TOWN OF GUILFORD

SCRCOG HAZARD MITIGATION PLAN UPDATE ANNEX

JANUARY 2023

Town of Guilford

31 Park Street

Guilford, Connecticut 06437

https://www.guilfordct.gov

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This municipality Annex includes details regarding Guilford not included in the main body of the 2023 SCRCOG Mitigation Plan Update. The municipality annexes were developed to assist municipalities with the process of implementing and maintaining their portion of the 2023 SCRCOG Mitigation Plan Update. The Annex includes a Municipality Profile, Risk Analysis, Capability Assessment, and Mitigation Actions.

1. Municipality Profile

The Town of Guilford is a coastal community along the Long Island Sound (though it stretches 12 miles northward) and consists of over 47 square miles. The region was first settled in 1639 as part of the New Haven area after negotiations with the Menunkatuck Tribe.[1] By the 18th century, the region became its own "thriving coastal community."[2] Though originally thrived in shipbuilding, trade, and granite mines, today Guilford is a popular summer destination for vacationers. Guilford contains the third largest collection of historical homes in New England, located in the Town Green.[3] There are more than 450 recorded historic structures that date from 1639 to 1937. The opening of the Connecticut Turnpike (I-95) in 1956 helped link the town to the ongoing metropolitan growth of the region which led to. Guilford's population rose from 5,100 in 1950 to 8,000 in 1960.[4] The Town of Guilford is governed by a Board of Selectmen/Board of Finance/Town Meeting model.[5]

1.1 Demographics

Guilford has a current population of 22,216. There are 9,249 housing units in Guilford of which 78.6% are owner-occupied, 12.2% renter-occupied, and 9.2% remaining vacant. The unemployment rate as of 2019 was 2.5% (down from a peak of 6.5% in 2010). 3.0% of Guilford's population is below poverty level and 13,117 are in the annual labor force. 58.4% of residents have a bachelor's degree or higher, which is up by 8.4% since 2000. The median household income in Guilford is $111,870.[6]

1.2 Geography and Water

Guilford, which lies between the municipalities of Madison to the east, and Branford/North Branford to the west, is a long stretch of land that includes 15 miles of coastline consisting of tidal wetlands, natural harbors, small beaches, rocky shorefronts, and numerous islands. The northwest side is bordered by the Metacomet Ridge, including the Totoket Mountain. Guilford has approximately 6,000 areas of Open

[1] "Guilford Plan of Conservation and Development Update. (2015) Guilford, Connecticut.

[2] "Welcome to the Town of Guilford, CT." (2017). The Town of Guilford.

[3] "Historical Overview." (2017). The Town of Guilford.

[4] "Guilford Plan of Conservation and Development Update. (2015) Guilford, Connecticut.

[5] "Government of Guilford." (2017). The Town of Guilford.

[6] "South Central Region, CT: Demographic & Socioeconomic Trends." (2021). South Central Regional Council of Governments.

Space comprised of the East River Preserve, Westwoods, Timberland Preserve, Northwoods Preserve and several smaller parcels. The primary settlement, Guilford Center, is in the southeastern corner of the jurisdiction. Guilford also contains the East River and West River, several small waterways and lakes, most notably Lake Quonnipaug.[7] The coastal town is included in the SCRCOG 2017 Coastal Resilience Plan.

In the 2015 Guilford Plan of Conservation and Development, the town aims to minimize the impacts of paving and building on water quality of flow. It was found that most of the watersheds in central and southern Guilford contained 4 to 10% impervious cover which is approaching a critical threshold that poses a hazard to water quality and wildlife habitats. Septic failure has declined since the 1980s but remains a concern for Guilford and CT DEEP has recommended a reevaluation of the current septic systems as part of Low Impact Development techniques. Due to water quality issues, swimming at the area's Lake Quonnipaug is periodically closed due to high bacteria levels.[8]

1.3 Transportation

Both Interstate 95 and U.S Route 1 running east to west, go through south Guilford. These roadways parallel the East ShoreLine railway, which goes through Guilford, and includes a stop in the town center. 82.8% of residents drove alone as a means of transportation, while 5.5% carpooled and 2.4% took public transportation. As of 2019, 70.9% of the population commuted to a different municipality of work, which is down from 82.5% in 2000.[9]

The New England National Scenic Trail, a 215-mile hike trail that goes from the Long Island Sound communities to the Massachusetts and New Hampshire borders, comprises historic Mattabesett, Metacomet, and Monadnock Trail systems. The trail has expanded to Chittenden Park in Guilford to run from Long Island Sound north through parts of Wallingford and into Meriden.[10]

1.4 Land Use and Development

Originally a coastal and agriculturally based economic community, Guilford has now become a popular summer tourist location with quaint coastal villages springing up in the 20th century. In the South Central Region: Plan of Conservation and Development 2018-2028, the vision statement for Guilford, states they are working to "promote a multi-modal transportation network, support higher density development, and encourage affordable housing."[11] The SCRCOG 2017 Coastal Resilience Plan outlines several

[7] "Guilford Facilities, Parks & Beaches." (2017). The Town of Guilford.

[8] "Guilford Plan of Conservation and Development Update. (2015) Guilford, Connecticut.

[9] "South Central Region, CT: Demographic & Socioeconomic Trends." (2021). South Central Regional Council of Governments.

[10] "South Central CT Region Plan of Conservation & Development." (2018). South Central Regional Council of Governments. Pg. 31.

[11] "South Central CT Region Plan of Conservation & Development 2018 Update." (2017). South Central Regional Council of Governments.

improvements, such as upgrading and restoring Chittenden Beach, Grass Island, and Long Cove, as well as improving shoreline infrastructure and transportation.[12] Guilford has also been a leader in farmland preservation with over 2700 acres (9% of its land) of protected farmland.[13]

Aside from over 13,000 acres of residential use, open space and conservation land is the second largest use of land in Guilford.[14]

[12] "Southern CT: Regional Framework for Coastal Resilience." (2017). South Central Regional Council of Governments, MetroCOG, Nature Conservancy.

[13] "South Central CT Region Plan of Conservation & Development 2018 Update." (2017). South Central Regional Council of Governments.

[14] "Guilford Plan of Conservation and Development Update. (2015) Guilford, Connecticut.

2. Hazard Profiles

2.1 Critical Facilities

There are 21 critical facilities in town, as seen in
Table 1, with two designated emergency shelters; the Guilford High School, and community center. Most facilities have emergency power supplies except the high school.

Table 1. Critical Facilities in the Town of Guilford.

Facility	Location	Emergency Power Supply?	Shelter?	In Floodplain or Coastal Flood Hazard Area?	In Surge Zones?
Emergency Services					
Police Station	400 Church Street	Yes	No	No	No
Fire Headquarters	390 Church Street	Yes	No	No	No
Fire Station	10 Graves Avenue	Yes	No	No	Cat. 4
Fire Station	120 Whitfield Street	Yes	No	No	Cat. 3
Fire Station	51 Water Street	Yes	No	Yes	Cat. 3
Fire Station	3087 Durham Road	Yes	No	No	No
Municipal Facilities					
Town Hall	31 Park Street	Yes	No	No	Cat. 4
DPW Facility/Town Garage	47 Driveway	Yes	No	Yes	Cat. 1
Transfer Station	1900 Boston Post	N/A	N/A	N/A	N/A

Facility	Location	Emergency Power Supply?	Shelter?	In Floodplain or Coastal Flood Hazard Area?	In Surge Zones?
	Road				
Library	67 Park Street	N/A	N/A	N/A	N/A
Brush & Leaf Disposal Area	Sullivan Drive	N/A	N/A	N/A	N/A
Shelters					
Community Center	32 Church Street	Yes	Yes	No	Cat. 4
Guilford High School	605 New England Road	No	Yes	No	No
Health Care and Senior Living Facilities					
Guilford House (former West Lake Lodge)	109 West Lake Avenue	Yes	No	No	No
Apple Rehab. (former Fowler Convalescent)	10 Boston Post Road	Yes	No	Yes	Cat. 1-4
The Gables	201 Granite Road	Yes	No	Yes	No
Yale-New Haven Shoreline Medical Center	111 Goose Lane	Yes	No	No	No
Boston Terrace (senior living)	41 Boston Terrace	Limited	No	Yes	Cat. 3-4
Sachem Hollow (senior living)	310 State Street	Limited	No	No	No
Guilford Court (senior living)	32 Guilford Court	Limited	No	No	No
Water and Wastewater					

Facility	Location	Emergency Power Supply?	Shelter?	In Floodplain or Coastal Flood Hazard Area?	In Surge Zones?
CWC Tank	Sachem Head Road	N/A	N/A	N/A	N/A

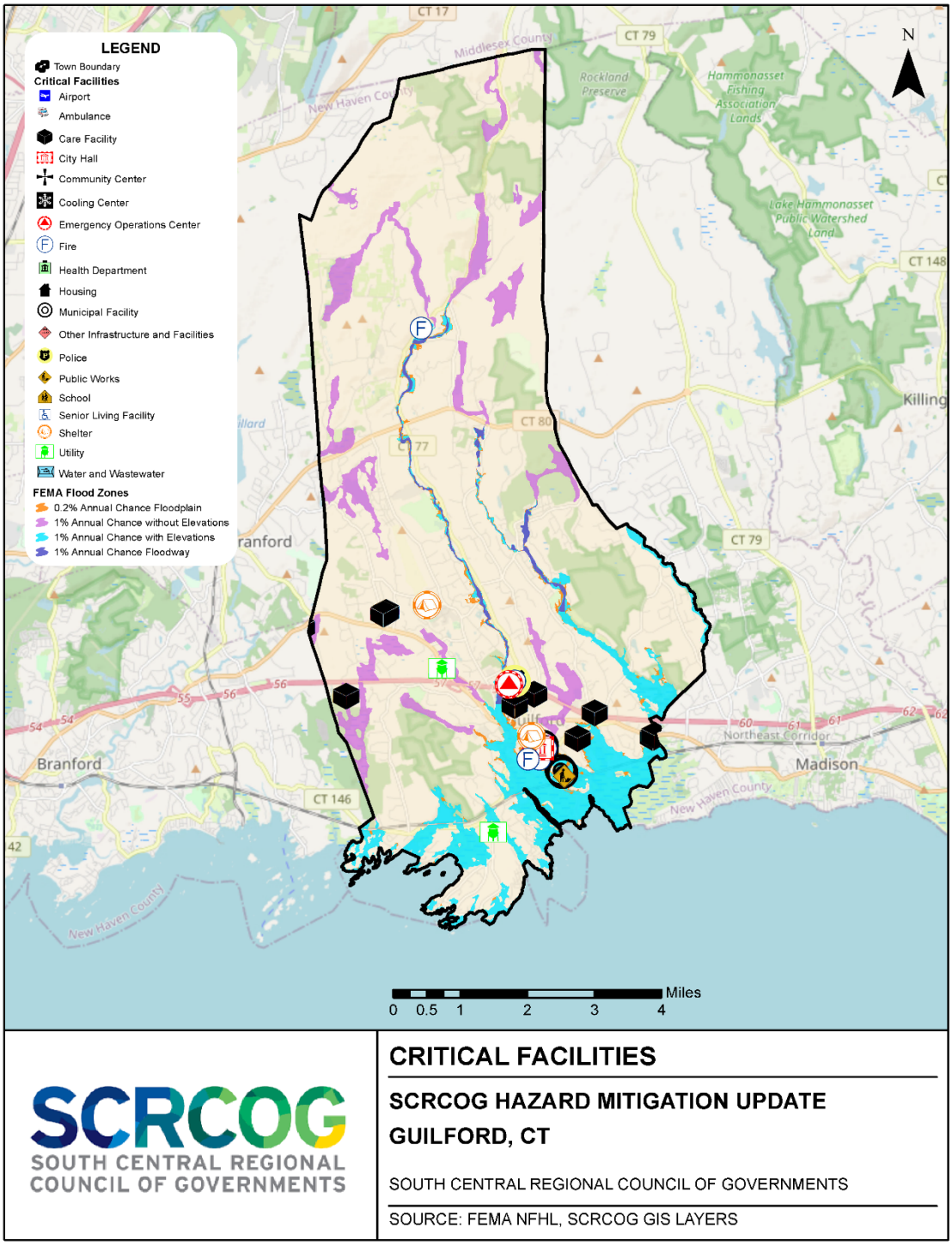

Figure 1. Guilford FEMA Flood Zones and Critical Facilities.

2.2 Vulnerable Assets

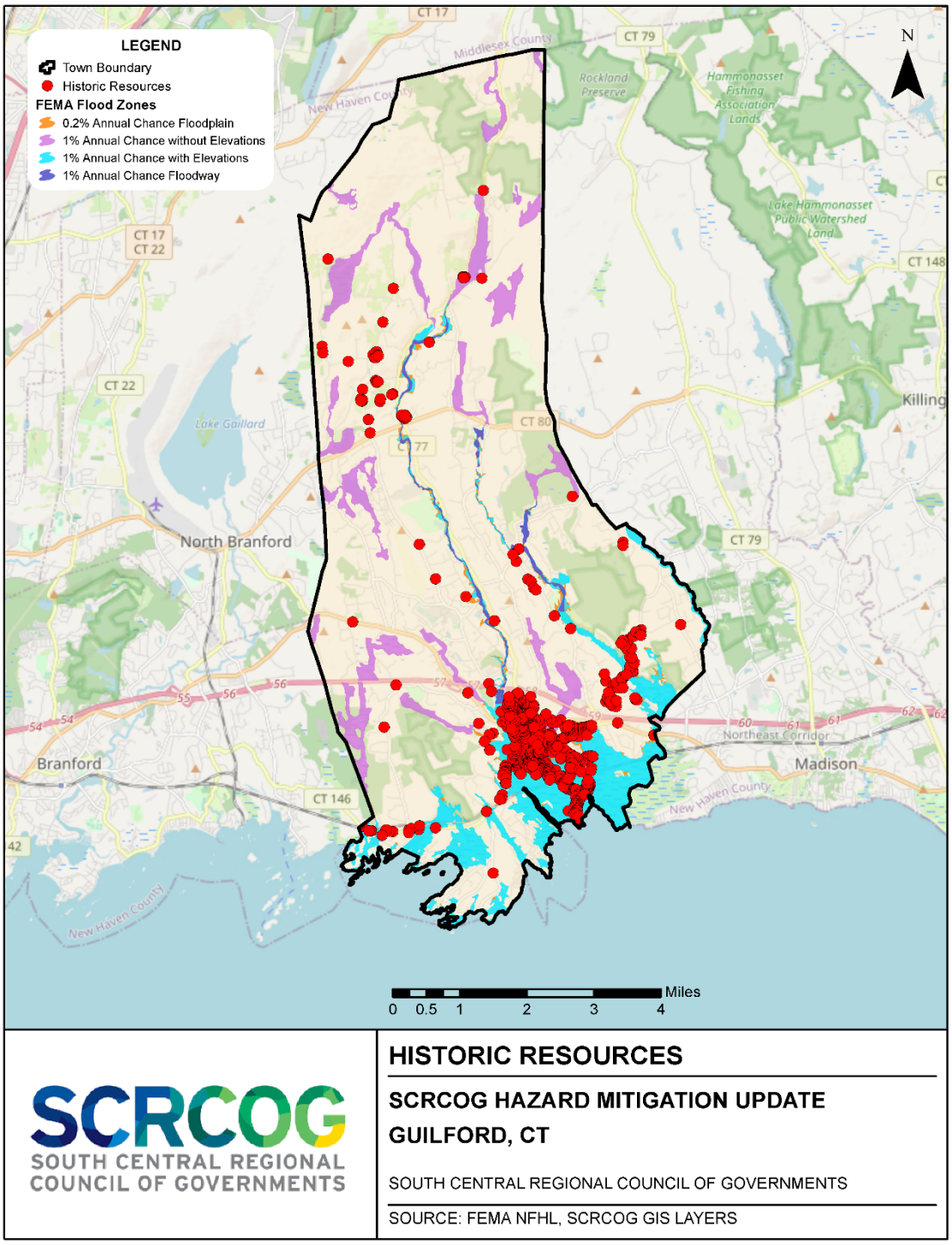

Figure 2. Guilford FEMA Flood Zones and Historic Resources.

Repetitive Loss and Severe Repetitive Loss Properties

In addition to the spatial analysis conducted above, summary information for repetitive flood loss and severe repetitive flood loss properties within the Town of Guilford also provides an indication of vulnerable assets, especially with regard to properties insured under the National Flood Insurance Program that have experienced repeated flooding (
Table 2).[15]

Table 2. Guilford Repetitive and Severe Repetitive Flood Loss Summary.

	Number of Losses	Number of Properties	Building Payments	Contents Payments	Total Payments
Repetitive Loss	147	63	$5,237,889	$635,480	$5,873,369
Severe Repetitive Loss	18	3	$231,086	$27,862	$258,948

The majority of the RL properties are single-family homes. One is a residential condominium unit and three are multi-family homes. Only four RL properties are non-residential. Three of these are water-dependent uses such as marinas, and one is a non-water-dependent commercial or industrial use.
As of July 31, 2017, the Town of Guilford had a total of 421 claims totaling $7,504,557 in losses for all NFIP-insured structures. As of March 31, 2022, the Town has had 433 claims totaling $8,045,874 in paid losses.

2.3 Historic Disasters

2.3.1 Federally Declared Events

Over the past two decades alone, six historic disaster events have occurred that have shaped how disaster response and recovery is handled across the United States. These events include Hurricanes Katrina, Sandy, Irma, Maria, and Harvey, along with the California wildfires in 2017. While not all of these events directly impacted the SCRCOG region, or the State of Connecticut, hazard mitigation planning has been driven by these catastrophic events.

The first federal act of relief occurred in 1803 following a destructive fire in Portsmouth, New Hampshire where Congress provided relief in the form of suspended bond payments. Over a century and a half later in 1979 the Federal Emergency Management Agency (FEMA) was created and tasked with nationwide emergency management. However, emergency and disaster declarations for the State of Connecticut

15 Based on information provided by the Federal Emergency Management Agency current as of 12/31/2012.

have been made since 1954. These declarations have included hurricanes, blizzards, severe wind and rainstorms, and tornadoes.

Since 2016, specifically for New Haven County, there have been three FEMA Disaster Declarations (DR), and two Emergency Declarations (EM) (
Table 3). These are in addition to the COVID-19 DR and EM that were declared in March 2020. FEMA declarations are made when it is determined that federal assistance is needed to supplement State and Tribal efforts in the wake of an event.

In addition to the FEMA declarations, the United States Department of Agriculture (USDA) declared eight agriculturally related disasters in the same time frame; two of which were also declared by FEMA. These USDA declarations make emergency loans available to agricultural producers in the designated counties.

Table 3. FEMA and USDA Disaster Declarations for New Haven County.

Event	Disaster	Date of Event	Date Declared
FEMA Disaster Declarations for New Haven County			
Severe Storms, Tornadoes, and Straightline Winds	DR-4385-CT	May 15, 2018	August 20, 2018
Tropical Storm (T.S.) Isaias*	DR-4580-CT EM-3535-CT	August 4, 2020	January 12, 2021
Hurricane Henri	EM-3564-CT	August 21-24, 2021	August 22, 2021
Hurricane Ida*	DR-4629-CT	September 1-2, 2021	October 30, 2021
USDA Declared Disasters for New Haven County			
Frost and Freeze	S4048	February 12, 2016	September 21, 2016
Drought	S4055	August 2, 2016	September 28, 2016
Excessive Rainfall	S4478	August 1, 2018	March 20, 2019
Drought	S4814	September 22, 2020	October 14, 2020
Drought	S4825	September 29, 2020	October 15, 2020
Tropical Storm Elsa	S5069	July 9, 2021	August 30, 2021

* Indicates FEMA declaration that was also made by USDA

In New Haven County, the May 2018 storms (DR-4385) caused $8,187,833 worth of damage, with federal assistance totaling $6,213,312. Tropical Storm Isaias (DR-4580) resulted in $4,656,424 worth of damage and federal assistance totaling $3,915,143. For reference, Hurricane Sandy resulted in over $14 million of damage. Public assistance (PA) was requested by most communities in the region.

In addition, Individual Assistance (IA) housing assistance for owners and renters was distributed in the wake of Hurricane Ida (DR-4629). Homeowners throughout the region received $570,033 in assistance and renters received $37,112.

2.3.2 National Centers for Environmental Information

The NOAA National Centers for Environmental Information (NCEI) maintains a storm events database that documents significant weather events and their impacts including injuries and loss of life, and economic impacts and property damage. Event types in this database generally include severe storm events such as hurricanes, thunderstorm, or windstorms, hail events, snow and freezing events, and several types of flood events such as flash or coastal floods.

Between 2017 and 2021 the SCRCOG region experienced 70 different events including floods, hail, high windstorms, and tornadoes (
Table 4). Property damage throughout the region for these 70 events was estimated to be $1,054,500. Losses specific to the Town of Guilford are discussed in section 0.

Table 4. NCEI Events Between 2017 and 2021.

Event Type	Number of Events
Flash Flood	25
Flood	1
Hail	2
Thunderstorm Wind	39
Tornado	3
Total	**70**

2.3.3 Drought Occurrences

The United States Drought Monitor (USDM) is a nation-wide map depicting which areas throughout the U.S are in drought, and the intensity of that drought. The USDM is developed via data syntehsis and observations from drought experts and local observers. The chart seen in Figure 3 is a graphictal representation of the drought periods in New Haven County from 2015 to the end of 2021. The dark organge and red areas indicate a more severe drought period. Most recently, New Haven County has experienced an extreme drought (D3) in 2016 into 2017, with a severe drought (D2) in 2020.

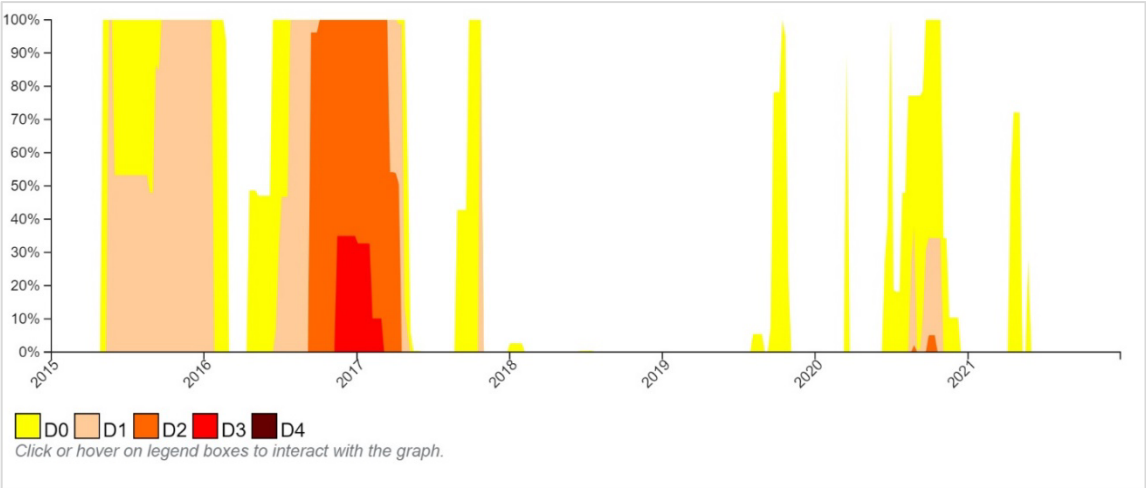

Figure 3. United States Drought Monitor (USDM) Drought Intensity for New Haven County from 2015 through 2021.

Another tool used to charcterize drought conditions is the Standardized Precipitation Index (SPI). This index identifies drought areas based on the deviation of recent preiciptation levels in comparison to the long-term average. Ultiamtely, if rainfall levels have been “lower than normal” or “wetter than normal” in a certin timeframe, the SPI represents these highs and lows at a nationl scale. The chart seen in Figure 4 shows the SPI for New Haven County from 2015 to the end of 2021. In comparison to the USDM, the fluctuations in drought periods are relatively synonmous, however, the SPI indiciated a more severe period of droght between 2015 and 2017 than the USDM. This is because the USDM is based on several other factors aside from just precipitation, hence why the USDM is typically used to determing local drought measures and needs. The blue areas on the chart are the periods of time that were wetter than usual with higher precipitation.

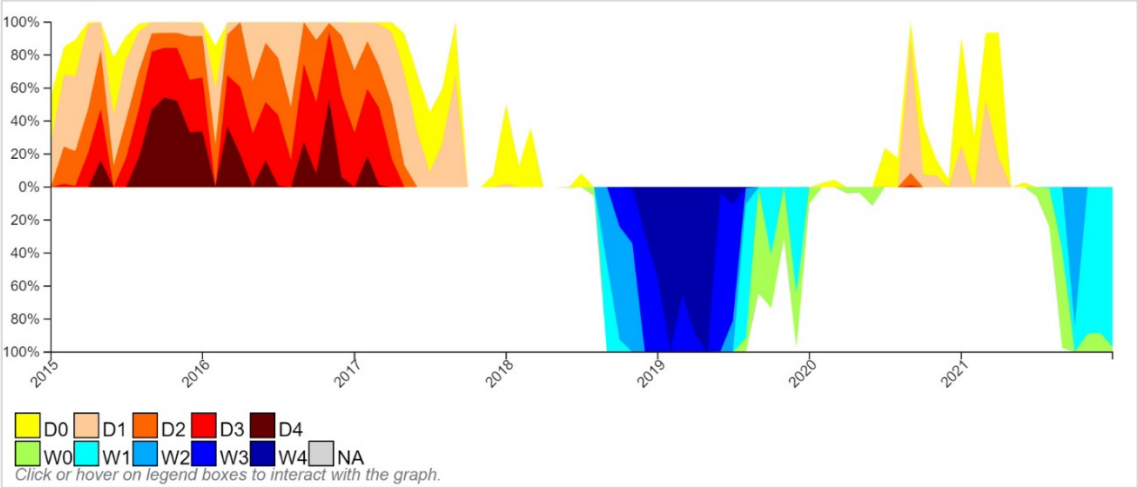

Figure 4. Standardized Precipitation Index (SPI) for New Haven County from 2015 through 2021.

The impacts of drought vary throughout the SCRCOG region, and are often felt over a longer period of time and are related to social, ecological, and economic concerns. The 2016 drought, the most extreme in recent years, resulted in mandated water conservation measures, and required some water utilities in the region, to make necessary water management changes. In addition, eight farm operations received assistance from the United States Department of Agriculture in the wake of the event in the amount of $78,590.

The severe drought in 2020 also impacted the region in various ways. At a statewide level, drinking water reservoirs were at 67% of capacity and 83.5% of normal. With decreased precipitation, and drinking water reservoir levels low, the Connecticut Interagency Drought Workgroup placed New Haven County in a Stage 1 drought per the State Drought Plan. Specifically, the Northeast Regional Climate Center identified the City of New Haven as having one of the highest rainfall deficits in the State at -11.09 inches average rainfall. During the 2020 drought, private wells were reportedly drying up, there were reports of livestock farms needing water, and water utilities throughout the region and state were experiencing reduced supply.

On October 15, 2020 the USDA identified New Haven County as a contiguous disaster county, making farm operators eligible to be considered for assistance from Farm Service Agency (FSA). Three farms in the region received assistance as a result of the drought in the amount of $17,982.

2.3.4 Wildland Urban Interface (WUI)

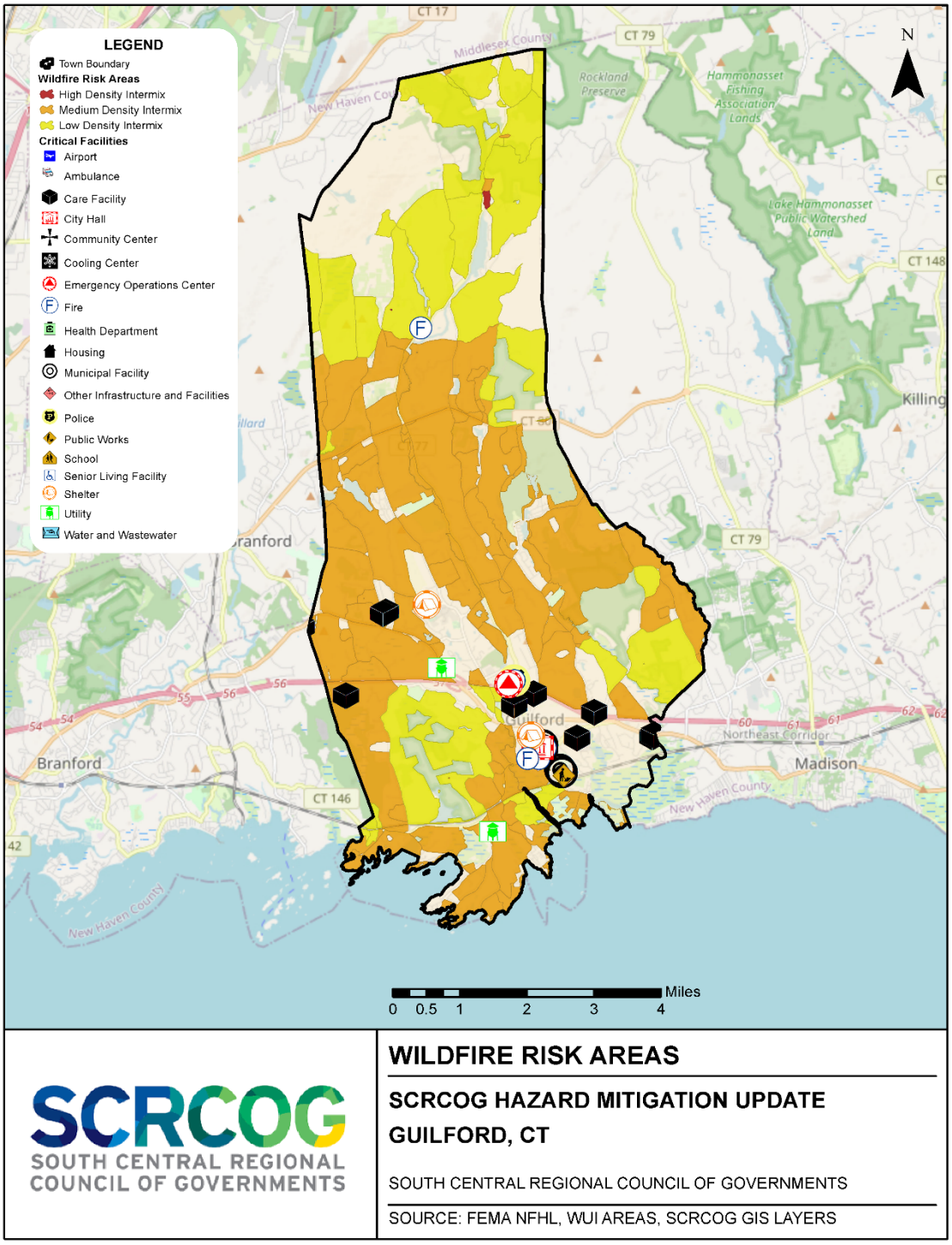

Figure 5. Guilford WUI and Critical Facilities.

3. Risk Analysis

3.1 Vulnerable Assets: Exposure Analysis

Vulnerable assets were identified by intersecting GIS-based asset inventories with known hazard boundaries to determine the numbers of parcels, critical facilities, and historic assets. This results in an estimation of vulnerable assets for the entire region, by hazard as shown in
Table 5. Drought exposure was estimated using the Connecticut DPH assumed private well data develop in 2021. The wildfire hazard boundary was defined by those parcels within the wildland-urban interface and intermix and that were also assumed to be a private well. The assumed presence of a private well indicates a lack of public water supply, and potentially reduced firefighting capacity. The estimated value of at risk assets is based on the Town's latest property tax values. Scenarios are cumulative, i.e., the 0.2% annual chance estimates also include the values and numbers of the 1% annual chance event.

Table 5. Town of Guilford Vulnerable Assets Exposure Analysis.

Hazard	At-Risk Parcels		At-Risk Facilities		At-Risk Historic Assets	
	Value	Number	Value	Number	Value	Number
Hurricane/Tropical Storm	$2,988,110,450	10,659	$118,474,130	21	$266,774,580	757
Severe Thunderstorm	$2,988,110,450	10,659	$118,474,130	21	$266,774,580	757
Severe Winter Storm	$2,988,110,450	10,659	$118,474,130	21	$266,774,580	757
Tornado	$2,988,110,450	10,659	$118,474,130	21	$266,774,580	757
Drought	$1,439,062,880	5,475	$562,280	2	$23,592,680	83
Flood						
1% Annual Chance	$1,020,037,650	2,820	$23,966,120	8	$98,790,250	272
0.2% Annual Chance	$1,087,475,000	3,064	$24,307,020	9	$126,017,380	361
VE Zone	$318,892,440	574	$562,280	2	$10,923,910	26
Storm Surge						

Hazard	At-Risk Parcels		At-Risk Facilities		At-Risk Historic Assets	
Category 1	$441,913,350	1,000	$2,820,540	4	$39,150,240	111
Category 2	$623,283,530	1,486	$6,746,090	6	$77,215,170	236
Category 3	$739,642,730	1,889	$7,446,920	8	$115,130,960	361
Category 4	$793,413,980	2,052	$9,566,420	12	$135,268,220	409
Earthquakes	$2,988,110,450	10,659	$118,474,130	21	$266,774,580	757
Wildfire	$1,662,048,660	6,514	$562,280	2	$21,770,690	79

3.2 Hazard Losses

3.2.1 Federal Assistance

Of the five natural hazard emergency and disaster declarations, the Town of Guilford received FEMA PA funds in the wake of two events; T.S. Isaias and the COVID-19 pandemic (
Table 6).

Table 6. Federal Funds Received from Disaster Declarations.

Event	Disaster	Assistance Type	Federal Funding Received	Total Project Need (Damages)
Tropical Storm (T.S.) Isaias	DR-4580-CT EM-3535-CT	PA	$227,838	$253,153
Covid-19	DR-4500-CT EM-3439-CT	PA	$55,461	$55,461

Funds received by the Town were primarily distributed for debris removal (72%), with approximately 28% of the $283,298 designated to police and fire emergency protective measures (Figure 6).

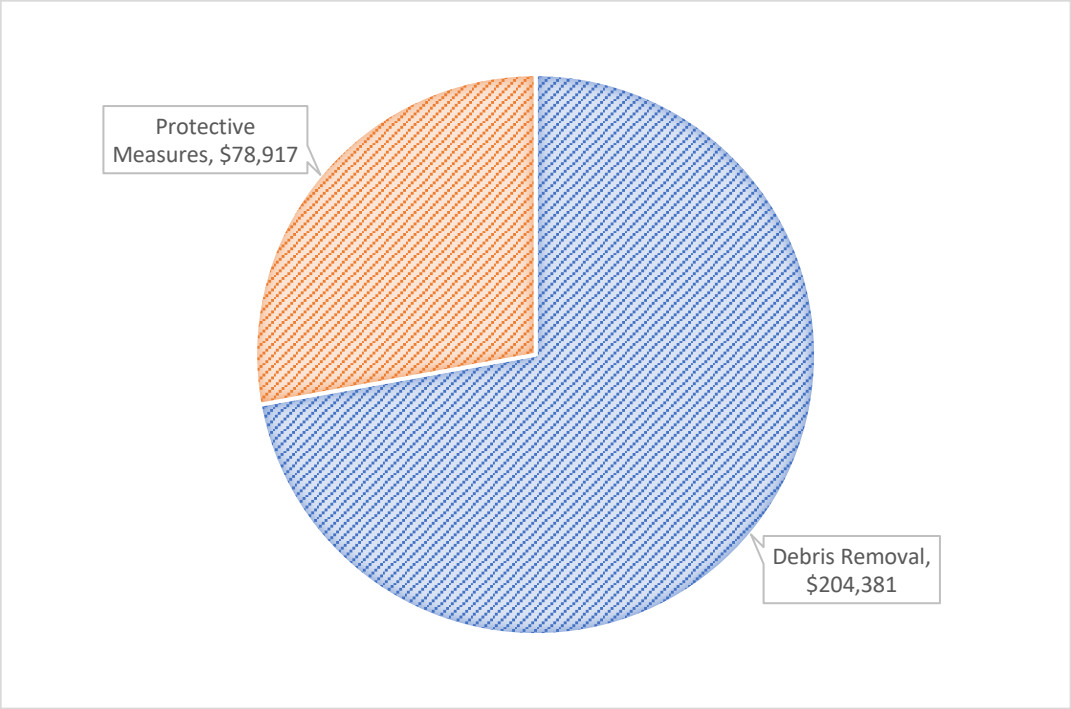

Figure 6. Federal Funds Received by Category.

3.2.2 National Centers for Environmental Information (NCEI)

The NCEI documentation identified five events for the Town of Guilford including one flash flood and four thunderstorm/wind events. The NCEI storm database did not have any recorded losses or property damage figures for the flash flood event and had a recorded $36,000 in damage for the four thunderstorm/wind events.

3.3 Loss Estimates

3.3.1 Sea Level Rise (SLR)

Table 7. Buildings in Guilford affected by the SLR Base Scenario.

Guilford	Buildings Affected	Critical Facilities	Historic Resources
Base Scenario			
Mean Higher High Water (MHHW)	1	0	1

Guilford	Buildings Affected	Critical Facilities	Historic Resources
10-year Flood Event	98	0	35
30-year Flood Event	147	2	46
50-year Flood Event	169	2	57
100-year Flood Event	198	3	63
500-year Flood Event	198	3	64

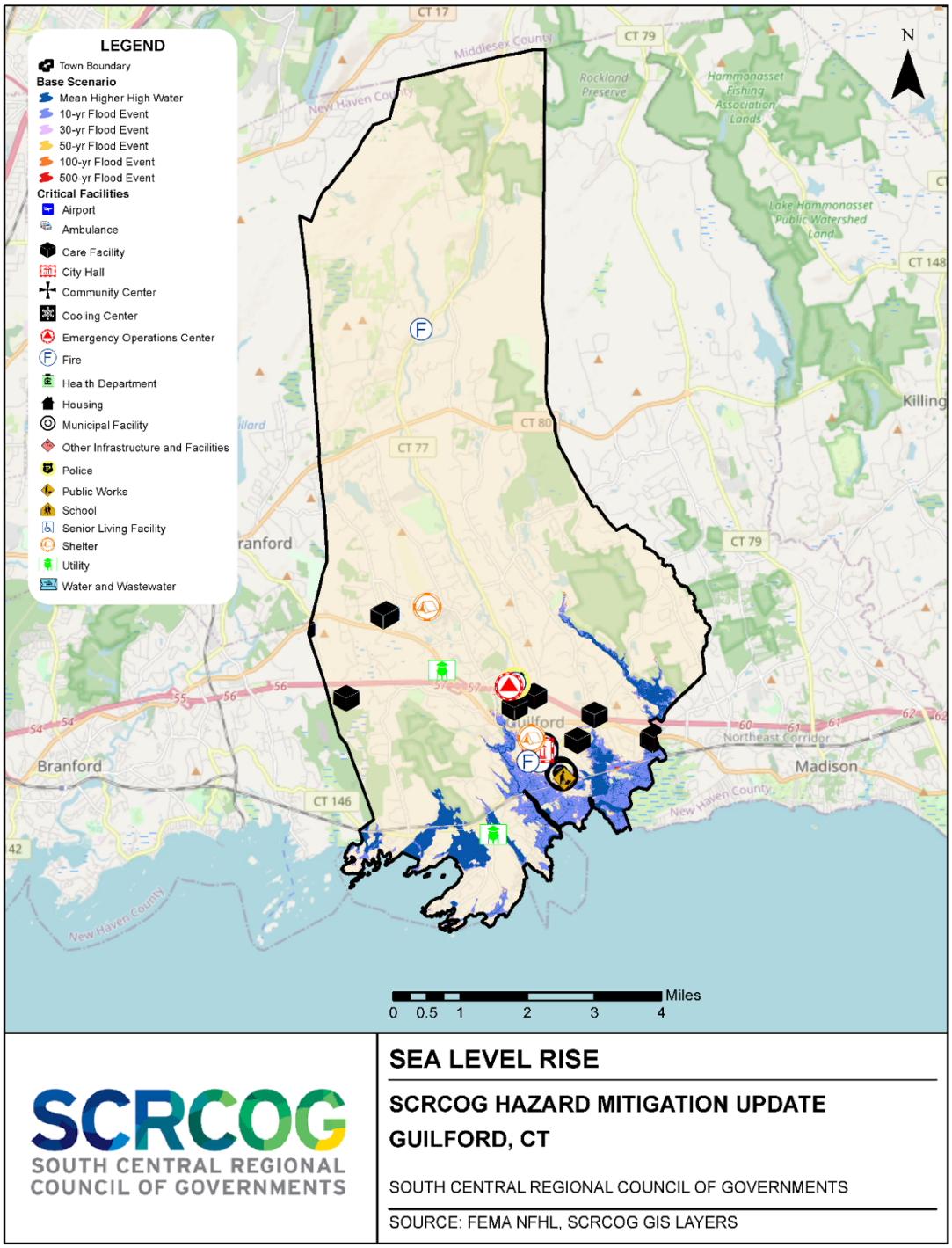

Figure 7. Guilford SLR Base Conditions Scenario.

Table 8. Buildings in Guilford affected by the SLR Future Conditions Scenario.

Guilford	Buildings Affected	Critical Facilities	Historic Resources
Future Conditions Scenario			
Mean Higher High Water (MHHW) +1 foot	4	0	2
Mean Higher High Water (MHHW) +20 inches	7	0	3
10-year Flood Event + 20 inches	198	3	63
30-year Flood Event + 20 inches	296	4	88
50-year Flood Event + 20 inches	332	4	100
100-year Flood Event + 20 inches	375	4	108
500-year Flood Event + 20 inches	430	4	127

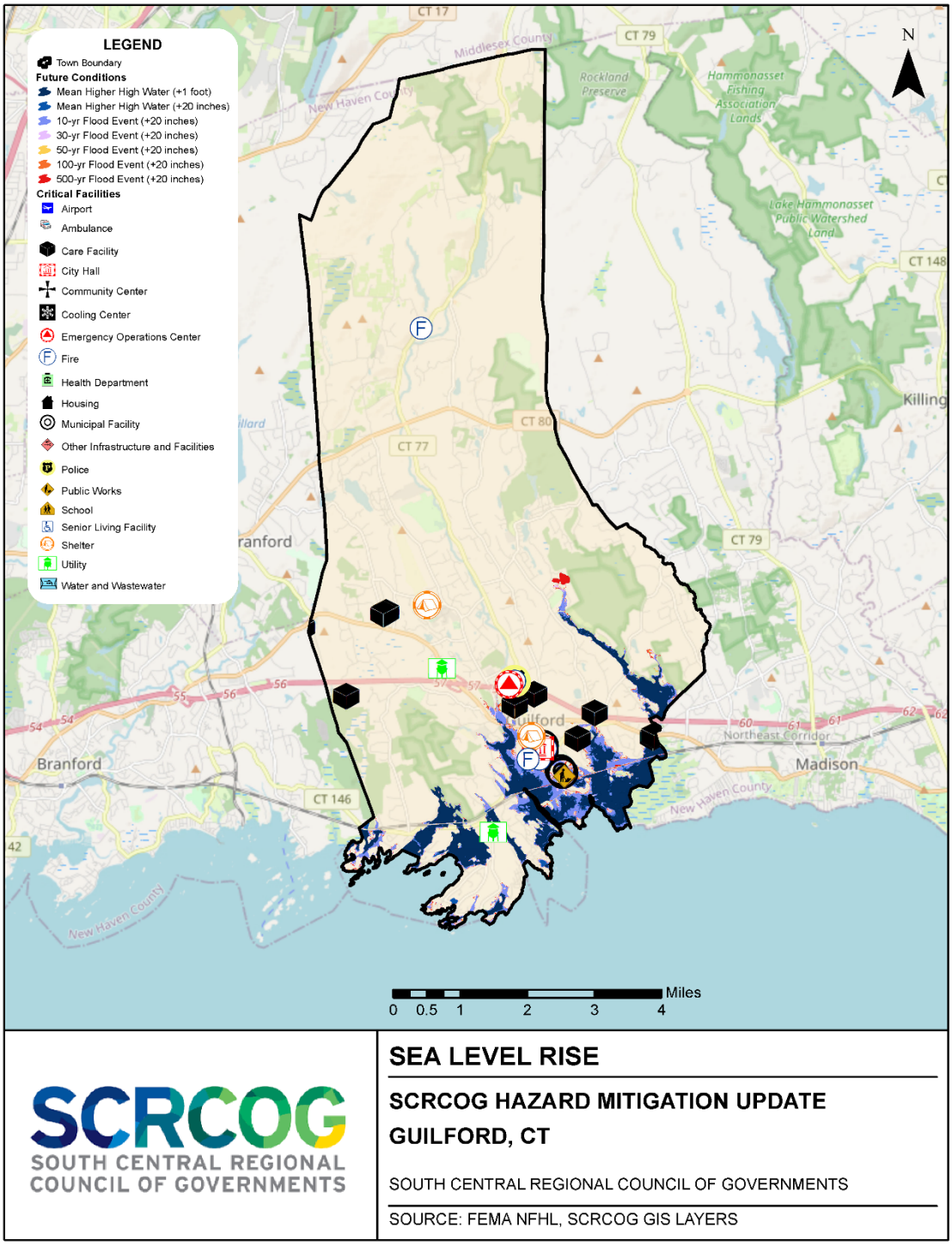

Figure 8. Guilford SLR Future Conditions Scenario.

3.4 HAZUS-MH Analysis

Hazus-MH (Hazus) v5.1 was used to complete the earthquake, hurricane wind, and both riverine and coastal flood analyses for vulnerability and loss estimates for the 2022 plan update. The Hazus software was developed by FEMA and the National Institute of Building Sciences. For the earthquake module, the U.S. Census tracts are the smallest extent in which the model runs; for the hurricane and flood modules, U.S. Census blocks were used. Multi-frequency depth grids were used for the riverine flood analysis, but only the 100-year coastal depth grid was available and used for analysis. Hazus was also used to calculate Storm Surge using the National Hurricane Center's (NHC) Sea, Lake, and Overland Surges from Hurricanes (SLOSH) Maximum of the Maximum Envelope of Waters (MEOWs) (MOM) depth grid.

3.4.1 Earthquake

The earthquake analysis was run based on the largest earthquake in Connecticut history, which occurred in East Haddam on May 16, 1791. Specific parameters include:

- Longitude of epicenter: -72.40
- Latitude of epicenter: 41.50
- Depth: 10.00 km.
- Magnitude: 6.40
- Attenuation function: CEUS 2008

After the earthquake analysis was performed, two tables for each municipality were created based off the tables for the 2018 update: Numbers of Buildings Damaged and anticipated extent of damage (Table 9) and Total Building-Related Economic Loss (Table 10) which includes the total economic loss by general occupancy type. An additional table was also created: Other Earthquake Impacts (Table 11) which includes information related to debris generated, number of displaced households, and the number of individuals who need to seek temporary shelter. Including this table allows these impacts to be compared across different hazards.

Table 9. Number of Buildings Damaged from the East Haddam Earthquake Scenario for the Town of Guilford.

Guilford	Slight	Moderate	Extensive	Complete	Total
2022 Count	22,119	20,805	20,043	19,824	82,790

Table 10. Total Building Related Economic Loss from the East Haddam Earthquake Scenario for the Town of Guilford.

Guilford	Residential	Commercial	Industrial	Others	Total
2022 Losses	$161,677,117	$119,729,343	$52,570,224	$24,368,668	$358,345,351

Table 11. Other Earthquake Impacts from the East Haddam Earthquake Scenario for the Town of Guilford.

Guilford	Debris Generated (Tons)	Households Displaced	Individuals Seeking Temporary Shelter
2022 Results	95	143	68

3.4.2 Hurricane

Hazus uses historical hurricane tracks and computer modeling to identify the probable tracks of a range of hurricane events and then assigns potential wind gusts that result. Widespread extreme thunderstorm wind events, such as those associated with well-developed squall lines, may have wind gusts of a similar magnitude to those of the 50- or 100-year hurricane wind event. A 1000-year event is the rough equivalent of a strong Category 1 or low-end Category 2 hurricane (or weak to mid-strength EF-1 tornado) with 3-second wind gusts of up to around 95 mph.

For the hurricane hazard, three tables for the Town of Guilford were created based off the tables for the 2018 update: Numbers of Buildings Damaged and anticipated level of damage (Table 12), Building-Related Economic Loss (Table 13), and Other Hurricane Impacts (Table 14) which includes information related to debris generated, number of displaced households, and the number of individuals who need to seek temporary shelter. These tables broke down the values for the six hurricane return periods (10-, 4-, 2-, 1-, 0.2-, and 0.01-percent-annual-chance).

Table 12. Number of Buildings Damaged from the Probabilistic Hurricane Scenario for the Town of Guilford.

Guilford	Return Period	Minor	Moderate	Severe	Destruction	Total
2022 Results	10-year	0	0	0	0	0
	20-year	4	0	0	0	4
	50-year	112	5	0	0	116
	100-year	564	43	1	0	609
	200-year	952	99	3	1	1,055
	500-year	2,412	539	54	27	3,031
	1,000-year	2,454	554	55	28	3,091

Table 13. Total Building Related Economic Loss from the Probabilistic Hurricane Scenario for the Town of Guilford.

Guilford	Return Period	Minor	Moderate	Severe	Destruction	Total
2022 Results	10-year	$0	$0	$0	$0	$0
	20-year	$6,819	$136	$0	$0	$6,954
	50-year	$219,336	$8,263	$265	$2	$227,865
	100-year	$1,118,018	$81,952	$2,874	$601	$1,203,446
	200-year	$1,891,981	$189,144	$7,912	$2,368	$2,091,405
	500-year	$4,819,404	$1,052,809	$109,497	$52,769	$6,034,479
	1,000-year	$4,905,276	$1,081,899	$111,860	$55,232	$6,154,266

Table 14. Other Hurricane Impacts from the Probabilistic Hurricane Scenario for the Town of Guilford.

Guilford	Return Period	Debris Generated (Tons)	Households Displaced	Individuals Seeking Temporary Shelter
2022 Results	10-year	0	0	0
	20-year	0	0	0
	50-year	2,781	0	0
	100-year	17,080	3	1
	200-year	21,233	9	4
	500-year	51,996	71	33
	1,000-year	55,709	72	34

3.4.3 Riverine Flood

Floods are often described in terms of annual percentage chance of occurrence. Floodplains have been delineated by FEMA to reflect the 1- and 0.2-percent-annual-chance flood events previously known as 100-year and 500-year floods, respectively. The area that has a 1 percent chance annually to flood each year is delineated as a Special Flood Hazard Area (SFHA) for the purposes of the National Flood

Insurance Program (NFIP). The 0.2-percent-annual-chance floodplain indicates areas of moderate flood hazard.

Hazus-MH v5.1 was used to complete the riverine flood analysis for vulnerability and loss estimates for this plan. The Hazus software was developed by FEMA and the National Institute of Building Sciences. A The flood loss estimation methodology consists of two modules that carry out basic analytical processes: flood hazard analysis and flood loss estimation analysis. The flood hazard analysis module uses characteristics, such as frequency, discharge and ground elevation to estimate flood depth, flood elevation and flow velocity. The flood loss estimation module calculates physical damage an economic loss from the results of the hazard analysis.

A Hazus Level 2 analysis was performed for the Town of Guilford with a user-provided depth grid. The flood model was used to run a single-frequency depth grid scenario which included the 1-percent - annual-chance flood (100-year) scenario. The average annualized losses (AAL) was not able to be calculated as a full suite of depth grids run in the multi-frequency scenario is required. The Town of Guilford is outside the multi-frequency depth grid footprint. For analysis purposes, the U.S. Census blocks are the smallest extent in which the model runs. Hazus generates economic loss estimates based on direct building damages and business interruption. Table 15 shows the 1-percent-annual-chance losses for the riverine flood scenario.

Table 15. 1-percent-annual-chance Riverine Flood Loss Estimates for the Town of Guilford.

Guilford	**2022 Results**				
	Residential	**Commercial**	**Industrial**	**Other**	**Total**
Direct					
Building	$24,026,000	$3,341,000	$2,473,000	$279,000	$30,119,000
Contents	$10,939,000	$9,764,000	$6,514,000	$1,637,000	$28,854,000
Inventory	$0	$126,000	$879,000	$36,000	$1,041,000
Subtotal	$34,965,000	$13,231,000	$9,866,000	$1,952,000	$60,014,000
Business Interruption					
Income	$353,000	$18,381,000	$683,000	$1,498,000	$20,915,000
Relocation	$13,154,000	$4,296,000	$466,000	$617,000	$18,533,000
Rental Income	$4,719,000	$3,078,000	$104,000	$35,000	$7,936,000

Guilford	2022 Results				
	Residential	Commercial	Industrial	Other	Total
Wage	$841,000	$18,994,000	$563,000	$3,283,000	$23,681,000
Subtotal	$19,067,000	$44,749,000	$1,816,000	$5,433,000	$71,065,000
Total	**$54,032,000**	**$57,980,000**	**$11,682,000**	**$7,385,000**	**$131,079,000**

3.4.4 Coastal Flood

Hazus-MH v5.1 was used to complete the coastal flood analysis for vulnerability and loss estimates for this plan. The Hazus software was developed by FEMA and the National Institute of Building Sciences. A The flood loss estimation methodology consists of two modules that carry out basic analytical processes: flood hazard analysis and flood loss estimation analysis. The flood hazard analysis module uses characteristics, such as frequency, discharge, and ground elevation to estimate flood depth, flood elevation and flow velocity. The flood loss estimation module calculates physical damage an economic loss from the results of the hazard analysis.

A Hazus Level 2 analysis was performed for the Town of Guilford with a user-provided coastal depth grid. The flood model was used to run a single-frequency depth grid scenario which only included the 1-percent-annual-chance (100-year) return period. While annualized loss is the preferred manner with which to express potential risk for hazard mitigation planning, as it is useful for creating a common denominator by which different types of hazards can be compared, an annual loss was not able to be generated with only the coastal 100-year depth grid developed for this analysis. Future work to improve this assessment would involve creating a full suite of return periods, either independently or through a Flood Risk Project. For analysis purposes, the U.S. Census blocks are the smallest extent in which the model runs. Hazus generates economic loss estimates based on direct building damages and business interruption.

Table 16 shows the 1-percent-annual-chance losses for the coastal flood scenario.

Table 16. 1-percent-annual-chance Coastal Flood Loss Estimates for the Town of Guilford.

Guilford	2022 Results				
	Residential	Commercial	Industrial	Other	Total
Direct					

Guilford	2022 Results				
	Residential	Commercial	Industrial	Other	Total
Building	$67,568,000	$7,735,000	$8,449,000	$723,000	$84,475,000
Contents	$59,010,000	$21,826,000	$19,125,000	$3,811,000	$103,772,000
Inventory	$0	$298,000	$2,368,000	$55,000	$2,721,000
Subtotal	$126,578,000	$29,859,000	$29,942,000	$4,589,000	$190,968,000
Business Interruption					
Income	$412,000	$14,863,000	$1,012,000	$1,178,000	$17,465,000
Relocation	$13,050,000	$2,845,000	$631,000	$342,000	$16,868,000
Rental Income	$4,592,000	$2,106,000	$160,000	$15,000	$6,873,000
Wage	$976,000	$15,670,000	$838,000	$3,234,000	$20,718,000
Subtotal	$19,030,000	$35,484,000	$2,641,000	$4,769,000	$61,924,000
Total	**$145,608,000**	**$65,343,000**	**$32,583,000**	**$9,358,000**	**$252,892,000**

3.4.5 Storm Surge

Hazus-MH v5.1 was used to complete the storm surge analysis for vulnerability and loss estimates for this plan. The Hazus software was developed by FEMA and the National Institute of Building Sciences. A Hazus Level 2 analysis was performed using user-provided depth grids. **Error! Reference source not found.** represents the storm surge inundation for the Town of Guilford. The NHC's SLOSH MOM model was used for this analysis. The flood model was utilized to run four separate single-frequency depth grid scenarios for the Category 1 to 4 hurricanes and a loss estimate was determined for each hurricane Category (Table 17 to Table 20**Error! Reference source not found.**). Figure 9 shows the location of the storm surge areas in Guilford and their relation to critical facilities.

Table 17. Category 1 Storm Surge using Maximum of MEOWs for the Town of Guilford.

Guilford	2022 Results				
	Residential	Commercial	Industrial	Other	Total
Direct					

Guilford	2022 Results				
	Residential	Commercial	Industrial	Other	Total
Building	$49,255,000	$6,733,000	$7,291,000	$639,000	$63,918,000
Contents	$42,130,000	$19,760,000	$16,499,000	$3,454,000	$81,843,000
Inventory	$0	$273,000	$1,955,000	$58,000	$2,286,000
Subtotal	$91,385,000	$26,766,000	$25,745,000	$4,151,000	$148,047,000
Business Interruption					
Income	$321,000	$13,782,000	$954,000	$1,091,000	$16,148,000
Relocation	$11,581,000	$3,390,000	$612,000	$460,000	$16,043,000
Rental Income	$4,145,000	$2,476,000	$150,000	$31,000	$6,802,000
Wage	$762,000	$14,731,000	$773,000	$3,010,000	$19,276,000
Subtotal	$16,809,000	$34,379,000	$2,489,000	$4,592,000	$58,269,000
Total	**$108,194,000**	**$61,145,000**	**$28,234,000**	**$8,743,000**	**$206,316,000**

Table 18. Category 2 Storm Surge using Maximum of MEOWs for the Town of Guilford.

Guilford	2022 Results				
	Residential	Commercial	Industrial	Other	Total
Direct					
Building	$108,067,000	$15,642,000	$13,420,000	$1,464,000	$138,593,000
Contents	$87,723,000	$43,047,000	$28,570,000	$6,722,000	$166,062,000
Inventory	$0	$621,000	$3,424,000	$101,000	$4,146,000
Subtotal	$195,790,000	$59,310,000	$45,414,000	$8,287,000	$308,801,000
Business Interruption					
Income	$574,000	$25,659,000	$1,358,000	$1,874,000	$29,465,000

Relocation	$19,623,000	$6,507,000	$847,000	$805,000	$27,782,000
Rental Income	$7,277,000	$4,806,000	$207,000	$63,000	$12,353,000
Wage	$1,359,000	$28,155,000	$1,107,000	$5,065,000	$35,686,000
Subtotal	$28,833,000	$65,127,000	$3,519,000	$7,807,000	$105,286,000
Total	**$224,623,000**	**$124,437,000**	**$48,933,000**	**$16,094,000**	**$414,087,000**

Table 19. Category 3 Storm Surge using Maximum of MEOWs for the Town of Guilford.

Guilford	**2022 Results**				
	Residential	**Commercial**	**Industrial**	**Other**	**Total**
Direct					
Building	$184,530,000	$30,149,000	$20,436,000	$4,215,000	$239,330,000
Contents	$139,900,000	$75,199,000	$41,623,000	$18,293,000	$275,015,000
Inventory	$0	$1,089,000	$4,898,000	$238,000	$6,225,000
Subtotal	$324,430,000	$106,437,000	$66,957,000	$22,746,000	$520,570,000
Business Interruption					
Income	$813,000	$42,715,000	$1,793,000	$4,637,000	$49,958,000
Relocation	$28,331,000	$10,829,000	$1,097,000	$2,630,000	$42,887,000
Rental Income	$10,687,000	$7,966,000	$268,000	$422,000	$19,343,000
Wage	$1,923,000	$47,439,000	$1,438,000	$21,713,000	$72,513,000
Subtotal	$41,754,000	$108,949,000	$4,596,000	$29,402,000	$184,701,000
Total	**$366,184,000**	**$215,386,000**	**$71,553,000**	**$52,148,000**	**$705,271,000**

Table 20. Category 4 Storm Surge using Maximum of MEOWs for the Town of Guilford.

Guilford	**2022 Results**				
	Residential	**Commercial**	**Industrial**	**Other**	**Total**
Direct					
Building	$295,235,000	$59,099,000	$28,285,000	$10,299,000	$392,918,000
Contents	$202,923,000	$126,991,000	$54,400,000	$35,321,000	$419,635,000
Inventory	$0	$1,975,000	$6,229,000	$907,000	$9,111,000
Subtotal	$498,158,000	$188,065,000	$88,914,000	$46,527,000	$821,664,000
Business Interruption					
Income	$1,031,000	$70,161,000	$2,086,000	$8,280,000	$81,558,000
Relocation	$39,332,000	$18,760,000	$1,264,000	$4,789,000	$64,145,000
Rental Income	$14,923,000	$13,832,000	$308,000	$781,000	$29,844,000
Wage	$2,438,000	$77,173,000	$1,712,000	$38,120,000	$119,443,000
Subtotal	$57,724,000	$179,926,000	$5,370,000	$51,970,000	$294,990,000
Total	**$555,882,000**	**$367,991,000**	**$94,284,000**	**$98,497,000**	**$1,116,654,000**

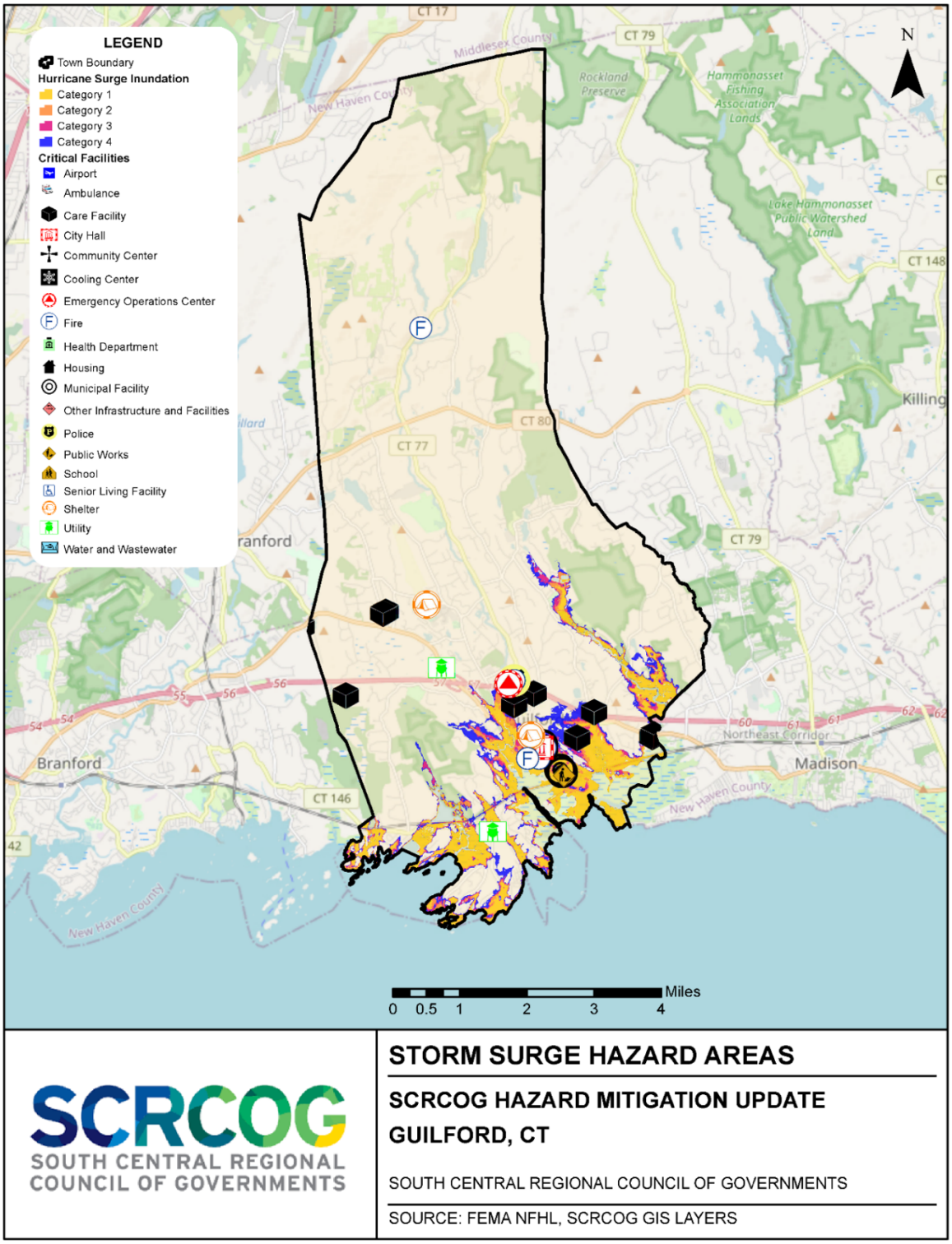

Figure 9. Storm Surge Hazard Areas in the Town of Guilford, Connecticut.

3.5 Annualized Losses

Annualized loss estimates (
Table 21) have been developed for each hazard discussed in the regional hazard profiles. These estimates have been derived from a number of sources, including:

- Historic FEMA PA funds received by the community
- Historic NFIP claims made within the community
- Connecticut State 2019 Hazard Mitigation Plan estimates
- HAZUS-MH modeling results performed for the region
- HAZUS-MH results from the Connecticut State 2019 Hazard Mitigation Plan

Table 21. Annualized Loss Estimates for the Town of Guilford.

Hazard	Source or Method	Losses in Guilford	Years of Record	Annualized or Annual Loss
Coastal Erosion	Refer to Multi-Jurisdiction document	$2,000,000	---	---
Dam Failure	CT HMP NPDP	$866	1	$866
Drought	USDA	$0	10	$0
	CT HMP NCEI	$418	1	$418
Earthquake	FEMA P-366	$41,718	1	$41,718
Extreme Heat	None Available	$0	10	$0
Flood	PA	$229,525	10	$22,953
	NFIP	$8,041,497	44	$182,761
	IA (Sandy and Ida)	$118,680	10	$11,868
Hurricanes	FEMA PA	$746,161	10	$74,616
Severe Thunderstorm	NCEI direct calculation	$46,000	10	$4,600
	CT HMP NCEI	$1,356	1	$1,356
Severe Winter Storm	FEMA PA	$457,446	10	$45,745
	CT HMP NCEI	$4,593	1	$4,593
Tornado	FEMA PA	$0	10	$0

Hazard	Source or Method	Losses in Guilford	Years of Record	Annualized or Annual Loss
	NCEI direct calculation	$0	10	$0
	CT HMP NCEI	$217,457	1	$217,457
Wildfire	CT HMP NFIC	$45,860	1	$45,860

3.6 Problem Statements

Problem statements were developed upon the completion and review of all risk assessment tasks. These statements are designed to briefly summarize the key hazard risks and vulnerabilities to the municipality based on potential impacts and losses from future events. They are among the issues of greatest concern and were used to assist in the identification and analysis of potential mitigation actions for. These problem statements will be reviewed and revised as needed during future plan updates to reflect the most current information resulting from the risk assessment.

Table 22. Guilford Problem Statements.

Problem Area	Description
Primary Hazards of Concern	
Coastal Flooding and Storm Surge	Coastal flooding is a well-documented natural hazard that threatens the Town far more frequently and in many more locations than inland flooding.
Sea Level Rise	There is an expressed concern in the plan regarding the continued increase in precipitation and sea level rise as it relates to future flood risk (inland and coastal).
High Winds	High winds – Most damage is a secondary result of wind speed and is caused by falling limbs and/or debris bringing about damage to public property. Of concern are the blockage of roads and the damage to the electrical power supply from falling trees and tree limbs. Many of the inland roads are narrow and bordered by private forest land, which is not cleared back from the right-of-way to prevent serious problems resulting from high winds.
Geographic Areas of Concern	
SFHAs	In general, the potential for flooding is widespread across Guilford, with most major flooding occurring along established SFHAs. Approximately 650

Problem Area	Description
	structures in Guilford are located within or near the 100-year floodplain or the 100-year floodway.
Route 146	FEMA mapping and previous occurrences show some level of flooding for vast areas south of Route 146 during coastal flood events.
West River corridor	The West River corridor is the primary area of vulnerability from inland flooding, with many of the problems occurring along Route 77.
Munger Brook between County Road and Route 80	The area along Munger Brook between County Road and Route 80 is reportedly a chronic flood-prone area.
Route 77/West River corridor south of Lake Quonnipaug and the Spinning Mill Brook Crossing of Long Hill Road above Route 1.	Nuisance flooding occurs along the Route 77/West River corridor south of Lake Quonnipaug and the Spinning Mill Brook Crossing of Long Hill Road above Route 1.
Sachems Head, Vineyard Point, Leetes Island, Tuttles Point, Indian Cove, and Mulberry Point	Several coastal areas of Guilford may become isolated from the mainland during coastal storms such as nor'easters and hurricanes. These areas include Sachems Head, Vineyard Point, Leetes Island, Tuttles Point, Indian Cove, and Mulberry Point as well as smaller unnamed areas adjacent to these. Road elevations that have been implemented (Old Quarry Road) or planned (Chimney Corner Road) will help reduce isolation risks.
Downtown Guilford	Complaints about localized shallow flooding in the downtown area are increasing in frequency. Some of these properties are near a tidal marsh associated with an undersized culvert.
Soundview Road Industrial Park	The Soundview Road commercial and industrial park is surrounded by areas of flood risk and some of the properties are also at risk of flooding. The Guilford Coastal Resilience Plan (2014) included a plan view concept for future adaptation of the area.
Town Center South	CIRCA's Resilient Connecticut program identified the Town Center South as a climate adaptation and resilience opportunity area due to the potential for flooding to increase risks to TOD, regional assets like the Amtrak station, and community assets.
North of I-95 and other areas prone to wildfires	The overall vulnerability of Guilford to wildfire hazards is believed to be relatively low (and the preparedness and responsiveness of the Guilford

Problem Area	Description
	Fire Department is very strong), but the following locations are identified as areas of concern: • The limited access conservation properties are at the highest risk for fires. This is land to the north of I-95. For example, the East River Preserve located north of I-95 and the intersection of Clapboard Hill Road and Duck Hole Road to Leatherman Road, the Timberland Preserve, woodlands surrounding Guilford Lakes are believed to be possible locations for future wildfires. The woodlands covering much of the extreme northwest and northeast sections of Town are likewise areas of concern. • The area known as "West Woods" just south of I-95 Exit 57 in Guilford has experienced wildfires over the past five years. Indian Cove and Mulberry Point are two coastal areas that are adjacent to extensive tidal marshes containing phragmites.
Vulnerable Community Assets	
Shelters	Neither the Community Center (primary shelter) nor the high school (secondary shelter) have hurricane-proof roofs, however both facilities meet current American Red Cross guidelines for shelters. Upgrades to the roofs to exceed local codes and meet hurricane wind standards are believed necessary, along with other modifications.
Three fire stations, the EOC, the Public Works building, and some senior living facilities	Three fire stations, the EOC, the Public Works building, and some senior living facilities are located within floodplains and/or hurricane storm surge inundation areas. The Public Works facility, proposed for relocation, is in a coastal flood zone and Category 1 hurricane surge zone associated with the Sluice Creek estuary.
Route 1	Route 1 just north of the West Side Cemetery has flooded during significantly high-volume precipitation events.
Town Hall	The Town's Reverse 911 Emergency Communications Center (ECC) is in the basement of Town Hall, a building that has a flood history (e.g., hurricane of 1938) but is not within a mapped floodplain according to FEMA.
Chittenden Park	The Town has partnered with Save the Sound to advance the concept design for a living shoreline at Chittenden Park. This concept was developed for the Regional Framework for Coastal Resilience. The design will occur in 2023.
Jacobs Beach	This beach is the Town's primary public beach. Erosion and high tides on sea level rise are reducing the available space at the facility. The playground

Problem Area	Description
	is at increasing risk.
Coastal Flooding Locations	The following locations have been identified by Guilford residents and Town officials as sites of chronic coastal flooding, where inundation occurs at least once every year and sometimes more frequently: • Several sections of Route 146 • Sachems Head Road at Route 146 • End of Whitfield Street near marina • Chimney Corner – a design for road elevation is underway • Falcon Road – a design for road elevation is underway • Shell Beach Road • Vineyard Point Road • Daniel Avenue • Soundview Road – see also the entry above for the commercial and industrial park • Seaside Avenue • River Street

4. Capabilities

The Town of Guilford is a combination residential and summer shoreline community with high capabilities and resources to support the implementation of hazard mitigation actions. This jurisdictional annex provides some additional documentation on the existing local authorities, policies, programs, and resources to support mitigation and the Town's ability to enhance or build upon these existing capabilities. This includes more detailed information on the updated capability findings for the community as highlighted in Chapter 6 (Capability Assessment), as well as the identification of some specific opportunities to expand and improve local mitigation capabilities for consideration as potential new actions for Chapter 7 (Mitigation Strategy).

4.1 Summary of Local Findings

4.1.1 Planning and Regulatory Capabilities

Planning and regulatory capabilities include the local plans, policies, codes, and ordinances that are relevant to reducing the potential impacts of hazards. The following planning and regulatory capabilities are currently in place for Guilford:

- Comprehensive/Master Plan (Plan of Conservation and Development)
- Capital Improvements Plan
- Economic Development Plan
- Local Emergency Operations Plan
- Transportation Plan
- Stormwater Management Plan
- Coastal Zone Management Plan
- Climate Change Adaptation Plan
- Coastal Resilience Plan
- Building Codes Adequately Enforced
- Zoning Ordinance Adequately Enforced
- Land Use Planning
- Zoning Ordinance
- Subdivision Ordinance
- Acquisition of Land for Open Space & Recreation

Given their direct relevance and significance to long-term hazard risk reduction, all current versions of formally adopted POCDs for participating jurisdictions were reviewed during the plan update process to ensure general consistency and integration as appropriate. Content from the Town of Guilford's POCD that is particularly relevant to this hazard mitigation plan is detailed below and hereby incorporated by reference. Additional information on how adequately the POCD and related planning tools are being

used for hazard mitigation purposes can be found under the Safe Growth Survey section of this annex (see Section 4.2).

Guilford Plan of Conservation and Development Update (2015)

- Under the Plan's Strategies and Actions for Goal 2 (Conserve Guilford's Lands, Waters, and Natural Areas), the plan proposes to "*Incorporate Municipal Coastal Plan, Hazard Mitigation Plan, and Community Coastal Resiliency Plan into land use policies,*" explaining that doing so will provide consistency in land use between plans, and that recommendations from these plans are aimed at "*making Guilford resilient and adaptive to the effects of sea level rise and coastal storms.*" (p. 24)
- The plan's Action Agenda includes many actions in support of hazard mitigation, including but not limited to the following:
    1. Transportation 1.5: Consider the effects of climate change and sea level rise, especially those in the Hazard Mitigation and Coastal Resiliency Plans, and assess appropriate resilience measures to mitigate their effect on critical infrastructure.
    2. Resources 5.1: Pursue recommendations for specific hard shoreline/structural measures, such as beach nourishment, wave attenuation structures, and maintaining or upgrading existing hard structures for property protection where appropriate.
    3. Resources 5.2: Pursue the use of living shoreline protective measures where appropriate. The Community Coastal Resilience Plan suggests the West River/Chittenden Park area as a pilot study area.
    4. Resources 5.3: Carefully regulate development and redevelopment along the shoreline, expanding the use of buffers to facilitate storm surge and wave attenuation.
    5. Resources 5.4: Consider the implementation of increasing building standards to enhance coastal resilience, such as adopting freeboard, liberal building height standards, and applying V Zone standards in A Zones.
    6. Resources 5.5: Consider pursuing acquisition of properties in flood-prone areas susceptible to sea level rise as appropriate.
    (p. 63)

Fortunately, as evidenced above, the Town of Guilford has some other important mitigation capabilities in place that work in conjunction with the POCD to reduce hazard risk. This includes the adoption and enforcement of building codes and land use and development ordinances/regulations that support mitigation by ensuring new or substantially improved development projects meet specific standards for public safety and protection from natural hazards. Many of these planning tools and regulations have recently been updated, including zoning and subdivision regulations and the floodplain management ordinance, and other improvements are underway such as a new Wastewater Plan and an updated POCD. The administration and enforcement of these codes and development regulations are considered among the most effective and cost-beneficial measures to protect people and future development from the impact of natural hazard events. Some additional information on how effectively these regulatory

tools and methods are being used for hazard mitigation purposes can be found in the Safe Growth Survey and NFIP Participation and Compliance sections of this annex. Some specific opportunities to enhance these tools are identified at the end of this Capabilities annex.

4.1.2 Administrative and Technical Capabilities

Administrative and technical capabilities include the local human resources and their skills/tools that can be used to support mitigation activities. The following administrative and technical capabilities are in place for Guilford:

- Planning Commission
- Maintenance Programs to Reduce Risk
- Mutual Aid Agreements
- Chief Building Official
- Floodplain Manager
- Emergency Manager
- Community Planner
- Civil Engineer
- GIS Coordinator
- Warning Systems

The Town of Guilford has strong administrative and technical capabilities across many departments under the general supervision of the First Selectman. For example, the Planning and Zoning Department develops and coordinates the town land use planning and regulatory processes related to the orderly development and growth of the community. The Building Department administers the Town's building inspection program adhering to and enforcing all code requirements of the State of Connecticut relating to building construction. The Engineering Department plans directs and coordinates engineering contracts and construction projects, including bridges, sanitary and marine development. The Town Engineer also provides technical consultation to the Town's many local boards and commissions and serves as town liaison with various state agencies. Town staff are supported by other community members who are appointed to local boards and commissions which goes a long way in supporting local administrative capabilities and technical expertise. This includes the Town's Hazard Mitigation Commission which was established by the Board of Selectmen in 2013 to support the development and implementation of this plan.

Guilford continues to implement floodplain management activities that go beyond minimum federal standards, and as another example of its strong administrative capabilities joined FEMA's Community Rating System (CRS) in 2018. However, it has been noted by some local staff that additional resources would be helpful in terms of keeping up with all the demands in providing service to the community as required. For example, the Engineering Department has only three staff members (the Town Engineer, an Assistant Town Engineer, and an Administrative Assistant). Higher staffing levels are needed to keep

up with all the required duties that include but go well beyond the floodplain development permitting process, stormwater management/improvement activities, and construction projects throughout town. Additional staff to support routine maintenance activities would also be helpful for the Public Works and Facilities Maintenance Departments.

4.1.3 Financial Capabilities

Financial capabilities include the fiscal resources the community has access to for helping to fund the implementation of hazard mitigation projects and related risk reduction activities. The following financial capabilities are in place for Guilford:

- Capital improvement project funding
- Authority to levy taxes for specific purposes
- Community Development Block Grant
- Federal Funding
- State Funding

The Town of Guilford has a full-time Finance Director who directs, controls, and coordinates all the financial activities of the town government. The annual budget serves as the foundation for the Town's financial planning and control. Annual budgets are recommended by the Board of Selectmen and Board of Education to the Board of Finance. Upon completion of budget hearings and careful review and deliberations, the Board of Finance recommends a final budget which is subject to voter approval through Town Meeting and referendum. The level of budgetary control (that is, the level at which expenditures cannot legally exceed the appropriated amount) is at the department level.

The Town also prepares and approves a Capital Improvement Program (CIP) annually, which is subject to the approval of the Board of Selectmen. The CIP is a long-term planning and policy document. Projects are evaluated and prioritized in terms of need, cost effectiveness, ability to generate economic benefit, and sources of funding. Most of the capital outlays are financed by the issuance of general obligation bonds and can be used for hazard mitigation and related purposes such as land acquisition.
The Town actively pursues state and federal grant opportunities as they can supplement local funding for these projects to reduce the reliance on long-term debt.

4.1.4 Education and Outreach Capabilities

Education and outreach capabilities include the local programs and methods already in place that can be used to support mitigation activities. The following education and outreach capabilities are in place for Guilford:

- Natural Disaster Program in Schools
- Public-Private Partnership for Disaster Issues

- Website
- Email Listserv
- Social Media

As a CRS community, the Town of Guilford also conducts public outreach as part of CRS Activity 320, including handouts, website information on flood risk, and publish articles annually in a publication that goes out to every address in the community. Annual letters are sent to local lending institutions, real estate agents, and insurance agents as well. For CRS Activity 502 the Town sends out informational letters annually to owners of Repetitive Loss Properties.

4.2 Safe Growth Survey

As introduced and described in Chapter 6 (Capability Assessment), the Safe Growth Survey was used again during the plan update process to help evaluate the extent to which the Town of Guilford is positioned to grow safely relative to its natural hazards. The survey covered six topic areas including the following:

- Land Use
- Transportation
- Environmental Management
- Public Safety
- Zoning Ordinance
- Subdivision Regulations
- Capital Improvement Program and Infrastructure Policies

The results of the Safe Growth Survey are summarized in

Table 23. This includes describing how strongly current Town staff agrees or disagrees with 25 statements as they relate to existing plans, policies, and programs for guiding future community growth and development, according to the following scale:

1=Strongly Disagree 2=Somewhat Disagree 3=Neutral 4=Somewhat Agree 5=Strongly Agree

Survey results provide some helpful information on how effective existing planning mechanisms are currently being used to address hazard mitigation and long-term risk reduction. The results were also incorporated into the analysis of possible new mitigation actions for the Town of Guilford to consider in terms improving or expanding upon its planning and regulatory capabilities to reduce the effects of natural hazards, including but not limited to the vulnerabilities identified in the risk assessment.

Table 23. Safe Growth Survey Results, Town of Guilford.

COMPREHENSIVE/MASTER PLAN *(i.e., Plan of Conservation and Development)*						
Land Use						
1.	The comprehensive/master plan includes a future land use map that clearly identifies natural hazard areas.	1	**2**	**3**	4	5
2.	Current land use policies discourage development and/or redevelopment within natural hazard areas.	1	**2**	**3**	4	5
3.	The comprehensive/master plan provides adequate space for expected future growth in areas located outside of natural hazard areas.	1	2	**3**	**4**	5
Transportation						
4.	The transportation element limits access to natural hazard areas.	1	**2**	**3**	4	5
5.	Transportation policy is used to guide future growth and development to safe locations.	1	**2**	**3**	4	5
6.	Transportation systems are designed to function under disaster conditions (e.g., evacuation, mobility for fire/rescue apparatus, etc.).	1	**2**	**3**	4	5
Environmental Management						
7.	Environmental features that serve to protect development from hazards (e.g., wetlands, riparian buffers, etc.) are identified and mapped.	1	2	**3**	**4**	5
8.	Environmental policies encourage the preservation and restoration of protective ecosystems.	1	**2**	**3**	4	5

COMPREHENSIVE/MASTER PLAN *(i.e., Plan of Conservation and Development)*		
9.	Environmental policies provide incentives to development that is located outside of protective ecosystems.	**1 2** 3 4 5
Public Safety		
10.	The goals and policies of the comprehensive/master plan are related to and consistent with those in the hazard mitigation plan.	1 **2 3** 4 5
11.	Public safety is explicitly included in the comprehensive/master plan's growth and development policies.	**1 2** 3 4 5
12.	The monitoring and implementation section of the comprehensive/master plan covers safe growth objectives.	**1 2** 3 4 5
ZONING BYLAWS		
13.	The zoning bylaws conform to the comprehensive/master plan in terms of discouraging development and/or redevelopment within natural hazard areas.	1 **2 3** 4 5
14.	The bylaws contain natural hazard overlay zones that set conditions for land use within such zones.	**1 2** 3 4 5
15.	Rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use.	1 **2 3** 4 5
16.	The bylaws prohibit development within, or filling of, wetlands, floodways, and floodplains.	1 **2 3** 4 5

COMPREHENSIVE/MASTER PLAN *(i.e., Plan of Conservation and Development)*						
SUBDIVISION REGULATIONS						
17.	The subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas.	1	**2**	**3**	4	5
18.	The regulations provide for conservation subdivisions or cluster subdivisions to conserve environmental resources.	1	2	3	**4**	**5**
19.	The regulations allow density transfers where hazard areas exist.	**1**	2	3	4	5
CAPITAL IMPROVEMENT PROGRAM AND INFRASTRUCTURE POLICIES						
20.	The capital improvement program limits expenditures on projects that would encourage development and/or redevelopment in areas vulnerable to natural hazards.	1	**2**	**3**	4	5
21.	Infrastructure policies limit the extension of existing facilities and services that would encourage development in areas vulnerable to natural hazards.	1	**2**	**3**	4	5
22.	The capital improvements program provides funding for hazard mitigation projects identified in the hazard mitigation plan.	1	2	**3**	4	5
OTHER						
23.	Small area or corridor plans recognize the need to avoid or mitigate natural hazards.	1	**2**	**3**	4	5
24.	The building code contains provisions to strengthen or elevate new or substantially improved construction to withstand hazard forces.	1	2	**3**	**4**	5
25.	Economic development and/or redevelopment strategies include provisions for mitigating natural hazards or	**1**	**2**	3	4	5

COMPREHENSIVE/MASTER PLAN *(i.e., Plan of Conservation and Development)*	
otherwise enhancing social and economic resiliency to hazards.	

4.3 NFIP Participation and Compliance

The Town of Guilford has actively participated in the National Flood Insurance Program (NFIP) since 1978. The current effective Flood Insurance Rate Map (FIRM) is dated May 16, 2017. As of August 31, 2022, there are a total of 510 NFIP policies in force. The total annual premium is $625,919 for a total of $146,344,700 in coverage. A total of 433 claims amounting to approximately $8,045,874 have been paid to NFIP policyholders in Guilford since joining the program.[16] More information on NFIP-insured structures, including those that have been repetitively damaged by floods, is provided in Chapter 5 (Risk Analysis).

Table 24 describes the Town of Guilford's participation and continued compliance in accordance with NFIP requirements and as specified in FEMA's 2022 Local Mitigation Planning Policy Guide.[17]

Table 24. NFIP Participation and Compliance, Town of Guilford.

REQUIRED INFORMATION	RESPONSE
Adoption of NFIP minimum floodplain management criteria via local regulation.	Adopted by via local ordinance at Chapter 174 Floodplain Management. Amended in its entirety January 7, 2019.
Adoption of the latest effective Flood Insurance Rate Map (FIRM), if applicable.	Adopted via the above ordinance (section §174-6: Basis for establishing areas of special flood hazard). Latest effective FIRM is dated July 8, 2013.
Implementation and enforcement of local floodplain management regulations to regulate and permit development in SFHAs.	Flood Hazard Permit applications are taken in along with Building Permit applications for structures in the special flood hazard area. Applications to Planning and Zoning are also

[16] FEMA NFIP, HUDEX Report, Policy and Loss Data by Community: https://nfipservices.floodsmart.gov//reports-flood-insurance-data
[17] Local Mitigation Planning Policy Guide. FEMA. April 2022. P. 26.

REQUIRED INFORMATION	RESPONSE
	reviewed for flood compliance during their process.
Appointment of a designee or agency to implement the addressed commitments and requirements of the NFIP.	Janice A Plaziak, Town Engineer
Description of how participants implement the substantial improvement/substantial damage provisions of their floodplain management regulations after an event.	The Town follows the same local permitting process as described above for implementing and enforcing floodplain management regulations following a flood event. The 5-year history of permitting is reviewed and documented on the application to make the determination of substantial improvement/damage.

Guilford's local floodplain management regulations and building code enforcement procedures include the following requirements that exceed minimum NFIP standards:

- Require freeboard (elevation requirements higher than the base flood)
- Require compensatory storage for new developments
- Prohibit or enforce higher standards for critical facilities subject to flood hazards
- Provision for cumulative substantial damage/improvement requirements

In Guilford, there is a 1 foot freeboard requirement in the Floodplain Management Ordinance. There is also a 5-year period utilized for the substantial improvement and substantial damage determination. New structures and substantial improvement or substantial damage are required to submit an elevation certificate demonstrating compliance prior to issuance of a certificate of occupancy. Floodplain considerations are also included in the Coastal Area Management Site Plan regulations for Planning and Zoning.

In terms of impediments to running an effective floodplain management program in the community, the Town does have some challenges with contractors understanding the implications of exceeding the scope of work on an already permitted project. Also, the Town has some Post-FIRM properties that are not truly compliant due to lack of confirmation in the past that projects were built compliant as they were permitted.

The Town of Guilford joined the CRS Program in 2018 and currently participates as a Class 9 community. As a CRS community the community's floodplain management activities are reviewed annually via a recertification process. A visit is scheduled for September 2022 by FEMA for a 5-year cycle verification, which is the Town's first since being accepted as a CRS community.

Additional information on each jurisdiction's floodplain management program and participation in the NFIP is provided in Chapter 6 (Capability Assessment).

4.3.1 Improvement Opportunities

While the Town of Guilford has a moderate degree of capabilities and resources to support hazard mitigation activities, it can expand and improve on the capabilities described in Chapter 6 (Capability Assessment) and this annex. The Town is aware of each it's strengths and weaknesses in terms of mitigating risk. Specific opportunities to address existing gaps or limitations in local capabilities to reduce risk have been identified for each capability type and are further described below. Each of these opportunities were then considered by the Town during the plan update process as potential new mitigation actions to be included in the updated Mitigation Strategy.

Planning and Regulatory Capabilities

- Assess all relevant regulations and the Town's permit review process to identify improvements to better address natural hazards, climate change, and projected future conditions (including coastal vulnerability but also extreme heat, heavy downpour events, etc.). This includes the incorporation of nature-based solutions such as living shorelines, low impact development, and other green infrastructure techniques into existing rules and regulations where most appropriate.
- Increase the integration of hazard mitigation and climate resiliency into the Town's existing CIP planning and project lists. Examples include (1) making resilience a key objective/priority for the Town's strategic, operational, and fiscal policies for municipal infrastructure and asset management; and (2) developing methods to help ensure the Town limits expenditures on projects or infrastructure improvements that would encourage development and/or redevelopment in areas vulnerable to natural hazards.
- Be opportunistic with addressing hazard mitigation and resilience through future amendments and implementation of the Town's updated POCD, especially as it relates to non-flooding hazards. This includes amending current land use policies to discourage development and/or redevelopment within high hazard areas (for example, those areas most susceptible to future coastal flooding, erosion, and sea level rise), and more directly aligning the Town's economic development goals and strategies with long-term community resilience.

Administrative and Technical Capabilities

- Increase current staff capacity to pursue and implement hazard mitigation, climate adaptation, and other community resilience building activities through additional hires as necessary. For example, higher staffing levels for the Engineering Department would help in keeping up with not only the daily provision of services to the community but also help expedite permitting approvals, stormwater management/improvement activities, and construction projects

throughout town. Additional staff to support routine maintenance activities would also be helpful for the Public Works and Facilities Maintenance Departments.

Financial Capabilities

- Maximize opportunities through the Town's budgeting and CIP process to help fund priority hazard mitigation and climate adaptation projects, especially when a local cost-share increases the Town's chances for a grant award.
- Continue to coordinate with SCRCOG and neighboring communities in the region as it relates to positioning the Town to pursue and capture future grant funding for regional hazard risk reduction projects.

Education and Outreach Capabilities

- Increase use of the Town's website to support low-cost public education and outreach initiatives on building community resilience to all natural hazards as well as individual mitigation actions for homeowners, business owners, etc.
- Expand opportunities for public/private partnerships to support public education and community outreach initiatives related to hazard awareness and risk reduction efforts.
- Identify and seek to address any unmet needs related to targeted outreach and education for the community's more vulnerable populations (i.e., environmental justice communities, residents with special needs, property owners in high risk hazard areas, etc.).

Possible New Actions Related to NFIP Participation and Compliance

- Coordinate with the State NFIP Coordinator on possible updates or revisions to local floodplain management regulations based on CT DEEP's most current Model Floodplain Management Regulations (which are routinely being updated as needed).
- High level training of engineering, planning & zoning, inland wetlands, health and building departments staff, P&Z commission and Building Code Board of Appeals members would be helpful.
- Maintain digital FEMA elevation certificates for all construction in the floodplain.
- Evaluate and consider the adoption of "higher standards" that are proven to reduce flood damage such as additional freeboard, setbacks, limitations on lower-level enclosure size, and the prohibition on use of fill.
- Establish a goal to have each plan reviewer and building inspector attend a related training periodically (for example, ASFPM's Annual National Conference, chapter conferences, webinars, etc.).
- Sponsor a periodic NFIP workshop for local surveyors and builders.
- Hold informative work sessions for newly elected officials and new appointees to planning commissions and appeals/variance boards, to provide an overview of floodplain management,

the importance of participating in the NFIP, and the implications of failing to enforce the requirements of the program or failing to properly handle variance requests.

- Develop a local Post-Disaster Substantial Damage Plan to assist with implementing substantial damage provisions of the NFIP, the State Building Code, and local floodplain regulations (guidance available).
- Obtain FEMA's Substantial Damage Estimator and attend training to be prepared to use it when damage occurs; develop mutual aid agreements with other jurisdictions to augment local inspection personnel after major disasters.

5. Mitigation Actions

Mitigation actions are projects or activities identified to reduce current and future vulnerabilities identified through the process of developing this 2023 SCRCOG Mitigation Plan Update. The first table in this section identifies the status of the mitigation actions included in the 2016 version of this plan. Besides current status, actions brought forward to this 2023 plan are identified in the Keep for Plan Update? column. The second table includes all the actions, and their essential details, for this 2023 SCRCOG Mitigation Plan Update. The actions are also listed in the Mitigation Action Tracker (a Google Sheet spreadsheet) maintained by SCRCOG. These actions were prioritized by the Municipality according to the criteria detailed in the main body of the plan.

Table 25. Status of Previous Mitigation Actions – Town of Guilford.

Action #	Action Title	Action Description	Current Status	Status Description/Explanation	Keep for Plan Update?
1	Evacuation Signs	Acquire and install evacuation signs.	Completed	Completed	NO (see explanation at left)
2	Expand Reverse 911 Coverage	Encourage the public to register their mobile phones with the reverse 911 system.	Completed	Completed	NO (see explanation at left)
3	Underground Utilities	Require that utilities be placed underground in new developments.	Completed	Complete (part of subdivision updates).	NO (see explanation at left)
4	Revetment Repair for Marina Area	Repair stone revetment in the marina area to protect adjacent road and sidewalk.	Canceled	Minor work is needed and can be done with available funding.	NO (see explanation at left)
5	Increase Funding for Tree Warden	Increase funding for the Tree Warden to address a wider range of tree limb hazards than the current budget allows.	Completed + To Be Continued	Budget increased from $85,000 in FY2018/19 to $125,000 in FY2021/22	YES (see Action #18)

Action #	Action Title	Action Description	Current Status	Status Description/Explanation	Keep for Plan Update?
6	Extend Public Water Supply	Extend public water supply and fire protection to Mulberry Point, Tuttles Point, and Indian Cove.	Completed	Completed	NO (see explanation at left)
7	Public Outreach and Education for Natural Hazards	Disseminate informational pamphlets regarding natural hazards to public and add pages to the Town website dedicated to citizen education and preparation for natural hazard events. These efforts will be aimed at promoting increased awareness and education on what businesses and property owners can do to prepare and prevent property damage and reduce injury and loss of life.	Completed + To Be Continued	Information Available on Hazard Mitigation Commission Web page	YES (see Action #5)
8	Coordinate with DOT on Flood Mitigation	Work with CT DOT to mitigate flooding problems along Route 146 at West River (upgrade bridge), Long Cove, Great Harbor/Hidden Lake (upgrade culverts) and along Leetes property.	Partially Completed / In Progress	Town is working with CT DOT with Roadway management plan for Route 146	YES (see Action #6)
9	Upgrade Community Center	Upgrade the Community Center to improve its viability as one of two primary shelters. Contract Engineer to inspect building and create recommendations regarding structural integrity for different storm events.	Delayed	Lack of Funding	YES (see Action #7)

Action #	Action Title	Action Description	Current Status	Status Description/Explanation	Keep for Plan Update?
10	CRS Participation	Consider enrolling in the Community Rating System.	Completed	Complete (enrolled in CRS in 2018)	NO (see explanation at left)
11	Improve Egress for Indian Cove	Create design plans to elevate Daniel Avenue or West Lane to provide multiple modes of egress for Indian Cove residents.	Canceled	This project is a future project for consideration but not likely to occur within the next five years.	NO (see explanation at left)
12	Elevate Low Spots on Chimney Corner Road	Create design plans to elevate low spots on Chimney Corner Road.	Partially Completed / In Progress	Plans have been prepared. Filing for required permits.	YES (see Action #8)
13	Erosion Control Study	Conduct study of erosion control alternatives at Jacobs Bch, Chittenden Bch, Grass Is., and Chaffinch Is; create conceptual designs; implement feasible/prudent alternatives.	Delayed	Working with Save the Sound as part of a grant project for Chittiden Park stabilization design project. The engineers have been asked to study three other coastal areas in Guilford for potential restoration which may include Jacobs Beach, Grass Island, Chaffinch Island, and the East River Marsh Complex.	YES (see Action #9)
14	Construct Walkways for Areas of Erosion Concern	Construct pile-supported walkways where foot traffic is exacerbating erosion.	Canceled	This project is a future project for consideration but not likely to occur within the next five years.	NO (see explanation at left)
15	Municipal Roof Load Study	Conduct a study to identify municipal buildings, critical facilities, and others that are vulnerable to roof damage or collapse due to heavy snow.	Delayed	Lack of funding.	YES (see Action #10)

Action #	Action Title	Action Description	Current Status	Status Description/Explanation	Keep for Plan Update?
16	Incorporate Dam Failure Areas into Reverse 911 System	Include dam failure areas in the Reverse 911 emergency contact database.	Delayed	Dam emergency response plans have been submitted to our emergency response coordinator. Funding not needed for this project.	YES (see Action #11)
17	Inspections for Town-owned Dams	Conduct formal inspections of Town-owned dams, especially Lake Quonnipaug Dam.	Completed	Completed. Town Engineer conducted a review of Town-owned dams.	NO (see explanation at left)
18	Living Shoreline for Chittenden Beach	Chittenden Beach living shoreline – Develop permit-level plans with required studies to obtain permits from CT DEEP and USACE.	Partially Completed / In Progress	Town of Guilford is working with Save the Sound to develop permit ready plans for the stabilization of the tidal marsh. Request for Proposals for the design work have been issued. Work is being conducted with a grant from the State of Connecticut.	YES (see Action #12)
19	Relocate Public Works Facility	Relocate the Public Works Facility outside a flood zone and hurricane surge zone.	Partially Completed / In Progress	Town of Guilford purchased land at the intersection of Route 80 and Long Hill Road for the future relocation of the public works facility. Preliminary design work is being conducted.	YES (see Action #13)
20	Mutual Aid for Brown's Boat Yard	Develop mutual aid agreement with Brown's Boat Yard to enable its assistance prior to disasters. Town to assist boat yard in locating upland storage area.	Canceled	Private property issue. No funding required to carry out this project	NO (see explanation at left)
21	Mutual Aid for Guilford Boat Yard	Develop mutual aid agreement with Guilford Boat Yard to enable its assistance prior to disasters. Town	Canceled	Private property issue. No funding required to carry out this project.	NO (see explanation at left)

Action #	Action Title	Action Description	Current Status	Status Description/Explanation	Keep for Plan Update?
		to assist boat yard in locating upland storage area.			
22	H&H Modeling for West River Watershed	Develop hydrologic and hydraulic model of the West River watershed as a way to prioritize mitigation activities such as culvert and bridge upgrades, property acquisitions and elevations, and retention/detention.	Canceled	Issue addressed on a case-by-case basis when culverts and bridges are replaced. Saw Mill Road Bridge completed and culvert downstream of Lake Q dam currently under design.	NO (see explanation at left)
23	Infrastructure Upgrades along West River	Upgrade bridges and culverts along West River south of Lake Quonnipaug.	Partially Completed / In Progress	Engineer has been contracted to design a new dam and culverts under Lake Drive.	YES (see Action #14)
24	Drainage Improvements for Munger Brook	Improve drainage and Munger Brook flood conveyance in the area that floods between County Road and Route 80.	Delayed	This action is a future project for consideration but not likely to occur within the next five years.	YES (see Action #15)
25	Elevation of Whitfield Street	Create design plans to elevate Whitfield Street from Seaview Terrace to the entrance of the marina to minimize flooding and improve drainage.	Canceled	This action is a future project for consideration but not likely to occur within the next five years.	NO (see explanation at left)
26	Elevate Low Spots on Seaside Avenue	Create design plans to elevate selected locations along Seaside Avenue.	Canceled	This action is a future project for consideration but not likely to occur within the next five years.	NO (see explanation at left)
27	Accommodate Migration of Tidal Wetlands	Set aside sufficient land for landward migration of tidal wetlands.	Partially Completed / In Progress	The Town of Guilford recently approved a $10 million bond for land acquisition.	YES (see Action #16)

Action #	Action Title	Action Description	Current Status	Status Description/Explanation	Keep for Plan Update?
28	Assistance and Outreach to Dam Owners	Provide technical assistance and outreach to owners of private Class B and Class C dams regarding inspections and maintenance.	Canceled	CTDEEP has jurisdiction over dams.	NO (see explanation at left)
29	Evaluate Unclassified Dams	Evaluate and classify the seven unranked dams in Guilford.	Canceled	CTDEEP has jurisdiction over dams.	NO (see explanation at left)
30	Public Outreach for Wildfire Hazards	Continue to support public outreach programs to increase awareness of forest fire danger, equipment usage, and protecting homes from wildfires.	Completed + To Be Continued	Fire Department web page	YES (see Action #17)
31	Phragmites Control	Develop a program of phragmites control that minimizes fires (work with CT DEEP on Phragmites Control Projects).	Canceled	Town is doing some on their properties now, but CT DEEP has limited resources available for this work at this time.	NO (see explanation at left)

Table 26. Updated Mitigation Actions (2023-2028) – Town of Guilford.

Action #	Action Title	Action Description	Estimated Cost	Potential Funding Source	Lead Department	Implementation Schedule	Priority
1	Falcon Road Seawall & Road Elevation	Develop plans for reconstructing seawall and elevating road	High	LOTCIP & Local Funding	Engineering	2023	High
2	Pearl Street & Ivy Street Flooding &	Drainage area analysis and culvert analysis for improvements to relieve neighborhood flooding	Medium	DEEP Climate Resilience	Engineering	2023	Medium

Action #	Action Title	Action Description	Estimated Cost	Potential Funding Source	Lead Department	Implementation Schedule	Priority
	Boston Street Culvert			Fund; LOTCIP; Municipal CIP Budget			
3	Generators for Critical Facilities	Generators for Critical Facilities, Town Hall South, Guilford Library, Transfer Station	Medium	Municipal CIP Budget	EMA, BOS	2024	Medium
4	Lake Quinnipaug Dam Upgrade	Rebuild dam at Lake Quonnipaug	High	Municipal CIP Budget	Engineering	2023	High
5	Public Outreach and Education for Natural Hazards	Disseminate informational pamphlets regarding natural hazards to public and add pages to the Town website dedicated to citizen education and preparation for natural hazard events. These efforts will be aimed at promoting increased awareness and education on what businesses and property owners can do to prepare and prevent property damage and reduce injury and loss of life.	Low	Staff time	HMC, Engineering	2023	High
6	Coordinate with DOT on Flood Mitigation	Work with CT DOT to mitigate flooding problems along Route 146 at West River (upgrade bridge), Long Cove, Great Harbor/Hidden Lake (upgrade culverts) and along Leetes property.	Very High	CTDOT	Engineering	2023	High

Action #	Action Title	Action Description	Estimated Cost	Potential Funding Source	Lead Department	Implementation Schedule	Priority
7	Upgrade Community Center	Upgrade the Community Center to improve its viability as one of two primary shelters. Contract Engineer to inspect building and create recommendations regarding structural integrity for different storm events.	High	FEMA HMA (BRIC / HMGP); CEDAP, EOC	BOS, EMA, DPR	2025	Medium
8	Elevate Low Spots on Chimney Corner Road	Create design plans to elevate low spots on Chimney Corner Road.	High	FEMA HMA (BRIC / HMGP); DEEP Climate Resilience Fund	DPW	2024	Medium
9	Erosion Control Study	Conduct study of erosion control alternatives at Jacobs Bch, Chittenden Bch, Grass Is., and Chaffinch Is; create conceptual designs; implement feasible/prudent alternatives.	High	FEMA HMA (BRIC / HMGP); DEEP Climate Resilience Fund	HMC, DPW	2024	Medium
10	Municipal Roof Load Study	Conduct a study to identify municipal buildings, critical facilities, and others that are vulnerable to roof damage or collapse due to heavy snow.	Medium	FEMA HMA (BRIC / HMGP); Municipal CIP Budget	DPW, B&E, BOE	2025	Medium

Action #	Action Title	Action Description	Estimated Cost	Potential Funding Source	Lead Department	Implementation Schedule	Priority
11	Incorporate Dam Failure Areas into Reverse 911 System	Include dam failure areas in the Reverse 911 emergency contact database.	Low	Staff time	EMA	2024	Medium
12	Living Shoreline for Chittenden Beach	Chittenden Beach living shoreline – Develop permit-level plans with required studies to obtain permits from CT DEEP and USACE.	Medium	FEMA HMA (BRIC / HMGP); DEEP Climate Resilience Fund	Natural Resources, Harbor Management	2023	Medium
13	Relocate Public Works Facility	Relocate the Public Works Facility outside a flood zone and hurricane surge zone.	Very High	FEMA HMA (BRIC / HMGP)	BOS, DPW	2024	Low
14	Infrastructure Upgrades along West River	Upgrade bridges and culverts along West River south of Lake Quonnipaug.	High	FEMA HMA (BRIC / HMGP); IIJA BIP	DPW	2023	Low
15	Drainage Improvements for Munger Brook	Improve drainage and Munger Brook flood conveyance in the area that floods between County Road and Route 80.	Medium	FEMA HMA (BRIC / HMGP); Municipal CIP Budget	DPW	2026	Low
16	Accommodate Migration of Tidal Wetlands	Set aside sufficient land for landward migration of tidal wetlands.	Very High	Bonds	BOS	2023-2028	Low
17	Public Outreach for Wildfire Hazards	Continue to support public outreach programs to increase	Low	Staff time	FD	2023-2028	Low

Action #	Action Title	Action Description	Estimated Cost	Potential Funding Source	Lead Department	Implementation Schedule	Priority
		awareness of forest fire danger, equipment usage, and protecting homes from wildfires.					
18	Increase Funding for Tree Warden	Increase funding for the Tree Warden to address a wider range of tree limb hazards than the current budget allows, including tree removals.	Medium	Municipal Operating Budget	TW, BOS	2023-2028	High
19	Coordinate with SCRCOG on Mitigation Funding Opportunities	Continue to coordinate with SCRCOG and neighboring communities in the region as it relates to positioning the Town to pursue and capture future grant funding for regional hazard risk reduction projects.	Low	Staff time	Engineering/ Natural Resources HMC	2023-2028	Medium
20	Floodplain Management Training	Establish a goal to have each plan reviewer and building inspector attend a related training periodically (for example, ASFPM's Annual National Conference, chapter conferences, webinars, etc.).	Low	Municipal Operating Budget / Staff time	Engineering, Natural Resources, Building & Planning & Zoning	2023-2028	Medium
21	Coordinate with CIRCA on Resilient Opportunity Areas	Work with CIRCA to determine whether the TOD resilience opportunity area identified by Resilient Connecticut should be scoped for project development.	Low	Staff time	Engineering/ Natural Resources HMC	2023-2028	Medium