



Participating Jurisdictions:

- Chester
- Clinton
- Cromwell
- Deep River
- Durham
- East Haddam
- East Hampton
- Essex
- Haddam
- Killingworth
- Lyme
- Middlefield
- Middletown
- Old Lyme
- Portland

2021 Lower Connecticut River Valley Hazard Mitigation Plan Update

Volume 2: Municipal Annexes



Lower Connecticut River Valley Council of Governments
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May 2021

With Contracted Support From:





LOWER CONNECTICUT RIVER VALLEY COUNCIL OF GOVERNMENTS
HAZARD MITIGATION PLAN 2021 UPDATE

TOWN OF ESSEX MUNICIPAL ANNEX

TOWN OF ESSEX ANNEX

UPDATED FOR THE 2021 HAZARD MITIGATION PLAN

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1.0 Point of Contact

1.1 Town of Essex

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1.1.1 Essex Local Planning Team

The following representatives listed in Table 1-1 participated in meetings and provided input, data, and council toward the development of Volume 1 and this Essex, Connecticut Annex.

Table 1-1. Essex Planning Team.

Name	Title
John Guskowski	Town Planner
John Planas	Fire Marshal
Lisa Fasulo	Deputy Emergency Management Director/Health Director
Maria Lucarelli*	Assistant to 1st Selectman
Ryan Welch	Public Works Director

**Local Coordinator*

1.2 Lower Connecticut River Valley Council of Governments

Margot Burns – Environmental Planner

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2.0 Jurisdiction Profile

2.1 Town of Essex Profile

The Nehantic Indians were the first people to live in the area now known as Essex, CT. In 1648 an area of the Saybrook Colony called the Potapoug Quarter was laid out, encompassing the modern town of Essex, Deep River, and parts of Winthrop and Chester. A village began to emerge around 1664 but it was not until 1722 that a real town was formed. It was in what was then referred to as Center Saye Brook but is now known as Centerbrook. The area that we refer to as Essex remained the Potapoug Quarter of Saybrook until 1854 when the state legislature split off Essex Village to become the Town of Essex. Centerbrook (including the present day Ivoryton) was added five years later.

As the community grew, a Town Hall, a town pound, and a poorhouse were added. The formation of an iron works, along with a saw mill and gristmill on the Falls River, contributed to the commercial economy of the Village. By the middle of the 18th century, the Town Center began a shift from Centerbrook to Potapoug Point, or modern Essex Village, where shipbuilding was beginning to offer an alternate occupation to farming. By the middle of the 19th century, Essex Village fell into a long period of financial decline as the business shifted to the village of Ivoryton.

Geographically, Essex is the smallest town within the RiverCOG region. It is bordered to the north by Deep River and to the south by Westbrook and Old Saybrook. The total area in Essex is 12.2 square miles of which 10.70 square miles is land area. Approximately 1.5 square miles within the town’s boundaries are occupied by the Connecticut River and its coves. Essex has about three and a half miles of linear shoreline, not including shoreline along the North, Middle and South Coves. The Falls River, Mud River and other smaller streams that drain to the Connecticut River also run through Essex posing a risk for inland flooding during major events. Figure 2-1 shows the location and corporate boundaries of Essex.

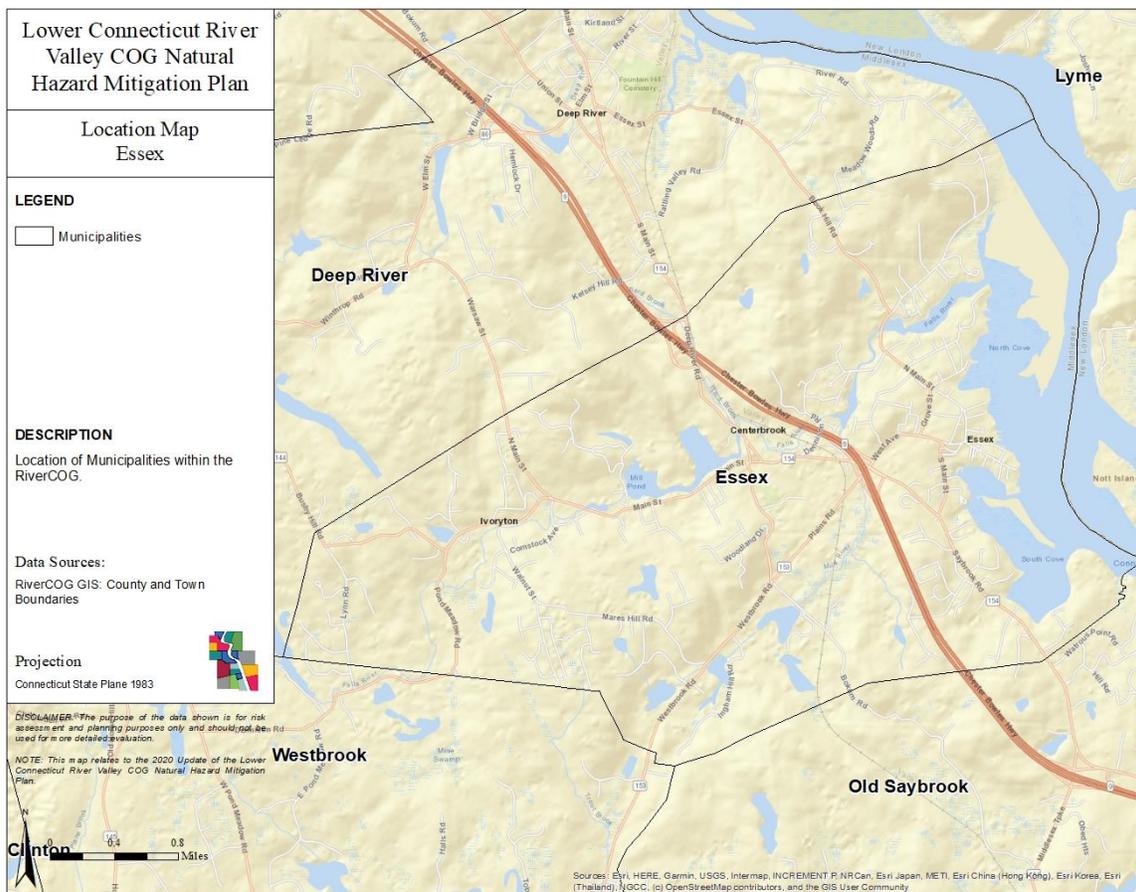


Figure 2-1. Essex Location

Essex is home to many of the major tourist destinations within the RiverCOG Region. These destinations include the Essex Steam Train, the Ivoryton Playhouse, and the Connecticut River Museum. There are also several historic homes and structures throughout the community, including the Griswold Inn, one of the oldest operating inns in the country. The Connecticut River Museum locations makes this site susceptible to large storms, including hurricanes, and has been damaged in the recent past as a result of storms.

Given Essex's topography, location on the Connecticut River and land use patterns, specific areas of the town are most vulnerable to flooding, hurricane, flooding, and high winds.

The town geology is typified by lowland tidal areas along the Connecticut River and rolling hills with ledge outcrops. Elevations range from near sea level at the Connecticut River to approximately 310 feet along the northern boundary of the town. Small areas of artificial fill consisting of sand and gravel are present in the vicinity of Ivoryton, the Valley Railroad, and State Route 9. Areas of glacial till are situated on the north-central shore of Mill Pond and at the eastern end of the town. Also present from the east end of Mill Pond to the eastern extremity of State Route 9 is an area of alluvium.

Essex consists of approximately 8% committed open space, 28% residential land, 1.6% commercial uses, 2.2% industrial use, 2.2% institutional uses, and 6.4% transportation uses. The rest of the Town is uncommitted vacant land. Commercial development is located along Plains Road and Westbrook Road. Industrial uses are located mostly in the Centerbrook area west of Exit 3 off Route 9. Transportation uses include Route 9, and the Valley Railroad property, a State Park leased by the railroad. Essex includes inland wetlands, ponds, lakes, and large tracts of uninterrupted forest. Lands designated as open space are owned by Essex Land Trust and other entities. Figure 2-2 shows land cover classifications in Essex.

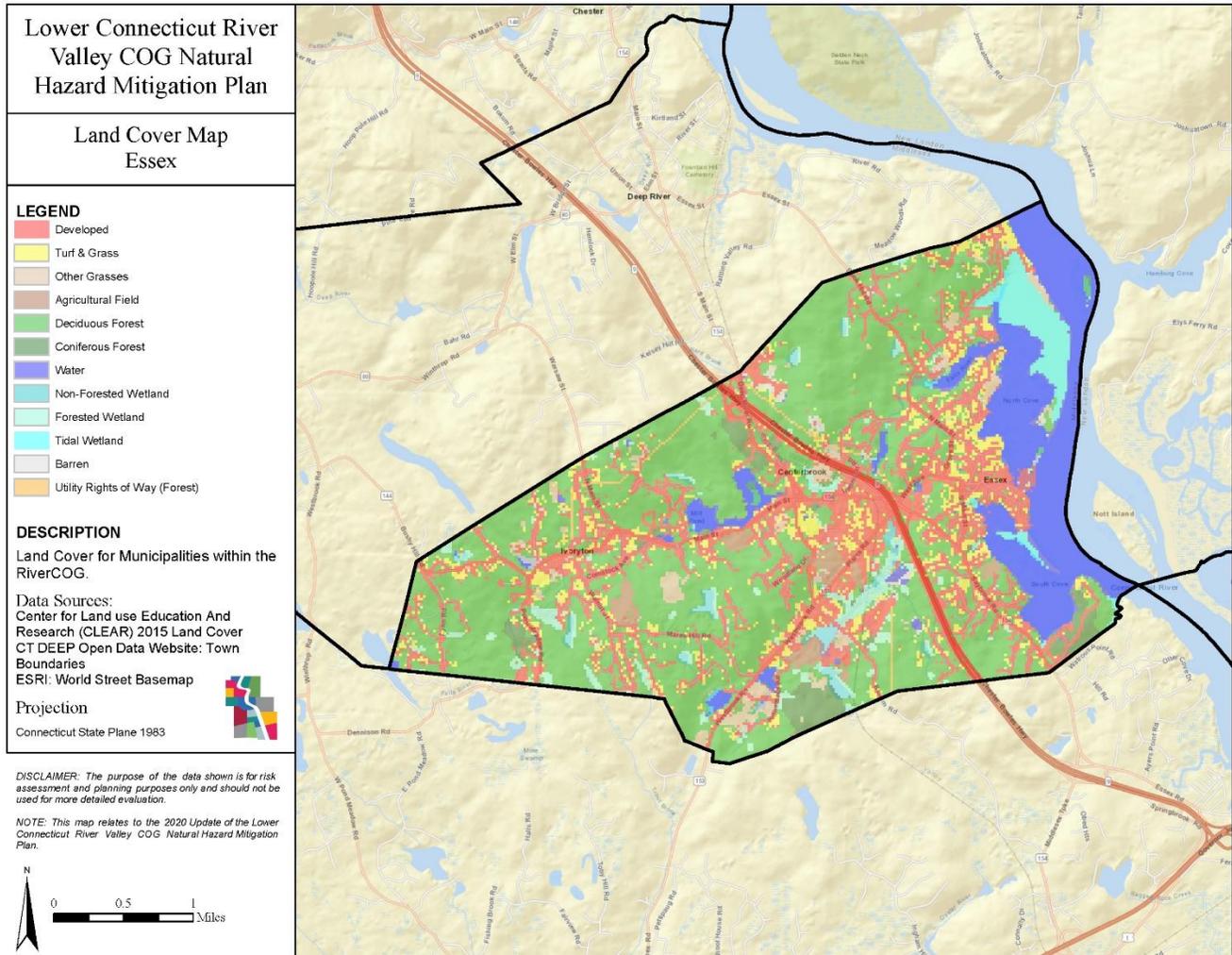


Figure 2-2. Essex Land Cover

day liquid-equivalent snowfall of at least 0.1 inches. The most snow falls during the 31 days centered around January 27, with an average total liquid-equivalent accumulation of 0.7 inches.

The windier part of the year lasts for 6.2 months, from October 13 to April 20, with average wind speeds of more than 7.3 miles per hour. The windiest day of the year is January 30, with an average hourly wind speed of 9.2 miles per hour.

With its dense forest coverage and abundant water features, Essex is slightly more protected from extreme heat than some of its neighbors, but heat waves do occur. Winter storms typically will impact the entire town; however, effects can vary locally depending on weather conditions (e.g. snowfall in higher elevations versus less snow close to the river or in southern parts of town).

2.3 Government Style

Essex has a Selectman-Town Meeting form of government. The First Selectman is the chief elected official and chairman of a three-member Board of Selectmen, who collectively serve as the executive branch. The Town Meeting serves as the Legislative Branch.

2.4 Development Trends

Historically, development has focused on three village centers: Essex Village, Centerbrook, and Ivoryton. The most intensively developed area is east of Route 9, surrounding Essex Village, with residential subdivisions developed over the last 10 years. Commercial uses are located along Plains Road and Westbrook Road, and industrial uses are located mostly in the Centerbrook area west of Exit 3 off Route 9.

Essex has seen somewhat active development over the past five years. Essex Station is a 52-unit apartment complex in three buildings, which was almost fully occupied by 2020. Essex Glen consists of 26 single-family houses off Bokum Road. Spencer Corner is a 17-unit redevelopment.

There is pressure for development along Route 153, Route 154, and Route 9, some of which are intersected by major streams and wetland areas. Careful monitoring of septic systems and existing soil conditions have been a factor in controlling development in these areas. None of these development areas are threatened by floodplain.

2.5 Specific Hazard Concerns

The economic core of Essex is vulnerable to loss of electricity and communication services due to downed utility lines. In general, flooding issues are of highest concern to the Town. There have been notable challenges in the past associated with storm surge, roads overtopping, and tidally influenced flooding, especially along Pratt and Ferry streets. The town is also concerned with wildfires as many historic buildings are closely spaced, in addition to concerns regarding fires being sparked from the Essex Steam Train. The information in the subsections below is intended to supplement the risk assessment in Volume 1, Section 2 of this plan update.

2.5.1 Flooding

Essex lies within the lower Connecticut River valley with about three and a half miles of linear shoreline, not including shoreline along the North, Middle and South Coves. The Falls River, Mud River and other smaller streams that drain to the Connecticut River also run through Essex creating the risk for inland flooding during major events. Flood hazard zones in town mostly follow the Falls and Mud Rivers.

Tidally influenced flooding occurs in Essex in low-lying areas along the Connecticut River. Pratt Street and Ferry Street are flooded monthly during astronomical high tides. Main Street can temporarily be made bi-directional as needed to detour people from Pratt Street. Other roads subject to nuisance flooding, as well as to more significant river flooding, include portions of River Road during high tides with storm surge, and Ivory Street during heavy rains.

Bridges of interest with regard to flood risk include Pond Meadow Bridge, Old Deep River Bridge, Dennison Road Bridge, and River Road Bridge. Old Deep River Road and River Road are local pinch points during storm events and have bridges over the Falls River that may have some risk from flooding or washout.

Extensive commercial and residential development exists in close proximity to the Falls River and the Connecticut River. The densest development lies in and around the three village centers, all located near ponds and streams.

In some cases, flooding events are exacerbated by inadequate storm water management infrastructure. During times of high tides and annual spring flooding resulting from snow melt, storm water drainage can back up and cause flooding associated with restriction points.

Beaver dams also present a problem in some areas.

2.5.2 Sea Level Rise and Shoreline Change

Rising sea levels have not been identified as a significant issue in Essex at this time; elevations near the Connecticut River tend to be relatively high, so rising seas are not expected to significantly increase flood risk. Shoreline change is a concern at the ends of Rackett Lane and Benson Lane.

2.5.3 Dam Breach

In the town of Essex, the Connecticut Department of Energy and Environmental Protection (DEEP) has fifteen dams in its inventory. Five are classified as Hazard Type A (low hazard), six as AA (negligible hazard), three as Type BB (moderate hazard), and one as Type C (high hazard). All the dams are privately owned. Figure 2-4 shows the location of dams with available GIS point locations. Table 2-1 lists the moderate to high hazard dams contained in DEEP's registry. A full list of dams in Essex is included in Appendix B.

Lower Connecticut River Valley COG Natural Hazard Mitigation Plan

Dam Location Map Essex

LEGEND

Dams Hazard Class

-  Unclassified
-  AA
-  A
-  BB
-  B
-  C

DESCRIPTION

Location of Dams in Municipalities within the RiverCOG.

Data Sources:

CT DEEP GIS Open Data Website:
Dams 10/28/2019
Town Boundaries
ESRI: World Topographic Map Basemap

Projection

Connecticut State Plane 1983



DISCLAIMER: The purpose of the data shown is for risk assessment and planning purposes only and should not be used for more detailed evaluation.

NOTE: This map relates to the 2020 Update of the Lower Connecticut River Valley COG Natural Hazard Mitigation Plan.



0 0.5 1 Miles

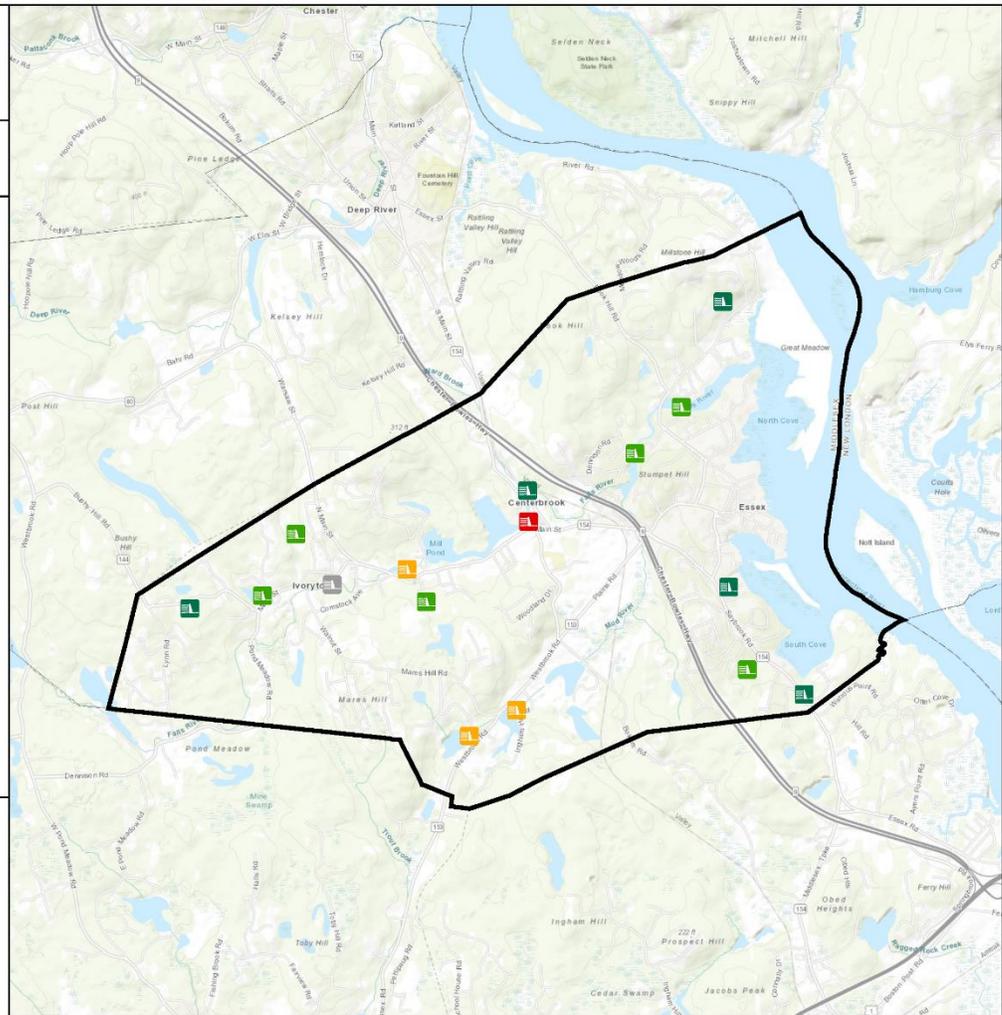


Figure 2-4. Location of Dams in Essex

Table 2-1. Moderate to High Hazard Dams in Essex

CT Dam #	Dam Name	Hazard Class	Owner	Watercourse
5002	MILL POND DAM	C	MAINSTREAM, INC.	FALLS RIVER
5004	BIRCH MILL POND	BB	SOUTHWINDS ASSOC INC.	TIFFANY BROOK
5005	TIFFANY POND	BB	SOUTHWINDS ASSOC INC.	TIFFANY BROOK
5008	IVORYTON POND DAM	BB	RECENTLY CHANGED OWNERSHIP – NOT IN RECORD	NOT LISTED

In 1982, Essex was severely affected by flooding. The town suffered dramatic flooding with the failure of the Bushy Hill Dam in Deep River which collapsed and sent a wall of water crashing down the Falls River. This caused or contributed to the failure of several other dams downstream and devastated areas of Ivoryton and Centerbrook. Although some of these have been removed while others have been repaired, the threat of Dam Failure is still

present. Old dams, some dating to the 1700's can become overburdened during flooding events and heavy rainstorms. The dams, if not maintained properly could collapse under the stress of more water than normal.

2.5.4 Drought and Wildfires

The western part of Essex does not have a public water distribution system. Many of the wells in this area are reportedly sub-standard and more than 1,000 feet deep in bedrock. The Town is concerned about the impacts that a drought would have in this area.

Essex is very concerned about the risk of wildfires spreading to structures, as the Town includes some closely spaced older buildings with significant vegetation on the properties. The Essex Steam Train occasionally causes small fires along the tracks. When the train sparks a fire, the train must be stopped; however, if the train is stopped for an excessive amount of time, the risk of explosion of the steam engine increases.

Architect Hill is an area of 10-15 houses where the public water system does not provide adequate pressure for firefighting, and the grade on the road is too steep for fire trucks. The Town and residents have discussed possible solutions but have not yet arrived at a consensus.

Other areas of concern for wildfire include the deciduous forest located in the northern areas of town or areas of Phragmites along the river. Drought also can exacerbate potential for small wildfires and hinder the ability of the town to control outbreaks.

2.5.5 Winter Weather

Winter storms typically will impact the entire town; however, effects can vary locally depending on weather conditions (e.g. snowfall in higher elevations versus less snow close to the river or in southern parts of town). Many water complaints are received from residents with regards to locations where water seepage leads to icy conditions throughout the winter season. Two to three inches of ice buildup are known to occur in some areas. A few roads need drainage improvements to reduce these ice conditions. Winter storms are likely to occur in Essex. They have caused significant damage and are second only to hurricanes in terms of the potential damage they can cause in Essex.

2.5.6 Hurricanes, and Tropical Storms

Because of the frequency of hurricanes and their potential severity, they are the natural disaster likely to cause the greatest damage. The greatest damage from hurricanes has been caused by trees and wires being downed due to high winds.

The Town is concerned about the risk of loss of access during storms to neighborhoods including the Cedar Grove Terrace, Cedar Grove Extension, and Hunters Trail neighborhood, and the Woodland Drive neighborhood. In the past, fallen trees have blocked access in and out of those areas.

2.5.7 Tornado and Microbursts

Historically there have been tornados and microburst wind events in other parts of the state. Thus, these events should not be dismissed entirely. Severe thunderstorms have been known to occur and spawn small tornados. Damage from sheer downburst winds has been suspected as another source of damage in the state.

Overall, residents throughout Essex are equally susceptible to the chance of a tornado occurrence. However, a strong tornado would likely cause more damage in the more densely developed Essex Center area. High wind can lead to extended power outages when downed trees and telephone poles caused power outages of more than a week in Essex.

2.5.8 Earthquake

The entire town could be affected by an earthquake in this region; however, impacts could vary locally. The most severe earthquake in Connecticut's history occurred at East Haddam on May 16, 1791. A Magnitude 4.0

earthquake in southern Connecticut occurred on November 3, 1968. It cracked plaster in Madison, furniture shifted in Deep River, and small items fell and broke. As recently as March 23, 2011 the village of Moodus in East Haddam, just north of Deep River experienced a 1.3 on the Richter scale tremor.

In Essex and the surrounding region, recorded impacts have been limited to shaking to the extent that things were knocked off shelves and people were alarmed. Structural damage has been limited to building components such as chimneys and buildings in poor repair; but failing structures have caused property damage in nearby towns.

3.0 Hazard Risk

3.1 Historical Events

Table 3-1 lists the Presidentially declared major disasters for Middlesex County, for which Essex requested assistance. Preliminary Damage Assessment figures are based on Public Assistance applications.

Table 3-1. Presidentially Declared Disasters since 2011.

Type of Event	Date	Preliminary Damage Assessment
Flood Event (DR-4087)	10/30/2012	\$28,025
Hurricane Event (DR-4023)	09/02/2011	\$111,195
Hurricane Event (DR-4087)	10/30/2012	\$79,695
Winter Weather Event (DR-4106)	03/21/2013	\$49,075
Wind Event (DR-4410)	12/05/2018	\$5,000

3.2 Recent Events

The most recent flood event of note occurred in September 2018 during a flood event that affected most of Connecticut from the Fairfield area east-northeastward to the Lebanon area. During this event, flooding was mostly confined to floodplains and wetlands. Washouts and infrastructure failures were not experienced, although water was observed over roads. The Town did not have to submit public assistance PA reimbursement requests in either 2015 or 2018.

Total PA reimbursements to the community (1998-2019) were as follows:

- Flood Events: \$133,035 (\$6,335 annually)
- Hurricane (Wind) Events: \$253,926 (\$9,378 annually)
- Winter (Snow) Storm Events: \$46,058 (\$2,193 annually)

Public Assistance for events between 2011 and the present are presented in Table 3-2 (flood), Table 3-3 (wind) and Table 3-4 (winter weather).

Table 3-2. Flood Event PA Reimbursements, Essex.

Incident	Oct-Nov 2012
Declaration	10/30/2012
Disaster No.	4087
Entity	FEMA PA Reimbursement
State	\$
Municipal	\$
Nonprofit	\$
Total	\$28,025
Annualized	\$1,335

Table 3-3. Hurricane Wind Event PA Reimbursements, Essex.

Incident	Aug-Sep 2011 (T.S. Irene)	Oct-Nov 2012 (SuperStorm Sandy)
Declaration	9/2/2011	10/30/2012
Disaster #	4023	4087
Entity	FEMA PA Reimbursement	
State	\$	\$
Municipal	\$	\$
Nonprofit	\$	\$
Total	\$111,195	\$79,695
Annualized	\$5,295	\$3,795

Table 3-4. Winter Storm PA Reimbursements, Essex.

Incident	Feb 2013
Declaration	3/21/13
Disaster #	4106
Entity	FEMA PA Reimbursement
State	\$
Municipal	\$
Nonprofit	\$
Total	\$49,075
Annualized	\$2,337

3.3 Hazard Risk Ranking

Essex participated in the regional hazard ranking conducted by the Hazard Mitigation Planning Team. Table 3-5 shows the scoring for the various ranking parameters that were used. The probability of each hazard is determined by assigning a level, from unlikely to highly likely, based on the likelihood of occurrence from historical data. The total impact value includes the affected area, primary impact, and secondary impact levels of each hazard. Each level's score is reflected in the matrix. The total score for each hazard is the probability score multiplied by its importance factor times the sum of the impact level scores multiplied by their importance factors. Based on this total score, the hazards are separated into three categories based on the hazard level they pose to the communities: Significant, Moderate, Limited.

Table 3-5. Hazard Rankings.

Probability	Importance	2.0
<i>Based on estimated likelihood of occurrence from historical data</i>		<u>Score</u>
Unlikely (Less than 1% probability in next 100 years or has a recurrence interval of greater than every 100 years.)		1
Somewhat Likely (Between 1 and 10% probability in next year or has a recurrence interval of 11 to 100 years.)		2
Likely (Between 10 and 100% probability in next year or has a recurrence interval of 10 years or less.)		3
Highly Likely (Near 100% probability in next year or happens every year.)		4

Affected Area	Importance	0.8
<i>Based on size of geographical area of community affected by hazard</i>		<u>Score</u>
Isolated		1
Small		2
Medium		3
Large		4

Primary Impact	Importance	0.7
<i>Based on percentage of damage to typical facility in community</i>		<u>Score</u>
Negligible - less than 10% damage		1
Limited - between 10% and 25% damage		2
Critical - between 25% and 50% damage		3
Catastrophic - more than 50% damage		4

Secondary Impacts	Importance	0.5
<i>Based on estimated secondary impacts to community at large considering economic impacts, health impacts, and crop losses</i>		<u>Score</u>
Negligible - no loss of function, downtime, and/or evacuations		1
Limited - minimal loss of function, downtime, and/or evacuations		2
Moderate - some loss of function, downtime, and/or evacuations		3
High - major loss of function, downtime, and/or evacuations		4

Survey Score	Importance	1.0
Survey Score = (Survey Rating / 3) x 10 where:		
Survey Rating is the average rating of concern based on a scale of 1 (low concern) to 3 (high concern) compiled from the survey responses.		

Total Score = (Probability x Impact) + Survey Score, where:
Probability = (Probability Score x Importance)
Impact = (Affected Area + Primary Impact + Secondary Impacts), where:
Affected Area = Affected Area Score x Importance
Primary Impact = Primary Impact Score x Importance
Secondary Impacts = Secondary Impacts Score x Importance

Hazard Planning Consideration	Total Score Range
Limited	0 - 26
Moderate	26.1 - 50
Significant	50.1 - 74

3.4 Potential Impacts of Hazards

Table 3-6 shows the results of the regional hazard ranking. Essex endorsed the ranking as accurate for the Town.

Table 3-6. Summary of Potential Hazard Impacts.

Hazard Type and Methodology		Probability	Impact			Survey Rating	Survey Score	Total Score	Hazard Planning Consideration
			Affected Area	Primary Impact	Secondary Impacts				
Winter Storms (Snow, Ice, Wind, including Noreasters)	Historic analysis for probability and annualized damages	4	4	1	3	3	10	50.80	Significant
Flood (Riverine, Drainage, Coastal Surge, Sea Level Rise - includes flooding from Noreasters)	Hazus, SLR Overlay, FS Model Overlay, Historic data and damages for additional probability	3	3	2	3	3	10	43.60	Significant
Severe Weather (thunderstorms, downbursts, hail, lightening)		4	2	1	2	2	7	33.87	Significant
Extreme Heat and Cold	Qualitative based on historic	3	4	1	1	1	3	25.53	Limited
Hurricanes	Hazus for wind	2	4	3	3	2	7	35.07	Significant
Tornadoes	Historic analysis for probability and annualized damages - pulling in surrounding counties	2	1	4	2	2	7	30.27	Moderate
Earthquakes	Hazus, 3 scenarios	1	4	4	4	1	3	20.93	Limited
Drought	Historic analysis for probability and annualized damages - some qualitative	2	3	1	1	1	3	18.13	Limited
Wildfire	Historic analysis for probability and annualized damages	2	2	1	1	1	3	14.13	Limited

Hazard Type and Methodology		Probability	Impact			Survey Rating	Survey Score	Total Score	Hazard Planning Consideration
			Affected Area	Primary Impact	Secondary Impacts				
Tree Infestation - in "Other Hazards Category"	Research based, mostly qualitative, supplemented by municipal figures, recommend survey for further analysis	3	3	1	2	3	10	38.40	Significant
Aquatic Invasive Species - in "Other Hazards Category"	Mostly qualitative	3	2	1	1	1	3	26.73	Limited

3.5 National Flood Insurance Program (NFIP) Participation

Essex began participating in the NFIP in 1973 and entered the regular phase of the program in 1980. There are a total of 79 policies in effect covering approximately \$24 million in property. Total claims paid have been approximately \$1.1 million.

3.5.1 Repetitive Loss Property Detail

There are five (5) repetitive loss (RL) properties, two commercial and three residential. Two are in flood zones along inland streams and three are in the flood zone along the Connecticut River. A propane tank placed on blocks has been observed at one of the non-residential RLPs. For these five properties, there have been a total of 18 claims filed for payments totaling \$167,414. There are currently no severe repetitive loss (SRL) properties in Essex.

4.0 Capability Assessment

This section discusses capabilities and operational procedures that Essex undertakes that contribute to or have the potential to contribute to hazard mitigation. It also notes deficiencies in those capabilities that could be addressed to strengthen resilience.

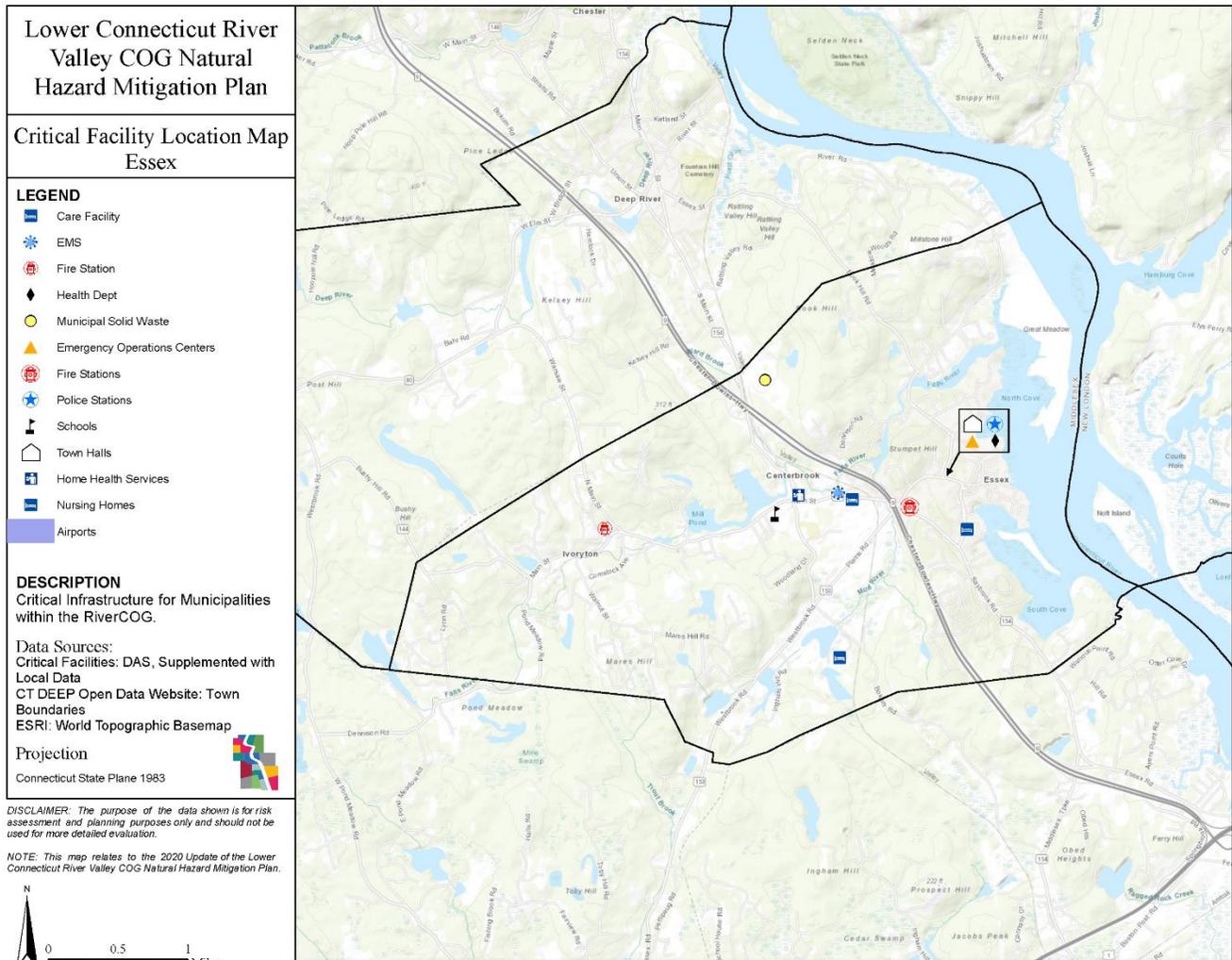
4.1 Critical Facilities

The Town’s police station and Emergency Operations Center (EOC) are both located at the Essex Town Hall, at 29 West Avenue, outside of mapped flood hazard zones. Since the previous update of this HMP, the EOC has been relocated from lower levels to the second floor, making it more resilient to potential flooding. There are two Fire Stations in Essex: one is located just south of the Route 154/153/9 intersection, the other is located at 12 Summit Street in the Ivoryton Village. The Essex Ambulance Association provides ambulance services to Essex and is located at the intersection of Route 154 and Dennison Road, in the Centerbrook section of town. The Essex Public Works facility and equipment storage is located on Dump Road, near Route 154 and Exit 4 off from Route 9. All these facilities are outside of flood hazard areas.

The emergency shelter for Essex is the John Winthrop Middle School in Deep River. It serves Chester and Deep River as well. The shelter does not accommodate pets but can provide food, a place to sleep and shower as well as charging of personal electronic devices. The shelter is accessed by a road with high tree coverage and that crosses a reportedly problematic culvert. Maintaining access to the shelter by repairing and upgrading culverts, and by trimming trees and branches, is critical. This is a state road. Sheltering capacity, access, and pet sheltering capabilities need to be addressed.

Essex also uses many of its public buildings during minor natural hazard events, such as cooling centers during heat waves.

The Middlesex Hospital’s Shoreline Clinic, a stand-alone emergency room previously located in Essex, was relocated to Westbrook in 2014. While Middlesex Health facilities remain in Essex, none offer emergency services. Figure 4-1 shows the location of critical facilities identified by the state and supplemented with local data from the RiverGOG flood susceptibility modeling project. Table 4-1 lists the facilities considered critical by the Town of Essex.



*The following facilities listed by the town as critical are not included on the Map. John Winthrop Middle School is in Deep River. The four gas stations were not included in available GIS data

Figure 4-1. Location of Critical Facilities in Essex

Table 4-1. Critical Facilities.

Facility	Type	Address	FEMA Flood Zone	Generator	Notes
Essex Town Hall	Municipal Emergency Operations Center	29 West Ave	None		Can be used to support displaced individuals during a disaster, but does not meet sheltering requirements
Resident State Troopers Office	Emergency Response	29 West Ave	None		
Essex Fire Department	Emergency Response	12 Saybrook Rd	None		
Essex Fire Engine Co. #1 – Ivoryton Station	Emergency Response	11 Summit St, Ivoryton	None		
Essex Ambulance Association	Emergency Response	149 Dennison Rd	None		
John Winthrop Middle School*	Shelter (Regional)	1 John Winthrop Rd, Deep River	None		Culvert near facility is reportedly in need of attention, may affect access.
Public Works Facility & Transfer Station	Municipal	5 Dump Rd	None	Yes	Generator is old; a new portable generator is desired. Fuel stored at facility.
Essex Elementary School	Municipal	108 Main Street	500-YEAR, 0.2% Annual Chance, on property and touches building		
Essex Public Library**	Municipal	33 West Ave	None		
Essex Meadows	Senior Living	30 Bokum Rd	None	Yes	Generator to be replaced in 2020
Essex Village at South Cove	Senior Living	59 S Main St	None		
Essex Place Centerbrook	Senior Living	26 Main Street Centerbrook	None	Yes	
Essex Housing Authority	Low Income Housing	16 Main St, Centerbrook	None		

Facility	Type	Address	FEMA Flood Zone	Generator	Notes
Gas Station 1**	Critical Utility	82 Main St, Centerbrook	None		
Gas Station 2**	Critical Utility	55 Main St, Centerbrook	None		
Gas Station 3**	Critical Utility	23 Main St, Centerbrook	None		
Gas Station 4**	Critical Utility	1 Saybrook Rd	None		

*Not included in on mapping-located in Deep River. **Not included in available GIS datasets – not on map in Figure 4-1.

Fuel to power vehicles and generators during and following disaster events is stored at the Public Works Facility; however, the Town wants to increase the amount of fuel available. This may be accomplished by increasing long term storage or arranging for emergency supplies to be placed on standby prior to forecast storms.

Essex Meadows is a large over 55 residential community in the southern end of town located off Bokum Road; the generator at this site will be replaced in 2020. Essex Village at South Cove is both a retirement community and an assisted living facility located just off Route 154 in the Centerbrook section, near Route 9. Essex Place Centerbrook is a 220-unit senior housing facility located adjacent to Essex Court; this facility has a generator, and residents are expected to shelter in place during a disaster.

Public and private utility facilities, which are vital to maintaining or restoring normal services to areas of town before, during, and after a natural disaster, were not inventoried extensively. Public and private utility facilities are subject to the same loss of power, potable water, communications, and accessibility as is the community they serve. Sanitary sewer service is provided throughout the town by the Essex WPCA. Public water systems located in the town are owned and operated by Connecticut Water Company and small community system providers. Electricity is provided by Eversource.

Structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic, or water-reactive materials may exist primarily in the Light Industrial District along Route 153, Industrial Park Road and Westbrook Road. These areas are mostly outside of the 100-year floodplain. Gas stations in Essex are located along Route 154 and Route 153; none are equipped with back-up generators. Cumberland Farms station has a quick connection for a portable generator.

4.2 Municipal Capabilities

The Town of Essex has a variety of natural hazard mitigation capabilities, including local regulations and ordinances, operational protocols, and emergency response capabilities. Following is a list of some highlighted capabilities identified by municipal staff.

4.2.1 Regulations and Ordinances

Essex implements State Building and Fire Codes and local Flood Codes through its municipal code and zoning regulations to enforce construction standards that minimize risks due to natural hazards. Flood-proof construction standards for roads and structures within the flood plain are strictly enforced. All new development must be designed to minimize runoff.

Essex participates in the National Flood Insurance Program (NFIP) and is committed to continuing NFIP compliance and standards. The most recent FEMA Flood Insurance Study for the community, which identifies Special Flood Hazard Areas (SFHA), is dated February 6, 2013. Within the Essex Zoning and Subdivision Regulations and the

Building Code, there are standards and criteria designed to meet NFIP requirements that govern the location and elevation of structures, construction methods, and the placement or removal of fill. For construction within the special flood hazard areas, the Zoning Enforcement Officer, Building Official and Town Engineer review and issue a flood permit and conduct follow-up inspections to confirm compliance with the permit. The Flood Plain District regulations also apply to substantial improvements to existing structures located in SFHAs. Substantial improvements are defined as “any combination of... improvements to a structure taking place within a five-year period, in which the cumulative cost equals or exceeds 50% of the market value of the structure.”

Section 103 of the Essex Zoning Regulations defines the Flood Plain District and lists requirements for anyone building or doing any construction activities within the management area.

The Subdivision Regulations state that the Planning Commission may order for the Fire Department and Fire Marshall to inspect any subdivision. When deemed necessary, storage tanks must be capable of holding at least 30,000 gallons of water. The applicant shall be required to demonstrate that such water supply meets or exceeds the minimum requirements as set forth in National Fire Protection Association (NFPA) Standard 1141 (Standards for Fire Protection in Planned Building Groups) and National Fire Protection Association (NFPA) Standard 1231 (Water Supplies For Suburban and Rural Firefighting).

4.2.2 Operations and Procedures

Complaints from members of the public about flooding are directed to the Selectman’s Office and then Public Works; the Town notes that very few complaints about flooding are received.

The Public Works department cleans all catch basins yearly, or more if needed. The Department also has an inventory of all catch basins, detention areas and other storm water infrastructure throughout town. Essex uses best management practices (BMPs) as described in the Connecticut DEEP Storm water Management Guidelines on a site-by-site basis as advised by a professional engineer.

While there are some roads in town that flood during storm events, the Town has procedures in place to allow these roads to flood and then return to normal conditions without causing excessive disruption.

The Town is generally supportive of acquisition of properties to reduce hazard risk or increase open space, and a procedure for acquisition is in place. Acquisition of floodprone properties is a priority, and in recent years the Town attempted to acquire one such property, though the buyout ultimately was unsuccessful due to eligibility issues.

Essex has a tree warden, a forestry truck, and a budget for tree maintenance. The tree warden works with Eversource’s local contact. Eversource reportedly focuses attention on the town and trims areas along utilities. Many ash trees have been taken down in recent years. Town staff report that its tree maintenance capabilities are robust. Additionally, utilities are installed underground for most new developments.

The Town handles most winter plowing in-house, although it also subcontracts work as needed. If more than 10 inches of snow have accumulated, the Town will remove snow from Main Street to facilitate parking. The Town also attempts to clear sidewalks. Essex uses treated salt, which is less corrosive than standard road treatment salt, and which helps reduce icing by leaving a residue that can be functional during the next storm.

Essex has access to dry hydrants and other water sources for fighting wildfires. Underground cisterns are sometimes required for new development but are not always available. The Town has mutual aid agreements with neighboring communities for use of water tankers. The Land Trust owns the largest tracts of forest in Essex and maintains its own management plan.

4.2.3 Emergency Response Capabilities

Essex has in place a program to evacuate residents without means of transport or with mobility challenges. The Town Health Department maintains a registry of these individuals, and an evacuation registry process is posted on the Town website (<https://www.essexct.gov/emergency-management>).

Essex has an annually reviewed Emergency Operations Plan, and a contingency fund of \$75,000 to help with immediate disaster recovery costs.

In anticipation of severe winter storms, the Town has the authority to order parking bans and can order evacuations in extreme situations if there is a significant threat of localized flooding. The Department of Public Works maintains a fleet of trucks and other snow removal equipment and monitors weather forecasts during the winter months to mobilize in advance of storms.

The Towns Emergency Management Director has the authority to establish a designated cooling center for those living without air conditioning should the need arise. These places provide a place for people to escape the heat as well as providing water. Table 4-2,

Table 4-3, and Table 4-4 provide an overview of legal, regulatory, administrative, technical and financial capabilities in Essex that can contribute to a mitigation program.

Table 4-2. Legal and Regulatory Capability.

	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
Codes, Ordinances & Requirements					
Building Code	Yes	Yes	No	Yes	All municipalities enforce the State Building Code
Zoning Code	Yes	No	No	No	
Subdivisions	Yes	No	No	No	
Post Disaster Recovery	Yes	No	No	No	
Real Estate Disclosure	Yes	No	No	Yes	State requirement
Growth Management	No	No	No	No	
Site Plan Review	Yes	No	No	No	
Special Purpose (flood management, critical areas)	Yes	Yes	No	Yes	State flood management Statutes and regulations
Planning Documents					
General Plan	Yes	No	No	Yes	POCD required every ten years
Floodplain or Basin Plan	No	No	No	No	
Stormwater Plan	Yes	No	No	Yes	MS4 Community
Capital Improvement Plan	Yes	No	No	No	
Habitat Conservation Plan	No	No	No	No	

	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
Economic Development Plan	Yes	No	No	No	GrowSmart (2016) Regional Plan
Emergency Response Plan	Yes	No	No	Yes	LEOP templates provided by DEMHS
Shoreline Management Plan	No	No	No	No	
Post Disaster Recovery Plan	Yes	No	No	Yes	LEOP templates provided by DEMHS

Table 4-3. Administrative and Technical Capability.

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Planning & Zoning
Engineers or professionals trained in building or infrastructure construction practices	Yes	Building Official, Town Engineer (on-call), Public Works Director
Planners or engineers with an understanding of natural hazards	Yes	Town Planner, Town Engineer (on-call)
Staff with training in benefit/cost analysis	No	
Floodplain manager	Yes	Zoning/Wetlands Official
Surveyors	No	Contracted as needed.
Personnel skilled or trained in GIS applications	Yes	Supported by RiverCOG
Emergency manager	Yes	Emergency Management
Grant writers	Yes	Municipal Staff

Table 4-4. Financial Resources.

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	Yes

Financial Resources	Accessible or Eligible to Use?
Withhold Public Expenditures in Hazard-Prone Areas	Yes (State)
State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	No
Other	NA

4.2.4 Capital Improvements

Essex has a Capital Improvement Plan, and consistently directs funding to replacement and upgrades of culverts and bridges. The Town plans to continue to fund bridge replacements over the next 20 years. The Town has successfully bonded bridge work in the past. The Town is proactive in seeking and applying for grants to fund infrastructure improvements and mitigation measures. When roads are reconstructed, the Town attempts to install adequate drainage systems.

4.2.5 Outreach, Education, Communication, and Warnings

The Town has implemented the “Safer Essex Emergency Alert Program,” powered by Everbridge, for public alerts and other mass communications. The system is tested regularly. Literature from FEMA and other organizations about natural disasters and hazard mitigation is displayed in the Town Hall and Library. The Town website has a page dedicated to emergency management.

4.2.6 New Capabilities and Completed Actions

The town notes the following new capabilities of actions completed since the 2014 plan update:

- Beaver Deceivers have been deployed in Essex Meadows, off Bokum Road. These have been somewhat successful at limiting beaver activities and mitigating the flood risks they can cause.
- A number of bridges and culverts have been replaced or upgraded.
 - The Falls River bridges have been replaced in the past 5-6 years; in one case, culvert pipes were converted to a single span bridge.
 - On Ivory Street, two culverts were replaced with higher-quality box culverts.
- The Town is obtaining a new fire boat.
- The Fire Department recently installed a new dry hydrant.
- A large fire prevention event was held on February 5, 2020, which included some information about other hazards. This was a pilot program; Essex will review the event and may decide to make it a regular occurrence.
- Essex has been certified under the Sustainable CT program. A local Sustainable Essex Committee has been formed to implement local environmental sustainability efforts.
- A regional school disaster recovery plan was developed with the three towns that are part of the regional school district.

5.0 Hazard Mitigation Action Plan

This section presents the progress made on the 2014 action plan and establishes new goals, objectives and actions identified for the 2020-2025 planning horizon.

5.1 Previous Mitigation Action Disposition

During the process of developing the 2014 Essex Hazard Mitigation Plan, several hazard mitigation actions were identified to be pursued during the five-year planning horizon that followed. Table 5-1 presents the actions listed in that document, and the status of those actions.

Table 5-1. Status of Previous Mitigation Strategies and Actions.

ACTION	Description	Status	Details
LOCAL PLANS AND REGULATIONS			
Amend Flood Ordinance	Consider adding a “freeboard” – an additional height above the flood level – to add a greater margin of safety. In the case of nonresidential structures, the insurance rates do not go down until a structure is flood proofed at least one (1) foot above the BFE.	Carry Forward with Revisions	The Town is currently in the process of overhauling the Zoning Regulations. This action is dropped and replaced with a new action related to that overhaul. (#12, Table 5-3)
Benefit-Cost Analysis	Evaluate opportunities for public funding of mitigation projects on private property where public benefits exceed the cost for RL properties or for properties otherwise eligible for buy- out.	Carry Forward with Revisions	The Town is generally supportive of acquisitions; it previously attempted an acquisition of a commercial property on Main Street, but it was not eligible. This action is replaced with a new action focused on RL properties. (#13, Table 5-3)
Best Management Practices	Continue to use best management practices (BMPs) as described in the Connecticut DEEP Storm water Management Guidelines on a site-by-site basic as advised by a professional engineer.	Capability	This is an existing capability and the action can be retired.
Business Recovery Plan	Develop business recovery plan cooperatively with other region towns and distribute to town businesses.	Drop	This is not considered a priority at this time and is removed from the action list.
Capital Improvement Program	Use Capital Improvement Program (CIP) to set aside funds for infrastructure improvements to reduce loss of life and property during natural hazard (NH) events.	Capability	This is a capability.
Conservation Planning	Educate the public about how the town uses planning, regulation, and ordinances to mitigate NHs via LID, aquifer recharge, riparian buffer, rain gardens, open burning ordinances, house numbering, etc.	Capability	Some of this is accomplished with the Town web site, social media, and e-newsletters. This type of education falls under the purview of the Sustainable Essex Committee, which is responsible for local implementation of the Sustainable CT program. Action does not need to be continued within this plan.
Design Standards	Continue to implement State Building/Fire Code and local Flood Code for construction that minimizes loss of life and property damage due to NHs.	Capability	This is a capability.
Immobile Evacuees	Review annually the program to evacuate persons without means of transport, including registration and house numbering.	Capability	The Town Health Department maintains a list of such individuals. An evacuation registry process is posted on the Town website.
Flood Zone Study	Update flood zone study for the town to incorporate changed conditions upland and within the floodplain.	Drop	The Town provided information to FEMA about new Falls River bridges so they could be incorporated into future modeling. This action is a FEMA responsibility and does not fall within municipal capabilities.

ACTION	Description	Status	Details
Forest Management Plan	Hire a consulting forester to establish a forest management plan to enable ability of firefighters to access forest fires during periods of drought.	Capability	The Land Trust owns the largest tracts of forest in Essex and maintains its own management plan. This can be considered a capability, and an action is not needed.
Grants	Identify and apply for grants to fund infrastructure improvements and other mitigation tasks identified in this plan.	Capability	The Town is proactive in seeking grants. This is a capability.
Land Use Regulation	Strengthen as appropriate, subdivision and zoning regulations to make safer new roads and lots within flood zones.	Carry Forward with Revisions	The Town is currently in the process of overhauling the Zoning Regulations. This action is dropped and replaced with a new action related to that overhaul. (#12, Table 5-3)
Landlord Incentives	Research what kind of incentives would motivate landowners to make the additional investment that would reduce potential damages to their properties and loss of life of their tenants.	Drop	The largest landlords in Essex are not located in areas of risk. Essex Meadows is addressing beaver dam problems independently. The Town has been proactive in working with three-family homeowners to address hazard risks. This action is not necessary.
Local Social Resources	Identify local resources to assist with those populations (i.e. elderly, disabled, non-English speakers, who may frequent, reside, or work) in Essex. Seek grants to provide funding for developing more detailed data to assist in the social – demographic analysis of how Essex will be affected by natural hazards.	Completed	This action has been completed.
Minimal runoff from development	Require all new development to be built using techniques to minimize run-off.	Completed	This action has been completed.
Owner Participation	Promote owner participation in mitigation efforts to protect their own properties.	Drop	This action is dropped and replaced with a new action about education and outreach.
Possible Open Space Criteria	The Town Commissions should consider making possible inundation by Storm Surge to its considerations for preserving open space.	Capability	This is already a factor of consideration.
Post Disaster School Arrangements	Establish reciprocal arrangements with other school districts for getting students back into classes during extended recovery periods.	Completed	A school disaster recovery plan was developed for all three towns in the regional district.
Potential Financial Impact of Probable Events	Estimate the municipal tax revenue that could potentially be lost in various events to provide the Board of Selectmen and Board of Finance with an idea of how large a “rainy day” fund might be necessary to cover that post disaster period when there would be minimal income and maximum output of public funds at all levels of government.	Drop	The Town has a contingency fund of \$75,000. The Town does not feel that a larger fund is feasible at this time.
Private Property Funds	Evaluate opportunities for public funding for projects on private property where the benefits exceed the costs.	Drop	This action is not considered necessary.
Public Transit Funding	Support regional transportation system (RTD) to facilitate movement of people without means of transportation prior to NH events.	Completed	This action has been completed.

ACTION	Description	Status	Details
Recovery & Reconstruction Plan	Develop a post-disaster recovery and reconstruction plan to re-establish infrastructure and public services, etc. damaged or destroyed by any NH event, including establishment of a "rainy day" fund in case Federal assistance is insufficient or delayed.	Completed	Essex has a local Emergency Operations Plan and a contingency of \$75,000 to handle events.
Regulations	Strengthen existing subdivision regulations to either optimally prevent road or house construction within the floodplain, or alternatively raise structures above BFE.	Completed	This action has been completed.
Zoning Map Audit	The town should conduct a comprehensive audit of the zoning map to considering what changes might be advisable so that the free market investing is not misguided back towards areas that are at high risk from natural disasters.	Carry Forward with Revisions	The Town is currently in the process of overhauling the Zoning Regulations. This action is dropped and replaced with a new action related to that overhaul. (#12, Table 5-3)
Structure and Infrastructure Projects			
Construction Standards	Ensure that flood proof construction standards for roads and structures within the flood plain are strictly enforced.	Capability	This is a capability. State Building Code is used for buildings. For roads, the Town works to add drainage when roads are reconstructed. In general, roads in Essex are floodable (they can be overtopped and then drain and are back to normal).
Critical Facilities	Upgrade as necessary all facility mechanicals, such as generators, in municipal and other critical facilities.	Carry Forward with Revisions	DPW has an older generator that is rarely used. The Town is interested in acquiring a portable generator. (#7, Table 5-3)
Data for Plans	Use GIS database to develop better mitigation plans.	Capability	This is a capability.
Dry Hydrants	Continue to require dry hydrants or fire ponds in new developments where water supply is inadequate.	Capability	This is a capability. The Fire Department recently installed a new dry hydrant.
Electronic Records Preservation	Design databases for records keeping. Create a back-up of existing electronic records, including geographic information system (GIS) data.	Carry Forward	The Town is in the process of creating electronic backups of essential data. Carry forward to completion.
Engineering Reports	Implement strategic enforcement actions to include engineering reports for structural expansion or alterations on properties within the 1% annual chance flood zone.	Capability	This is a capability. Enforcement is completed in coordination with the Building Official.
Firefighting Infrastructure Analysis	Evaluate existing firefighting infrastructure to identify needs for improvement to cover gaps in availability.	Capability	Evaluation is completed regularly, and upgrades made as needed.
Geographic Information System	Annually review and update as necessary existing town GIS data.	Capability	The Town has contracted a third party to manage its GIS, including making regular reviews and updates.
GIS Database	Establish a comprehensive GIS database to better identify and assess areas, structures and populations potentially affected by natural disasters. These data will provide the town with information necessary to assess natural hazard risks and develop plans to mitigate risks to people and property.	Capability	The Town has contracted a third party to manage its GIS.

ACTION	Description	Status	Details
Municipal Buildings Capable of being Shelters	Future investment in municipal structures should include funding for new construction or renovation that will assure the structure is compliant with the standards for use as a shelter, to the extent possible.	Carry Forward with Revisions	Improvements to local sheltering capabilities is still desired by the Town. This action is replaced with a broader action. (#5, Table 5-3)
Oblique Imagery	Over the next five (5) years obtain oblique imagery in order to allow for assessment of such factors as extent of fire damage, compliance with building standards, identification of shoreline hardening and shoreline erosion and accretion.	Drop	This action is expected to be filled by regional, state, or national aerial imagery initiatives, and so is not necessary for Essex to pursue. Remove.
Paper Records Preservation	Convert all paper records maintained by the municipality to an electronic format, consistent with any State recommendations, to ensure their survival. Establish protocols for practices going-forward.	Carry Forward with Revisions	The Town is in the process of creating electronic backups of essential data. Carry forward to completion. Add to Electronic Records strategy. (#14, Table 5-3)
Pet Sheltering	Participate in regional program for sheltering pets during hazard events.	Drop	Essex will participate in any regional action regarding pet sheltering. A separate action addressing pet sheltering for Essex is included below. Remove.
Promote Self Inspection	Develop a list of techniques for homeowner self-inspection especially for those located in coastal areas.	Drop	Action is dropped and replaced with a new public education action.
Public Works Garage & Transfer Station Generator	Install a generator for back-up power.	Drop	DPW has an aged generator currently installed and is interesting in acquiring a portable generator. That action exists separately, so this action can be dropped.
Risk Reduction	Develop a strategy and funding program to elevate or relocate structures of flood-prone properties or acquire RL properties that request a "buy-out".	Drop	Action is dropped and replaced with a new public education action.
RL and SRL Properties	Encourage property owners of repetitive loss properties to obtain assistance for hazard mitigation funding from DEEP/FEMA for elevation of structures and repairs where applicable.	Carry Forward with Revisions	The Town is generally supportive of acquisitions. This action is replaced with a new action focused on RL properties. (#13, Table 5-3)
Road Evaluation	Evaluate to develop plans and improve for emergency access and evacuation.	Drop	This action is dropped and replaced by a number of more specific actions below.
Road Reconstruction	Develop a priority list for road and bridge reconstruction and elevation for routes which experience frequent flooding or are integral to evacuation such as Pratt Street, Falls River Drive, and others.	Drop	Pratt Street and Ferry Street are examples of roads that experience tidally influenced flooding. The Town is able to handle these disruptions. Additionally, roads that are flooded by rivers and streams are able to be opened soon after flooding. New actions addressing specific roads of concern have been added to the 2020-2025 actions table.
Storm water Infrastructure Inventory	Implement mapping and monitoring of catch basins, storm water outfalls and related infrastructure.	Capability	Mapping of outfalls and catch basins is completed; Public Works is implementing monitoring schedule.
Storm water Infrastructure Maintenance	Provide for annual maintenance of storm water infrastructure, including detention basins.	Capability	This is an ongoing capability and will be removed as a specific action.

ACTION	Description	Status	Details
Structural Reports	Continue to require structural engineering reports for expansion or alteration of buildings within the flood zones. Evaluate benefits of requiring structural engineering reports for expansion or alteration of buildings within other zones.	Capability	This is an ongoing capability and will be removed as a specific action.
Telecommunication Tower Generators (Private)	Evaluate whether generators are needed for back-up power at telecommunications facilities.	Drop	Town has not identified this action as a priority and will allow the telecommunication providers to install back-up power as needed.
Underground Utilities	Require underground utilities for new development; require retrofitting during redevelopment of existing sites to bury utilities where appropriate to mitigate NHs.	Capability	New development or redevelopment plans are reviewed to determine whether utility burial is necessary and feasible. This is an existing capability and will be removed as an action.
Natural Systems Protection			
Assist Property Owners with Buyouts	Develop strategy and program for flood prone property owners who request a buyout.	Carry Forward with Revisions	The Town is generally supportive of acquisitions. This action is replaced with a new action focused on RL properties. (#13, Table 5-3)
Below Base Flood Elevation Funding	Encourage property owners whose homes are below BFE to obtain assistance from DEEP and FEMA to acquire hazard mitigation funds to elevate structures where appropriate.	Drop	Action is dropped and replaced with a new public education action.
Boats	Identify places where people could store their boats during flooding and hurricane events that would reduce the damage to them and that they cause to the waterfront infrastructure when they break from moorings. Contact boat marinas to ascertain how many boats might need to be removed from docks and moorings.	Carry Forward	Harbor Management Commission and Harbor Master coordinates with marinas and owners on removal plans (#16, Table 5-3)
Dam Inventory	Update inventory of dams and assess downstream risks due to catastrophic failure. Include State, town, and Privately owned dams.	Carry Forward with Revisions	Six private dams are located in Essex and they have not all been addressed. Action is replaced with one that addresses Emergency Action Plans for Class B and C dams. (#11, Table 5-3)
Drought Study	Conduct town-wide study of ground- and surface water capacity as it relates to planning for droughts.	Drop	Other actions addressing drought and water supply have been added to the action list, below.
Fire Warning	During vulnerable periods, a system of warnings about campfires and open fires should be posted in public locations	Capability	This is a capability
FIRMs	Work with Federal Emergency Management Agency (FEMA) to incorporate updated Flood Insurance Rate Maps (FIRMs) into town's planning, outreach, and mitigation actions.	Drop	Action is dropped and replaced with a new public education action.
Flood Enforcement	Enforce through existing zoning, building and flood permitting processes, construction standards to minimize flood risks.	Capability	This is an existing capability and the action can be retired.

ACTION	Description	Status	Details
Land Acquisition	Advance an assertive land acquisition plan to reserve vacant land subject to NHs.	Drop	Essex supports land acquisition. Most vacant land in town is owned by the Land Trust. This action is not necessary.
Park Maintainer	Fund a dedicated Park Maintainer to act as steward of public open spaces, including parks, forests, drainage basins, conservation easements, coastal access points, and forests, and to mitigate NHs at town-owned properties.	Drop	The Land Trust owns the largest tracts of forest in Essex and maintains its own management plan. This action is not necessary.
Risk Assessment	Use GIS to conduct NH risk assessments that identify potentially affected areas and depicts evacuation routes.	Capability	This is a capability
Storm water Management	Continue to use best management practices (BMPs) as described in the Connecticut DEEP Storm water Management Guidelines on a site-by-site basis as advised by a professional engineer.	Capability	This is an existing capability and the action can be retired.
Water Conservation	Recommendations for future land use patterns including recharge into existing aquifers, including site design to encourage water conservation through such techniques as: strict regulation of vegetative buffers for stream and river corridors, rain gardens for site drainage, and prohibition of wetlands alteration.	Capability	Zoning and Subdivision Regulations require Low Impact Development for ground water recharge on new developments. Sustainable CT Committee doing outreach to existing property owners on rain gardens and conservation techniques
Tree Hazard Management Program	Implement a tree hazard management program to encourage appropriate planting practices to minimize future storm damage to buildings, utilities, and streets.	Capability	Tree Warden manages necessary tree planting plans and removals in coordination with Public Works and Utility Companies
Education and Awareness Programs			
Circulate Existing Literature	Access existing literature prepared by regional groups and the chamber of commerce and FEMA and display for public distribution in the town Hall and Library.	Capability	This is an ongoing capability
Drought Education	Coordinate with Connecticut Water Company on public education and public service announcements during droughts.	Capability	This is an existing capability and the action can be retired.
Educate About Risk Where People Live	Educate residents at high risk due to demographic or social attributes about the risk(s) present in the areas that they live.	Drop	Action is dropped and replaced with a new public education action.
Hotline	Publicize emergency "hotline" phone number or website for public information and volunteer support.	Drop	Action is dropped and replaced with a new public education action.
Incident Notification System	Enlist public participation through public workshops to develop methods for notification of hazard events and emergencies.	Drop	Action is dropped and replaced with a new public education action.
Information	Publish materials on additional hazards and encourage additional insurance.	Drop	Action is dropped and replaced with a new public education action.
Interpretation in Shelters	Request information regarding the need for providing non-English language speakers during natural disasters from the District 4 School administration; and coordinate a shared service for non-emergency and emergency operations.	Drop	Action is dropped and replaced with a new public education action.

ACTION	Description	Status	Details
Natural Hazard Training	Continue to train and educate emergency responders about mitigating NHs.	Capability	This is an existing capability and the action can be retired.
Outreach	Promote owner participation in mitigation efforts to protect their property.	Drop	Action is dropped and replaced with a new public education action.
Pet Sheltering	Distribute hurricane preparedness information including pet sheltering plans.	Drop	This action is dropped while regional pet sheltering capabilities are pursued.
Preparedness Webpage	Create a page on the town website with NH preparedness information, including hazard areas, evacuation routes deemed appropriate per NH event and locations of shelters.	Completed	This is complete; https://www.essexct.gov/emergency-management . See also the guidebook at https://www.essexct.gov/sites/essexct/files/file/emergency_planning_guidebook.pdf
Proactive Pamphlets	Provide pamphlets and refer to web-based information for property owners for hazards listed in this document to show options for obtaining additional insurance, structural alterations to protect against various hazard damage, and emergency procedures for families during a hazard. Include information for contractors and homeowners on the risks of building in hazard prone areas.	Drop	Action is dropped and replaced with a new public education action.
Public Participation	Enlist public participation through public workshops/surveys to develop methods for notification of emergencies.	Capability	On February 5, 2020, the Town held a large fire prevention educational event that included some hazard information. This is a pilot program and will become regularly scheduled if successful. Essex also has a "Community Day" that is an annual event and includes some fire prevention.
Recovery Webpage	Post on town website information about recovery assistance following NH events.	Completed	This is complete; https://www.essexct.gov/emergency-management . See also the guidebook at https://www.essexct.gov/sites/essexct/files/file/emergency_planning_guidebook.pdf
Reverse 911	Consider establishing reverse 911 alert system or similar alert system.	Completed	This is complete (the "SaferEssex Emergency Alert Program" powered by Everbridge)
Schools	Visit schools and educate children about the risks of floods, hurricanes, and other natural hazards and how to prepare for them.	Capability	This is an existing capability and the action can be retired.
Social – Demographic Impacts	Seek grants to provide funding for developing more detailed data to assist in the social – demographic analysis of how Essex will be affected by natural hazards.	Capability	This is conducted as part of the hazard mitigation planning process and does not need to remain as an action.
Tenant Notification	Develop a mechanism for tenants to register for disaster notification.	Drop	Action is dropped and replaced with a new public education action.

ACTION	Description	Status	Details
Webpage	Update town webpage with the section on Hazard Preparedness for the public. Include maps of evacuation route, storm surge areas, and shelters. Include options for mitigation for residential structures and business recovery and provide links to FEMA, NOAA, State OEM and RiverCOG websites for additional information.	Completed	This is complete; https://www.essexct.gov/emergency-management . See also the guidebook at https://www.essexct.gov/sites/essexct/files/file/emergency_planning_guidebook.pdf
Wildfire Education	Educate the public about potential hazard of wildfire caused by campfires or open burning.	Capability	On February 5, 2020, the Town held a large fire prevention educational event that included some hazard information. This is a pilot program and will become regularly scheduled if successful. Essex also has a "Community Day" that is an annual event and includes some fire prevention.

5.2 Updated Mitigation Goals, Objectives and Actions

As noted in Section 3 of Volume 1, all the RiverCOG participating communities, including Essex, participated in setting regional goals and objectives. Essex has endorsed the goals and objectives as valid for the Town's annex. The three goals and objectives are as follows:

Goal 1: Promote implementation of sound flood management and other natural hazard mitigation principals on a regional and local level. Note: Covers future development through policy, planning, regulation, emergency services, and environmental strategies.

- **Objective for Goal 1:** To promote the development, improvement and implementation of programs, policies, regulations and emergency services that result in the reduction of long-term risks to life and property.

Goal 2: Implementation of effective natural hazard mitigation projects at the regional and local level regional and local level. Note: Covers infrastructure and building related projects – the existing built environment.

- **Objective for Goal 2:** To enhance the ability of RiverCOG, other regional entities, and local communities to reduce or eliminate risks to life and property from natural hazards through cost-effective hazard mitigation projects, including avoidance.

Goal 3: Increase research, planning and outreach activities for the mitigation of natural hazards on a regional and local level. Note: Covers the people component of mitigation via outreach and education, and integration with other planning and continuous improvement through increase research.

- **Objective for Goal 3:** To increase general awareness of the region's natural hazards and encourage State agencies, local communities, and the public to be proactive in taking actions to reduce long-term risk to life and property.

5.2.1 Prioritization of Mitigation Strategies

In considering which projects, processes, and other measures to undertake in the upcoming plan period, municipal and regional officials evaluated the need to address problems and vulnerabilities in their communities against the communities' resources and capabilities. To prioritize mitigation strategies, a set of criteria commonly used by public administration officials and planners was applied to each proposed strategy. The method, called STAPLEE, is outlined in FEMA planning documents such as Developing the Mitigation Plan (FEMA 386-3) and Using Benefit-Cost Review in Mitigation Planning (FEMA 386-5). STAPLEE stands for the "Social, Technical, Administrative, Political, Legal, Economic, and Environmental" criteria for making planning decisions. Benefit-cost review was emphasized in the prioritization process. Criteria were divided into potential benefits (pros) and potential costs (cons) for each mitigation strategy. The following questions were asked about the proposed mitigation strategies:

Social:

- **Benefits:** Is the proposed strategy socially acceptable to the community?
- **Costs:** Are there any equity issues involved that would mean that one segment of the community could be treated unfairly? Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower-income people? Is the action compatible with present and future community values?

Technical:

- **Benefits:** Will the proposed strategy work? Will it reduce losses in the long term with minimal secondary impacts?

- **Costs:** Is the action technically feasible? Will it create more problems than it will solve? Does it solve the problem or only a symptom?

Administrative:

- **Benefits:** Does the project make it easier for the community to administrate future mitigation or emergency response actions?
- **Costs:** Does the community have the capability (staff, technical experts, and/or funding) to implement the action, or can it be readily obtained? Can the community perform the necessary maintenance? Can the project be accomplished in a timely manner?

Political:

- **Benefits:** Is the strategy politically beneficial? Is there public support both to implement and maintain the project? Is there a local champion willing to see the project to completion? Can the mitigation objectives be accomplished at the lowest cost to the community (grants, etc.)?
- **Costs:** Have political leaders participated in the planning process? Do project stakeholders support the project enough to ensure success? Have the stakeholders been offered the opportunity to participate in the planning process?

Legal:

- **Benefits:** Is there a technical, scientific, or legal basis for the mitigation action? Are the proper laws, ordinances, and resolutions in place to implement the action?
- **Costs:** Does the community have the authority to implement the proposed action? Are there any potential legal consequences? Will the community be liable for the actions or support of actions or for lack of action? Is the action likely to be challenged by stakeholders who may be negatively affected?

Economic:

- **Benefits:** Are there currently sources of funds that can be used to implement the action? What benefits will the action provide? Does the action contribute to community goals such as capital improvements or economic development?
- **Costs:** Does the cost seem reasonable for the size of the problem and the likely benefits? What burden will be placed on the tax base or local economy to implement this action? What proposed actions should be considered but be tabled for implementation until outside sources of funding are available?

Each proposed mitigation strategy presented in this plan was evaluated and quantitatively assigned a "benefit" score and a "cost" score for each of the seven STAPLEE criteria as outlined below:

- For potential benefits, a score of "1" was assigned if the project will have a beneficial effect for that criterion or a "0" if the project would have a negligible effect or if the questions were not applicable to the strategy.
- For potential costs, a score of "-1" was assigned if the project would have an unfavorable impact for that criterion or a "0" if the project would have a negligible impact or if the questions were not applicable to the strategy.
- Technical and Economic criteria were double weighted (multiplied by two) in the final sum of scores.
- The total benefit score and cost score for each mitigation strategy was summed to determine each strategy's final STAPLEE score.

Although a community may implement recommendations as prioritized by the STAPLEE method, an additional consideration is important for those recommendations that may be funded under the FEMA mitigation grant programs. To receive federal funding, the mitigation action must have a benefit-cost ratio (BCR) that exceeds a

value of 1.0. Calculation of the BCR is conducted using FEMA's Benefit Cost Analysis (BCA) toolkit. The calculation method may be complex and vary with the mitigation action of interest. Calculations are dependent on detailed information such as property value appraisals, design and construction costs for structural projects, and tabulations of previous damages or NFIP claims. The BCR scoring system used is outlined Table 5-2.

Table 5-2. BCR Scoring System

Scoring	Benefits	Costs
Low: 0-1 points	Few would benefit; the impacts being addressed are not severe; benefits may be short term	Likely to be done by existing personnel with little impact on budget; not complicated to accomplish. Costs to implement is likely to be under \$10,000.
Medium: 2-3 points	Benefits may be felt by many in the community; the action may solve a problem or otherwise benefit the community for several years	May need additional funding or studies; may require change in practices; costs to implement may be between \$10,000 and \$100,000
High: 4-5 points	Benefits would accrue to many in the community; benefits may accrue to the most vulnerable or those not able to recover on their own; benefits would be long term and may permanently protect from damages	Likely to cost over \$100,000 and require obtaining funding outside of operating budget; complicated, lengthy process to implement

The STAPLEE method accounts for cost-benefit considerations both directly (through the "Economic" category) and indirectly (through general consideration of costs and benefits of actions). Additionally, the range of estimated costs of each strategy are included in the STAPLEE table. The assumed costs of projects and generalized presentation of the benefits accruing from them are not based on specific detailed cost estimates as that level of analysis is not appropriate for this type of planning effort. For some projects, such as routine or recurring operations that are established practices and conducted with municipal general operating funds and existing staff, the STAPLEE results can be the only explicit comparison of costs and benefits. For projects for which bonding and/or grant funding will be sought, more in-depth evaluations of costs and benefits will be required. As project scopes are detailed, benefits and costs can be identified with more precision, and the benefit-cost ratio which results from a full benefit-cost analysis may differ from the planning-level STAPLEE results presented here.

It should be noted that higher BCRs do not necessarily correspond to high priorities, nor do low BCRs or BCRs under 1.0 correspond to low-priority projects. An important project with a high priority to the community may have a lower BCR because of its complexity, assumed high expense, and other costs. Communities should not be discouraged or deterred from further consideration of projects that have low BCRs or BCRs less than 1.0 until additional, more specific evaluations of the costs and benefits have been undertaken.

5.2.2 2020-2025 Prioritized Hazard Mitigation Actions

In addition to the regional mitigation actions endorsed by Essex and outlined in Section 3 of Volume 1 of the regional plan, the Town identified or carried over from the last update, ranked and evaluated the actions in Table 5-3. For each identified action, the goal and objective it addresses is noted. Additionally, a description, lead agency, indication of costs and potential funding sources an estimated timeline for completion is included. Also included are the hazards addressed by a specific action.

KEY: SW= Severe Weather, TW = Tornado/Wind, ET = Extreme Temperatures, WS=Winter Storm, F = Flood, TI = Tree Damage and Invasive Species, WF = Wild Fire, D = Drought, E = Earthquake, CC = Climate Change

Table 5-3. Essex Hazard Mitigation Strategies and Prioritization.

Activity #	Goal/Objective	Activity Description	Lead Agency	Est. Cost*	Potential Funding Sources	Timeframe for Completion	Hazard (s) Addressed	Weighted STAPLEE Criteria														Total STAPLEE Score/Priority	
								Social Benefit	Social Cost	Technical Benefit	Technical Cost	Administrative Benefit	Administrative Cost	Political Benefit	Political Cost	Legal Benefit	Legal Cost	Economic Benefit	Economic Cost	Environmental Benefit	Environmental Cost		
1	2-1	Create a secondary, emergency access route from Route 9 to the Cedar Grove Terrace, Cedar Grove Extension, and Hunters Trail neighborhood.	P&Z	\$50,000-\$100,000	OB, Grant	7/2023-6/2024	SW, TW, WS, F	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	5/H
2	2-1	Create a secondary, emergency access route to Woodland Drive	P&Z	\$50,000-\$100,000	OB, Grant	7/2023-6/2024	SW, TW, WS, F	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	5/H
3	2-1	Collaborate with residents of Architect Hill to identify an acceptable method of improving the neighborhood's supply of firefighting water (such as installation of underground water tanks). Implement the identified solution.	FD, EM	\$10,000-\$20,000	OB	7/2021-6/2022	WF, D	1	0	1	1	0	0	1	0	0	0	1	0	1	0	8/H	

Activity #	Goal/Objective	Activity Description	Lead Agency	Est. Cost*	Potential Funding Sources	Timeframe for Completion	Hazard (s) Addressed	Weighted STAPLEE Criteria														Total STAPLEE Score/Priority
								Social Benefit	Social Cost	Technical Benefit	Technical Cost	Administrative Benefit	Administrative Cost	Political Benefit	Political Cost	Legal Benefit	Legal Cost	Economic Benefit	Economic Cost	Environmental Benefit	Environmental Cost	
4	1-1	Develop a technical assistance and incentive program to help Essex residents with private drinking water wells improve the quality and reliability of those wells, especially under drought conditions.	DPW	\$1,000-\$5,000	Ob, Staff time	2021	WF, D	1	0	1	1	0	0	1	0	0	0	1	0	1	0	8/H
5	1-1	Develop a plan for improving the emergency sheltering capabilities of Essex. Factors to consider include capacity, access, and pet sheltering. Plan may include establishing a backup emergency shelter located within Essex, which can support residents if the John Winthrop Middle School Regional Shelter in Deep River is inaccessible. Possible options for local sheltering include the Town Hall, Public Library, or Essex Elementary School	EM	\$5,000-\$10,000	Staff time	2021	SW, TW, ET, WS, F, TI, WF, D, E, CC	1	0	1	0	1	1	0	0	0	0	0	0	0	0	5/H

Activity #	Goal/Objective	Activity Description	Lead Agency	Est. Cost*	Potential Funding Sources	Timeframe for Completion	Hazard (s) Addressed	Weighted STAPLEE Criteria														Total STAPLEE Score/Priority	
								Social Benefit	Social Cost	Technical Benefit	Technical Cost	Administrative Benefit	Administrative Cost	Political Benefit	Political Cost	Legal Benefit	Legal Cost	Economic Benefit	Economic Cost	Environmental Benefit	Environmental Cost		
6	2-1	Perform an assessment and alternatives analysis of the (Old) Deep River Road, River Road, Dennison Road, and Pond Meadow Road bridges over the Falls River to determine what work needs to be done to mitigate the risk of flooding or washout at those sites and maintain traffic flow for access and egress during and following disasters.	DPW	\$10,000 - \$20,000	OB, Grant	7/2022-6/2024	F	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	6/M
7	2-1	Acquire a portable generator to be stationed at the Essex Public Works Facility.	DPW, BOS, BOF	\$1,000-\$10,000	OB, Grant	2021	SW, TW, WS, F	1	0	0	0	0	0	1	1	0	0	1	1	0	0	0	7/H
8	2-1	Increase the amount of emergency fuel available in Essex by either increasing long-term storage or arranging for emergency supplies to be placed on standby prior to forecast storms.	DPW, BOF	\$1,000-\$10,000	OB	7/2021-6/2022	SW, TW, WS, F	1	0	0	0	0	0	1	1	0	0	1	1	0	0	0	7/H

Activity #	Goal/Objective	Activity Description	Lead Agency	Est. Cost*	Potential Funding Sources	Timeframe for Completion	Hazard (s) Addressed	Weighted STAPLEE Criteria														Total STAPLEE Score/Priority
								Social Benefit	Social Cost	Technical Benefit	Technical Cost	Administrative Benefit	Administrative Cost	Political Benefit	Political Cost	Legal Benefit	Legal Cost	Economic Benefit	Economic Cost	Environmental Benefit	Environmental Cost	
9	3-1	Conduct a coastal risk and vulnerability analysis or study to identify potential impacts of shoreline change (and the effects of sea level rise on those dynamics) along the tidal Connecticut River in Essex	P&Z	\$5,000-\$15,000	OB, Grant	7/2022-6/2025	F, CC	0	0	1	1	1	0	0	0	1	0	1	0	0	0	8/H
10	2-1	Perform drainage improvements on roads known to become icy due to water seepage during the winter season	DPW	\$25,000-\$50,000	OB, Grant	7/2023-6/2025	F	1	0	1	1	0	0	1	1	0	0	0	0	0	0	7/H
11	1-1	Work with private owners of Class B and C dams to complete Emergency Action Plans for their dams. Ensure that EAPs are on file with pertinent town departments.	BOS	\$1,000-\$5,000	Staff time	7/2021-6/2022	F	0	0	1	0	1	1	0	0	1	0	0	0	0	0	5/H
12	1-1	Incorporate hazard mitigation standards and considerations into the ongoing overhaul of the Town's Zoning Regulations.	P&Z, EM	\$1,000-\$5,000	Staff time	7/2021-6/2022	SW, TW, WS, F, WF, E, CC	1	1	1	0	0	1	0	0	0	1	1	0	1	0	7/H

Activity #	Goal/Objective	Activity Description	Lead Agency	Est. Cost*	Potential Funding Sources	Timeframe for Completion	Hazard (s) Addressed	Weighted STAPLEE Criteria														Total STAPLEE Score/Priority
								Social Benefit	Social Cost	Technical Benefit	Technical Cost	Administrative Benefit	Administrative Cost	Political Benefit	Political Cost	Legal Benefit	Legal Cost	Economic Benefit	Economic Cost	Environmental Benefit	Environmental Cost	
13	3-1	Conduct a direct outreach campaign to owners of Repetitive Loss and Severe Repetitive Loss properties informing them of mitigation options including elevation, relocation, and acquisition. Include information about funding and technical assistance from municipal, state, and federal sources.	BOS	\$1,000-\$5,000	OB, Staff time	7/2021-6/2022	F, CC	1	0	0	0	0	0	1	1	1	1	0	1	1	0	9/H
14	3-1	Complete creation of back-ups of existing electronic records, including geographic information system (GIS) data, and establish a protocol or process for continual data back-up. Digitize all paper records as back up for their preservation.	IT	\$5,000-\$10,000	OB	7/2021-6/2023	SW, TW, ET, WS, F, TI, WF, D, E, CC	0	0	1	0	1	1	1	0	0	0	0	0	0	0	5/M

Activity #	Goal/Objective	Activity Description	Lead Agency	Est. Cost*	Potential Funding Sources	Timeframe for Completion	Hazard (s) Addressed	Weighted STAPLEE Criteria														Total STAPLEE Score/Priority
								Social Benefit	Social Cost	Technical Benefit	Technical Cost	Administrative Benefit	Administrative Cost	Political Benefit	Political Cost	Legal Benefit	Legal Cost	Economic Benefit	Economic Cost	Environmental Benefit	Environmental Cost	
15	3-1	Develop a written annual schedule for natural hazard public education and outreach efforts through the Town website, social media outlets, mailers, in-person outlets, neighborhood associations, and other media, to ensure consistent and long-term public education programs. Education should include information on sheltering locations, private property owner mitigation action options, techniques for homeowner self-inspection, hazard insurance, and geographic distributions of natural hazard risk zones in Town.	EM	\$0-\$1,000	Staff time	7/2021-6/2022	SW, TW, WS, F	1	1	0	0	1	1	0	0	0	0	0	0	0	0	4/M
16	1-1	Develop an emergency plan for private boat owners to relocate and store boats during flood and hurricane events.	HMC	\$0-\$1,000	Staff time, OB	7/2023-6/2024	SW, F	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2/L
17	2-1	Implement mapping and monitoring of catch basins, storm water outfalls and related infrastructure.	DPW	\$5,000-\$10,000	Staff time, OB, Grant	7/2022-6/2025	F	0	0	1	1	1	1	0	0	0	0	0	0	0	0	6/H

