass	259.8	1.27%
Agricultural Field	890.7	4.36%
Deciduous Forest	7,850.5	38.47%
Coniferous Forest	379.3	1.86%
Water	938.5	4.60%
Non-Forested Wetland	24.9	0.12%
Forested Wetland	380.0	1.86%
Tidal Wetland	1.8	0.01%
Barren	148.6	0.73%
Utility Row	73.3	0.36%
Total	20,407	100%

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

1.5 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 Shelton.

The City is located in the northeastern part of the Appalachian Orogenic Belt, also known as the Appalachian Highlands, which extend from Maine southward to Mississippi and Alabama. The Appalachian Highlands were formed when Pangaea assembled during the late Paleozoic era. The region consists primarily of schist, granulite, and gneiss lying in fairly diagonal bands stretching from northeast to southwest in the same general orientation as the region. This bedrock is cut through by numerous thrust faults.

One main fault, the "East Derby Fault," is oriented from northeast to southwest and runs to the east of Route 8 through the eastern portion of Shelton. Upon reaching the Shelton town line, the fault and the roadway are generally positioned in the same orientation from northeast to southwest. The East Derby Fault stretches from Bethany southwest to Bridgeport over a span of approximately 16.25 miles. The fault is classified as "FTO," an overturned thrust fault, and is currently inactive. There is one geologic contact (classified as "C") that branches off the East Derby Fault in Shelton.

Glaciers began forming in the northern hemisphere about three million years ago. Since then, the southernmost portions of these glaciers covered the region on at least two occasions. At the end of the ice age, the last of the glaciers' mineral holdings were released with the melting ice. The region's different formations born of bedrock while exposed to hydrological, atmospheric, and glacial processes include glacial till, **stratified drift**, rivers and lakes, outwash plains, and coastal formations.

Stratified drift formations were deposited in valleys by glacial streams. These valleys were later inherited by the larger of our present-day streams and rivers. Thus, stratified drift is generally coincident with inland floodplains.

The amount of stratified drift also has bearing on the relative intensity of earthquakes and the likelihood of soil subsidence in areas of fill.

1.6 Drainage Basins and Hydrology

The City is divided among five subregional watersheds. Four subregional watersheds (Means Brook, Farmill River, Pumpkin Ground Brook, and Housatonic River) drain to the Housatonic Main Stem. A small portion of the Booth Hill Brook drainage basin covers the southwest corner of City and drains to the Southwest Eastern subregional basin.

Housatonic River

Lake Housatonic (328 acres) is formed by the Derby Dam that spans between downtown Derby and downtown Shelton. The flow rate of the Housatonic River is managed in this reach of the river. River flows are periodically ponded behind the dam. The water is then released to turn the turbines to produce electric power. Despite this control, the Lake Housatonic part of the river is generally a flowing, run-of-the-river reach, and this is where much of the flooding described in this HMP has occurred.

Below the Derby Dam, the Housatonic River begins its final transition, becoming an estuary where salt water and fresh water mix. In this lower 12-mile section, the river is tidal, supporting wetlands and salt marshes that provide important habitat for plants, birds, shellfish, finfish, and other aquatic life. The entire southeastern riverfront in Shelton is tidal.

Means Brook and Farmill River – From northeastern to central Shelton, numerous unnamed streams flow to Means Brook before Means Brook joins the Farmill River. Means Brook is an important stream as it flows through historical Huntington Center in Shelton. The Farmill River receives water from Harvey Pete Brook, Sharps Brook, Boehm Brook, Walnut Tree Hill Brook, Hazelton Brook, Wells Brook, Black Brook, and other unnamed streams through southern Shelton. The river then forms the border with Stratford for a short distance before emptying into the Housatonic River.

Other Watercourses – From north to south along the Housatonic River in Shelton are White Hills Community Brook, Upper White Hills Brook, Indian Hole Brook, Curtiss Brook, Burying Ground Brook, Ivy Brook, Butternut Hollow Brook, and unnamed streams flowing into the Housatonic River.

1.7 Climate and Climate Change

In Shelton, the summers are warm, humid, and wet; the winters are very cold; and it is partly cloudy year round. Over the course of the year, the temperature typically varies from 22°F to 81°F and is rarely below 8°F or above 88°F.

The warm season lasts for 3.5 months, from June 2 to September 17, with an average daily high temperature above 72°F. The hottest day of the year is July 21, with an average high of 81°F and low of 66°F. The cold season lasts for 3.3 months, from December 4 to March 14, with an average daily high temperature below 45°F. The coldest day of the year is January 30, with an average low of 22°F and high of 36°F.

The wetter season lasts 4.3 months, from April 10 to August 19, with a greater than 29% chance of a given day being a wet day. The chance of a wet day peaks at 35% on May 30. The drier season lasts 7.7 months, from August 19 to April 10. 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 3.9 inches. The snowy period of the year lasts for 4.9 months, from November 14 to April 10, 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 26, with an average total liquid-equivalent accumulation of 0.9 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 CO₂ 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 Fairfield County is 5 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 Shelton as 5.01 inches.

The NOAA Atlas 14, released on September 30, 2015 puts the 24-hour rainfall amount for a 10% annual-chance storm in Shelton at 5.63 inches.

These precipitation amounts, and more details, are summarized in Table 1-2, below.

Table 1-2: 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	5.0	5.7	7.2
NRCC	5.0	6.3	8.8
NOAA Atlas 14	5.6	6.9	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 Shelton can expect the 24-hour rainfall amount for a 10% annual-chance storm to be around 5.4 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).

1.8 Development Trends

The 2010 U.S. Census reported a population in Shelton of 41,141 individuals. U.S. Census Bureau estimates for 2019 show a population around 37,508 individuals, a decrease from 2010 of 8.8%. The Connecticut State Data Center predicts that population will decrease by 3.5% through 2025 to an estimated population of 8,389 individuals.

According to the Connecticut Data Collaborative, the number of annual housing permits in Shelton fluctuated significantly over the last decade. The number of permits issued in 2010 and 2011 was 31 and 35, respectively, while 46 permits were issued in 2016, and 65 permits were issued in 2017. On average, 105 housing permits were issued each year in Shelton between 2010 and 2017.

According to the U.S. Census Bureau, the overall number of housing units in Shelton rose by approximately 6.2-percent between 2010 and 2019, from 16,146 units in 2010 to 17,208 units in 2019. In 2019, the housing stock was made up of approximately 78% single-unit structures, 4% two-unit structures, 16% multi-unit structures, and 2% mobile-homes or other types of structures.

According to the Connecticut Office of Policy and Management, Shelton's 2019 Total Equalized Net Grand List was valued at \$4,820,000,000. 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 Shelton, included as Appendix C.

The 2017 POCD describes development goals for Shelton. The plan recommends developing master plans for the Huntington Center, White Hills, and Pine Rock Park commercial center areas consistent with Village District standards and guidelines. The POCD also encourages the development of the Mas property. It encourages the amendment of PRD regulations to appropriately guide alternative styles of residential development. The Future Land Use Plan identifies Mixed-Use Economic Growth Areas.

According to the 2019 NVCOG Transit Oriented Scenario Report, which looked at development opportunities around the Derby Station (MetroNorth Waterbury Line), downtown Shelton can accommodate the addition of approximately 500 units of housing as infill development/redevelopment in the near-term on vacant and underutilized sites located just over one-half a mile from the Derby train station.

Residential development in Shelton is concentrated along the Route 8 corridor and the Housatonic River. Almost all developable parcels surrounding the Route 8 corridor have been developed to date. Shelton has many rural areas that largely exist away from the Route 8 corridor, the Housatonic River, and the Huntington section of Shelton. Due to the smaller land area size of the City, developable parcels are generally limited.

Recent development projects include an apartment complex just north of Route 8 in the downtown area of Shelton, and other residential and commercial projects in the same area. A new utilities substation constructed in the southern part of the city. Redevelopment is also common throughout the City.

Municipal officials report approximately \$1 billion in new development underway in Shelton. The projects include:

- Seven new residential structures under construction downtown. In total, these will have 500 new apartments that will all be on public utilities.
- approximately 100 new residential units are planned in new subdivisions in lower-density parts of the City.
- A variety of commercial structures are being built, including professional office buildings and a warehouse.
- A new commercial retail shopping center, hotel, and restaurant are being built along Bridgeport Avenue.
- The Shelter Ridge project is in the planning stages. This is a proposed two-million square-foot mixed-use development to be located on several hundred acres of land. Much of the proposed development lies within wetlands and floodplains. As part of the approval process, the developer will need to demonstrate that peak flows leaving the site will not impact downstream properties. City staff are closely monitoring this application as it could potentially alter the hydrology of the Far Mill River, Housatonic River, and downstream areas.

It should be noted that some of this development is occurring near the Housatonic River.

The City hopes that Aquarion Water Company will create a new water main loop on Ripton Road. The water main would also be available to connect to future residential development in this area.

Summary

Development over the past five years has primarily consisted of redevelopment of previously developed lots, and so the increase in hazard exposure created by this development is very limited; overall, recent development is not thought to have significantly increased the community's vulnerability to natural hazards. Development trends in Shelton may increase overall community exposure to natural hazards in the future. Balancing development with continued improvement of hazard mitigation capabilities and enforcement of zoning regulations and building codes can help prevent an increase in natural hazard risks.

1.9 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 Shelton 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.

1.10 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

Shelton is considered to have a Low to Medium level of social vulnerability, with higher vulnerability scores for the SVI categories of Socioeconomic Status and Housing Type & Transportation. In other words, a particular challenge in Shelton may include a lack of access to financial resources, the presence of lower-quality housing, or lack of access to transportation for evacuation.

2.0 MUNICIPAL CAPABILITIES

2.1 Governmental Structure and Capabilities

2.1.1 Municipal Departments and Commissions

Shelton is managed by a mayor and Board of Aldermen system. The mayor appoints the Board of Aldermen following election.

The mayor oversees many of the municipal departments, commissions, and boards and are directly responsible for appointing members of many commissions and boards. Appropriate municipal departments, commissions, and boards are involved with natural hazard mitigation. The following subsections describe general departmental responsibilities, and duties related to natural hazard mitigation within the City. Where applicable, one or more of the six types of mitigation (prevention, property protection, natural resource protection, structural projects, emergency services, and public education) are identified as relevant for each department.

Public Works Department and Commission

In Shelton, the Public Works and Highway Departments are under the general supervision of the Board of Aldermen. These departments are responsible for planning, organizing, and administering the public works operations as well as managing the public works staff and budget. Responsibilities include directing highway construction and maintenance procedures.

As is common throughout Connecticut, the Public Works Department is often charged with implementing numerous structural projects that are related to hazard mitigation. Specifically, roadway/infrastructure maintenance and complaint logging/tracking are the two primary duties of the Public Works Department. For example, the Public Works Department tracks, plans, prepare for, and responds to flooding, inundation, and/or erosion of roads and infrastructure such as the sewer pumping station and the wastewater treatment plants. The Public Works Department also conducts snow removal and deicing on roads; tree and tree limb maintenance; and the appropriate maintenance and upgrades of storm drainage systems to prevent flooding caused by rainfall.

Because of the duties described above, Public Works Department personnel are often the de facto first responders during emergencies. The Public Works Department must maintain access for the Police and Fire Departments to respond to emergencies.

Building and Engineering Departments

The Building Official administers the City's building inspection program adhering to and enforcing all code requirements of the State of Connecticut relating to building construction. Additional responsibilities include administering and enforcing all related state codes for the safety, health, and welfare of persons and properties in the municipality, supervising departmental policies and procedures, and providing technical assistance to municipal officials.

The Building Official has a unique responsibility when it comes to hazard mitigation as he or she is responsible for overseeing a number of codes such as those related to wind damage prevention as well as those related to inland flood damage prevention. Although other departments and commissions may review development plans and develop or revise regulations, many important types of pre-disaster mitigation are funneled through and enforced by the Building Department. For example, the Building Department enforces standards for floodproof construction and building elevations, maintain elevation certificates, and enforce building codes that protect against wind and fire damage. Thus, the types of mitigation that are administered by the Building Department include prevention and property protection.

The City Engineer plans, directs, and coordinates engineering contracts and construction projects, including bridges, sanitary, and different developments. The Engineer provides technical consultation to municipal boards and commissions and serves as the municipal liaison with various state agencies. As such, the Engineer will often need to review issues related to drainage, flood conveyance, and flood mitigation and related elements of structural hazard mitigation.

Fire Department and Emergency Management Department

The Fire Department and Emergency Management Departments are the primary entities involved with hazard mitigation through emergency services in the City. The EMDs are the primary municipal contacts for this HMP.

Police Department

Typical day-to-day duties of the Police Department include crime prevention, criminal investigations, traffic enforcement, motor vehicle accident investigations, and patrols. Duties related to natural hazard mitigation include planning and coordination of personnel, equipment, shelters, and other resources necessary during an emergency. The types of mitigation that are directly administered by the Police Department include mainly emergency services and public education. Communication and coordination with the Fire Department is critical before, during, and after natural hazard emergencies.

Planning Department

Planning and Zoning Commissions and municipal planning or land use staff are in charge of planning provide assistance to other applicable departments within the municipality, including the Building and Engineering personnel, and are responsible for housing and economic development planning. The Zoning Enforcement Officers/Inland Wetlands Enforcement Officers enforce the zoning regulations and are the administrators of the inland wetlands regulations on issues of zoning compliance. The NFIP Coordinator responsibilities are shared between the Planning and Zoning Departments and the Building Official.

Because the Planning staff assist the applicable commissions with administration of the Zoning Regulations, Subdivision Regulations, and Inland Wetland Regulations (described below in Section 2.8), the municipal departments are responsible for elements of almost all six facets of mitigation (prevention, property protection, natural resource protection, structural projects, emergency services, and public education).

Commissions Related to Hazard Mitigation

In addition to the Public Works Commission and Emergency Management Committee described above where applicable, several commissions are involved with hazard mitigation:

- Conservation Commission – Charged with the development, conservation, supervision, and regulation of natural resources and water resources (hazard mitigation through natural resource protection)
- Inland Wetlands and Watercourses Commission – Charged with implementing and enforcing all provisions of the Connecticut General Statutes as regards the Inland Wetlands and Watercourses Act (hazard mitigation through prevention, natural resource protection, and structural projects)
- Planning and Zoning Commission – Charged with establishing, implementing, and overseeing planning and zoning regulations as provided by the Connecticut General Statutes (hazard mitigation through prevention, property protection, natural resource protection, structural projects, emergency services, and public education)
- Board of Fire Commissioners (Shelton)

2.1.2 Plans and Regulations

Plans of Conservation and Development

The Shelton Planning and Zoning Commission adopted the most recent update to the POCD in 2006. The POCD is organized into eight sections that cover resources, development, community needs, future land use, and implementation. The majority of the Shelton POCD is focused on describing goals and strategies for enhancing transportation, development, housing, and community facilities for a diverse community containing urban, suburban, and rural neighborhoods.

The Shelton POCD includes a detailed section about open space. The POCD recommends a variety of methods of increasing open space as well as continuing the extension of greenways along the Housatonic River, Farmill River, and Means Brook. The POCD also promotes the prioritization of open space along the coastal portion of the Housatonic River. These goals and strategies are all consistent with the goals of this HMP.

The POCD briefly addresses a few inaccessible homes along the Housatonic River in the extreme northern part of Shelton. These homes are only accessible by boat from across the river. The POCD discourages the year-round use of these homes. This is important in the context of this HMP as the area is floodprone, and residents have no means of evacuating during floods.

Emergency Operations Plan

The Shelton EOP was most recently updated in 2012.

Sections I and II of the City's EOP provide its purpose and assumptions. Section III of each EOP describes mitigation, increased readiness, emergency phase operations, and recovery phase operations. The EOP may list snowfall, ice storms, blizzards, hazardous material incidents, aircraft accidents, hurricanes, tornadoes,

flooding, electrical storms, major fires, energy/fuel shortages, forest fires, dam failures, water contamination, earthquakes, and highway accidents as hazards covered by the EOP. Specific mitigation measures typically include the following:

1. Carry out hazard mitigation activities appropriate to the functions of departments & agencies
2. Restrict development in hazardous areas consistent with the degree of risk
3. Promote fire prevention
4. Work with commerce & industry to improve hazardous materials storage, use, transport, & disposal
5. Encourage public safety at all levels
6. Maintain a stock of sandbags
7. Develop and maintain all-hazard evacuation and mass care annexes with predesignated evacuation routes and shelter facilities
8. Maintain mutual aid agreements with neighboring communities
9. Maintain a radiological protection reference guide

Section IV of the EOP sets and describes roles and responsibilities. The EMD coordinates with the Chief Elected Official and other agencies. Roles of the Fire Department, Police Department, Health District, Public Works Department, and other specific people are also described.

Section V of the EOP describes administration and logistics. This section also describes the duties of the American Red Cross (ARC) and Salvation Army such as provision of food, clothing, and various types of assistance. Section VI of the EOP describes plan maintenance. Section VII of each provides various attachments, such as templates for declaring an emergency.

Flood Damage Prevention

Flood damage prevention is covered by Chapter 5 of the City of Shelton Code, adopted June 1991. The code sets forth the policies for administration and the detailed standards for flood damage prevention, which are generally a duplicate of the NFIP regulations. The code requires compensatory storage in flood zones and also requires that floodplain encroachments shall not result in any ("0.00 feet") increase in base flood elevations.

The code also requires that, in the Zone A, base flood elevation data shall be provided for subdivision proposals and other proposed development (including manufactured home parks and subdivisions) that are five acres or 50 lots, whichever occurs first. This is consistent with FEMA's recommended regulations and will require, in some instances, that detailed flood studies accompany development proposals.

Zoning Regulations

The Shelton Zoning Regulations were adopted in 1977 and have been amended through July 2009. Unlike other Valley communities, the flood zone is not a distinct overlay district in Shelton.

- Sections 31.5.2, 33.6.4, and 33.13.6 state that all utilities in residential developments shall be underground. Section 36.11 requires the same in the Central Business District (downtown).

- Coastal Site Plan Review (CSPR) requirements are in Section 45.5. The coastal boundary is found along the Housatonic River in southeastern Shelton. Shelton's CSPR regulations are typical of those found in Connecticut, with exemptions similar to most coastal communities.
- Section 46 includes the standards for soil erosion and sediment control.

Subdivision Regulations

The Subdivision Regulations are administered by the Planning and Zoning Commission. These regulations have been revised through 2001. Components of the regulations that directly or indirectly address hazard mitigation (flooding, public safety, etc.) are listed below:

- Section 2-3-11 (Flood Plain Areas) requires that applications for subdivisions in flood hazard areas shall include written assurance that the flood-carrying capacity of a watercourse will be maintained; that encroachments into a floodway will result in no increase in the base flood elevation; and that base flood elevation data will be furnished for any subdivision of 50 lots or five acres.
- Section 2-4-5 (Flood Plain Development Permit) notes that the subdivision process must include verification of receiving a Development Permit as required by the Flood Damage Prevention code.
- Section 4.4.2 sets the required widths for roadway rights-of-way, and Section 4.4.3 sets the required widths for pavement.
- Section 4.4.10 discourages the use of dead-end streets. When included in a proposal, the dead-end street shall not exceed a length of 10 lots per side.
- Section 4.6 describes drainage provisions. Street drainage systems must be designed to handle two inches of rain per hour, and culverts must be designed to handle four inches per hour. Design of pipe systems must take entire drainage areas into account rather than just the site. The discharge of stormwater shall be into drains, ditches, or other facilities with adequate capacity.
- Section 4.10 (Special Flood Hazard Areas) explains that lots, streets, drainage, and other improvements shall be designed to be capable of use without danger from flooding and must conform to the Flood Prevention Ordinance (code). Streets must be elevated or otherwise suitably protected from flooding for continued access.
- Section 4.10.3 (Preservation) allows the commission to prohibit the subdivision of any portion of a property lying in a flood zone and to protect those areas from damage resulting from clearing, grading, or dumping.
- Section 4.20 describes the information required in sedimentation and erosion control plans.
- Section 4.21 requires installation of underground utilities if five or more units are constructed.

Inland Wetland and Watercourses Regulations

The Inland Wetlands Commission is charged with administering the Inland Wetlands and Watercourses Regulations. These regulations are revised through July 2010 and mainly describe permit procedures, enforcement, appeals, etc. Appendix A of the regulations includes a list of setbacks that are necessary between certain activities and watercourses. Interestingly, the setbacks for septic systems vary by watercourse and range from 50 feet from unnamed streams to 100 feet from the Housatonic River, Far Mill River, and Means Brook. Setbacks are 75 feet from most of the remaining named streams. The variable setback likely helps prevent activities in floodplains.

2.2 Infrastructure

Transportation

The primary transportation routes into and out of the City are Routes 8 and 108 running southwest to northeast, Route 110 running along the Housatonic River, and Route 714 running parallel to Route 8. Other key roads include East Village Road, Walnut tree Road, Mohegan Road, Huntongton Street, Long Hill Ave, and Constitution Blvd. Route 8 and the Shelton Derby Bridge are the only bridges over the Housatonic River in Town.

Shelton is served by the valley Transit District public bus system, and by the Greater Bridgeport Transit System. The Derby-Shelton train station, a commuter-rail station on the Waterbury Branch of the Metro-North Railroad New Haven Line, is located just over the river in Derby.

Utilities

Public water in Shelton is provided by the Aquarion Water Company. Public sewer service is provided by the Shelton Water Pollution Control Authority.

United Illuminating is the primary electricity provider in Shelton. There is no natural gas infrastructure in City; residents rely on oil, propane, and wood.

According to geolSP (geolSP.com), there are 1 DSL Providers, 3 Cable Internet providers, 4 Fiber Internet (FTTH) providers, and 0 Fixed Wireless (WISP) providers in Shelton, CT. There are also 4 Mobile Broadband (cellular) providers with service available in Shelton.

2.3 Critical Facilities and Emergency Response

Shelton has identified several critical facilities throughout the City, as summarized on Table 2-1 below.

Table 2-1: Critical Facilities

Facility	Address or Location	Comment	Emergency Power	Shelter	SFHA
City Hall	54 Hill St	EOC	✓		
Police Department	85 Wheeler St	Backup EOC	✓		
Community Center	41 Church St	Primary Shelter	✓	✓	
Shelton High School	120 Meadow St	Backup Shelter	✓	✓	
Animal Shelter	11 Brewster St	Pet Shelter	✓	✓	
Echo Hose Hook & Ladder Co. No. 1	379 Coram St	Emergency	✓		
Huntington Fire Company No. 3	44 Church St	Emergency	✓		
Pine Rock Fire Company No. 4	722 Long Hill Ave	Emergency	✓		
White Hills Fire Company No. 5	2 School St	Emergency	✓		
Echo Hose Ambulance Corps	100 Meadow St	Emergency			
Public Works	41 Myrtle St	Municipal			
Water Pollution Control Facility	10 Riverdale Ave	Utility	✓		✓
Sewer Pumping Stations	5 Locations	Utility	✓		
Senior Center	81 Wheeler St	Municipal			
Sinsabaugh Heights	187 Meadow St	Elderly Housing			
Wesley Village	580 Long Hill Ave	Elderly Housing			
The Ripton	423 Howe Ave	Elderly Housing			
Helen DeVeaux House	Howe Ave	Elderly Housing			
Crosby Commons	580 Long Hill Ave	Assisted Living			
Shelton Lakes	5 Lake Rd	Convalescent Home			
Bishop Wicke Health Center	580 Long Hill Ave	Convalescent Home			
Gardner Heights	172 Rocky Rest Rd	Convalescent Home			
Hewitt Memorial Hospital	45 Maltby St	Convalescent Home			
Apple Tree Daycare	117 Long Hill Cross Rd	Daycare			
A Child's Garden	20 Ivy Brook Rd	Daycare			
Bright Horizons	3 Corporate Dr	Daycare			
Happy Day	41 Church St	Daycare			
Kidstop	215 Bridgeport Ave	Daycare			
Little Academy	250 River Rd	Daycare			
Pumpkin Preschool	100 Beard Saw Mill Rd	Daycare			
Wonder Years	188 Rock Rest Rd	Daycare			
Woodland Park	515 Bridgeport Ave	Mobile Home Park			
Fairchild Heights	804 Bridgeport Ave	Mobile Home Park			
Sunnyside	South Main St	Mobile Home Park			

Fire and Police Department Facilities

The Shelton Fire Department is comprised of four fire stations that are located throughout the city: Echo Hose Hook and Ladder Company located at 379 Coram Street, Huntington Fire Company at 44 Church Street, Pine Rock Park Fire Company at 722 Long Hill Avenue, and White Hills Fire Company at 2 School Street. None of the fire stations are located within a flood zone.

The Shelton Police Department is located at 85 Wheeler Street and is not located in a flood zone. The Police Department consists of approximately 55 officers and 19 civilian members. The Police Department has been designated as the backup EOC.

Generators were installed at the Police Department and at each of the four fire stations between 2018 and 2019.

Public Works Facility

The City believes that the Public Works facility is situated in an appropriate location relative to hazard mitigation, disaster resiliency, and outside of FEMA flood zones. City personnel report that the Public Works facility is in need of a generator.

Shelters

Shelton has two shelters: the Community Center at 41 Church Street is the primary shelter, and Shelton High School at 120 Meadow Street is the secondary (backup) shelter. Both locations are ARC-recognized.

Additionally, the Animal Shelter at 20 Riverdale Avenue houses pets during emergencies. Pet owners must remain with their pets throughout the duration of the pets' stay during an emergency.

None of the three shelters is located in a flood zone. The high school is equipped with a fuel cell and a small generator is available to run the IT system; however, a new generator is still needed to power freezers, restrooms, the gym, and heating and cooling systems. The Community Center and Animal Shelter each have a generator.

Other Municipal Facilities

City Hall is Shelton's EOC. City Hall is equipped with a generator, but it is reportedly very limited in capacity and needs to be upgraded.

Echo Hose Ambulance Corps has been added to the list of critical facilities.

The Water Pollution Control Facility at 10 Riverdale Avenue is located within a 100-year floodplain. The Control Facility and Shelton Sewer Pumping Stations are all equipped with emergency power. Several sewer pump stations need upgrades or maintenance. In particular, the sewer pump station on Bridgeport Avenue is undersized and runs constantly. The lack of downtime is a concern for maintaining emergency power supply during outages.

Health Care, Assisted Living, Daycare, and Special Needs Populations

Four elderly housing complexes, one assisted living facility, four convalescent homes and eight daycare centers are located throughout the City. In addition, three mobile home parks are located in the City, including two on Bridgeport Avenue and one on South Main Street. None of these population centers are located within a flood zone.

Evacuation Routes and Preparedness

Evacuation routes for the City are conducted on a case-by-case basis depending upon the storm event and road access. There are certain neighborhoods that are known to be at risk for impaired access during floods. These areas should be targeted for development of specific evacuation protocols. Examples include the residents at the end of Indian Well Road in Shelton that can be cut off by floodwaters from the Housatonic River and residents in northern Shelton that can be cut off by floodwaters from the Housatonic River.

Communications

Shelton relies on Reverse 911 for communicating emergency alerts to citizens. In addition, the City relies on radio, cable television, area newspapers, and the internet to spread information on the location and availability of shelters. It is understood that several of these information sources can be cut off due to power failure, and emergency personnel can also pass this information on manually.

3.0 FLOODING

3.1 Existing Capabilities

Regulations, Codes, and Ordinances

The municipal codes, Zoning Regulations, Subdivision Regulations, and Inland Wetland and Watercourses Regulations were described in detail in Section 2.10. The Planning and Zoning Commissions, Inland Wetlands and Watercourses Commissions, and the Building Officials are all charged with reviewing projects and developments in SFHAs as well as projects not located in SFHAs that will alter hydrology and runoff.

The City has regulations that are at least as stringent as the NFIP regulations. A few of the provisions of these codes and regulations are especially notable relative to preventing flood damage:

- The City of Shelton requires that, in the Zone A, base flood elevation data shall be provided for subdivision proposals and other proposed development which are five acres or 50 lots. This is consistent with FEMA's recommended regulations and will require, in some instances, that detailed flood studies accompany development proposals. In addition, the Planning and Zoning Commission may prohibit the subdivision of any portion of a property lying in a flood zone.
- The City of Shelton requires a roadway of suitable elevation to access subdivisions in SFHAs. This is consistent with FEMA's recommendation for dry land access to residential populations.

Bridge Replacements, Drainage, and Maintenance

The Public Works Department is in charge of the maintenance of drainage systems and perform clearing of catch basins, bridges, and culverts and other maintenance as needed. Drainage complaints are routed to the Public Works Department. Public Works handles outreach and any response measures necessary. The City uses these reports to identify potential problems and plan for maintenance and upgrades. However, the City does not use a tracking system for processing complaints. The Engineering division is typically involved in drainage investigations.

Flood Watches and Warnings

The City receives regular weather updates through DEMHS Region 3 email alerts and can also access the Automated Flood Warning System to monitor precipitation totals and river stage changes. The Connecticut DEEP installed the Automated Flood Warning System in 1982 to monitor rainfall totals as a mitigation effort for flooding throughout the state.

Warnings are particularly necessary for the Housatonic River below the Stevenson Dam as the flooding in this area can rapidly catch the riverfront neighborhoods off guard in Shelton. While these warnings have not always prevented a loss of property, they have prevented loss of life.

Participation in the NFIP

Shelton has participated in the NFIP since 09/29/1978. The Flood Insurance Rate Map (FIRM) for the community was most recently updated in 06/18/2010. Shelton does not participate in the FEMA Community Rating System (CRS) program.

According to FEMA, there are 244 flood insurance policies in force in Shelton as of 6/30/2019 with an insurance value of \$57,801,200.

New Capabilities and Completed Actions

Shelton continues to maintain its strong flood mitigation capabilities.

Two bridges were recently replaced in 2020. The bridges are located on Waverly Road over Farmill River and on Lane Street over an unnamed tributary to Means Brook. Both projects were primarily completed to mitigate issues due to age. Minimal widening improvements were also completed to increase conveyance capacity.

Five homes in the Maples neighborhood, which were reportedly classified as repetitive loss properties, were elevated in 2013 and 2014. These projects were completed using grant funding available following Storm Sandy.

Summary

In summary, the City has primarily attempted to mitigate flood damage and flood hazards by restricting activities in floodprone areas and relying on existing flood control structures such as dams and levees. The former is primarily carried out through the Planning and Zoning Commission working with the Building Officials. The City anticipates that a wider range of mitigation efforts will be utilized in the future, including additional elevations and acquisitions of floodprone structures.

3.2 Vulnerabilities and Risk Assessment

3.2.1 Vulnerability Analysis of Specific Areas

Flooding is known to occur along numerous watercourses in the City. These areas are described below, grouped by drainage basin. There are certain neighborhoods that are known to be at risk for impaired access during floods:

- Indian Well Road can be cut off by floodwaters from the Housatonic River.
- Northern Shelton that can be cut off by floodwaters from the Housatonic River.

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

Housatonic River

Riverine flooding occurs downstream of the Stevenson Dam along the Housatonic River in Shelton, Seymour, and Derby. The floodprone section is from the Stevenson Dam (upstream of Shelton) to the Derby Dam, which spans the river at downtown Shelton and Derby.

Erosion is evident along Birch Bank Road. The erosion is thought to be caused by drainage from the hillside.

Railroad crossing disrepair often makes it difficult to access the northern section of Canal Street East during flood events. The railroad crossing blocks access to nearly 800 residential units in the Avalon Shelton facility. In the past, the City has constructed temporary bridges to access this area. A more permanent solution is needed, as this is an evacuation concern.

Maples Neighborhood

Severe flooding of the Maples area of Shelton is well documented. Flooding in March 2011 caused extreme damage, and coverage in the press was thorough. All 41 homes were evacuated as extremely high flows passed over the Stevenson Dam. Some homes in the neighborhood have been elevated, but many have not. Many homes remain on the list of repetitive loss properties (RLP).



Maples Neighborhood, 9/8/11

Indian Well Road will sometimes be impassable during flooding of the river. In particular, significant drainage tends to accumulate near the railroad track. This affects the group of homes located north (upstream) of the Maples neighborhood. Some sections of the road become impassable due to the rising river water, and some become impassable from high flows of small streams that cross under the road. Even if residents are not required to evacuate due to a threat of their homes flooding, they may find that access to their homes is cut off during floods.



Indian Well Road, 9/8/11

The Maples neighborhood was studied in 1985 with financial support provided by FEMA and the Connecticut DEEP. The summary of findings and recommendations found that there is no economically justifiable structural flood mitigation measure that would have the effect of eliminating future flooding of the neighborhood. Additionally, the findings stated that Shelton, the Bridgeport Hydraulic Company (currently Aquarion Water Company), and the State of Connecticut should join forces to purchase the residential structures in the neighborhood and relocate residents.

City staff report that there have not been any recent flooding problems in the Maples neighborhood.

Means Brook Watershed

Means Brook is a major tributary to the Farmill River. Shelton's Huntington Village is located along Means Brook. An unnamed tributary to Means Brook is conveyed under Brookwood Lane in a small culvert, near the intersection with Walnut Tree Hill Road. The culvert is in need of upgrading and replacement. The neighborhood located upstream had three culverts replaced along the same small watercourse due to neighborhood flooding in 2002. This is a very high-priority mitigation project for the City and they hope to see progress in the next five years.

Elsewhere, a different unnamed tributary of Means Brook runs beneath Beardsley Road and alongside Jonathan Lane. Although major flooding is not suspected in this area, the stream appears to be associated with an RLP.

Huntington Center is densely developed with commercial and residential properties. The Shelton Avenue (Route 108) bridge over Means Brook is a DOT-owned structure that was constructed in the 1920s. It is reported to be hydraulically inadequate and has caused flooding in Huntington Center. The adjacent DOT culvert that conveys Pole Brook under Route 108 is also undersized. Overtopping of the culverts results in flooding of nearby commercial parking lots. One RLP is located in Huntington Center near Means Brook.

Farmill River

There are multiple locations in Shelton along the Farmill River where flooding has occurred. The culvert at Walnut Hill Road is reportedly under-capacity, leading to roadway flooding. Following large-scale rain events, which typically occur one to two times per year, closure of the roadway is necessary. Twin boiler sections currently serve as culverts. An engineering study conducted in 1989 recommended their replacement with twin 15-foot by six-foot precast concrete culverts.

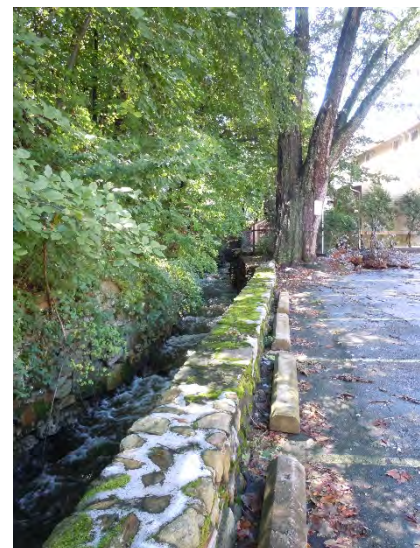
Slightly downstream, an RLP is located in the Walnut Hill Road/Waverly Road area. It is believed that culverts in this area may be undersized as well, possibly leading to the flooding.

Finally, one more RLP is located in the most downstream reach of the river in Shelton (where the river forms the municipal border with the town of Stratford). The road known as Yatuka Trail follows the river corridor and is generally at a high elevation above the SFHA, but there are several low sections.

A major rain storm in September 2018 resulted in minor flooding along Burying Ground Brook at Bridgeport Avenue. Several driveway culverts were washed out, and some basement and backyard flooding reported.

Burying Ground Brook

FEMA has mapped an area of shallow flooding (zone AO) in downtown Shelton along the historical channel of Burying Ground Brook, which is one of the only areas in the state mapped with the AO designation. It is indicative of potential sheet-flow flood damage with a depth of



Burying Ground Brook in Shelton

three feet. A stone masonry arch structure near Long Hill Avenue is eight feet in height and partially collapsed in 2011 after a moderate rainfall event, requiring emergency repairs. Flooding occurs in this area following significant rainfall events that lead to road closures. To reduce flood levels daylighting and/or widening of Burying Ground Brook may be necessary. A flood study is recommended prior to mitigation design.

Unnamed Watercourse Along Wooster Street

An Oak Avenue stone masonry culvert conveys a small watercourse that parallels Wooster Street from the area of Jefferson Street under Oak Avenue and through private properties to the Wooster Street-Brook Street intersection. The culvert is approaching 100 years of age and requires relocation to the public right-of-way as well as an increased conveyance capacity to eliminate flooding conditions. This area is upstream of the Boys & Girls Club which is adjacent to Curtiss Brook. There are sections of the watercourse upstream of Jefferson Street that have been placed in conduits on private property that are in need of being upgraded and relocated to the public right-of-way for proper maintenance.

Nearby, the Congress Avenue/Oak Avenue storm sewer conduit conveys a significant drainage area of approximately 125 acres through private properties and under Oak Avenue. The various conduits consist of 30" reinforced concrete pipe (RCP), 42" RCP, and both 40" x 41" and 36" x 42" stone masonry structures. Various sections of this conduit have been repaired since 1983 as they fail. Repairs are ongoing as damage occurs, with the most recent repair work in 2020.

Marks Brook

A RLP is located along Marks Brook immediately adjacent to a culvert.

3.2.2 Vulnerability Analysis of Private Properties

In 2012, the software platform ArcGIS was utilized along with 2010 Microsoft Virtual Earth aerial photography to determine the number of structures located within the various floodplains within the City. According to this analysis, Shelton has 365 structures within the 100-year floodplain or floodway, with a total of 2,578 acres of land located within the 100-year flood boundary, and an additional 1,090 acres of land located within the 500-year flood boundary.

According to FEMA, Shelton has thirteen Repetitive Loss Properties (RLP). Of those, three are classified as Severe RLP and one has been mitigated in the past. According to Shelton personnel, the City has 18 RLPs, and several in the Maples neighborhood have been mitigated using federal grant programs. The RL properties in Shelton are located along or near the Housatonic River, an unnamed watercourse, Means Brook, and the Farmill River. Each of the structures is located within the 1% annual-chance floodplain except for the structure on Beardsley Road in Shelton, which is not located in a SFHA. The majority of the RLPs are located in the Maples neighborhood. Several of the residential structures appear to have walk-out basements or garages that may be damaged by flooding whereas the living areas appear to be higher.

Table 3-1: Repetitive Loss Properties in Shelton

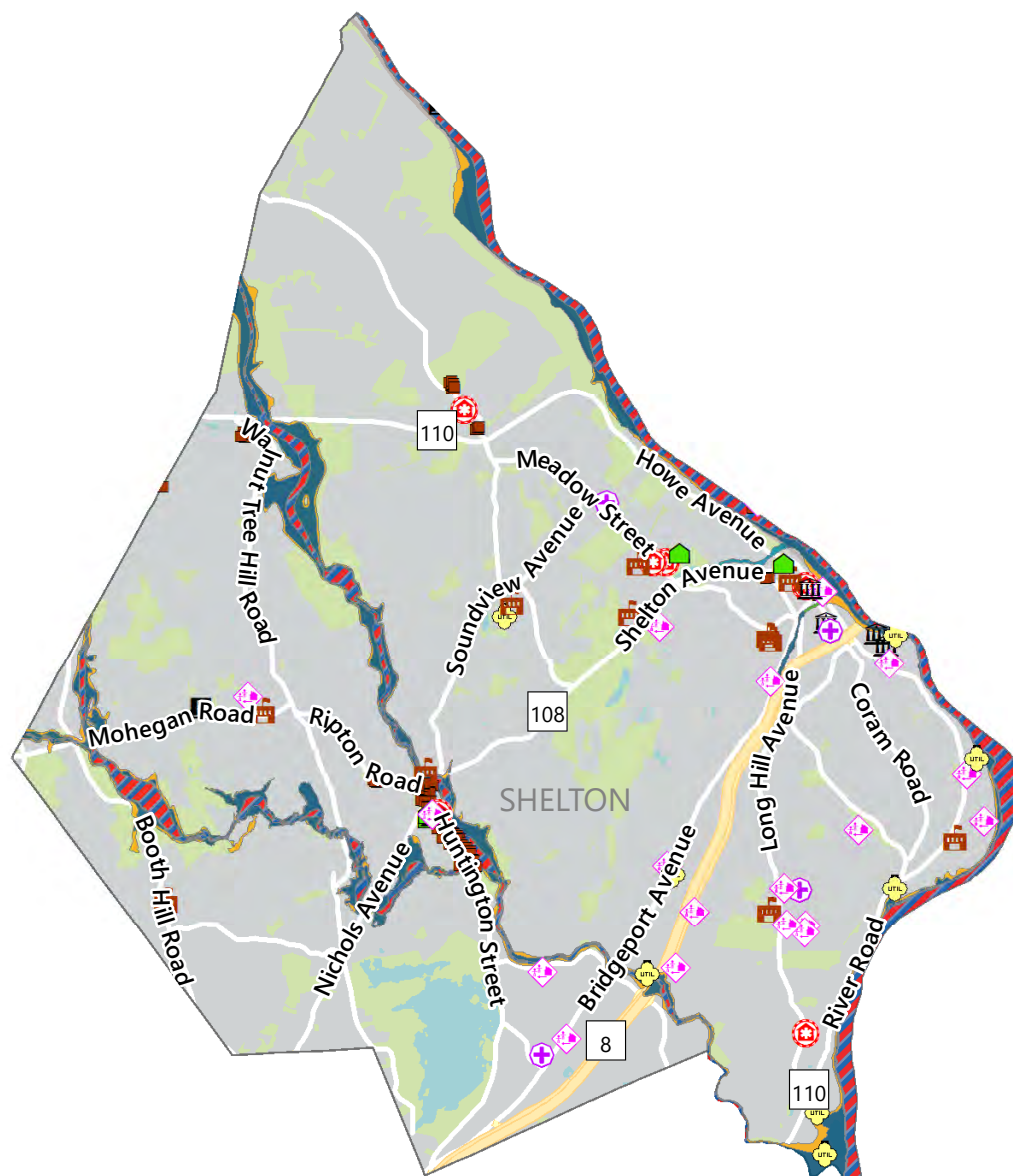
Total	Residential	Non-Residential	Mitigated	SRL
13	13	0	1	3 Residential

3.2.3 Vulnerability Analysis of Critical Facilities

The Sheton Water Pollution Control Facility (WPCF) is the only critical facility in Shelton that falls within a SFHA. Despite its location, the flood risk was reduced following the recent completion of a project to floodproof a wall facing the river.

Table 3-2: Critical Facilities Located Within or Adjacent to Floodplains

Name or Type	Address	Flooding Source
Water Pollution Control Facility	Riverdale Avenue	Housatonic River



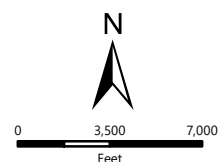
- | | |
|----------------------------|-----------------------|
| Critical Facilities | Historic Sites |
| Care Facility | Historic Sites |
| Community Center | |
| Emergency Response | Flood Zone |
| Fuel | Floodway |
| Government Services | AO |
| School | X: 0.2% Annual Chance |
| Utility | |
| Vulnerable Population | |



99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773

Flood Hazards in Shelton

NVCOG Hazard Mitigation Plan Update
Naugatuck Valley Council of Governments
47 Leavenworth Street, 3rd Floor
Waterbury, CT 06702



DATE 6/15/2021

141.3211.00029
PROJ. NO.

FIG. 3-1

4.0 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 Shelton is 115 mph for a Category 1 event, 125 mph for a Category 2, and 135 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.

United Illuminating (UI), the local electric utility, provides tree maintenance near its power lines. The City Tree Warden is part of the Parks and Recreation Department. In recent years, the tree maintenance budget has only seen a minimal increase. This is because UI has been very aggressive in trimming trees near power lines. Generally, UI trees trees back until they are eight feet from powerlines. UI's current tree trimming program has been active for four years, and approximately 46% percent of city trees have been trimmed. Another 20% of city trees are expected to be trimmed back in 2021.

The City's Tree Warden performs tasks with variable responsibilities and resources as noted below:

- The "Tree Engineer" or Tree Warden in the city operates out of the Parks and Recreation Department on a part-time basis.
- The Tree Warden often fields calls from businesses and homeowners regarding the ownership of trees that lie at or near business or residential properties.
- The Public Works Department often works closely with the Tree Warden to address the needs of home and business owners with issues.

Prior to severe storm events, the City ensures that warning/notification systems and communication equipment are working properly and prepare for the possible evacuation of impacted areas.

New Capabilities and Completed Actions

Shelton continues to maintain its strong tropical cyclone mitigation capabilities.

Summary

Shelton 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

Shelton is susceptible to both high winds and flooding from heavy inland precipitation caused by hurricanes. Wind damage is a risk throughout the City, flooding is possible along rivers and in areas with poor drainage, and structures along the tidal portion of the Housatonic River below the Derby Dam are vulnerable to storm surge.

Of particular concern to the City are the blockage of roads and the damage to the electrical power supply from falling trees and tree limbs. According to municipal officials, most areas within the City are vulnerable to falling trees and limbs with the exception of the City center where the number of trees is significantly lower.

The City's housing stock consists of many historic buildings and homes greater than 50 and sometimes 100 years old, relatively younger buildings built before the 1990s when the building codes changed to mitigate for wind damage, and relatively recent buildings that utilize the new code changes. Since most of the existing housing stock in the municipality predates recent code changes, many structures are highly susceptible to roof and window damage from high winds.

According to City officials, municipally owned critical facilities do not have wind-mitigation measures installed to specifically reduce the effects of wind. Thus, it is possible that many of the critical facilities in the City are as vulnerable to damage from hurricane-force winds as other noncritical structures. Note that many critical facilities in the City are not specifically designed to withstand hurricane-force winds. Newer critical facilities, such as the Shelton Police Department, are considered to be the most resistant to wind damage even if they are not specifically wind resistant for hurricane gusts.

Also of particular concern are the conditions of levees and dams that necessitate emergency planning during a high-precipitation hurricane event.

Wind damage is typically widespread throughout the City. Mobile home parks are particularly susceptible to potential wind damage.

Tropical Storm Isaias in August 2020 caused widespread tree and limb damage in the City. Two homes were destroyed, and several other homes were damaged by falling trees and limbs. Trees fell across several roads and downed wires in many areas. The City and United Illuminating (UI) had reportedly excellent coordination and Make Safe crews were quickly dispatched to areas with downed power lines. Power was restored to all properties within four days, and most residents were without power for even less time. City staff cleared debris, conducted trimming away from power lines and cleaned up after restoration was completed.

5.0 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 Shelton 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 test and exercise tornado response plans.
- Putting emergency personnel on standby at tornado "watch" stage.
- Providing all summer storm and tornado mitigation procedures and plans to the public in appropriate municipal buildings, on municipal websites, and through municipal social media platforms.

The City has a Tree Warden and as-needed programs for tree trimming as explained in Section 4. UI has limited tree trimming maintenance programs in place. Utilities in new subdivisions must be located underground whenever possible in order to mitigate storm-related wind damage. The Public Works Department has the necessary equipment to clean up downed tree limbs and brush following major wind events.

New Capabilities and Completed Actions

Shelton 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

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

5.2 Vulnerabilities and Risk Assessment

Thunderstorms are expected to impact the City at least 20 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 City is very high during any given thunderstorm. The risk of at least one hailstorm occurring in City is considered moderate in any given year. The City has moderate to high potential to experience tornado damage in the future.

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 moderate for any given year. All areas of the City are susceptible to damage from high winds although more building damage is expected in the City center and the densely populated neighborhoods surrounding them.

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 the City 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.

In summary, the City is at relative risk for experiencing damage from summer storms and tornadoes. Based on the historical record, only a few summer storms or tornadoes have resulted in costly damages to Shelton. Most damages are relatively site specific and occur to private property (and therefore are paid for by private insurance). For municipal property, city budgets for tree removal and minor repairs are generally limited to handling routine summer storm damage. However, the EF1 tornado that caused minor property damage along a 0.5-mile path through eastern Shelton in 2009 and the EF1 tornado that struck Bridgeport in 2010 have raised awareness regarding the potential catastrophic damage such storms can cause and the possibility of one taking place within the area. Tornadoes that struck the region in May 2018 reportedly did not impact Shelton.

6.0 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 and maintenance to protect utilities, roads, and structures; and other associated snow removal and response preparations.

The Connecticut Building Code specifies that a weight of 30 pounds per square foot be used as the base "ground snow load" for computing snow loading for different types of roofs.

The Connecticut DOT works with Shelton's Highways and Bridges Department (a branch of the Public Works Department) to conduct the majority of plowing within the municipality. Within the City, the Connecticut DOT plows Routes 8 and 110. Private developments are responsible for their own plowing while municipal roadways are plowed in the order of primary routes and bus routes to secondary routes as conditions permit. During winter storms, the City has set plow routes however, they are not publicly available.

Snow drifts and icy roads are mitigated through municipal plowing and sanding efforts.

New Capabilities and Completed Actions

Shelton continues to maintain its strong winter storm mitigation capabilities.

Summary

Shelton 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

Many tree limbs on city roadways are not suited to withstand high wind and snow or ice loads. If trees or tree limbs fall on the roadways, the proximity of structures puts them at risk for damage.

Winter storms present some unique transportation vulnerabilities. There is a high propensity for traffic accidents during heavy snow and even light icing events. Roads may become impassable, inhibiting the ability of emergency equipment to reach trouble spots as well as the accessibility to medical and shelter facilities. Stranded motorists, especially senior and/or handicapped citizens, are at a particularly high risk during a blizzard.

Icing and drifting snow are a concern in several areas. Drifting snow typically occurs on Shelton Avenue near Brownson Country Club, and on Booth Hill Road. Ice jams continue to be a concern along the Housatonic River. The Maples neighborhood is particularly at risk to flooding.

Winter Storm Nemo in February 2013 dropped 40 inches of snow on the City. Snow fell so quickly that plows could not keep up with the accumulation. It was reportedly difficult to find locations to store the plowed snow. Backhoes and other heavy equipment were brought in to move snowpiles following the storm.

A major winter storm in January 2015 reportedly caused minimal damage in Shelton.

7.0 GEOLOGICAL HAZARDS

7.1 Existing Capabilities

Due to the infrequent nature of damaging earthquakes or landslides, land use policies in the City do not directly address these hazards. Nevertheless, various regulations indirectly address areas susceptible to earthquake damage and landslides, and regulations help to minimize potential earthquake and landslide damage.

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 municipal utilities, then, generally, the Public Works Department is in charge of repairs.

The POCD for Shelton makes reference to steep slopes in the "strategies" lists within the natural resources discussion, indicating that the community desires avoiding development on steep slopes. However, much of the Land available for development in the City consists of steep slopes, and City personnel will need to be careful in their review of development proposals.

New Capabilities and Completed Actions

Shelton continues to maintain its earthquake and landslide mitigation capabilities.

Summary

Shelton 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

Structures in areas underlain by alluvium or sand and gravel are at increased risk from earthquakes due to amplification of seismic energy and/or collapse. The areas that are not at increased risk during an earthquake due to unstable soils are those underlain by glacial till.

Areas of steep slopes can collapse during an earthquake, creating landslides. Seismic activity can also break utility lines, such as water mains and 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.

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 6.0 damaging the region. Results are presented in the table below.

Table 7-1: Probability of a Damaging Earthquake

Time Frame (Years)	Probability of an Earthquake > Magnitude 5.0	Probability of an Earthquake > Magnitude 6.0
50	1% to 2%	< 1%
100	4% to 6%	< 1%
250	8% to 10%	2% to 3%
350	12% to 15%	2% to 3%

While the risk of an earthquake affecting the City is relatively low over the short term, long-term probabilities suggest that a damaging earthquake (magnitude greater than 5.0) could occur and affect the City. Despite the low probability of occurrence, earthquake damage presents a potentially significant hazard to the City.

Landslide Vulnerabilities

The likelihood of a landslide occurring in the City is considered to be moderate for any given year. 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.

Landslides and slumps often occur near watercourses when slopes are undercut and become unstable. In areas where the drainage network is comprised only of sheet flow, roadways can act as watercourses and cause landslides. For example, when construction activities undermine the natural grade of a hill, the hillside can collapse.

All developed areas on steep slopes are considered vulnerable to landslides. These areas are found throughout the City but are concentrated on the *peripheries* of the central business district or historic downtown area of Shelton. Most landslides in Shelton occur in these peripheral areas.

8.0 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

Shelton continues to maintain its capabilities for mitigating and responding to dam failure risks. The City regularly inspects its dams on the schedule mandated by CT DEEP. The City reportedly has been receiving an increased volume of phone calls regarding dams recently. The CT DEEP has reportedly been removing debris near dams in the City.

Summary

Shelton mitigates dam failure hazards primarily by supporting State Dam Safety Program efforts locally. City staff are routinely involved in the update process for EAPs related to privately owned dams in the city. In general, dams that require EAPs are up-to-date.

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 Shelton. Five of these dams had a Significant or High Hazard Potential rating. These dams are listed in Table 8-1 and shown in Figure 8-1.

Table 8-1: DEEP-Inventoried Dams in Shelton

Number	Name	Class	Owner
12601	TRAP FALLS RESERVOIR DAM	C	Water Utility
12602	MEANS BROOK RESERVOIR DAM	C	Water Utility
12604	ISINGLASS RESERVOIR DAM	B	Water Utility
12605	SHELTON RESERVOIR #2 DAM	C	Municipal
12606	ARMSTRONG PARK POND DAM	BB	Private Corporation
12607	FAR MILL RIVER DAM	B	Private
12608	SHELTON RESERVOIR #3 DAM	BB	Municipal
12609	BEARD MILL POND DAM	BB	Private
12610	TRI-LAKE DAM	AA	Private
12611	CHORDAS LAKE DAM	A	Private Corporation
12612	PARK POND DAM	BB	Municipal
12613	NELSON BROOK DAM	A	Private
12614	LONG HILL AVENUE POND DAM	AA	Municipal
12615	WILSON GARDEN'S DOG POND		State Owned
12616	RIVER ROAD POND DAM	A	Private Club
12617	WALNUT AVENUE POND DAM	AA	Private Corporation
12618	FARM POND DETENTION BASIN DAM	A	Private
12619	SHELTON RESERVOIR #1 aka PINE LAKE DAM		Municipal
12620	SWAMP POND DAM	A	Private
12621	NURSERY POND DAM	A	Private
12622	UNNAMED POND DAM	A	Private
12623	CAP POND DAM	A	Private
12624	BARN HILL POND	A	Private
12625	BEARDSLEY DAM - REMOVED		Municipal
12626	SAWMILL POND	A	Private
12627	SHARPS BROOK DAM	A	Private
12628	UPPER FARMILL RIVER DAM	A	Private
12629	LITTLE POND DAM	A	Private
12630	ANDREW POND DAM	A	Private
12631	MEANS BROOK DAM		Water Utility
12632	BEARDSLEY POND		Private
12633	ARSENAULT POND DAM		Private
12634	FARMILL POND DAM		Water Utility
12635	UNKNOWN		Private

The following table summarizes the status of EAPs for the higher-hazard potential dams in Shelton:

Table 8-2: EAP Status of Higher-Hazard Dams

Number	Name	Class	EAP Status	EAP Status Date
12601	TRAP FALLS RESERVOIR DAM	C	Acceptance Letter Sent	6/27/2017
12602	MEANS BROOK RESERVOIR DAM	C	Acceptance Letter Sent	6/27/2017
12604	ISINGLASS RESERVOIR DAM	B	Acceptance Letter Sent	3/24/2021
12605	SHELTON RESERVOIR #2 DAM	C	Acceptance Letter Sent	3/23/2017
12607	FAR MILL RIVER DAM	B	Assigned to DEEP Staff for review	3/30/2021

Shelton should work to ensure EAPs are up-to-date.

Trap Falls Reservoir Dam (No. 12601)

Trap Falls Reservoir Dam is located at the southern end of the Trap Falls Reservoir to the north of Route 8 near the municipal intersection of Shelton, Stratford, and Trumbull. The impoundment creates a water supply source, and both the reservoir and the dam are owned by Aquarion Water Company (Aquarion). The dam was originally constructed in 1905 and was raised in 1916. The dam is composed of concrete with buttresses with a height of 48 feet and a length of 1,080 feet. A concrete spillway is located on the right side of the dam and is 138 feet in linear length. The dam spillway is adequate enough to pass the spillway design flood (SDF), which is also the probable maximum flood (PMF). The date of the most recent inspection performed by Aquarion is September 14, 2010 when the condition of the dam was described as "good." Inspections are conducted every two years by Aquarion. The dam's original EOP was created in 2002 and is updated annually.

Failure of the Trap Falls Reservoir Dam would likely cause catastrophic damage south of the dam, inundating Huntington Street, Bridgeport Avenue, Route 8 into Stratford including the Beaver Dam Access Road, the areas immediately surrounding Beaver Dam Lake and southward including homes and sections of roadways along Beaver Dam Road, Wildwood Road, Pumpkin Ground Road, Cutspring Road, Circle Drive, Route 15, Linton Street, Cheshire Street, Morning Glory Terrace, Morning Dew Lane, Chapel Street, Ross Drive, Butternut Lane, Rosebrook Drive, Whippoorwill Lane, Mill Pond Road, Main Street, Winton Place, and River Road.

Means Brook Reservoir Dam

Means Brook Reservoir Dam (No. 12602) is located in central Shelton, was originally created for water supply in 1915, and is currently used for water supply and owned by Aquarion. The dam is located at the southern end of the Means Brook Reservoir along Means Brook. The dam was originally constructed in 1915 and is comprised of concrete. The dam is 50 feet in height with a length of 527 linear feet. The dam's the SDF is the dam's PMF. Based on the dam's size and its hazard class, the spillway is not adequate enough to pass the SDF. The dam has a concrete ogee spillway at the right side of the dam, which is approximately 100 feet in length. The dam was last inspected on September 14, 2010 and is inspected every two years. The most recent inspection described the dam's condition as being fair. The dam's original EOP was created in 2002 and is updated annually. Aquarion updates the EOP annually.

Failure of the Means Brook Reservoir Dam would likely cause catastrophic damage along Means Brook south of the dam including homes and roadway sections on Chamberlain Drive, Cobblestone Drive, Longmeadow Road, Tulip Lane, Treeland Road, Mark Drive, Brownson Drive, Soundview Avenue, Shelton

Avenue, Old Shelton Road, Meeting House Lane, Lane Street, Huntington Street, Courtland Drive, Sycamore Drive, Serene Drive, Great Oak Road, Buddington Road, Mill Street, Commerce Drive, Stratford Road, Beard Saw Mill Road, Yutaka Trail, Kanungum Trail, Pine Tree Trail, River Road, and Ojibwa Trail.

Shelton Reservoir #2 Dam

Shelton Reservoir #2 Dam (No. 12605) is located at the east end of Pine Lake to the north of Shelton Avenue (Route 108). The dam is owned by Shelton, and the dam is composed of stone masonry and an earthen embankment. The dam is 150 feet in linear length and 23 feet in height with a spillway at the center of the dam that is 32 feet in linear length. A wooden bridge spans the spillway and is three feet above the spillway crest. The dam impounds Curtiss Brook and has a maximum discharge of 535 cfs with an impoundment surface area of approximately 7.3 acres. The most recent item on file at the Dam Safety Section was a letter from the CT DEEP to Shelton regarding there being no EOP on file at the Dam Safety Section.

Isinglass Reservoir Dam

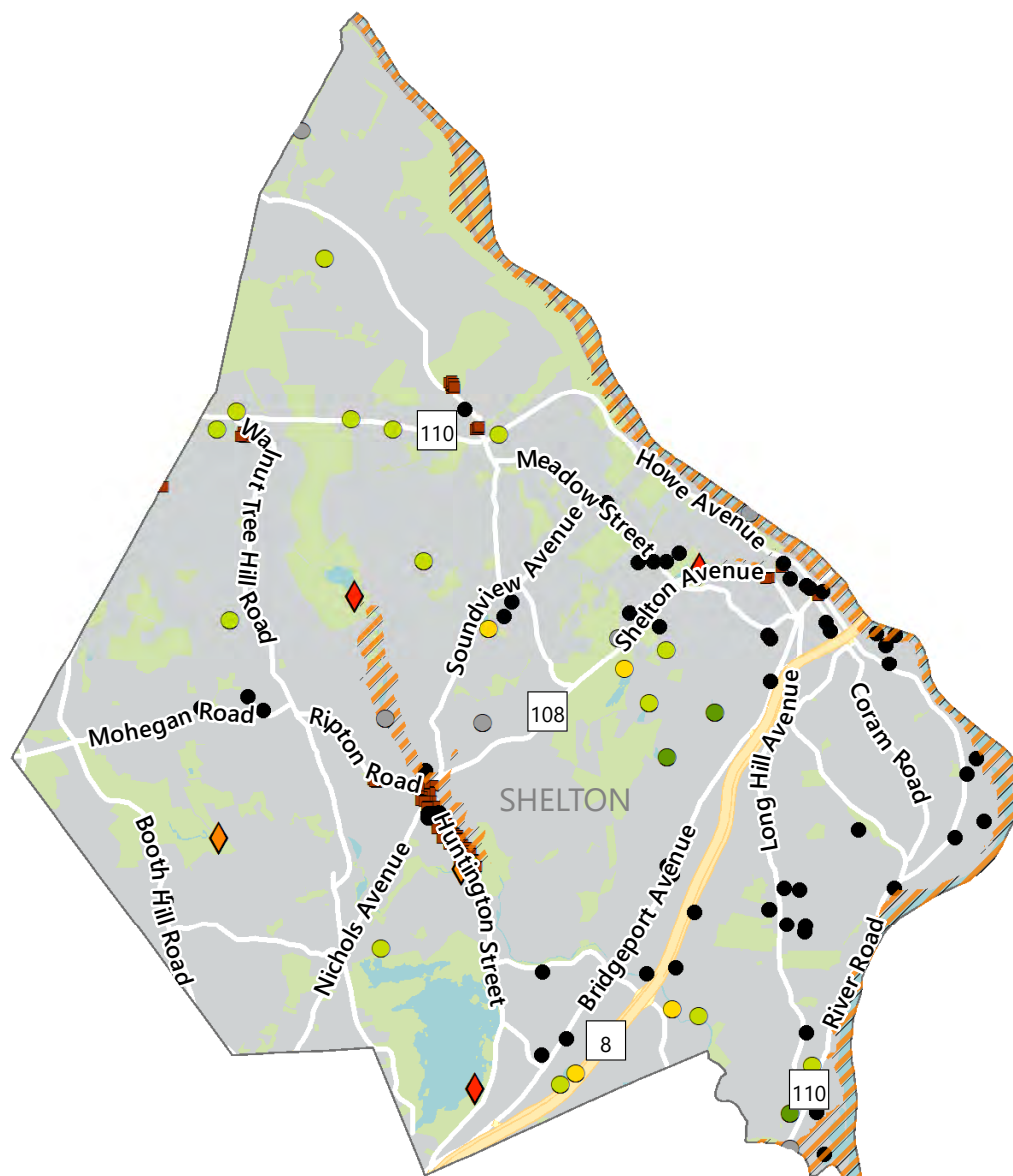
Isinglass Reservoir Dam (No. 12604) is located just to the west of Far Mill Street in Shelton to the south of the Copper Benny Lane-Far Mill Street intersection. The dam was created as water supply and still serves this purpose, currently owned by the Aquarion Water Company (Aquarion). The Farmill River is impounded creating the Isinglass Reservoir. The concrete dam was originally constructed in 1905 and has a height of 24 feet with a linear length of 114 feet. According to Aquarion, based on the size and hazard class of the dam, the spillway design flood is one-half PMF, and the dam spillway is not adequate enough to pass the SDF. The dam is inspected every five years and was most recently inspected on September 16, 2011. The most recent inspection deemed the dam's condition as fair, and the EOP was originally created in 2002 and is updated every other year.

Overtopping of the dam would include the inundation of roadways and homes south of the Isinglass Reservoir and along the Farmill River through sections of Far Mill Street, Corn Hill Road, Horse Stable Circle, Laurel Glen Drive, Misty Lane, Brentley Drive, Walnut Tree Hill Road, Earl Street, Waverly Road, Willard Road, Pond View Drive, Elizabeth Street, Nicholas Avenue, Bayberry Lane, Mulburry Lane, Courtland Drive, Huntington Street, Lane Street, Great Oak Road, Mill Street, Commerce Drive, Old Stratford Road, Route 8, Beard Sawmill Road, Yutaka Terrace, Kanungum Trail, Maple Trail, River Road, and Pine Tree Trail.

Far Mill River Dam

Far Mill River Dam (No. 12607) is located in south-central Shelton to the west of Huntington Street, north of Courtland Drive, and south of Roaring Brook Lane. The dam is located on the eastern end of what is known as Ross Pond. The dam is currently owned by Thomas and Elaine Bombero. The most recent documentation on file at the CT DEEP Dam Safety Section was a 2006 letter requesting routine maintenance work and an updated EOP from the owners. The letter stemmed from a 2006 inspection that outlined the poor condition of the masonry wall and embankment. No dimensions of the dam were included in the file at the Dam Safety Section.

The owners were contacted via mail for an EOP, inundation mapping, dimensions, and any other pertinent information. The owners did not return any correspondence.

**Dam Hazard Class**

- Unclassified
- AA - Negligible Hazard
- A - Low Hazard
- BB - Moderate Hazard
- ◆ B - Significant Hazard
- ◆ C - High Hazard

▨ Dam Breach Inundation Area

Critical Facilities

- Critical Facilities

Historic Sites

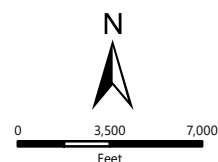
- Historic Sites



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Dam Failure Hazards in Shelton

NVCOG Hazard Mitigation Plan Update
Naugatuck Valley Council of Governments
47 Leavenworth Street, 3rd Floor
Waterbury, CT 06702



DATE 6/15/2021

PROJ. NO. 141.3211.00029

FIG. 8-1

9.0 WILDFIRES

9.1 Existing Capabilities

Existing mitigation for wildland fire control is typically focused on Fire Department training and maintaining an adequate supply of equipment. The City's Subdivision Regulations require provision of supplemental water supply systems for fire protection and stipulate that the Fire Department reviews and approves the location, size, design, construction specifications, and installation of these water supply systems. In addition, new roads, subdivisions, and fire ponds are required to allow for fire truck access.

The City has wildfire fighting equipment including off-road vehicles. The same areas of concern noted in the 2012 Plan are still considered potentially susceptible to wildfires. However, the City believes that it has the necessary equipment and access points (i.e. along trails) to fight wildfires.

Because prevention is still the primary means of reducing wildfire risks, the DEEP regularly posts updates about wildfire risk and circulates warnings to the press.

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

Actions Completed and New Capabilities

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

The City hopes that Aquarion Water Company will create a new water main loop on Ripton Road. Currently, no hydrants are in this area.

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.

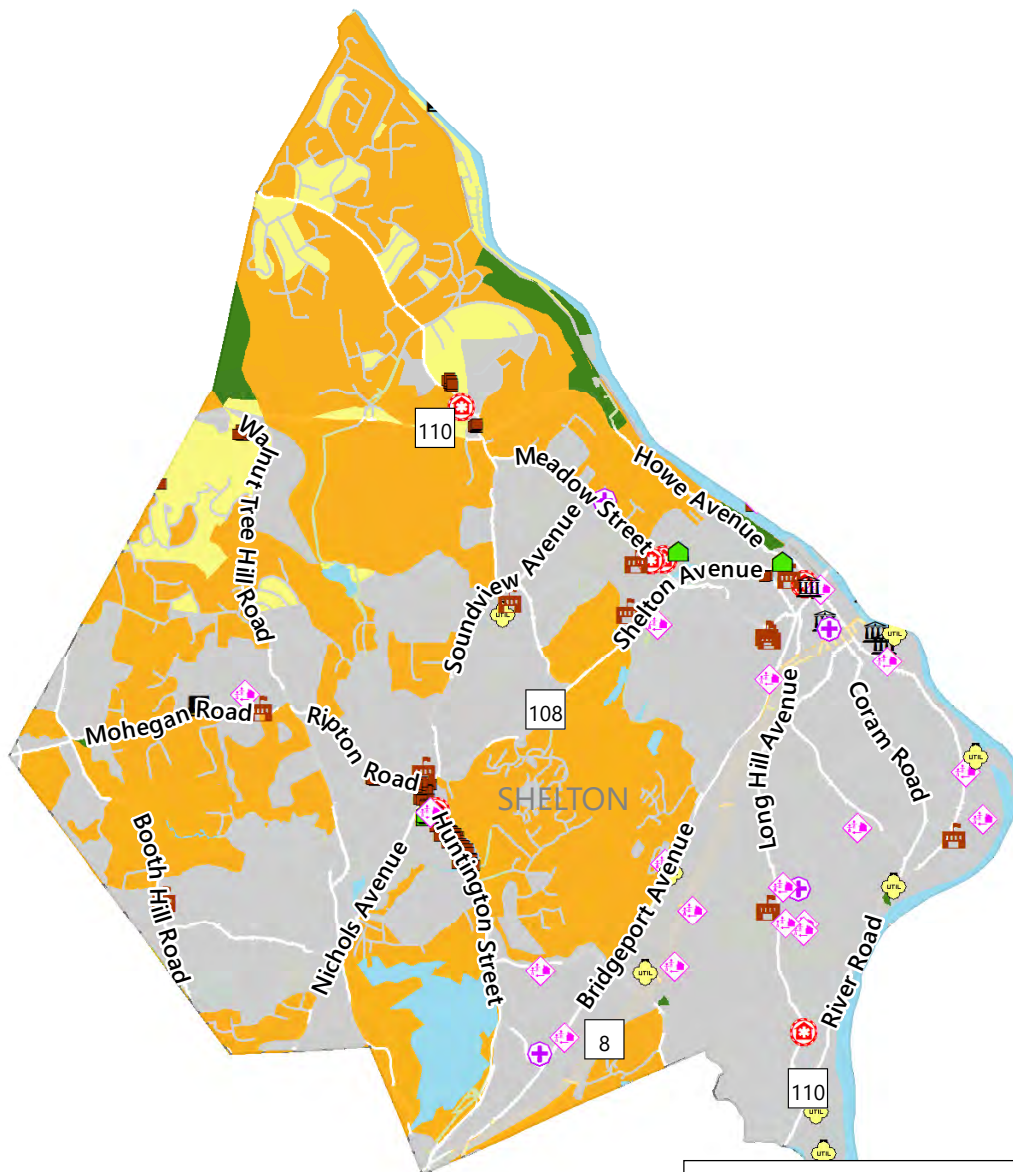
9.2 Vulnerabilities and Risk Assessment

In Shelton, the lone area of the city that was indicated by city officials as being problematic with a history of wildfires is the area of Shelton Avenue at Nells Rock Road. According to city officials, this area of the city had areas of burning for a period of five to six weeks in 1995. The only other pocket of considerable open space is the area around the Shelton Lakes Greenway in southern Shelton to the north of Bridgeport Avenue (Route 714). However, this area was not described by city officials as being problematic. The City has not had to fight any recent brush fires.

The approximately 11,011 acres of forests and undeveloped land in Shelton may be susceptible to drought conditions that make them more vulnerable to wildfires. The approximately 1,151 acres of agricultural fields

and maintained grasses may be vulnerable to direct damage from drought conditions. Wildfire risk zones are mapped in Figure 9-1.

There are areas of the City where roads are narrow and/or one way or are windy through areas of steeper slopes, which hinders emergency access to fight fires.



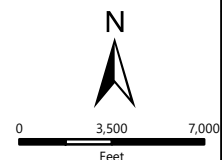
Critical Facilities	Wildland Urban Interface Type
Care Facility	Wildland-Urban Intermix
Community Center	Wildland-Urban Interface
Emergency Response	Vegetated: Low Housing Density
Fuel	Vegetated: No Housing
Government Services	Non-vegetated
School	Water
Utility	
Vulnerable Population	
Historic Sites	
Historic Sites	



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Wildfire Hazard in Shelton

NVCOG Hazard Mitigation Plan Update
Naugatuck Valley Council of Governments
47 Leavenworth Street, 3rd Floor
Waterbury, CT 06702



DATE 6/15/2021
141.3211.00029
PROJ. NO.

FIG. 9-1

10.0 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	Description	Responsible Party	Status	Notes
SHT-1	Obtain copies of the disaster planning guides and manuals from the "Are You Ready?" series and make them available at the City and City Halls	EMD	Complete	Yes
SHT-2	Disseminate informational pamphlets regarding natural hazards to public locations	EMD	Complete	Yes
SHT-3	Develop checklists for permittees that cross-references regulations and codes related to disaster resilience	PZC, B&E, EMD	Complete	Checklists and flow charts have been added to the department websites to guide applicants through various permitting processes. New software for all departments has also been installed that should help to ensure compliance and improve information sharing between departments – this record keeping system is now in place that can be used by a couple departments. More departments will connect to improve coordination in the near future. About 20% of departments have this software at this time, so a strategy should be carried forward regarding this effort.
SHT-4	Require that utilities be placed underground in new developments	PZC	Complete	This is required for all subdivisions of five or more single units on a new street. For example, the new developments downtown have been required to install underground utilities. This is not required (but is encouraged) for single lot developments.

Strategy	Description	Responsible Party	Status	Notes
SHT-5	Pursue funding to place utilities underground in existing developments	MO	Drop	This may not be feasible from a financial standpoint, and nothing is planned in the next five years.
SHT-6	Encourage residents to purchase and use NOAA weather radio with an alarm feature	EMD	Capability	This is a capability.
SHT-7	Review and update evacuation route maps at least annually	EMD	Capability	This is a capability and performed with the regular EOP update.
SHT-8	Install evacuation signs in SFHAs	EMD	Drop	These are no longer desired.
SHT-9	Consider floodproofing measures at the WPCF at 10 Riverdale Avenue	EMD, PW	Complete	A project was recently completed that removed a door and sealed the wall that was open to the river.
SHT-10	Install an emergency generator for Public Works Garage at 41 Myrtle Street	EMD, PW	Carry Forward with Revision	A small generator was installed to provide power to the fuel dispensing pumps. However, a larger generator is needed for this facility.
SHT-11	Install an emergency generator for Shelton High School	EMD	Complete	A fuel cell was installed at the High School to provide power. There is also a generator on site which provides power to the IT systems.
SHT-12	Develop an evacuation plan for residents of Indian Well Road that can be isolated during flooding	EMD	Drop	This is better evaluated on a case-by-case basis. The City's Code Red system would be used to notify the residents to evacuate. There is only one road in and out of the area.
SHT-13	Develop an evacuation plan for residents of northern Shelton that can be isolated during flooding	EMD	Drop	This is better evaluated on a case-by-case basis. The City's Code Red system would be used to notify the residents.
SHT-14	Continue to regulate activities within SFHAs to the greatest extent possible with the municipal codes and Zoning and Subdivision Regulations	PZC, B&E	Capability	This is a capability.
SHT-15	Consider requiring new buildings in flood prone areas to be protected to the highest recorded flood level regardless of SFHA status	PZC, B&E	Drop	This would likely be difficult to enact because it vastly exceeds the NFIP standard (BFE) and the State of Connecticut building code standard (BFE+1 foot). Note that the flood damage prevention ordinance for the City is consistent with the NFIP standard but not the current building code standard.
SHT-16	Ensure that new buildings be designed and graded to shunt drainage away from the building	PZC, B&E	Complete	This is provided for in the State Building Code.

Strategy	Description	Responsible Party	Status	Notes
SHT-17	Require developers to demonstrate whether detention or retention of storm water is the best option for reducing peak flows downstream	PZC, B&E	Capability	The zoning regulations require no increase in overland flow of storm drainage as certified by a qualified engineer.
SHT-18	Provide technical assistance to owners of non-residential structures regarding floodproofing measures such as wet and dry floodproofing	EMD, B&E	Capability	This is a capability, as City staff routinely provide examples for property owners of potential mitigation methods.
SHT-19	Pursue elevation of residential structures that suffer flood damage; repetitive loss properties should be prioritized.	EMD, MO	Capability	Several residents of the Maples took advantage of a federal (likely HMA) program to elevate their homes several years ago. As other programs become available, they will be offered to the residents.
SHT-20	Consider enrolling in the Community Rating System	EMD, B&E	Carry Forward with Revision	It would reduce the cost of flood insurance for property owners in Shelton but would require staff time to maintain the program. City staff need time to consider this program in more detail.
SHT-21	Provide outreach regarding structure elevation, flood barriers, dry and wet floodproofing, and other improvement techniques	EMD, B&E	Capability	This is a capability, as City staff routinely provide examples for property owners of potential mitigation methods.
SHT-22	Ensure that EMDs and other personnel attend DEEP and other training workshops such as the FEMA-sponsored training at EMI in Maryland	EMD, B&E	Capability	First responders have attended and continue to attend FEMA classes.
SHT-23	Pursue acquisition/demolition of residential structures that suffer flood damage; RLPs should be prioritized.	EMD, BOS/BOA	Capability	This is likely a capability, as it could be advanced whenever properties become available. No purchases have been made recently, as property owners have historically been more interested in elevations.
SHT-24	Pursue the acquisition of additional municipal open space in SFHAs	MO	Capability	This is likely a capability, as it could be advanced whenever properties become available.
SHT-25	Selectively pursue conservation recommendations listed in the Plan of Conservation and Development and other studies and documents	MO	Capability	The Plan of Conservation and Development was updated in 2016 but is not available online. The City has purchased and accepted donated properties to expand open space areas.

Strategy	Description	Responsible Party	Status	Notes
SHT-26	Continue to regulate development in protected and sensitive areas, including steep slopes, wetlands, and floodplains	PZC	Capability	This is being done.
SHT-27	Develop a hydraulic/hydrologic model of flood prone river systems to prioritize mitigation such as bridge and culvert replacement, property acquisitions, etc.	EMD, PW	Drop	It is unlikely that the City would perform a large-scale model as targeted studies may be more appropriate, and flooding along the Housatonic River is well understood.
SHT-28	Upgrade Walnut Tree Hill culvert to reduce flooding along the Farmill River	PW	Carry Forward	Engineering plans need to be developed. This is a priority project for the City.
SHT-29	Upgrade the Long Hill Avenue stone masonry arch culvert conveying Burying Ground Brook to reduce flooding	PW	Carry Forward	Engineering plans need to be developed. This (and possible daylighting or widening of sections of this brook) are also priority projects.
SHT-30	Upgrade and replace the Brookwood Lane culvert to reduce flooding	PW	Carry Forward	The outlet side was reconstructed. The inlet side needs to be done.
SHT-31	Upgrade and replace the Oak Avenue drainage system to reduce nuisance flooding	PW	Carry Forward	Minor work was done, primarily repairs. Engineering plans need to be developed.
SHT-32	Work with CT DOT to assess and replace culverts along Shelton Avenue (Route 108) conveying Means Brook and Pole Brook if needed	PW, CT DOT	Drop	This is ultimately DOT's jurisdiction. No work has been done.
SHT-33	Continue tree limb inspections and maintenance and outreach to private property owners regarding branches above powerlines	TW	Capability	This is a capability.
SHT-34	Increase funding for the Tree Warden to address a wider range of tree limb hazards than the current budget allows	TW, MO	Carry Forward	There has been a minor increase in the tree budget. More funding will be needed once UI completes its trimming project.
SHT-35	Provide for the Building Department to make literature available during the permitting process regarding appropriate design standards for wind	B&E	Carry Forward with Revision	Nothing is available in the department at this time, but there is interest in providing such materials to permittees. Carried forward as a new general action to provide property protection information.

Strategy	Description	Responsible Party	Status	Notes
SHT-36	Encourage the use of wind-mitigation structural techniques in new structures to protect new buildings to a greater level than the required standard	B&E	Capability	Potential code-plus additions may be considered whenever new City facilities are constructed.
SHT-37	Conduct a study to identify municipal buildings, critical facilities, and commercial/industrial buildings that are vulnerable to roof damage or collapse	PW, B&E	Drop	Clearing is performed on a case-by-case basis.
SHT-38	Develop a plan to prioritize snow removal from the roof of municipal buildings (especially critical facilities) and have funding available for clearing	PW, B&E	Drop	Clearing is performed on a case-by-case basis as a general City capability.
SHT-39	Retrofit or modify critical facilities as needed to strengthen roofs and structures and make them more resilient to snow loading	PW, B&E	Capability	Retrofits are performed on a case-by-case basis as part of other projects.
SHT-40	Consider posting the snow plowing routes in municipal buildings and the municipal web sites	PW	Drop	No need to post routes.
SHT-41	Identify areas that are difficult to access during winter storm events and develop contingency plans	PW	Capability	This is reviewed each year as part of the annual EOP update.
SHT-42	Provide information for mitigating icing, insulating pipes, and retrofits for flat roofed buildings	PW, B&E	Carry Forward	Nothing is available at City hall, but there is interest in providing such materials to the public. Carried forward as a new general action to provide property protection information.
SHT-43	Consider preventing residential development in areas prone to collapse such as below steep slopes, or in areas prone to liquefaction	PZC	Drop	Steep slope areas must be shown on the plans and are omitted from the buildable area of a lot. There is presently nothing in the regs regarding liquefaction. Section 32 of the Zoning regulations requires the commission to prevent the creation of or exacerbation of safety hazards such as unstable slopes.

Strategy	Description	Responsible Party	Status	Notes
SHT-44	Consider restricting construction on 25% slopes* and restricting excavation and clearing above and below such slopes	PZC	Complete	Per Section 5.25 of the Zoning Regulations, steep slope areas (25% or more) are omitted from the buildable area calculation of a lot. These areas are required to be shown on the plans. The regs have requirements for maximum grade of new slopes.
SHT-45	Consider adopting or codifying USDA guidelines to regulate development in areas of steep slopes	PZC	Drop	Section 32 of the Zoning regulations requires the commission to prevent the creation of or exacerbation of safety hazards such as unstable slopes. The USDA guidelines may not be needed.
SHT-46	Consider preserving areas of steep slopes as protected open space through acquisitions or modified zoning	MO	Drop	Modified zoning has not occurred. No open space acquisitions of steep slope areas occurred since 2012. Nothing is projected for the next five years. However, steep slopes are set aside as non-buildable land during the site plan review process as noted above.
SHT-47	Continue to require adherence to the state building codes	B&E	Complete	This is a capability. All new construction must adhere to the State Building Code through the permit process.
SHT-48	Encourage through-streets instead of dead-end streets	PZC	Drop	Section 33.13.10 of the Zoning regulations state that "street planning...should provide for through street connections when necessary for overall City and neighborhood circulation purposes. Section 4.4.9 of the Subdivision regs indicate that "local streets...shall be planned where appropriate for continuation of existing streets in adjoining areas and for projections into adjoining properties when subdivided." A specific strategy is not necessary.
SHT-49	Ensure that utility providers are aware of landslide potentials and have responder teams available to repair damage caused by slides	EMD	Complete	Areas of concern have been discussed with the local utilities.
SHT-50	Make education materials available at Building and Engineering departments regarding identification of landslide risk areas	B&E	Drop	Nothing is available and there is no interest in providing education materials for landslide risk at this time.
SHT-51	Consider expanding and over-sizing drainage systems in the vicinity of steep slopes	PW	Capability	This is a capability, as this can be considered by Public Works whenever a project is designed.

Strategy	Description	Responsible Party	Status	Notes
SHT-52	Encourage property owners to have retaining walls inspected by structural engineers	EMD	Capability	The City can recommend this at any time.
SHT-53	Ensure that municipal departments and critical facilities have adequate backup facilities in case damage occurs	EMD	Carry Forward	While backups are considered during the regular EOP update process, the City wishes to consider this in more detail over the next five years.
SHT-54	Provide support as necessary to Riverdale Apartments on Shelton Avenue to decrease chances of future slides	PW	Complete	No further work needs to be done.
SHT-55	Monitor the slope below North Oak Avenue	PW	Capability	This area is monitored and does not appear to be at risk at this time.
SHT-56	Include dam failure areas in the Reverse 911 and CodeRed emergency contact database	EMD	Complete	The Reverse 9-1-1 system has the capability of targeting phone calls into specific areas.
SHT-57	Work with T. and E. Bombero to develop EOP and maintenance plan for the Far Mill River dam	EMD	Complete	An EAP has been developed and revised in 2019. The owner of the dam is now the Aquarion Water Company. The company meets with the City on an annual basis.
SHT-58	Develop or update the EOP for Shelton Reservoir Dam #2	EMD	Complete	EAP was developed and last updated in 2017.
SHT-59	Continue to support public outreach programs to increase awareness of forest fire danger, equipment usage, and protecting homes from wildfires	FD	Capability	This is a capability.
SHT-60	Ensure that provisions of Subdivision Regulations regarding fire protection facilities are being enforced	PZC	Capability	This is a capability.
SHT-61	Pursue additional sources of fire-fighting water where adequate supplies do not exist	FD, MO	Capability	This is constantly evaluated, and new sources are pursued as the budget allows. No specific projects (other than the looping project on Ripton Road) have been immediately identified for the next five years.
SHT-62	Patrol municipal-owned open space and parks to prevent campfires	FD, PD	Capability	This is a capability.

Strategy	Description	Responsible Party	Status	Notes
SHT-63	Continue to promote inter-municipal cooperation in fire-fighting efforts	FD	Capability	This is done on a daily basis.
SHT-64	Continue to monitor the Nells Rock Road area in Shelton which has a history of fires	FD	Capability	This is a capability.
SHT-65	Enforce regulations and permits for open burning	FD, PD	Capability	This is done on a daily 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 City 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 SHT-01	
Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	
Lead	Plan
Cost	\$0 - \$25,000
Funding	OB, CT DEEP, Sustainable CT
Timeframe	2022
Priority	High

Action SHT-02	
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	EM, Plan, FS
Cost	\$0 - \$25,000
Funding	OB
Timeframe	2022
Priority	High

Action SHT-03	
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	EM, Plan, FS
Cost	\$0 - \$25,000
Funding	OB, CT DEEP
Timeframe	2022
Priority	High

Action SHT-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	Plan, FS, NFIP Coordinator
Cost	\$0 - \$25,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022
Priority	Med

Action SHT-05	
Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	
Lead	Plan, FS, NFIP Coordinator
Cost	\$0 - \$25,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022
Priority	Med

Action SHT-06	
Remain engaged with CIRCA's Resilient Connecticut project and utilize vulnerability mapping tools to help with local planning and project development.	
Lead	Plan
Cost	\$0 - \$25,000
Funding	OB, CT DEEP, Resilient CT
Timeframe	2022
Priority	Med

Action SHT-07	
Remain engaged with FEMA and the State during the Housatonic River Watershed flood map updates. Review draft maps and provide comments to FEMA.	
Lead	Plan, FS, NFIP Coordinator
Cost	\$0 - \$25,000
Funding	OB, FEMA Grant, CT DEEP
Timeframe	2022
Priority	Med

Action SHT-08	
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	EM, FS
Cost	\$0 - \$25,000
Funding	CT DEEP
Timeframe	2022
Priority	Med

Action SHT-09	
Work with CIRCA to develop potential risk reduction pilot projects in the identified "adaptation/resilience opportunity areas" near and in locations of transit-oriented development (TOD).	
Lead	Plan
Cost	\$0 - \$25,000
Funding	OB, CT DEEP, Resilient CT
Timeframe	2022
Priority	Med

Action SHT-10	
Increase funding for the Tree Warden to address a wider range of tree limb hazards than the current budget allows	
Lead	TW, MO
Cost	\$0 - \$25,000
Funding	OB
Timeframe	2022
Priority	Low

Action SHT-11	
Provide information to developers and residents about property mitigation methods including design standards for wind, mitigating icing, insulating pipes, retrofits for flat-roofed buildings to better withstand snow loads, and floodproofing methods. Have information available through the Building Department.	
Lead	PW, B&E
Cost	\$0 - \$25,000
Funding	OB
Timeframe	2022 – 2023
Priority	Low

Action SHT-12	
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	Plan, HC/HDC
Cost	\$0 - \$25,000
Funding	OB, CT SHPO
Timeframe	2022 – 2023
Priority	Low

Action SHT-13	
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	Plan, HC/HDC
Cost	\$0 - \$25,000
Funding	OB, CT SHPO
Timeframe	2022 – 2023
Priority	Low

Action SHT-14	
Assess the increase in municipal administration capacities that would be needed to enroll and maintain participation in the Community Rating System, to determine whether participation would be feasible and cost effective.	
Lead	EMD, B&E
Cost	\$25,000 - \$50,000
Funding	OB, CT DEEP
Timeframe	2022 – 2023
Priority	Med

Action SHT-15	
Conduct a flood study on Burying Ground Brook to identify appropriate stream restoration and flood mitigation actions.	
Lead	DPW, ConCom
Cost	\$50,000 - \$100,000
Funding	OB, CIP, CT DEEP
Timeframe	2022 – 2024
Priority	Low

Action SHT-16	
Ensure that municipal departments and critical facilities have adequate backup facilities in case damage occurs	
Lead	EMD
Cost	\$50,000 - \$100,000
Funding	CIP, FEMA Grant, CT DEMHS
Timeframe	2023 – 2025
Priority	Low

Action SHT-17	
Upgrade and replace the Oak Avenue drainage system to reduce nuisance flooding	
Lead	PW
Cost	More than \$500,000
Funding	OB, CIP, FEMA Grant, CT DEEP
Timeframe	2023 – 2025
Priority	High

Action SHT-18	
Daylight and perform stream restoration on Burying Ground Brook to reduce flood levels that area, based on results of the flood study referenced in action #SHT-15.	
Lead	DPW, ConCom
Cost	\$100,000 - \$500,000
Funding	OB, CIP, CT DEEP
Timeframe	2023 – 2025
Priority	Low

Action SHT-19	
Work with Aquarion Water Company to create a water main loop on Ripton Road that can provide wildfire-fighting water. There are no hydrants in this area at present.	
Lead	FD
Cost	\$100,000 - \$500,000
Funding	CIP, FEMA Grant, FEMA AFG, CT DEEP
Timeframe	2023 – 2025
Priority	Low

Action SHT-20	
Complete design for replacing the culvert on Walnut Tree Hill Road. Design should incorporate the latest Extreme Precipitation figures from the Northeast Regional Climate Center (NRCC).	
Lead	DPW
Cost	More than \$500,000
Funding	OB, CIP, FEMA Grant, CT DEEP
Timeframe	2023 – 2025
Priority	Med

Action SHT-21	
Upgrade Walnut Tree Hill culvert to reduce flooding along the Farmill River	
Lead	PW
Cost	More than \$500,000
Funding	OB, CIP, FEMA Grant, CT DEEP
Timeframe	2023 – 2025
Priority	Med

Action SHT-22	
Upgrade the Long Hill Avenue stone masonry arch culvert conveying Burying Ground Brook to reduce flooding.	
Lead	PW
Cost	More than \$500,000
Funding	OB, CIP, FEMA Grant, CT DEEP
Timeframe	2023 – 2025
Priority	Med

Action SHT-23	
Upgrade and replace the Brookwood Lane culvert to reduce flooding	
Lead	PW
Cost	More than \$500,000
Funding	OB, CIP, FEMA Grant, CT DEEP
Timeframe	2023 – 2025
Priority	Med

Action SHT-24	
Install an emergency generator at City Hall.	
Lead	EM, DPW
Cost	\$100,000 - \$500,000
Funding	CIP, FEMA Grant
Timeframe	2025 – 2027
Priority	Low

Action SHT-25	
Work with the railroad operator and CTDOT to identify a permanent solution to the flooding that occurs at the railroad crossing with Canal Street East. It is often difficult to access the northern section of Canal Street East, including nearly 800 residences in The Avalon Shelton, during flooding that occurs at the railroad crossing. The City has needed to make temporary bridges to access this area in the past.	
Lead	EM
Cost	\$100,000 - \$500,000
Funding	OB, CT DEMHS
Timeframe	2025 – 2027
Priority	Low

Action SHT-26	
Install a larger emergency generator at the Public Works Garage at 41 Myrtle Street capable of powering the entire facility.	
Lead	EM, DPW
Cost	\$100,000 - \$500,000
Funding	CIP, FEMA Grant
Timeframe	2025 – 2027
Priority	Low

Action SHT-27	
Perform upgrades and maintenance on sewer pump stations. In particular, the sewer pump station on Bridgeport Avenue is undersized and needs to run constantly to provide adequate service. The lack of downtime is a concern for maintaining emergency power supply during outages.	
Lead	DPW
Cost	\$100,000 - \$500,000
Funding	CIP, CT DEEP
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	
SHT-01	Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.	Sustainable CT	Plan	\$0 - \$25,000	OB, CT DEEP, Sustainable CT	2022	1	1	1	1	1	1	1	0	0	0	0	0	0	0	9
SHT-02	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	EM, Plan, FS	\$0 - \$25,000	OB	2022	1	1	1	0	1	1	0	0	0	0	0	0	0	0	7
SHT-03	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	EM, Plan, FS	\$0 - \$25,000	OB, CT DEEP	2022	1	1	1	0	1	1	0	0	0	0	0	0	0	0	7
SHT-04	Upgrade and replace the Oak Avenue drainage system to reduce nuisance flooding	Drainage	PW	More than \$500,000	OB, CIP, FEMA Grant, CT DEEP	2023 – 2025	0	1	0	1	1	1	0.5	0	0	0	0	0	0	0	6.5
SHT-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	Plan, FS, NFIP Coordinator	\$0 - \$25,000	OB, FEMA Grant, CT DEEP	2022	1	1	1	0	1	0	1	0	0	0	-1	0	0	0	5
SHT-06	Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.	Flood Regulations	Plan, FS, NFIP Coordinator	\$0 - \$25,000	OB, FEMA Grant, CT DEEP	2022	1	1	1	0	1	0	1	0	0	0	-1	0	0	0	5
SHT-07	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	Plan, FS, NFIP Coordinator	\$0 - \$25,000	OB, FEMA Grant, CT DEEP	2022	1	1	1	0	1	0	1	0	0	0	-1	0	0	0	5
SHT-08	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	EM, FS	\$0 - \$25,000	CT DEEP	2022	1	0	1	0	1	1	1	0	0	0	0	0	0	0	6
SHT-09	Remain engaged with CIRCA’s Resilient Connecticut project and utilize vulnerability mapping tools to help with local planning and project development.	Resilient CT	Plan	\$0 - \$25,000	OB, CT DEEP, Resilient CT	2022	0	1	1	1	1	1	0	0	0	0	0	0	0	0	7
SHT-10	Work with CIRCA to develop potential risk reduction pilot projects in the identified “adaptation/resilience opportunity areas” near and in locations of transit-oriented development (TOD).	Resilient CT	Plan	\$0 - \$25,000	OB, CT DEEP, Resilient CT	2022	0	1	1	1	1	1	0	0	0	0	0	0	0	0	7
SHT-11	Assess the increase in municipal administration capacities that would be needed to enroll and maintain participation in the Community Rating System, to determine whether participation would be feasible and cost effective.	CRS	EMD, B&E	\$25,000 - \$50,000	OB, CT DEEP	2022 – 2023	1	1	0	1	1	1	0	0	0	-1	0	0	0	0	6
SHT-12	Complete design for replacing the culvert on Walnut Tree Hill Road. Design should incorporate the latest Extreme Precipitation figures from the Northeast Regional Climate Center (NRCC).	Culvert & Bridge Upgrades	DPW	More than \$500,000	OB, CIP, FEMA Grant, CT DEEP	2023 – 2025	0	1	0	1	1	1	0.5	0	0	0	0	0	0	0	6.5
SHT-13	Upgrade Walnut Tree Hill culvert to reduce flooding along the Farmill River	Culvert & Bridge Upgrades	PW	More than \$500,000	OB, CIP, FEMA Grant, CT DEEP	2023 – 2025	0	1	0	1	1	1	0.5	0	0	0	0	0	0	0	6.5
SHT-14	Upgrade the Long Hill Avenue stone masonry arch culvert conveying Burying Ground Brook to reduce flooding.	Culvert & Bridge Upgrades	PW	More than \$500,000	OB, CIP, FEMA Grant, CT DEEP	2023 – 2025	0	1	0	1	1	1	0.5	0	0	0	0	0	0	0	6.5
SHT-15	Upgrade and replace the Brookwood Lane culvert to reduce flooding	Culvert & Bridge Upgrades	PW	More than \$500,000	OB, CIP, FEMA Grant, CT DEEP	2023 – 2025	0	1	0	1	1	1	0.5	0	0	0	0	0	0	0	6.5
SHT-16	Increase funding for the Tree Warden to address a wider range of tree limb hazards than the current budget allows	Tree and Debris Management	TW, MO	\$0 - \$25,000	OB	2022	0	0.5	1	1	1	1	1	0	0	0	-1	0	0	0	6
SHT-17	Conduct a flood study on Burying Ground Brook to identify appropriate stream rectoration and flood mitigation actions.	Conservation & Restoration	DPW, ConCom	\$50,000 - \$100,000	OB, CIP, CT DEEP	2022 – 2024	1	1	0	1	1	0	1	0	0	0	0	0	0	0	6
SHT-18	Daylight and perform stream restoration on Burying Ground Brook to reduce flood levels that area, based on results of the flood study referenced in action #SHT-17.	Conservation & Restoration	DPW, ConCom	\$100,000 - \$500,000	OB, CIP, CT DEEP	2023 – 2025	1	1	0	1	1	0	1	0	0	0	0	0	0	0	6
SHT-19	Work with Aquarion Water Company to create a water main loop on Ripton Road that can provide wildfire-fighting water. There are no hydrants in this area at present.	Wildfire Risk Reduction	FD	\$100,000 - \$500,000	CIP, FEMA Grant, FEMA AFG, CT DEEP	2023 – 2025	0	1	0	0	1	1	1	0	0	0	0	0	0	0	6
SHT-20	Provide information to developers and residents about property mitigation methods including design standards for wind, mitigating icing, insulating pipes, retrofits for flat-roofed buildings to better withstand snow loads, and floodproofing methods. Have information available through the Building Department.	Public Education & Engagement	PW, B&E	\$0 - \$25,000	OB	2022 – 2023	1	0.5	0	1	1	1	0	0	0	-1	0	0	0	0	5.5
SHT-21	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	Plan, HC/HDC	\$0 - \$25,000	OB, CT SHPO	2022 – 2023	1	0	1	1	0	1	0	0	0	0	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		
SHT-22	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	Plan, HC/HDC	\$0 - \$25,000	OB, CT SHPO	2022 – 2023	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	5
SHT-23	Ensure that municipal departments and critical facilities have adequate backup facilities in case damage occurs	Critical Facility Protection	EMD	\$50,000 - \$100,000	CIP, FEMA Grant, CT DEMHS	2023 – 2025	0	0.5	1	0	1	1	0	0	0	0	0	0	0	0	0	5
SHT-24	Install an emergency generator at City Hall.	Backup Power	EM, DPW	\$100,000 - \$500,000	CIP, FEMA Grant	2025 – 2027	0.5	0.5	1	1	0	1	0	0	0	0	0	0	0	-1	-1	3.5
SHT-25	Work with the railroad operator and CTDOT to identify a permanent solution to the flooding that occurs at the railroad crossing with Canal Street East. It is often difficult to access the northern section of Canal Street East, including nearly 800 residences in The Avalon Shelton, during flooding that occurs at the railroad crossing. The City has needed to make temporary bridges to access this area in the past.	Evacuation & Access	EM	\$100,000 - \$500,000	OB, CT DEMHS	2025 – 2027	1	0	1	1	1	0	0	0	0	-1	0	0	0	0	0	3.5
SHT-26	Install a larger emergency generator at the Public Works Garage at 41 Myrtle Street capable of powering the entire facility.	Backup Power	EM, DPW	\$100,000 - \$500,000	CIP, FEMA Grant	2025 – 2027	0.5	0.5	1	1	0	1	0	0	0	0	0	0	0	-1	-1	3.5
SHT-27	Perform upgrades and maintenance on sewer pump stations. In particular, the sewer pump station on Bridgeport Avenue is undersized and needs to run constantly to provide adequate service. The lack of downtime is a concern for maintaining emergency power supply during outages.	Utility Resilience	DPW	\$100,000 - \$500,000	CIP, CT DEEP	2025 – 2027	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	3

APPENDIX B

RECORD OF MUNICIPAL ADOPTION

CERTIFICATE OF ADOPTION
SHELTON BOARD OF ALDERMEN

**A RESOLUTION ADOPTING THE NAUGATUCK VALLEY COUNCIL OF GOVERNMENTS
HAZARD MITIGATION PLAN UPDATE, 2021-2026**

WHEREAS, the City of Shelton 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 Shelton Board of Aldermen approved the previous version of the Plan in 2012; and

WHEREAS, the City of Shelton and the Naugatuck Valley 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 Shelton; and

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

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

RESOLVED by the Board of Aldermen:

1. The Plan is hereby adopted as an official plan of the City of Shelton;
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 Aldermen.

Adopted this 10th day of November, 2021 by the Board of Aldermen of Shelton, Connecticut

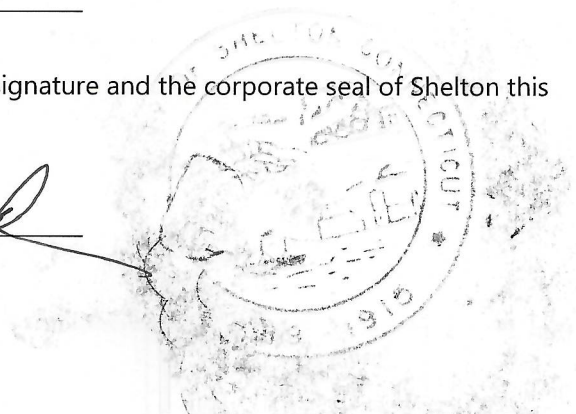


Mark A. Lauretti, Mayor

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of Shelton this 18 day of Nov., 2021.



Margaret R. Domorod, City / Town Clerk



APPENDIX C

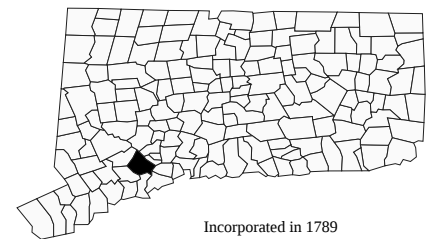
CERC City Profile 2019

Shelton, Connecticut

CERC Town Profile 2019 *Produced by Connecticut Data Collaborative*

City Hall
54 Hill Street
Shelton, CT 06484
(203) 924-1555

Belongs To
Fairfield County
LMA Bridgeport - Stamford
Naugatuck Valley Planning Area



Incorporated in 1789

Demographics

Population

	<i>Town</i>	<i>County</i>	<i>State</i>
2000	38,101	882,567	3,405,565
2010	39,559	916,829	3,574,097
2013-2017	41,282	947,328	3,594,478
2020	38,374	944,692	3,604,591
'17 - '20 Growth / Yr	-2.5%	-0.1%	0.1%

	<i>Town</i>	<i>County</i>	<i>State</i>
Land Area (sq. miles)	31	625	4,842
Pop./Sq. Mile (2013-2017)	1,348	1,516	742
Median Age (2013-2017)	47	40	41
Households (2013-2017)	15,961	337,678	1,361,755
Med. HH Inc. (2013-2017)	\$89,250	\$89,773	\$73,781

	<i>Town</i>	<i>State</i>
Veterans (2013-2017)	2,382	180,111

Age Distribution (2013-2017)

	<i>0-4</i>	<i>5-14</i>	<i>15-24</i>	<i>25-44</i>	<i>45-64</i>	<i>65+</i>	<i>Total</i>
Town	1,554 4%	4,433 11%	5,456 13%	8,071 20%	13,351 32%	8,417 20%	41,282 100%
County	53,055 6%	125,776 13%	126,096 13%	229,587 24%	271,888 29%	140,926 15%	947,328 100%
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)

	<i>Town</i>	<i>County</i>	<i>State</i>
White Non-Hisp	35,884	595,323	2,446,049
Black Non-Hisp	610	98,931	350,820
Asian Non-Hisp	1,508	48,421	154,910
Native American Non-Hisp	7	1,372	5,201
Other/Multi-Race Non-Hisp	511	22,631	84,917
Hispanic or Latino	2,762	180,379	551,916

	<i>Town</i>	<i>County</i>	<i>State</i>
Poverty Rate (2013-2017)	5.3%	8.8%	10.1%

Educational Attainment (2013-2017)

	<i>Town</i>	<i>County</i>	<i>State</i>
High School Graduate	8,628 29%	673,582 27%	
Associates Degree	2,322 8%	188,481 8%	
Bachelors or Higher	11,759 39%	953,199 38%	

Economics

Business Profile (2018)

<i>Sector</i>	<i>Units</i>	<i>Employment</i>
Total - All Industries	1,372	24,534
23 - Construction	97	350
31-33 - Manufacturing	64	4,623
44-45 - Retail Trade	92	1,772
54 - Professional, Scientific, and Technical Services	199	2,328
56 - Administrative and Waste Services	97	3,410
62 - Health Care and Social Assistance	130	3,205
Total Government	19	1,214

Top Five Grand List (2018)

	<i>Amount</i>
Robert Scinto	\$212,843,297
United Illuminating Co	\$71,136,120
Avalon Shelton III LLC	\$30,208,150
Shelton Properties LLC Trustee	\$27,999,620
Aquarian Water Co of CT	\$26,024,450
Net Grand List (SFY 2016-2017)	\$4,578,870,525

Major Employers (2014)

Brennan Realty Llc	BIC Corp
Prudential Financial	Pitney Bowes Inc
Super Stop & Shop	

Education

2018-2019 School Year

	<i>Grades</i>	<i>Enrollment</i>
Shelton School District	PK-12	4713

Smarter Balanced Test Percent Above Goal (2017-2018)

Smarter Balanced Test Percent Above Goal (2017-2018)						
	Grade 3		Grade 4		Grade 8	
	Town	State	Town	State	Town	State
Math	75.1%	53.8%	68.5%	51.3%	63.9%	43.0%
ELA	74.3%	53.1%	74.9%	54.9%	73.4%	56.1%

Pre-K Enrollment (PSIS)

	<i>2018-2019</i>
Shelton School District	63

Rate of Chronic Absenteeism (2017-2018)

	<i>All</i>
Connecticut	10.7%
Shelton School District	10.1%

4-Year Cohort Graduation Rate (2017-2018)

	<i>All</i>	<i>Female</i>	<i>Male</i>
Connecticut	88.3%	91.8%	85.1%
Shelton School District	90.0%	90.6%	89.3%

Public vs Private Enrollment (2013-2017)

	<i>Town</i>	<i>County</i>	<i>State</i>
Public	83.2%	82.2%	86.8%
Private	16.8%	17.8%	13.2%

Shelton, Connecticut

CERC Town Profile 2019



Connecticut
Economic
Resource Center

Government

Government Form: Mayor - Council

Total Revenue (2017)	\$130,937,320	Total Expenditures (2017)	\$133,096,641	Annual Debt Service (2017)	\$11,645,714
Tax Revenue	\$103,100,306	Education	\$84,064,002	As % of Expenditures	8.7%
Non-tax Revenue	\$27,837,014	Other	\$49,032,639	Eq. Net Grand List (2017)	\$6,807,601,488
Intergovernmental	\$23,714,694	Total Indebtedness (2017)	\$38,978,295	Per Capita	\$164,447
Per Capita Tax (2017)	\$2,487	As % of Expenditures	29.3%	As % of State Average	108.9%
As % of State Average	84.8%	Per Capita	\$942	Moody's Bond Rating (2017)	Aa2
		As % of State Average	37.5%	Actual Mill Rate (2017)	22.31
				Equalized Mill Rate (2017)	15.12
				% of Net Grand List Com/Ind (2017)	17.7%

Housing/Real Estate

Housing Stock (2013-2017)

	Town	County	State
Total Units	17,130	369,044	1,507,711
% Single Unit (2013-2017)	67.4%	58.0%	59.2%
New Permits Auth (2017)	65	1,719	4,547
As % Existing Units	0.4%	0.5%	0.3%
Demolitions (2017)	5	538	1,403
Home Sales (2017)	353	5,187	21,880
Median Price	\$341,500	\$417,800	\$270,100
Built Pre-1950 share	15.5%	29.0%	29.3%
Owner Occupied Dwellings	12,867	228,666	906,798
As % Total Dwellings	80.6%	67.7%	66.6%
Subsidized Housing (2018)	503	34,037	167,879

Distribution of House Sales (2017)

	Town	County	State
Less than \$100,000	13	34	536
\$100,000-\$199,999	19	343	5,237
\$200,000-\$299,999	110	749	6,681
\$300,000-\$399,999	123	865	3,863
\$400,000 or More	88	3,196	5,563

Rental (2013-2017)

	Town	County	State
Median Rent	\$1,301	\$1,439	\$1,123
Cost-burdened Renters	44.3%	54.6%	52.3%

Labor Force

	Town	County	State
Residents Employed	21,275	461,750	1,827,070
Residents Unemployed	919	19,017	78,242
Unemployment Rate	4.1%	4.0%	4.1%
Self-Employed Rate	11.8%	13.0%	10.0%
Total Employers	1,372	36,389	122,067
Total Employed	24,534	420,674	1,673,867

Connecticut Commuters (2015)

Commuters Into Town From:		Town Residents Commuting To:	
Shelton, CT	3,326	Shelton, CT	3,326
Bridgeport, CT	2,271	Bridgeport, CT	2,171
Stratford, CT	1,341	Stratford, CT	1,584
Milford, CT	1,160	Fairfield, CT	1,075
Trumbull, CT	870	Milford, CT	974
Ansonia, CT	809	New Haven, CT	904
Seymour, CT	680	Stamford, CT	898

Quality of Life

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

	Town	State
Property	987	1,777
Violent	70	228

Disengaged Youth (2013-2017)

	Town	State
Female	4.9%	4.2%
Male	5.2%	5.6%

	Town
Library circulation per capita	4.26

Distance to Major Cities

	Miles
Hartford	40
New York City	60
Providence	96
Boston	131
Montreal	295

Residential Utilities

Electric Provider	The United Illuminating Co. (800) 257-0141
Gas Provider	Eversource Energy (800) 989-0900
Water Provider	Aquarion Water Company (800) 732-9678
Cable Provider	Comcast Seymour (800) 266-2278