Middlesex, Vermont

2025 Local Hazard Mitigation Plan

FEMA Approval Pending Adoption Date:

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Central Vermont Regional Planning Commission

Contents

1 INTRODUCTION

Mitigation planning allows local governments to lessen the impact of the next natural disaster. The goal of this Plan is to advance and prioritize mitigation investment to reduce risks posed by natural hazards and to increase the Town of Middlesex's resilience to damages from natural hazard impacts and to protect the Town's residents and businesses from harm when possible.

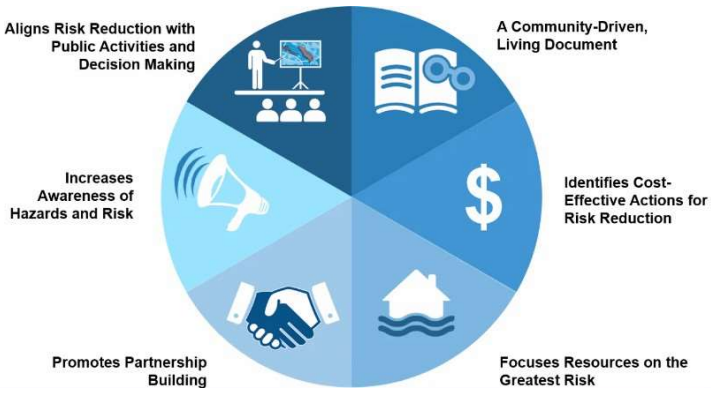
Hazard Mitigation is any sustained policy or action that reduces or eliminates long-term risk to people and property from the effects of natural hazards. FEMA (Federal Emergency Management Agency) and state agencies have come to recognize that it is less expensive to prevent disasters than to repeatedly repair damage after a disaster has struck. This Plan recognizes that opportunities exist for communities to identify mitigation strategies and measures during all the other phases of Emergency Management – Preparedness, Response and Recovery. While the hazards can never be completely eliminated, it is possible to identify what the hazards are, where their impacts are most severe, and identify local actions and policies that can be implemented to reduce or eliminate the severity of the impacts.

In the wake of the 2023 July flood, December rain on snow event that caused flooding, and the July 2024 floods, the Town has an increased focus on mitigating flooding specifically, but all hazards in general to their residents.

2 PURPOSE

This Plan helps the Town identify natural hazards facing the community, ranking them according to local vulnerabilities, and developing strategies to reduce risks from those hazards. Once adopted, this Plan is not legally binding; instead, it outlines goals and actions to prevent future loss of life and property.

The benefits of mitigation planning include:



Source: FEMA LHMP Skill Share Workshop 2021

Furthermore, the Town seeks to be in accordance with the strategies, goals, and objectives of the 2023 State Hazard Mitigation Plan.

3 COMMUNITY PROFILE

Land Use and Development Patterns

The Town of Middlesex is approximately 39.9-square miles in size and is located in the northwest quadrant of Washington County. It is bordered by Worcester to the north, by East Montpelier and Montpelier to the east, by Berlin and Moretown to the south and by Waterbury to the west. Middlesex is classified as a rural town and is characterized by large, forested areas and open fields.

The village of Middlesex is located near the interstate exit at the intersection of Route 2 and Route 100B. It is an historic settlement of residential, municipal, and commercial buildings. Putnamville

is an additional historical residential hamlet located on Route 12, north of the Wrightsville Reservoir. Additional development in Middlesex is scattered low-density residential development. Aside from ongoing and completed buyouts of properties at high risk of flooding, there have not been recent changes in Middlesex's land use. These buyouts will reduce hazard risk.

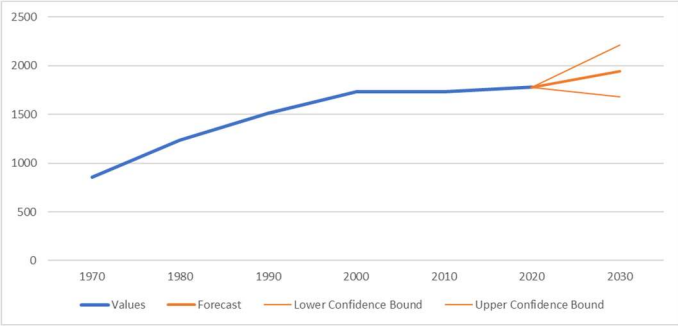
Land Features

The Town is located within the Winooski Valley watershed and major waterways include Martins Brook which flows into the man-made Wrightsville Reservoir in the eastern quadrant. The Winooski River runs along the town's southern boundary from Montpelier toward Lake Champlain.

Demographics and Growth Potential

According to the US Census, the estimated population of Middlesex in 2020 numbered 1,779 living in 752 housing units. New development in Middlesex continues to be scattered rural residential. The new development is limited and scattered and not in the floodplain so does not increase the vulnerability for the Town.

Since 2000, the Town's population has been slowly increasing. The population was 1,731 in 2010 and 1,729 in 2000, according to the US Census.



Source: Census data with Excel expected growth projection

In 2020, the median age of Middlesex residents was 48.5; higher than the Vermont median age of 42.9. Between 2000 and 2020, the median age of Middlesex increased by 11.2 years, from 37.3 in 2000, according to census data. The portion of the population over 65 was 22.9%, compared to 20.6% in Vermont and 16% in the country. The population density of the Town is 45 people per square mile compared to an overall state density of 68 people per square mile.

The population data show that Middlesex's population is aging, which mirrors statewide trends. Being a small rural community, Middlesex's aging population has direct implications on services and volunteerism. Since the town is served by both volunteer fire and EMS services, it may become harder to fill these roles as the population continues to age. This also increases the overall risk to the community from all hazards, especially those that contribute to power outages, because older residents have a higher likelihood of needing medical assistance devices. Older residents also can be more adversely impacted by evacuations during natural disasters.

We currently do not have good census data to quantify the influx of residents who relocated to Middlesex during the Covid-19 pandemic (DR-4532); however, press reports stated that this was a trend statewide, likely including Middlesex. Some previous second homes were converted into full-time residences.

Climate change is anticipated to increase the frequency and intensity of hazards, resulting in greater impacts to the community assets identified in the hazard profiles, including people. Land use changes can either increase or decrease the impacts of hazards. Middlesex has recently updated their Town Plan (2022) and zoning (2023) to help prevent

development that may be vulnerable to hazards and climate change. As the population of the community ages, as discussed, overall vulnerability to all hazards may increase due to challenges in communication, preparing for or responding to hazards, mobility challenges, and greater susceptibility to hazards.

It is important as a community that we utilize appropriate preplanning for development to minimize future risk. This can be through bylaws and ordinances to create pathways for smart development. With the real-world impacts of climate change upon us, it is critical to address the increased risks of heavy snow, ice, high winds, wildfire, invasive species migration, and flooding directly impacting our communities, in addition to the greatest risk in Vermont (as recognized in the State Hazard Mitigation Plan), fluvial erosion. Making sure that we have smart development away from flood- and erosion-susceptible areas is paramount to a resilient future.

Precipitation and Water Features

Average annual precipitation is 43 inches of rain; with July being the wettest month. Average annual snowfall is 99 inches; with February being the snowiest month.

The Winooski River, the North Branch of the Winooski River, Mad River, Great Brook, Martins Brook (AKA Shady Rill), Sunny Brook, and the Wrightsville Reservoir are the major water features in Middlesex.

Drinking Water and Sanitary Sewer

Middlesex has no municipal water or wastewater treatment facility. Residents rely on private wells and springs and ground-treatment septic systems. The State of Vermont Regional Office issues water/wastewater permits for soil-based wastewater systems with flows less than 6,500 gallons per day, for potable water supplies (water supplies that are not public), and for municipal water and sewer connections.

Transportation

The major transportation corridor in Middlesex is Interstate 89 which runs parallel to Route 2, the Central Vermont Railroad, and the Winooski River. According to the Middlesex Town Plan 2019 "the I-89 exit in Middlesex is along the most heavily traveled section of the highway in the state and the Middlesex exit is one of the least commercially developed exits in central Vermont." Route 12 runs north-south along the eastern edge of the Town, through the village of Putnamville.

Middlesex has 77.75 miles total traveled highways, according to the 2024 VTrans Certificate of Highway Mileage. 60.75 miles are owned by the Town: 0 miles of Class 1, 15.92 miles of Class 2, 32.19 miles of Class 3, 9.14 miles of Class 4, and 3.5 miles of Legal Trails. In addition, there are 17 miles of State highway and Interstate.

There are 23 publicly owned bridges in Middlesex. Six are owned by the Town: three short structures (6'-20' length) and three long structures (>20' length). Additionally, there are 17 State-owned long structure bridges in Middlesex along State highways and the interstate. The Town's three long structures are inspected every two years by VTrans through the Town Highway Bridge Program.

Middlesex has a total of 423 culverts in the municipal road right-of-way, according to the

2022 CVRPC culvert inventory. 16 culverts were listed as closed, two were listed as urgent, and 89 were listed as poor at the time. (As detailed below, this data is likely outdated due to repairs and upgrades after July 2023 and July 2024 floods that washed out numerous road segments. The Mitigation Action table in Section 6 lists culverts that are currently the Town's top priorities for replacement and/or upgrade or cleaning in accordance with the 2013 Town Road and Bridge Standards. The local road network is maintained by the municipal Public Works Department, whose garage is currently located on Shady Rill Road.

According to the Town's 2023 road erosion inventory, 41% of Middlesex's road mileage is hydrologically connected - meaning it is within 100 feet of a water resource (i.e., stream, wetland, lake, or pond). Proximity to water resources can make these sections of road more vulnerable to flooding and fluvial erosion. These sections must be up to the standards created for the Municipal Roads General Permit program with a requirement of 7.5% of non-compliant segments being upgraded per year.

Electric Utility Distribution System

Electricity is provided by Green Mountain Power (GMP) and Washington Electric Coop.

Electric service to approximately 884 accounts is provided by Green Mountain Power (306) and the Washington Electric Cooperative (578). Data is from the Central Vermont Regional Plan.

Public Safety

Police services are supplied by Vermont State Police. The Middlesex Volunteer Fire Department (MVFD) is responsible for fire protection and provides initial emergency medical services. The MVFD operates from two stations: one located in the village, and one located on Shady Rill Road between the Rumney School and the Town Garage. According to the Town of Middlesex, Vermont Annual Report 2023, the MVFD responded to a total of 99 FD calls in town, and 14 calls from neighboring communities. Medical first response service is provided the volunteer Middlesex FAST Squad and the Town contracts with the City of Montpelier for ambulance service. The Middlesex FAST Squad responded to 168 calls in 2023 in addition to the MVFD.

Emergency Management

Middlesex has adopted and approved the Local Emergency Management Plan (LEMP), which is updated and adopted annually. The LEMP was last updated in April 2024 and is due for renewal by May 1, 2025. In conjunction with the LEMP, on March 25, 2014, the town adopted the use of the National Incident Management System (NIMS) as the standard for management and systematic approach involving all threats and hazards, regardless of cause, size, location, or complexity, in order to reduce loss of life, property, and harm to the environment.

Per the Town's LEMP, the Select Board Chair Liz Scharf serves as Emergency Management Director and Stephen Dennis serves as Emergency Management Coordinator. They work with the Town Administration, Select Board, and Planning Commission to keep the LEMP up to date and coordinate with nearby municipalities and regional emergency planning efforts. This plan is updated yearly.

4 PLANNING PROCESS

Plan Developers

The Town assembled a Hazard Mitigation Planning Team to participate in updating the Plan. Team members included: Town Clerk, Road Foreman/Fire Chief, Emergency Management Coordinator, Select Board Chair, Planning Commission Chair, a current Select Board member, and a former Select Board member.

The CVRPC assisted the Town with this Plan update. FEMA Building Resilient Infrastructure and Communities (BRIC) funds supported this process.

Plan Development Process

The 2025 Local Hazard Mitigation Plan is an update to the 2018 single jurisdiction mitigation plan. A summary of the process taken to develop the 2025 update is provided in **Table 2**.

Table 2: Plan Development Process

June 10, 2043: Kick-off meeting. Discussed what an LHMP is; benefits of hazard mitigation planning; current plan status; planning process; outreach strategy; and plan sections. Planning Team working meetings were open to the public. Worked on Section 1,2 and began 3.

July 2024: To notify the Whole Community* of the plan update, the Town posted physical and online notices. Physical notices were posted at the Town Office, Online notices were posted on the Town website (middlesexvermont.org)), and Front Porch Forum.

*Whole Community stakeholders include: 1) local and regional agencies involved in hazard mitigation; 2) entities with authority to regulate development; 3) neighboring towns; 4) representatives of business, schools/academia, and other private organizations that sustain community lifelines; and 5) representatives of nonprofit organizations that work directly with or provide support to vulnerable populations.

CVRPC posted online notices on the CVRPC website ((centralvtplanning.org). CVRPC also direct emailed notice to:

Table 2: continued Plan Development Process

1) officials (Selectboard and Planning Commission chairs, Town Managers and Clerks, Emergency Management Directors) in neighboring towns of Berlin, East Montpelier, Montpelier, Moretown, Waterbury and Worcester

2) Key Partners (Friend of the Winooski, Winooski Natural Resources Conservation District, Winooski Basin CWSP, VDH Regional Emergency Preparedness Specialist, VTrans District 6 Projects Manager, Central VT Floodplain Manager). Notice included CVRPC contact for information on planning process and opportunities for public input – see **Appendix C**.

July 31, 2024: Planning Team working meeting – confirmed plan purpose (Section 2). Planned next meeting for hazard risk assessment (Section 5).

August 5, 2024: Planning Team working meeting. -Team met and utilized ranking table to complete the hazard profile. Comments were collected and incorporated into Section 5.

August 8, 2024: To solicit input from the Whole Community, the Town utilized a survey (see **Appendix D**) and hosted an in- person Community Workshop on **August 8, 2024 with 6 attendees**. The Town provided notice of the survey and workshop by posting physical notices at the Middlesex Town Office, and online notices on the Town website, Town Facebook page, and Front Porch Forum. Public Comments were collected and incorporated into the mitigation actions plan.

CVRPC posted online notices on the CVRPC website of the opportunities to provide input on where each hazard might impact the Town; assets most likely to be affected; and preferred types of mitigation actions (Sections 5 and 6). CVRPC also direct emailed notice of the survey and to local officials in neighboring towns and Key Partners – see **Appendix C**.

August 26, 2024: Planning team meeting to begin development of Mitigation Actions Plan action options. (Section 6)

September 5, 2024: Planning team reviewed mitigation action list Table 5 and ranked actions utilizing matrix to achieve STAPLEE compliance. From this town developed Table 6 mitigation action plan. (Section 6)

In addition to the local knowledge of Planning Team members and other relevant parties, several existing plans, studies, reports, and technical information were utilized in the preparation of this Plan. A summary of these is provided in **Table 3.**

Table 3: Plans Utilized, Studies, Reports & Technical Information

2022 Zoning Map Referenced to develop Community Capabilities, Integrating into Existing Plans and Procedures, Mitigation Strategy Updates – Changes Since 2018 Plan in Section 6.

2020 and 2000 US Census Data Used to develop the Demographics and Growth Potential information in Section 3.

2023 State of Vermont Hazard Mitigation Plan Primarily referenced to develop the risk assessment and profiles in Section 5.

2017 FEMA Region 1 Mitigation Ideas for Natural Hazards Used to develop mitigation actions to address impacts from severe winter storms, high wind, and floods.

2023 Road Erosion Inventory Referenced to develop the risk profile in Section 5 and mitigation actions to address floods in Section 6.

2013 FEMA Mitigation Ideas Resource for Reducing Risk to Natural Hazards Used to develop mitigation actions to address impacts from severe winter storms, high wind, and floods.

VTrans Town Highway Bridge Inspection Reports Referenced to develop the risk profile in Section 5 and mitigation actions to address floods in Section 6.

National Oceanic and Atmospheric (NOAA) National Climatic Data Center's Storm Events Database Referenced to develop the risk profile and hazard history in Section 5.

FEMA Disaster Declarations for Vermont Referenced to develop the risk profile and hazard history in Section 5.

Vermont Department of Health Referenced to develop the risk profile in Section 5.

Vermont Department of Conservation Stream Geomorphic Assessments-Structures Used to identify bridges and culverts that are undersized and prone to failure mitigation actions to address floods in Section 6.

Table 3: Cont..

Vermont Agency of Natural Resources Natural Resources Atlas Referenced to develop the risk profile in Section 5.

2021 Vermont Climate Assessment Referenced to develop the flood risk profile in Section 5.

2024 Local Emergency Management Plan Primarily used to identify local organizations that support vulnerable populations to ensure these organizations are invited to participate in the plan update.

2006 Structures Inventory (culverts and short structures) Referenced to develop the risk profile in Section 5 and mitigation actions to address floods in Section 6.

2023 FEMA NFIP Ins. Reports and 2013 Flood Ins. Study Used to determine how many structures are insured, number of repetitive loss properties, and describe NFIP compliance in Section 6 and Section 5 risks.

Mitigation Assistance Program Policy Guide Used to ensure plan meets the Federal mitigation planning requirements, including those for addressing climate change.

Vermont Dam Inventory (VDI) Referenced to develop the risk profile in Section 5 and mitigation actions to address floods in Section 6.

2022 Middlesex Town Plan Referenced to develop Community Capabilities, Integrating into Existing Plans and Procedures, Mitigation Strategy Updates – Changes Since 2018 Plan in Section 6.

March 2023 Middlesex Land Use and Development Regulations Referenced to develop Community Capabilities, Integrating into Existing Plans and Procedures, Mitigation Strategy Updates – Changes Since 2018 Plan in Section 6.

2023 FEMA Local Mitigation Planning Handbook Used to ensure plan meets the Federal mitigation planning requirements, including those for addressing climate change.

VTrans Transportation Resilience Planning Tool Referenced to develop the risk profile in Section 5 and mitigation actions to address floods in Section 6.

Mitigation Strategy Update - Changes Since 2018

The 2018 local hazard mitigation planning effort analyzed natural hazards and the risk they posed to Middlesex. The risk assessment resulted in the categorization of Highest risk level hazards and other hazards. Floods and fluvial erosion, severe storms, ice jams, and dam failure were ranked as the community's High-risk natural hazards. Actions proposed in 2018 focused on mitigating risks from flooding and fluvial erosion, severe storms and dam failures.

As the Town has sought to implement the 2018 mitigation strategy, they have looked for opportunities to incorporate information and recommendations from the 2018 Plan into other plans, programs, and procedures. They were successful in doing so in the 2019 Town Plan update and 2023 Land Use & Development Regulations update.

The Middlesex Town Plan, adopted in 2019, serves as the Town's framework and guide for reaching community goals, including those for how future growth and development should proceed.

It includes flood resilience and land use policies and actions to support the goal of mitigating risks to public safety, critical infrastructure, historic structures, and municipal investments posed by flooding and fluvial erosion.

The Town Plan is the basis for local land use controls such as those in the Land Use & Development Regulations, adopted in 2023. Middlesex's Flood Hazard Area Regulations to ensure the selection, design, creation, and use of development in these hazard areas is reasonably safe and accomplished in a manner that is consistent with public wellbeing, does not impair stream equilibrium, floodplain services, or the stream corridor.

In addition, Middlesex made significant progress in completing other mitigation actions identified in the 2018 Plan – see **Appendix A**.

Noteworthy mitigation accomplishments are highlighted below:

The Town has updated its Town Plan and Land Use & Development Regulations to exceed FEMA's minimum standards for Special Flood Hazard Area development and has adopted interim River Corridor Bylaws.

The Town has begun participating in VT Alert to warn residents of emergencies.

The Town has assisted three buyouts of properties at risk of flooding and 16 additional buyouts are ongoing.

Actions taken by Middlesex since 2018 have made the community more prepared and less vulnerable to future natural hazard impacts.

As described in the Community Profile above, Middlesex's population has not changed significantly since 2018. Proximity to frequently-flooded population centers like Montpelier and Barre City and the abundance of undeveloped land in Middlesex may drive future population growth in the Town; however, much of the land is not easily

developable due to slope.

Property buyouts and regulating new development will reduce future flood damages. Many of the properties at highest risk of flooding have received or are pursuing buyouts with the Town's support. The Town's flood hazard area and interim river corridor zoning regulations will limit future development in areas at highest risk of flooding. Adopting permanent river corridor zoning regulations will help further limit future flood damages.

Vermont is projected to have increased risk of wildfires due to climate change. Middlesex's current settlement pattern of sparse development in large tracts of forested land may lead to high risk for residents if wildfires do occur.

Changes in population and development since 2018 have not made Middlesex more vulnerable to natural hazards. Rather, changing weather conditions most influenced the Town's current mitigation strategy.

Climate change is increasing the frequency, duration, and intensity of storms, floods, fires, and extreme temperatures across the nation. Local communities are feeling the impacts of climate change now, and these multi-hazard trends are expected to continue to increase in severity over the next century[1]

As a result, Middlesex considered the effects of future conditions, like climate change, on the type, location, and range of intensities of identified hazards when they conducted the risk assessment in 2024 for the 2025 Local Hazard Mitigation Plan. The highest risk hazard impacts that the Town believes they are most vulnerable to remained essentially the same as those from 2018:

- **Inundation Flooding and Fluvial Erosion/Flash Flooding**

In the 2018 Plan, dam failure was a higher concern for the Town, largely because of the possibility that the Marshfield #6 Dam would release water during high-precipitation events like 2011's Tropical Storm Irene. The Hazard Planning Team and community outreach indicated that dam failure is still a concern in 2025, but less so than in 2018 because nearby dams have been upgraded to reduce the likelihood of failure and the town has made progress toward reducing residents' risk through property buyouts and participating in emergency alert systems. Dam failure is addressed in the 2025 Local Hazard Mitigation Plan in combination with inundation flooding and fluvial erosion since those are the direct impacts through which dam failure would affect Middlesex residents.

As climate change increases the frequency of freeze-thaw cycles, muddy roads have emerged as a higher priority for the Town in 2025. Of particular concern is the potential for emergency vehicles to be unable to access certain areas that may be cut off by muddy roads. The Town has already begun developing an inventory of locations that are prone to mud and will continue to build that inventory to inform future mud mitigation actions. These actions may include increasing drainage, paving problem areas, widening/reinforcing existing dirt roads, or developing alternative access routes to areas that are cut off.

During public outreach, Middlesex residents expressed that Brook Road and the Great

[1] FEMA Hazard Mitigation Assistance Program and Policy Guide, March 23, 2023.

Brook, river corridor were of particular concern due to repeated road washouts and residences affected by fluvial erosion. As detailed in Section 6, the Town identified developing a Great Brook Hazard Mitigation Plan as a high-priority hazard mitigation action.

In addition to the traditional natural hazards assessed for the 2025 Plan, the Town also considered infectious disease and invasive species to align with the hazards identified in the 2023 State Hazard Mitigation Plan.

The primary mitigation goal in the 2025 Plan is to increase the Town's resilience to natural hazards by advancing mitigation investment to reduce or avoid long-term risk to people, homes, neighborhoods, the local economy, cultural and historic resources, ecosystems, and Community Lifelines.

When evaluating mitigation actions, the Town selected actions that support the mitigation goal and are acceptable and practical for the community to implement. Actions that directly benefit a vulnerable population were assigned a high prioritization score – see **Table 6**.

***This Plan defines a natural hazard as a source of harm or difficulty created by a meteorological, environmental, or geological event.**

FEMA Local Mitigation Planning Handbook, May 2023

5 HAZARD IDENTIFICATION AND RISK ASSESSMENT

Local Vulnerabilities and Risk Assessment

One of the most significant changes from the 2018 Plan is the way hazards are assessed. To be consistent with the approach to hazard assessment in the 2023 State Hazard Mitigation Plan, the Hazard Mitigation Planning Team conducted an initial analysis of known natural hazard events* to determine their probability of occurring in the future (high probability events are **orange** in **Table4**).

The Team then ranked the impacts associated with the natural hazard events based on 1) probability of occurrence and 2) potential impact to people, infrastructure, the environment, and local economy.

This assessment considered the effects of future conditions, like climate change, on the type, location, and range of intensities of identified hazards.

The ranking results are presented in **Table 4** and reflect the following **Primary Hazard Risks** that the Town believes they are most vulnerable to:

***Floods** both flash flooding and inundation during severe storm events*

***Landslides** often associated with fluvial erosion and flooding events.*

The **hazard risks** are profiled in this section. Lower risk hazards justify mitigation but to a

lesser extent due to a low probability of occurrence and/or low impact.

The planning team decided that lower risk hazards for Middlesex included Hail and Earthquakes. Historically, hail has had minimal damage to Middlesex and the damage that has occurred has been primarily to vehicles. Middlesex has experienced earthquakes, but they have been small with minimal damages, plus in a state with no building codes, the Town of Middlesex has limited ability to develop effective mitigation strategies to prevent earthquake damage. See the State Hazard Mitigation Plan for information on the lower risk hazards.

Table 4: Community Hazard Risk Assessment

2025 Hazard Mitigation Plan - Hazard Assessment							
Hazard Impacts	Probability	Potential Impact					Score*:
		Infrastructure	Life	Economy	Environment	Average	
Fluvial Erosion	4	4	2	4	4	3.5	14
Inundation Flooding	4	2	2	3	2	2.25	9
Ice	4	3	2	2	1	2	8
Snow	4	2	1	2	1	1.5	6
Wind	3	2	1	2	2	1.75	5.25
Heat	3	1	1	1	1	1	3
Cold	3	1	1	1	1	1	3
Drought	3	1	1	1	1	1	3
Landslides	4	4	2	4	4	3.5	14
Wildfire	2	1	1	2	3	2	4
Invasive Species	4	1	1	1	3	1.5	6
Infectious Disease Outbreak	2	3	3	3	3	3	6
Hail	3	1	1	1	1	1	3
Earthquakes	1	1	1	1	1	1	1

*Score = Probability x Average Potential Impact

The following were chosen as low risk and/or not able to be mitigated by the Town.

- Earthquakes - minimal risk in region
- Hail - most damages in region come from associated strong wind (severe storm)

	Frequency of Occurrence: Probability of a plausibly significant event	Potential Impact: Severity and extent of damage and disruption to population, property, environment, and the economy
1	**Unlikely:** <1% probability of occurrence per year	**Negligible:** isolated occurrences of minor property and environmental damage, potential for minor injuries, no to minimal economic disruption
2	**Occasionally:** 1–10% probability of occurrence per year, or at least one chance in next 100 years	**Minor:** isolated occurrences of moderate to severe property and environmental damage, potential for injuries, minor economic disruption
3	**Likely:** >10% but <75% probability per year, at least 1 chance in next 10 years	**Moderate:** severe property and environmental damage on a community scale, injuries or fatalities, short-term economic impact
4	**Highly Likely:** >75% probability in a year	**Major:** severe property and environmental damage on a community or regional scale, - multiple injuries or fatalities, significant economic impact

IMPACT DEFINITIONS

INFRASTRUCTURE IMPACTS: (Effects on Roads, Bridges, Structures, Homes)

- 1—Minor: Localized/Isolated impacts to Infrastructure (Temporary loss of use)
- 2—Moderate: Neighborhood level impacts (1-2-day loss of use)
- 3—Severe: Community-wide impacts (2-5-day Loss of use)
- 4—Disastrous: Regional losses of roads, bridges, homes (Extensive replacement/rebuild)

LIFE SAFETY ISSUES: (Health and Welfare of Population)

- 1—Minor scrapes/injuries
- 2—Occasional Hospitalization required due to injuries
- 3—Multiple hospitalizations required and/or fatality
- 4—Community-wide hospitalizations and/or fatalities

ECONOMIC IMPACTS: (Direct recovery costs to municipality and residents)

- 1— < $10,000 in damages (Can generally be handled within budget or via insurance)
- 2—$10,000-$100,000 (May require assistance for the uninsured or large impact on local budget)
- 3—$100,000-$1,000,000 (Requests of assistance/FEMA eligible)
- 4— > $1,000,000- (All resources used, Possible National Guard use)

ENVIRONMENTAL IMPACTS: (Effects to municipal operations and environment)

- 1 – Negligible: Short term impacts, low clean-up costs for spills
- 2 – Minor: Moderate clean-up costs, temporary redirection of municipal resources
- 3 – Moderate: Extended redirection of local resources/ impacts to normal operations, high clean-up costs
- 4 – Major: Long-term recovery efforts (could take years for full recovery or permanent loss of use)

Highest Risk Hazard Profiles

Floods (fluvial erosion, inundation, dam failure) can damage or destroy property; disable utilities; destroy or make impassable roads and bridges; destroy crops and agricultural lands; cause disruption to emergency services; and result in fatalities. Floods were ranked as the highest threat again for 2025, though the Middlesex planning team's emphasis shifted from dam failure-related flooding (the highest threat in the town's 2018 LHMP) to flash flooding caused by severe storms. This shift is due to safety measures implemented at dams in and upstream of Middlesex and severe flooding in July 2023 and July 2024.

People may be stranded in their homes without power, heat, or communication or unable to reach them for an undetermined period of time during the flood event. Long-term collateral dangers include damages to public utilities, including water, sewer, storm drains and telecom utilities, and additionally loss of fuel storage tanks, fires, release of hazardous materials and mold growth.

As noted in the 2023 State Hazard Mitigation Plan and 2021 Vermont Climate Assessment, the most common recurring hazard event impacting Vermont communities is flooding. There are two types of flooding: inundation and flash flooding. Inundation is when water rises onto low lying land. Flash flooding is a sudden, violent flood which often entails stream bank erosion (fluvial erosion).

Inundation flooding of land adjoining the normal course of a stream or river is a natural occurrence. If these floodplain areas are in their natural state, floods likely would not cause significant damage.

While inundation-related flood loss can be a significant component of flood disasters, the more common mode of damage in Vermont is fluvial erosion, often associated with physical adjustment of stream channel dimensions and location during flood events. These dynamic and often catastrophic adjustments are due to bed and bank erosion of naturally occurring unstable stream banks, debris and ice jams, or structural failure of or flow diversion by human-made structures.

"Damage from high flows is the single most costly type of disaster in Vermont, primarily due to the erosive power of water. Many roads and culverts conflict with the room needed by streams and rivers."
2021 Vermont Climate Assessment

Several major flooding events have affected the State in recent years, resulting in multiple Presidential Disaster Declarations. From 2003 to 2019, Washington County experienced roughly $88.82 million in property damage due to flood events. The impacts from the most recent July 2024 flood event are still being totaled at the time of this writing.

The most recent flooding event to strike the Town came in July of 2024 (DR-4810). This impacted many homes that had been damaged in 2023 flooding. In July of 2023 (DR4720) which inundated almost the entire FEMA designated special flood hazard area plus other outlying areas had impacted the Town. This event was caused by an atmospheric river that dropped between 5"-9" of rain throughout the region on already saturated soils causing 1 death within the county. This event caused significant economic damage to the region both in losses to housing and economic damage to businesses. The previous record from recent history was from Tropical Storm Irene (DR-4022), which dropped up to 5-7+"of rain in some areas of Washington County. Irene caused 2 deaths and $75 million in reported property damage and $2.5 million in crop damage in Washington County.

The December 2023 rain on snow flooding affected the Town but the mitigations actions and response planning that have been implemented helped to prevent any large damages, limiting the effects to minor flooding of low-lying areas.

The Town is attempting to forge a path forward with trying to mitigate risk in these areas. The pace of these weather events has been hard for residents and the municipality to handle. The Town staff has performed remarkably well in responding and working through the responses to these events.

The Town is concerned with the increased temperatures in winter seasons brought on by climate change. The increase in temperature fluctuations and associated precipitation is worrisome due to rain on snow events that have impacted the region. The snowpack can become hazardous due to the rapid melting from rain on snow and sudden warming, fueling extreme and rapid runoff. The Town's overall risk has changed during the winter to a decreased risk of ice jam flooding and an increased risk of rain on snow events.

Middlesex is vulnerable to inundation flooding primarily along Great Brook, Sunny Brook, and the Winooski River main stem. A wide range of assets are at risk from inundation flooding in these areas. There are 65 buildings in the FEMA special flood hazard area, as well as roads, culverts, and bridges. There are no public buildings or buildings that are considered critical Town infrastructure in the special flood

hazard area.

Middlesex's infrastructure and some residences are at high risk of fluvial erosion. Many of the roads and bridges are in the fluvial erosion hazard area ("river corridor"). The Town has supported buyouts for residences in the river corridor and special flood hazard area, but some residents remain, and buyouts are at the owner's discretion.

The Town has completed three buyouts, and 16 buyouts are ongoing. The majority of the buyouts are along the Winooski River main stem on Three Mile Bridge Road, Rich Road, and Cross Road. Other buyouts are on the Winooski River North Branch on VT Route 12 and along Sunny Brook on Lower Sunny Brook Road.

Some affected residents have chosen to remain and have not chosen buyouts. Other residences have been affected by fluvial erosion but are ineligible for FEMA-funded buyouts because they are not located in FEMA's mapped special flood hazard area. FEMA's flood maps show inundation risk but not erosion risk and are based on outdated weather models that do not reflect climate change. FEMA expects to release updated maps in the coming years. These maps and Flood Insurance Studies (FIS) don't have much data on tributaries, generally only studying on the main branches. An example is that Shady Rill has no study data in the last FIS.

Other residences that are not at high risk of flooding may be isolated if access roads are washed out by fluvial erosion. Road repairs are becoming more costly and take time to complete. Estimated repair costs from the July 2024 flood totaled approximately $3.6 million, according to the Town's post-flood FEMA documentation. The Town is considering retiring sections of road that repeatedly wash out and is determining how to maintain access to residences. Adapting transportation infrastructure to increased precipitation and fluvial erosion will continue to be a high priority for Middlesex.

With inundation flooding, there are cascading impacts involving infectious disease and hazardous material. Floodwater can contain numerous types of infectious agents and host insects that can be vectors for disease transmission such as West Nile Virus. The waters also often hold a toxic stew of household chemicals, fuels, animal and human waste, and industrial chemicals.

Flash flooding can occur any time the area has heavy rain. It can impact areas that are located outside of designated floodplains, including the fluvial erosion hazard area along streams confined by narrow valleys (also known as River Corridors). Again, a wide range of assets are at risk from flash flooding.

As of July 2nd, 2024, the Town had recorded five buildings with repetitive loss payments totaling approximately $110,000. None of those five repetitive loss buildings had NFIP policies in force. There were four NFIP policies in force in Middlesex with a total insured value of $807,000. There had been 37 closed paid losses for a total of approximately $570,000.

The most common type of flash flood damage is road washouts and bank undermining. When runoff volumes exceed the capacity of the stormwater collection system (ditching and culverts), washouts can occur.

The Town's structures and road erosion inventories as well as VTrans Transportation Resiliency Planning Tool were used to help identify locations and assets at risk from flash flooding.

Almost all the roads in the town have been impacted by flash flooding. This has greatly impacted mobility during and after these events, especially along the Sunny Brook and the Great Brook.

65 buildings are in the Special Flood Hazard Area mostly single-family dwellings and businesses.

According to FEMA, 6% of these properties have flood insurance. In total, these 4 policies cover $807,000 in value.

There are 5 repetitive loss properties, none of which are insured.*

**Information on types of repetitive loss properties in Middlesex was not available due to FEMA's data access restrictions.*

Both fluvial erosion and inundation flooding can drastically affect the road network depriving locally important routes and/or access to critical facilities – such as Center Road, Shady Rill Road, and West Hill Road.

When roads are impacted by flooding, the Town coordinates with its Public Works Department, the Fire Department and both local and State Dispatch to close roads and set up detours. Road closures can create longer commute times and longer emergency service response times.

Additionally, ice jams and dam failures can result in flash flooding in Middlesex. Ice jams on the Winooski River main stem along Three Mile Bridge Road are possible, with impacts to nearby businesses and residents. As detailed above, property owners and the Town of Middlesex are pursuing numerous buyouts in that area.

There are three dams in Middlesex listed in the Vermont Dam Inventory (a database managed by the VT Dam Safety Program containing spatial, structural, historic, and regulatory information on dams in the state). Two are classified as high hazard potential and one is rated as minimal.

The high hazard dams in Middlesex are the Wrightsville Dam and Middlesex No. 2 Dam. Wrightsville Dam, located on the Winooski River North Branch in the northeast part of Middlesex, is a flood control and hydroelectric dam owned by the State of Vermont's Department of Environmental Conservation (DEC) and regulated by the DEC. Middlesex No. 2 Dam, located on the Winooski River main stem in the southeast part of town near the border with Moretown, is owned by Green Mountain Power and regulated by the DEC. Failure of Middlesex No. 2 Dam would likely affect downstream communities more than Middlesex.

The minimal hazard dam is Middlesex-3, which is located on Great Brook and is not under state or federal jurisdiction. Ownership data was not available on the Vermont Dam Inventory; however, Vermont Parcel Viewer indicated the dam was on a large, privately owned parcel.

High hazard potential dams upstream of the Town are Marshfield No. 6 Dam, East Barre Dam, and Thurman Dix Reservoir Dam.

The Marshfield No. 6 Dam (AKA Molly's Falls Dam) is located on Molly's Brook in Cabot. During the May 2011 flooding, high water levels reached more than 3.3 feet above the top of the service spillway; the flow of water over the spillways caused damage to roads and culverts downstream of the dam. During Tropical Storm Irene in August 2011, high water levels caused similar damage. Middlesex's flood risk related to potential failure of the Marshfield No. 6 Dam has decreased since 2018 due to various risk-reduction actions by the dam's owner. Since 2018, the dam has undergone the following maintenance repairs and modifications, according to the dam's 2022 Emergency Action Plan:

"Marshfield No. 6 Dam underwent maintenance repairs and modifications in 2018, 2020, and 2022 to address recommendations in past inspection reports. Maintenance in 2018 included improvements to the condition and performance of the earth-fill dam, service spillway, gatehouse, and downstream toe area. Work completed in 2020 included installation of new electrically actuated vertical slide gates at the service spillway and concrete side wall extensions. The work completed in 2022 was focused on the emergency spillway and included construction of a new reinforced concrete chute spillway with a lower stepped portion and plunge pool armoring."

The East Barre Dam is a flood control dam owned by the State of Vermont's Department of Conservation and regulated by the US Army Corps of Engineers on the Jail Branch of the Winooski River. The East Barre Dam only impounds water during high flow events. It is an earthen dam that is 1,632 feet long and 60 feet high with a maximum storage capacity of 23,550 acre-feet. It allows water passage through a culvert that when exceeded the overall capacity causes the impoundment to fill.

Upstream of the East Barre Dam on the Jail Branch is the Thurman Dix Reservoir Dam, which has a poor condition rating. This dam is an earthen dam that holds the water supply for and is owned by Barre City. Its normal storage pool is 1,070 acre-feet and maximum capacity is 2,280 acre-feet. The City is currently working with an engineer to assess the needs for the dam to improve its condition. The Thurman Dix dam failure extent would most likely be entirely within the Town of Orange since the inundation area would lie behind the East Barre dam.

Dams of Concern in Middlesex

Name	*Date built*	*Type*	*Location*	*Length and Height*	*Dimensions*	*Hazard Class*
Wrightsville Dam	1935	Earthen	North Branch, Middlesex	1,525 ft. x 115 ft.	Drainage: 68 sq. miles Surface area: 190 acres Storage: 2,800-acre ft. Max storage: 36,000 acre ft.	High hazard potential
Marshfield No. 6 Dam	1927	Earthfill	Molly's Brook, Cabot	1,100 ft. x 48 ft.	Drainage: 19 sq. miles Surface area: 411 acres Storage: 9,259-acre ft. Max storage: 13,526 acre ft.	High hazard potential
East Barre Dam	1933	Earthfill	Jail Branch, Barre Town	1,632 ft. x 65 ft.	Drainage: 39 sq. miles Surface area: 687 acres Storage: 0-acre ft. Max storage: 23,550 acre ft.	High hazard potential
Thurman W. Dix Reservoir	1950	Earth/ Gravity	Orange Brook, Orange	920 ft. x 50 ft.	Drainage: 9.35 sq. miles Surface area: 119 acres Storage: 1070 -acre ft. Max storage: 2280 acre ft.	High hazard potential

Table 5: Dams That Could Increase Middlesex Flooding

Flash flooding often entails stream bank or fluvial erosion. Several existing studies were used to help identify locations and assets at risk from fluvial erosion; specifically, structure Stream Geomorphic Assessments of the Winooski River's main stem and North Branch.

Stream Geomorphic Assessments (SGAs) provide information about the physical condition of streams and factors that influence their stability. The 2006 Upper Winooski-above Bolton Dam SGA identifies priority locations for river corridor protection, planting stream buffers, stabilizing stream banks, removing berms, and removing/replacing human- placed

structures (i.e., dams, bridges, culverts). There are a number of culverts in the Town that showed up in the SGA for structures as being undersized. Staff met with the Town Road Foreman to discuss locations for mitigation especially in the wake of the two federally declared disasters and many culverts having been replaced during the recovery from these events.

Stormwater Master Planning (SWMP) involves identifying stormwater, sediment, nutrient, and septic inputs to waterways and designing projects to mitigate those inputs; either eliminating them at the source through green stormwater infrastructure, septic system improvements, back road projects or improving floodplain access within the stream network to increase sediment attenuation. Middlesex has not completed a stormwater master plan.

As demonstrated in the above referenced studies, environmental impacts from flooding can be significant, especially to the water quality in the Winooski River and its tributaries. This can in turn have an adverse impact on local tourism, residents' health and recreation. Flood events with associated road closures can also have a short-term impact on the local economy due to fewer shopping trips and commuter delays.

The extent for fluvial erosion is across the entire Town, and more specifically along any of the natural drainage channels that are found along the hillsides. Inundation flooding extent is closely related to the FEMA defined special flood hazard area but can also be found around the intakes of larger underground culverts that can back up or fill with debris during large rain events. Any rain event with greater than 2"/hour or greater than 4" total is of great risk to the Town and residences.

The Town of Middlesex has a high vulnerability to inundation and fluvial erosive flooding due to the large amount of floodplain along the Winooski along the town's southern boundary. Most of the town lies upslope of this area reaching to the Worcester Range along the northwest boundary. The speed of runoff on the smaller watersheds has greatly impacted the transportation infrastructure in adjoining areas. This can be seen in the Martins Brook, Sunny Brook, Great Brook and along the Winooski in the special flood hazard area identified on FEMA flood maps.

Floods Hazard History

These are the most up to date significant events impacting Middlesex. Federal declarations are depicted in **bold**.

7/10/2024: DR-4810 4-6" rain: $ still to be determined.
12/18-19/23: 2" of rain on snow event
7/10/2023: DR-4720 5-9"" rain: $12,000,000 estimated local damages
7/20/2021: Heavy rain: $50,000 county damages
7/14/2020: 3-4" rain: $5,000 county damages
11/1/2019: 2-4" rain: $250,000 county damages
6/20/2019: Heavy rain: $25,000 county damages
5/20/2019: Heavy rain: $25,000 county damages
4/15/2019: DR-4445 1" rain with significant snow melt:
7/1/2017: DR-4330 3-4" rain the previous 3-4 days with flash flooding on 7/1/17: $240,000 county damages
7/19/2015: Heavy rain: $1,000,000 county damages
4/15-18/2014: DR-4178 heavy rain on snow event $250,000 county damages
6/25-7/10/2013: DR-4140 1-3" of heavy rain over a half hour: $625,000 county damages
8/28/2011: DR-4022 Tropical Storm Irene with 3-7+" rain: $75,000,000 Public county damages

As weather patterns shift and we see larger storms and more frequent freeze-thaw cycles, the Town will monitor for signs that rivers that have historically been stable becoming less stable, with increased erosion, widening, trees falling in from its banks, etc.

Landslides are the sliding of a large mass of rock, earth, or debris, down a sloped section of land. Landslides can be caused by rainstorms, fires, alternate freezing or thawing and/or the steepening of slopes by erosion or human modification. In Middlesex, landslides tend to occur or are exacerbated by fluvial erosion as most of the landslides occur on or near a stream bank, or during extreme wet conditions in areas of clay substrate.

Landslides were tied for the highest-ranked risk. The Middlesex planning team placing a greater emphasis on landslide risk mitigation than in 2018 reflects the team's concern that the town's hilly topography makes it vulnerable to landslides, especially during high rainfall. Because the town has limited flat, developable land outside of its river corridors and floodplains, many residences and roads are located on high ground that is at risk of landslide.

Landslides have three major causes: geology, morphology, and human activity.

Geology refers to characteristics of the material itself. The earth or rock might be weak or fractured, or different layers may have different strengths and stiffness.

Morphology refers to the structure of the land. For example, slopes that lose their vegetation to fire or drought are more vulnerable to landslides. Vegetation holds soils in place, and without the root systems of trees, bushes, and other plants, the land is more likely to slide away.

Human activity, such as agriculture and construction, can increase the risk of a landslide. Irrigation, deforestation, excavation, and water leakage are some of the common activities that can help destabilize, or weaken, a slope.

During the July 2024 rain event Middlesex experienced multiple landslides across Town. There were 17 landslides reported on the State Landslide map. The town has prioritized two locations on the road network that have been affected by landslides, Center Road and Portal Road.

Total damages for landslides are not tracked well within the State of Vermont since landslides are often in association with Fluvial Erosion and the damages are often lumped together. With the increase in precipitation trends due to climate change the risk from landslides is increasing. This can be addressed through land use regulations and mitigation of surface runoff from human actions and development. Historically, landslides in Middlesex have been small at ~0.1 acres or less.

The extent of risk to landslides is steeper sloped areas, areas of fill material and cut banks where a slope has been dug into and is no longer supported. Most of the landslides identified on the State map were along the slopes of the Great Brook.

Other Hazards

Severe Storms with Snow and Ice typically occur between the months of December and March in the Central Vermont Region. They can include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Events can also be associated with Strong Wind or Floods, increasing the potential hazard.

Ice storms are characterized by ice accumulation from freezing rain, which can weigh down trees and power lines, causing outages and potentially occurring in conjunction with flooding in rain on snow events. Ice storms can occur alone or in conjunction with snowstorms, blizzards, and extreme cold. Significant

accumulations of ice can cause hazardous conditions for travel, weigh down trees and power lines, and cause power outages. Freezing rain can also be combined with mixed precipitation and snowfall, hiding ice accumulation and further hindering travel. Ice accumulation on waterways is associated with the potential for ice jams and flooding.

This is the breakdown based off light winds, under 10 mph:

- 0.25 inch, isolated power outages
- 0.50 inch, widespread outages
- 0.75 inch, major damage
- 1.0 inch, devastating damage

Severe winter storms bring the threat of heavy accumulations of snow, cold/wind chills, strong winds, and power outages that result in high rates of damage and even higher rates of expenditures. A heavy accumulation of snow, especially when accompanied by high winds, causes drifting snow and very low visibility. Sidewalks, streets, and highways can become extremely hazardous for pedestrians and motorists. Severe winter storms develop through the combination of multiple meteorological factors. In Vermont and the northeastern United States, these factors include the moisture content of the air, direction of airflow, collision of warm air masses coming up from the Gulf Coast, and cold air moving southward from the Arctic.

Extreme Cold, Snow, and Ice Hazard History

These are the most up to date significant events impacting Middlesex. Federal declarations are depicted in **bold**.

1/11-14/2022: 10-40 below zero with winds: no reported damages
12/18/2021: 5-7" snow $10,000 county damages
1/16/2021: 3-6" wet snow: $50,000 county damages
3/23/2020: 7-10" snow: $5,000 county damages
2/7/2020: 10-16"; ¼" ice: $20,000 county damages
1/16/2020: DR 4474 6-10" snow: $10,000 county damages
3/22/2019: 9" snow: $25,000 county damages
2/12/2019: 7-15" snow: $10,000 county damages
1/29/2019: 6-10" snow: $10,000 county damages
1/19/2019: 10-18" snow: $25,000 county damages
1/8/2019: 8-20+" snow: $25,000 county damages
1/8/2019: 8-20+" snow: $25,000 county damages
11/26/2018: 6-14" heavy snow: $125,000 county damages
3/13/2018: 12-30" snow: $20,000 county damages
3/7/2018: 7-13" snow: $10,000 county damages
1/7/2015: 0-10 degrees with wind of 15-30 mph creating wind chills colder than 20-30 below zero: no reported local damage
12/9/2014: DR4207 10-20" snow: $250,000 county damages
5/26-27/2011: DR-4001 3-5+" rain on snow event:, $5,500,000 county damages
5/20/2011: DR-4043: Heavy rain: $400,000 county damages
4/23-5/9/2011: DR-4043 rain on snow event: $1,000,000 county damages

The main costs of these storms come in the form of power outages due to heavy snow or ice, damaged trees, school closings, and traffic accidents. From 2014 to 2022, Washington County experienced $585,000 in property and crop damage from winter storms. The frequency of heavy wet snowfall is increasing due to warming of the climate.

There have been two winter storm-related federally declared Disasters in the county (the

ice storm of January 2020 DR-4474; and December 2014 DR-4207, respectively (see table above).

Extreme cold can have impacts on public health and safety, especially if extreme temperatures coincide with power outages, which can cut off heat and communication services. Severe winter storm impacts can put vulnerable populations (e.g., older adults, children, sick individuals, pets) at even greater risk.

WSSI Descriptor	General Description of Expected Storm Severity Impacts
None	No snow or ice forecast. No potential for ground blizzard conditions.
Limited	Small accumulations of snow or ice forecast. Minimal impacts, if any, expected. In general, society goes about their normal routine.
Minor	Roughly equates to NWS Advisory Level criteria. Minor disruptions, primarily to those who were not prepared. None to minimal recovery time needed.
Moderate	Roughly equates to NWS Warning Level criteria. Definite impacts to those with little preparation. Perhaps a day or two of recovery time for snow and/or ice accumulation events.
Major	Significant impacts, even with preparation. Typically several days recovery time for snow and/or ice accumulation events.
Extreme	Historic. Widespread severe impacts. Many days to at least a week of recovery needed for snow and/or ice accumulation events.

See the Strong Wind profile below for more information about the Town's vulnerability to power outages.

Snow accumulation typically does not result in loss of road accessibility. The Town's fleet of snowplows ensures all roads are accessible, even in major accumulation events. Roads adjacent to critical facilities are well maintained and along with connector routes, are prioritized in winter storm events.

Environmental impacts are predominantly tree damage. Extreme snow and ice events typically have a short-term impact on the local economy – in business closures and commuter delays.

Extent of risk is Town wide for Snow hazards would be 6"-24" of wet snow as seen in DR4207.

Strong Wind can occur alone, such as during straight-line wind events, or it can accompany other natural hazards, including severe thunder and/or winter storms.

High winds pose a threat to the safety of Middlesex's residents and property. The National Weather Service (NWS) issues a wind advisory when winds are sustained at 31 to 39 mph for at least one hour or any gusts 46 to 57 mph. Sustained winds of 40 to 73 mph or gusts of 58 mph or higher cause the NWS to issue a High Wind Warning.

FEMA's National Risk Index defines Strong Wind as damaging winds that exceed 58 mph. Strong Wind poses a threat to lives, property, and vital utilities primarily because of flying debris or downed trees and power lines.

From 1996 to 2022, wind events caused more than $1.270 million in property damage in Washington County, with $450,000 due to one event in December 2022.

Strong wind is possible here; Middlesex is susceptible to high directional winds Townwide. Many storms with high winds result in downed trees as well as damaged phone and power lines, buildings, and other property.

Downed trees within the road right-of-way are the root cause of many power outages. Roads that pass through dense wooded areas are also prone to downed trees, which often can lead to fallen power lines.

Power outages are the main reason for disrupting communications, which are crucial in times of crisis. For example, the loss of phone service is of particular concern for Middlesex's vulnerable populations and residents. Landline phones that have been converted from copper wire to fiber rely on an in- home battery back-up. The battery life is typically less than eight hours, whether the phone is used or not. Though many residents use cell phones, longer power outages and damage from high winds further complicating the problem of contacting

emergency services during power outages.

Telecommunications are also needed for warning systems before a disaster, as well as for response during and after recovery. During a disaster, municipal response is managed by the local Emergency Operations Center (EOC), this would include all communications – from phone calls to internet browsing and 2-way radio.

To mitigate the impacts of power outages, the following public buildings/critical facilities have been equipped with backup power or generator hookup: Fire Station, Town Garage, and the Rumney Elementary School.

Strong Wind Hazard History

These are the most up to date significant events impacting Middlesex. Federal declarations are depicted in **bold**. Damages are to Washington County.

12/23/2022: 50-60+ wind gusts: $450,000
10/30/2017: 40 mph wind: $250,000
2/26/2010: 55 mph wind: $15,000
2/17/2006: 37 mph wind: $10,000
9/29/2005: 35 mph wind: $50,000
11/13/2003: 35 mph wind: $10,000
10/15/2003: 50 mph wind: $10,000
3/10/2002: strong wind: $5,000
12/12/2000: strong wind: $5,000
3/28/2000: strong wind: $5,000
9/17/1999: strong wind: $75,000
11/23/1998: strong wind: $10,000
2/22/1997: 50 mph wind: $15,000

Beaufort Scale

Beaufort number	Wind Speed (mph)	Seaman's term		Effects on Land
0	Under 1	Calm		Calm; smoke rises vertically.
1	1-3	Light Air		Smoke drift indicates wind direction; vanes do not move.
2	4-7	Light Breeze		Wind felt on face; leaves rustle; vanes begin to move.
3	8-12	Gentle Breeze		Leaves, small twigs in constant motion; light flags extended.
4	13-18	Moderate Breeze		Dust, leaves and loose paper raised up; small branches move.
5	19-24	Fresh Breeze		Small trees begin to sway.
6	25-31	Strong Breeze		Large branches of trees in motion; whistling heard in wires.
7	32-38	Moderate Gale		Whole trees in motion; resistance felt in walking against the wind.
8	39-46	Fresh Gale		Twigs and small branches broken off trees.
9	47-54	Strong Gale		Slight structural damage occurs; slate blown from roofs.
10	55-63	Whole Gale		Seldom experienced on land; trees broken; structural damage occurs.
11	64-72	Storm		Very rarely experienced on land; usually with widespread damage.
12	73 or higher	Hurricane Force		Violence and destruction.

Public buildings lacking backup power include Town Hall. The Town has been pursuing upgrades to Town Hall, which would include a backup generator, but grant applications to fund the upgrades were put on hold after the July 2024 flooding. The Town will continue to pursue those upgrades in the future.

The extent of risk to winds is spread out across the entire Town. Roof tops and prominent structures on hillsides have the most risk but all structures within the Town since the primary risks are loss of power due to line breakages and transportation due to downed trees and debris.

Infectious Disease is caused by micro-organisms, such as bacteria, viruses, or parasites, according to the Vermont Department of Health (VTDOH). A vector-borne disease is an infectious disease that is transmitted to humans by blood-feeding arthropods, including ticks, mosquitoes, and

fleas, or in some cases by mammals (e.g. rabies). Climate change is increasing the risk of viral and bacterial infectious disease pathways through warmer temperatures and increased flooding. Due to the warming climate, the season that vector-borne organisms can survive in has increased by 7 days over the last 2 decades.

According to the VTDOH, infectious disease dynamics depend on a range of factors, including land use, human behavior, climate, efficacy of healthcare services, population dynamics of vectors, population dynamics of intermediate hosts, and the evolution of the pathogens themselves. Many of these diseases require continuous monitoring, as they present seasonal threats to the general population. An epidemic emerges when an infectious disease occurs suddenly in numbers that are in excess of normal expectancy. Infectious disease outbreaks put a strain on the healthcare system, can cause continuity of operations challenges for local businesses, impact the economy, and interrupt daily life for everyone within a community. These outbreak incidents are a danger to emergency responders, healthcare providers, schools, and the public. Examples include Coronavirus 19 (Covid-19) which was a federally declared disaster DR-4532, influenza (e.g. H1N1), pertussis, West Nile virus, and many other diseases.

Upon consideration of five climate and health reviews, The VTDOH has separated vector-borne and other infectious diseases into five threat categories (Table below). More details on this classification system and the diseases can be found in the 2016 Vermont Climate Health Report.

Table 27: Threat Categories of Vector-Borne and Other Infectious Disease

Threat Classification	Disease
Diseases already present in Vermont that may be exacerbated by climate change	West Nile Virus
	Eastern Equine Encephalitis
	Lyme Disease
	Anaplasmosis
	Babesiosis
	Tularemia
	Powassan
Diseases that may spread to Vermont even without contribution of climate change, whose spread to and transmission of Vermont could be exacerbated by climate change	St. Louis Encephalitis
	Western Equine Encephalitis
	La Crosse Encephalitis
	Ehrilichiosis
	Rocky Mountain Spotted Fever
Diseases with vectors that may spread to Vermont by the end of the century under a higher emission scenario	Dengue
	Chikungunya
Disease that have competent vectors or may in the future have competent vectors in Vermont, but are unlikely to become established in Vermont despite a vector presence	Yellow Fever
	Malaria
	Chagas Disease
	Rift Valley Fever
Diseases that may be present in Vermont or may spraed to Vermont in the future but whose link with climate changes expected in Vermont is tenuous	Batonellosis
	Rabies
	Hanta Virus
	Leptospiriosis
	Plague
	Valley Fever
	Anthrax
	Q Fever

Source: Vermont Department of Health

There is no scale or metric for prioritizing infectious disease at the Town level. The easiest method would be to track hospitalizations by day increase above the average. Or in a pandemic scenario record of days with closed businesses due to risk of infection.

The primary vulnerability would be to those who are immune compromised, elderly and young populations and are most susceptible to respiratory viruses.

Readers should look to the VTDOH for more information on significant infectious disease outbreaks, such as epidemics and pandemics. The Town will monitor these for up-to-date threat information and follow the appropriate protocols developed by these agencies as necessary.

Invasive Species are non-native to the ecosystem under consideration and their introduction causes or is likely to cause economic or environmental harm or harm to human health, according to the National Invasive Species Council. Invasive species can overwhelm native species and their habitats, forcing the native species out. They are considered to pose the second-greatest threat to biodiversity globally. Invasive plants in Vermont, such as Japanese knotweed, common reed (Phragmites), purple loosestrife, and garlic mustard can change soil composition, change water tables, and disrupt insect cycles. They often lack food value upon which wildlife depends. Some invasive animals prey heavily upon native species while others, such as the alewife and zebra mussel, out-compete native species for food and nutrients with significant impacts reverberating up and down food chains.

Invasive pests such as Emerald Ash Borer (EAB), first found in Vermont in 2018, have serious financial implications for forest landowners and municipalities alike. EAB feeds on ash trees in Vermont, deeply damaging each tree and hindering its ability to move carbohydrates and water resources as necessary. Infected trees will die between three and five years after the introduction of EAB. Productive timber is destroyed by EAB and trees along roads become hazards as they die and pull-down power lines. Preventative measures are crucial to prevent the further spread of these insects and protect native ash populations, such as traps, which will be further discussed below under Invasive Species Mitigation. Additionally, invasive species can directly or indirectly cause harm to human health. Giant hogweed, wild parsnip and wild chervil are three invasive plant species in Vermont that have phytophototoxic properties, meaning direct contact of their sap with human skin can cause a chemical reaction that makes skin hypersensitive to ultraviolet light. Vermonters have received serious skin burns from the toxicity of the sap of these plants combined with exposure to sunlight. Another example is that of Japanese barberry, which has been proven to increase the incidence of Lyme disease by providing sheltered habitat that increases the abundance of small rodents, which act as hosts to the ticks that carry Lyme disease pathogens.

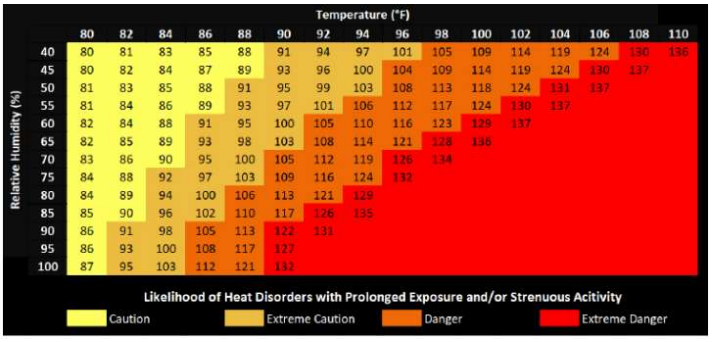
The risk of invasive species is higher in more disturbed soils and developed areas, but the extent is varied. Emerald Ash Borer is more likely to be found in the heavily wooded upland slopes with Japanese knotweed along the river and stream banks. The Town generally will follow the State of Vermont guidance from the Agency of Natural Resources on how to deal with invasive species.

Extreme Heat and Cold Heat is becoming increasingly prevalent due to our shifting climate. Vermont has been seeing an increase in 90+ degree temperature days. This trend is expected to continue. Most of our housing stock and individuals are well adapted to dealing with cold temperatures but the quick swings to higher temperatures do not allow for acclimation and many of our structures are designed to retain, rather than shed, heat. Traditionally, Vermont homes have not been built for cooling or had to modify structures to add air conditioning, but recent weather has increased heat emergencies created the need for cooling.

Epidemiological analyses completed by the VTDOH indicate that Vermonters are five times as likely to visit the emergency department for heat-related illnesses when the heat index reaches the 80s, 10 times as likely when the heat index reaches the low 90s, and over 20 times as likely when the heat index reaches the upper 90s

or hotter. These risks are greatly modified by how acclimated a person is to hot weather – the risk for heat-related health impacts is higher early in the heat season, and lower if it has been consistently hot over the past week or more. Consecutive days of hot weather with warm overnight temperatures further increase the risk of experiencing severe heat-related health impacts. Risk also depends on the "normal" level of heat experienced in an area – places that are relatively cool will typically experience health impacts at lower heat index values than a place that is relatively warm. June 2024 saw a forecasted heat index of 102. Below are the 4 heat-related listings from the 2023 SHMP.

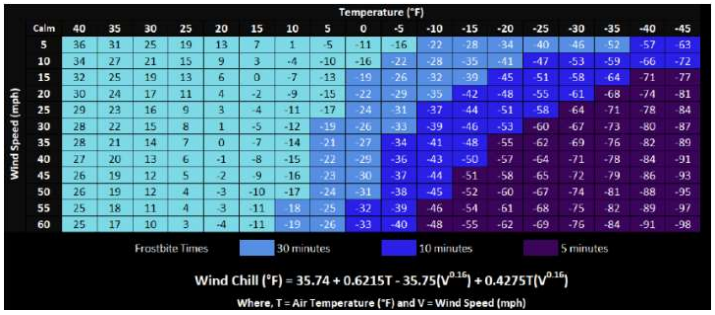
WASHINGTON (ZONE)	8/1/2006	Heat
WASHINGTON (ZONE)	8/2/2006	Heat
WASHINGTON (ZONE)	7/21/2011	Heat
WASHINGTON (ZONE)	7/1/2018	Heat



Older adults, people with chronic health conditions, and people with disabilities are at particularly high risk, especially if they live in housing without air conditioning or are unhoused and cannot access cooling facilities and other support resources. The unhoused may not be or feel welcomed at cooling centers, sleep in hot tents, and carry heavy loads of their possessions in the heat. There is increasing risk of multiday heat events in Middlesex along with an increase in heat warnings. There is on average at least 1 multiday heat advisory per year.

Due to the instability of the jet stream from climate change, extreme cold can still be an issue. If it is a long-lasting cold without snow cover, frost can migrate deep into the ground freezing pipes and heaving roadways. Most of this would be dealt with by the Town either through their utility contracts or by the Town Public Works crew in keeping the transportation infrastructure and Town-owned utilities in usable condition. Loss of power during one of these cold snaps may require use of the emergency shelter (Rumney School) and is planned for in the Town Local Emergency Management Plan.

What constitutes "extreme cold" can vary across different areas of the country based on what the population is accustomed to in their respective climates. Vermont is adapted to cold conditions; however, very cold temperatures remain a threat despite their commonality during Vermont winters. For cold weather events, the Town uses Rumney School as a heating shelter. There is currently no cooling shelter for extreme heat events.



Drought is a deficiency of moisture that results in adverse impacts on people, animals, or vegetation over a sizeable area (National Weather Service – NOAA) or a period of abnormally dry weather sufficiently long enough to cause a serious hydrological imbalance (American Meteorological Society). It is a complex phenomenon that is difficult to monitor and assess because it develops slowly and covers extensive

areas, as opposed to other disasters that have rapid onsets and obvious destruction. The effects of drought can linger long after the drought has ended.

In the Northeast, we frequently experience what are referred to as "flash" droughts, defined as rapid onset of intense dry periods that can follow periods of normal or above normal precipitation. These may last from 2-6 months, and can have profound impacts within the region, on agricultural losses, shortages of water supply and very low stream flows. This pendulum often swings from a dry year to a wet year.

The main risk to the Town would be to the water supply. The Town does not have any ordinances restricting water use during drought conditions.

There have been 3 instances of D3 level droughts in Washington County, VT since 2000: one longer event in 2016, one in 2018, and then a short one in 2020.

Wildfires are not often much of a concern within our region, although the Spring and Fall can be times when dry hazardous conditions exist.

Opportunity for wildfires occurs due to the lack of foliage in these seasons: before Spring green up or in the Fall after foliage has died back when combined with dry conditions. Historically, Vermont has seen the most wildfires between March and June. These are generally times when dry conditions exist for an extended period causing drought conditions. Ignition of wildfires is mainly caused by human activity and mainly by debris fires not contained or supervised. Thus, messaging when conditions exist is very important to convince individuals not to make mistakes in relation to ignition sources. This messaging is handled by the Town Fire Department and Code Enforcement.

The extent for wildfire risk would be most of the Town since it is heavily forested. Upland areas face the highest risk due to increased tree cover and inaccessibility for firefighters. Wildfire risk is projected to increase due to increased droughts caused by climate change.

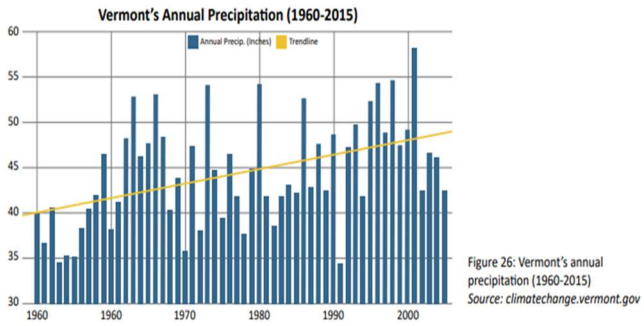
The largest wildfire/brush fire in Middlesex records was a brush fire in the 1980s that covered approximately 20 acres, according to Middlesex's fire warden.

The Hazard Identification and Risk Assessment is the foundation for the Mitigation Strategy to reduce future risk.

Changing Climate

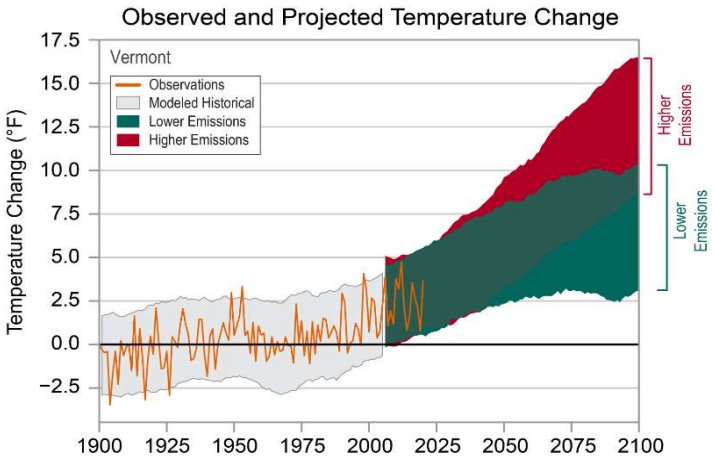
With the increasing risks of events from our changing climate, all weather-related natural events are expected to have an increase in both frequency and in intensity. Vermont is predicted to experience increases in heat waves, extreme rain events (greater than 2") and flooding. This also can lead to flash droughts and cold snaps without the time for acclimation. There have been 29 federal declared disasters in Washington County Vermont in the last 40 years, with 18 being since 2011.

The Town is very aware of the increased risk of climate change and is trying to find a path forward to maintain its vitality and protect its residents and businesses from this evolving reality.

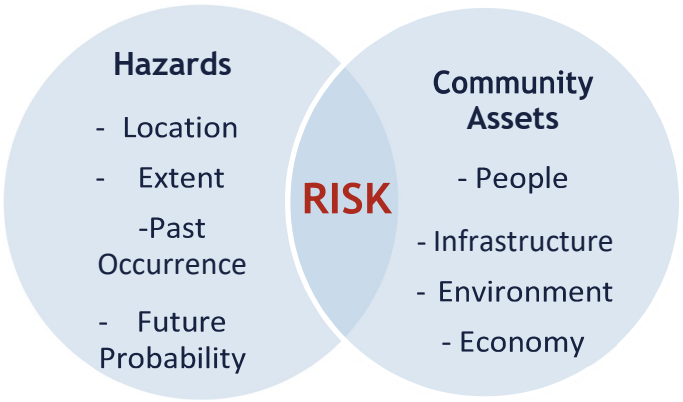


Precipitation data showing increased precipitation trends from VT State Climate Action Plan

The increase in Atlantic Ocean temperatures as well as the overall climate will create drastic increases in storm potential. This will increase the storm severity regardless of the time of year. Due to higher windspeeds and greater airborne moisture capacity, many previous records will be exceeded. This has been documented as the atmosphere passes the 400 ppm CO2 tipping point and will continue as permafrost melts and releases more naturally occurring greenhouse gases.



-NOAA 2022 Vermont Climate summary



Vulnerability Summary

The extent of risk for the highest-rank hazards, floods, and landslides, are summarized below. For extents of risk for all hazards, please refer to Table 9: Extent of Risk – All Hazards.

Floods

Vulnerable Assets

People (especially older adults, children, and unhoused); transportation infrastructure; buildings; dams; local businesses; housing.

Location

Inundation Flooding:

Along Winooski River Main Stem and North Branch, Sunny Brook. Special Flood Hazard Area.

Flash Flooding:

Great Brook, Martins Brook, and smaller tributaries.

Fluvial Erosion:

Same as Flash Flooding.

Landslides

Vulnerable Assets

People; transportation infrastructure; buildings; local businesses; housing.

Location

Steep slopes, unstable soils. Often undercut by streams or waterways.

6 HAZARD MITIGATION STRATEGY

The highest risk natural hazards and vulnerabilities identified in the previous section of this Plan directly inform the hazard mitigation strategy outlined below, which the community will strive to accomplish over the coming years. The mitigation strategy chosen by the Town includes the most appropriate activities to reduce future risk from potential hazards.

Mitigation Goals

The Hazard Mitigation Planning Team identified the following as the community's primary mitigation goal:

Increase the Town of Middlesex's resilience to natural hazards by planning mitigation investments to reduce or avoid risk to people, homes, the local economy, cultural and historic resources, ecosystems, and community lifelines such as transportation, water, energy, and communications.

See Community Survey results in Appendix C for which assets survey respondents thought were most important to protect against potential future severe weather impacts

Middlesex residents identified the Great Brook river corridor and Brook Road as the primary area for hazard risk mitigation. The first step toward reducing hazard risk in that area is the following mitigation action:

Develop a Great Brook and Brook Road Hazard Mitigation Plan.

In public outreach meetings and online survey responses, Middlesex residents identified Brook Road and the Great Brook river corridor as the highest-priority area for flood risk mitigation. Residences in the Great Brook river corridor are at high risk of being undermined by fluvial erosion and some are also at risk of inundation flooding. Additionally, frequent washouts of Brook Road can leave residents isolated following floods.

The first step to reduce flood risk along Great Brook is to develop a hazard mitigation plan for the area; this is consistent with Strategy 33 of the 2022 Middlesex Town Plan: "Develop a hazard mitigation plan for the Great Brook and Brook Road corridors."

The Great Brook Hazard Mitigation Plan is estimated to cost approximately $100,000 and would involve an alternatives analysis including restoring floodplains, armoring streambeds, moving infrastructure, managing wood debris, and continuing property buyouts.

Community Lifelines

Community Lifelines enable the continuous operation of critical government and business functions and are essential to human health and safety or economic security. The goal of the lifeline concept is to focus response efforts on stabilizing or re-establishing these most fundamental services during and after a disaster. Mitigating lifelines should reduce cascading impacts across government and business functions and lessen system-wide damage.

Community Lifelines are organized into seven categories:

1. Law Enforcement
2. Fire Service
3. Search & Rescue
4. Government Service
5. Community Safety

1. Food
2. Water
3. Shelter
4. Agriculture

1. Medical Care
2. Public Health
3. Patient Movement
4. Medical Supply Chain
5. Fatality Management

1. Power Grid
2. Fuel

1. Infrastructure
2. Responder Communications
3. Alerts, Warnings, & Messages
4. Finance
5. 911 & Dispatch

1. Highway/Road/Motor Vehicle
2. Mass Transit
3. Railway
4. Aviation
5. Maritime

1. Facilities HAZMAT, Pollutants, Contaminants

Community Capabilities

Each community has a unique set of capabilities, including authorities, programs, staff, funding, and other resources available to accomplish mitigation and reduce long-term vulnerability. Middlesex's mitigation capabilities that reduce hazard impacts or that could be used to implement hazard mitigation activities are listed below.

Administrative & Technical This capability refers to the Town's staff and their skills and tools that can be used for mitigation planning and to implement actions. In addition to the Emergency Management staff described in Section 3, municipal staff that can be used for mitigation planning and to implement specific mitigation actions include:

Town Clerk, Assistant Town Clerk, Road Commissioner, Road Foreman/Fire Chief, Fire Warden, Emergency Management Coordinator, Tree Warden, Zoning Administrator, Treasurer, and E911 Coordinator.

In addition to paid staff, there is the 5-member Select Board, 5-member Planning Commission, Conservation Commission, and Development Review Board, among others.

To augment local resources, the Town has formal mutual aid agreement for emergency response – fire as being a member of the Capital Fire Mutual Aid Association. Technical support is available through the CVRPC in the areas of land use planning, emergency management, transportation, GIS mapping, and grant writing. Technical support is also available through the State ANR for floodplain bylaw administration and VTrans Districts for hydraulic analyses.

Planning & Regulatory These capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of hazards. Examples of planning capabilities that can either enable or inhibit mitigation include land use plans, capital improvement programs, transportation plans, stormwater management plans, disaster recovery and reconstruction plans, and emergency preparedness and response plans. Examples of regulatory capabilities include the enforcement of zoning ordinances, subdivision regulations, and building codes[2] that regulate how and where land is developed, and structures are built.

Municipal Plan: March 2022
Description: A framework and guide for how future growth and development should proceed.
Relationship to Natural Hazard Mitigation Planning: Includes goals and policies related to flood resilience and land use.

Flood Hazard Area Regulations: March 2023
Description: Provides for orderly community growth promoting the health, safety, and general welfare of the community.
Relationship to Natural Hazard Mitigation Planning: Establish site plan review requirements within the Special Flood Hazard Area, with specific standards for proposed development. Requirements are designed to mitigate negative impacts to the and prevent increases to the base flood elevation; ensure design and construction of development in flood hazard areas are accomplished in a manner that minimizes or eliminates the potential for flood

[2] Middlesex does not have any local building codes. Vermont has adopted statewide codes for commercial building fire safety and energy standards. The energy code also applies to residential buildings. Codes enforced by Vermont's Division of Fire Safety are the 2015 National Fire Protection Association (NFPA) 1 Fire Code; 2015 NFPA 101 Life Safety Code; the 2015 International Building Code (IBC); 2017 NFPA 70 National Electrical Code; 2021 International Code Council (ICC) International Plumbing Code; and the 2015 National Board Inspection Code from the National Board of Boiler and Pressure Vessel Inspectors.

loss or damage to life and property. Establishes requirements and rules for Substantial damage/improvement determinations.

River Corridor Regulations: (Interim)
Description: Provides for orderly community growth promoting the health, safety, and general welfare of the community.
Relationship to Natural Hazard Mitigation Planning: Establish site plan review requirements within the River Corridor, with specific standards for proposed development. Requirements are designed to mitigate negative impacts to the and prevent increases to the base flood elevation; ensure design and construction of development in river corridors are accomplished in a manner that minimizes or eliminates the potential for flood loss or damage to life and property. Establishes requirements and rules for Substantial damage/improvement determinations.

Road and Bridge Standards: July 2019
Description: Provide minimum codes and standards for construction, repair, maintenance of Town roads and bridges. Relationship to Natural Hazard Mitigation Planning: Standards include management practices and are designed to ensure travel safety, minimize damage to road infrastructure during flood events.

Road Erosion Inventory Report: 2023
Description: Prioritizes those infrastructure projects necessary to improve transportation network resiliency and water quality.
Relationship to Natural Hazard Mitigation Planning: Improvements are designed to minimize or eliminate flood impacts on hydrologically connected road segments.

Local Emergency Management Plan: April 2024
Description: Establishes lines of responsibility and procedures to be implemented during a disaster and identifies high risk populations, hazard sites, and available resources.
Relationship to Natural Hazard Mitigation Planning: Includes actions for tracking events and response actions including damage reports to facilitate funding requests during recovery. This type of information can be essential to preparing hazard mitigation project applications for FEMA funding.

Fire Department ISO Rating: September 2024
Description: Middlesex Fire Department's ISO rating is 9. This rating is a score from 1 (exemplary) to 10 that indicates how well-protected the community is by the local fire department.
Relationship to Natural Hazard Mitigation Planning: Everyone wants to keep family, home, and business safe from fires. The ISO rating is a measure of the effectiveness of a community's fire services.

Unified Development Ordinance: March 2023
Description: Provide for orderly and coordinated development; and that land use and development will not adversely impact public health, safety and welfare; Protect natural, cultural and historic resources; Allow for residential land uses and development to meet the housing needs of residents; Ensure that there be adequate vehicular, pedestrian and emergency access to and within development sites; that rate of growth does not exceed Town resources; and Establish engineering standards for constructed projects within the Town.
Relationship to Natural Hazard Mitigation Planning: Establish site plan review requirements and zoning districts, with specific standards for proposed development. Requirements are designed to prevent overdevelopment; Protect natural, cultural, and historic resources; and ensure design and construction of development in the Town is appropriate to the infrastructure and built to engineering standards.

Financial These capabilities are the resources that a community has access to or is eligible to use to fund mitigation actions.

Middlesex's 2024-2025 approved budget is $1,845,508, with $871,678 to fund the Public Works Department. In addition to property tax revenues, the Town collects separate fees for zoning permits, dog licenses, marriage licenses, birth/death/marriage certificates, and recording.

Outreach & Education Middlesex has several outreach and education opportunities that are being used to implement mitigation activities and communicate hazard-related information:

- Central Vermont Chamber of Commerce, Middlesex Neighborhood Watch, Middlesex Fire Department.
- Town website, Front Porch Forum, and several Department Facebook pages.

National Flood Insurance Program Compliance

The Town joined the National Flood Insurance Program (NFIP) in 1982. The effective date of the current Flood Insurance Rate Map (FIRM) is March 19, 2013. The Town also has a Flood Insurance Study of the same date: FIS #50023CV003A that is used for determining elevations and areas of interest for mitigation within the Town boundaries. The Zoning Administrator enforces NFIP compliance through permit review requirements in its Flood Hazard Area regulations. Middlesex's regulations outline detailed minimum standards for development in flood hazard areas defined as FEMA Special Flood Hazard Areas and Floodway Areas. The regulations also require administering Substantial Improvement and Substantial Damage (SI/SD) requirements in accordance with FEMA P-758 SI/SD Desk Reference, May 2010.

The Town discussed the following as possible actions to continue NFIP compliance:

1) Prepare, distribute, or make available NFIP insurance explanatory pamphlets or booklets.
2) Participate in NFIP training offered by the State and/or FEMA.
3) Train at least 1 Town staff member to be Certified Floodplain Manager.

State Incentives for Flood Mitigation

Vermont's Emergency Relief Assistance Funding (ERAF) provides state funding to match FEMA Public Assistance after federally declared disasters. Eligible public costs are generally reimbursed by FEMA at 75% with a 7.5% State match. The State will increase its match to 12.5% or 17.5% if communities take steps to reduce flood risk as described below.

12.5% funding for communities that have adopted four (4) mitigation measures:

1) NFIP Participation
2) Town Road and Bridge Standards
3) Local Emergency Plan
4) Local Hazard Mitigation Plan

17.5% funding for communities that also participate in FEMA's Community Rating System OR adopt Fluvial Erosion Hazard or other river corridor protection bylaw that meets or exceeds the Vermont ANR model regulations.

Middlesex's current ERAF rate is 7.5%. Upon adoption of the 2025 Local Hazard Mitigation Plan their ERAF rate could increase to 17.5%.

Strengths

Middlesex has taken various regulatory and policy actions to reduce risk from flooding, including participating in NFIP, adopting interim river corridor regulations, and pursuing buyouts for repetitive loss structures. Additionally, the Town's Department of Public Works has been upsizing culverts and drainage ditches to reduce the impacts of fluvial erosion on transportation infrastructure.

Areas for Improvement

Despite the Department of Public Works' success in mitigating fluvial erosion to transportation infrastructure, many of the Town's roads are still at high risk of fluvial erosion. Additionally, as a small town with a limited budget, Middlesex relies on volunteers to perform many essential administrative and enforcement functions. Volunteers often have

primary jobs in addition to the roles they serve for the Town and, as such, may not have as much time to dedicate to advanced planning and implementation as full-time Town staff would. As detailed above, Middlesex's population is aging, which also may negatively impact volunteers' ability to deliver essential services and residents' vulnerability to hazards.

Mitigation Action Identification

The Hazard Mitigation Planning Team discussed the mitigation strategy, reviewed projects from the 2018 Plan, and identified possible new actions from the following categories for each of the highest risk natural hazards identified in **Section 5**.

Local Plans & Regulations These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.

Structure & Infrastructure Projects These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This applies to public or private structures as well as critical facilities.

Natural Systems Protection These actions minimize damage and losses and preserve or restore the functions of natural systems.

Outreach & Education Programs These actions inform and educate the public about hazards and potential ways to mitigate them. Although this type of action reduces risk less directly than structure projects or regulation, it is an important foundation. Greater awareness is more likely to lead to community support for direct actions.

Local Plans & Regulations Examples

Integrate Mitigation into Capital Improvement Programs: Incorporate risk assessment and hazard mitigation principles into capital planning.

Reduce Impacts to Roadways: The leading cause of death and injury during winter storms is automobile accidents, so it is important to plan for and maintain adequate road and debris clearing capabilities.

Develop a Road Right-of-Way Vegetation Management Plan: Identify community priorities and plan of action for site-specific tree and roadside forest management to increase roadside resilience.

Improve Flood Resilience with a Flood Study: The aim of a flood study is to define existing flood behavior for a particular catchment, river, or creek. The study helps inform building, land use planning, community awareness and disaster management.

Improve Stormwater Management Planning: Rain and snowmelt can cause flooding and erosion in developed areas. A community-wide stormwater management plan can address stormwater runoff- related flooding.

Manage Development in Erosion Hazard Areas: The intent of River Corridor Bylaws is to allow for wise use of property within river corridors that minimizes potential damage to existing structures and development from flood-related erosion.

Structure & Infrastructure Project Examples

Protect Power Lines: Protect power lines by 1) inspecting and maintaining hazardous trees in the road right-of-way and 2) burying power lines.

Protect Critical Roadways: Use snow fences or living snow fences (e.g., rows of trees) to limit blowing and drifting of snow.

Retrofit Critical Facilities: Critical facilities can be protected from the impacts of high winds and winter storms by 1) retrofitting them to strengthen structural frames to withstand wind and snow loads; 2) anchoring roof-mounted mechanical equipment; and 3) installing back-up generators or quick connect wiring for a portable generator.

Remove Existing Structures from Flood Hazard Areas: FEMA policy encourages the removal of structures from flood-prone areas to minimize future flood losses and preserve lands subject to repetitive flooding.

Improve Stormwater Drainage Capacity: Minimize flooding and fluvial erosion by 1) increasing drainage/absorption capacities with green stormwater management practices; 2) increasing dimensions of undersized drainage culverts in flood- prone areas; 3) stabilizing outfalls with riprap and other slope stabilization techniques; and 4) re- establishing roadside ditches.

Conduct Regular Maintenance for Drainage Systems: Help drainage systems and flood control structures function properly with 1) routine cleaning and repair; 2) cleaning debris from support bracing underneath low-lying bridges; and 3) inspecting bridges and identifying if any repairs are needed to maintain integrity or prevent scour.

Protect Infrastructure and Critical Facilities: Minimize infrastructure losses and protect critical facilities from flooding by 1) elevating roads above base flood elevation to maintain dry access; 2) armoring streambanks near roadways to prevent washouts; 3) rerouting a stream away from a vulnerable roadway; and 4) floodproofing facilities.

Natural Systems Protection Examples

Protect and Restore Natural Flood Mitigation Features: Natural conditions can provide floodplain protection, riparian buffers, groundwater infiltration, and other ecosystem services that mitigate flooding. Preserving such functionality is important. Examples include 1) adding riparian buffers; 2) stabilizing stream banks; 3) removing berms; 4) minimizing impervious area development; 5) restore floodplain; and 6) restore incision areas.

Outreach & Education Program Examples

Educate Residents about Extreme Winter Weather: Winter storms create a higher risk of car accidents, hypothermia, frostbite, carbon monoxide poisoning, and heart attacks from overexertion. Educational outreach can help minimize these risks.

Assist Vulnerable Populations: Measures can be taken to protect vulnerable populations from natural hazards, such as 1) organizing outreach and 2) establishing and promoting accessible heating or cooling centers in the community.

Mitigation Action Evaluation

For each mitigation action identified, the Planning Team evaluated its potential benefits and/or likelihood of successful implementation. Actions were evaluated against a range of criteria, including a planning level assessment of whether the costs are reasonable compared to the probable benefits. Results of this evaluation are presented in **Table 6.**

See Community Survey results in **Appendix D** for which category of mitigation actions survey respondents wanted the Town to prioritize.

Mitigation Action Plan for Implementation

After careful evaluation, the Planning Team agreed on a list of actions that support the Mitigation Goals of this Plan and are acceptable and practical for the community to implement.

Actions without overall public support/political will were not selected for implementation. Actions whose costs were not reasonable compared to probable benefits were also not selected.

For the selected actions, the Planning Team then 1) assigned a responsible party to lead the completion of each action; 2) identified potential grant funding; 3) defined a timeframe for implementation; and ranked each action's priority (high, medium, low).

Natural hazards pose a unique threat to the Town's vulnerable populations. Data has shown that underserved and marginalized populations tend to live in at-risk hazard-prone areas or in homes with substandard construction. The data also suggests that this segment of the community is less likely to fully recover after a disaster. When ranking an action's priority, those that directly benefit a vulnerable population were ranked high.

The mitigation action plan is presented in **Table 7**.

TABLE 6 Middlesex	Life	Prop	Tech	Political	Admin	Other	Benefit	Est	C/B	
Mitigation Actions	**Safety**	**Protect**				**Obj**	**Score**	**Cost**		
Fluvial Erosion										Mitigation type
Update Road Erosion and Culvert Inventories	3	3	3	3	3	3	18	1	Y	Local Plans and Regulations
Study Watersheds of Shady Rill and Great Brook	3	3	3	3	3	3	18	2	Y	Local Plans and Regulations

Bolduc Road by Portal Road Culvert Hydrology Study	3	3	3	3	3	3	18	2	Y	Structures and infrastructure
Center Road by Molly Supple Road Culvert	3	3	3	3	3	3	18	2	Y	Structures and infrastructure
Dolan Road Culvert Hydrologic and Hydraulic Study and Replacement	3	3	3	3	3	3	18	2	Y	Structures and infrastructure
Shady Rill Herrick Brook Culvert Hydrologic and Hydraulic Study and Replacement	3	3	3	3	3	3	18	3	Y	Structures and infrastructure
Daniels Farm Road Bridge Hydrologic and Hydraulic Study and Replacement	3	3	3	3	3	3	18	2	Y	Structures and infrastructure
Macey Road Feasibility Study	3	3	3	3	3	3	18	2	Y	Structures and infrastructure
Stabilize Stream Banks Where Necessary	3	3	3	3	3	3	18	2	Y	Natural Systems
Floodproof Critical Facilities	3	3	3	3	3	3	18	3	N	Structures and infrastructure
Utilize Voluntary Buyouts in Problem Locations	3	3	3	3	3	3	18	3	Y	Structures and infrastructure
Education Program About Rain Gardens and Wetland and What Individuals Can Do To Lessen Runoff	1	2	3	3	3	3	15	1	Y	Outreach and Education
Develop A Hazard Mitigation Plan for the Great Brook and Brook Road Corridors	3	3	3	3	3	3	18	2	Y	Local Plans and Regulations
Hydraulic Study of Shady Rill/Hill Road Bridge + Possible Replacement and Realignment	3	3	3	3	3	3	18	2	Y	Structures and infrastructure
Inundation Flooding										
Utilize Voluntary Buyouts in Problem Locations	3	3	3	3	3	3	18	3	Y	Local Plans and Regulations
Increase Dimension of Drainage Culverts to Bank Full Width Standard	3	3	3	3	3	3	18	2	Y	Structures and infrastructure
Routinely Clean and Repair Stormwater Infrastructure	3	3	3	3	3	3	18	1	Y	Structures and infrastructure
Snow										
Protect Power Lines and Roads by Inspecting and Removing Hazardous Trees in Road ROW	3	3	3	3	3	3	18	2	Y	Structures and infrastructure
Backup Generators for Critical Town Infrastructure	1	1	1	1	1	1	6	2	N	Structures and infrastructure
Educate Homeowners on the Importance of Carbon Monoxide Monitors and Alarms	3	3	3	3	3	3	18	1	Y	Outreach and Education
Ice										

Protect Power Lines and Roads by Inspecting and Removing Hazardous Trees in Road ROW	3	3	3	3	3	3	18	2	Y	Structures and infrastructure
Backup Generators for Critical Town Infrastructure	1	1	1	1	1	1	6	2	N	Structures and infrastructure
Educate Homeowners on the Importance of Carbon Monoxide Monitors and Alarms	3	3	3	3	3	3	18	1	Y	Outreach and Education
High Winds										
Educate Homeowners on Tree Maintenance Around Homes and Utilities	3	3	3	3	3	3	18	1	Y	Outreach and Education
Coordinate with Utilities to Encourage Them to Bury New and Upgraded Power Lines	3	3	3	3	3	3	18	1	Y	Outreach and Education
Update Zoning Ordinance to Require New Subdivision Development or Planned Unit Development to Bury Power Lines	3	3	3	3	3	3	18	1	Y	Local Plans and Regulations
Backup Generators for Critical Town Infrastructure	1	1	1	1	1	1	6	2	N	Structures and infrastructure
Protect Power Lines and Roads by Inspecting and Removing Hazardous Trees in Road ROW	3	3	3	3	3	3	18	2	Y	Structures and infrastructure
Wildfires										
Educate Homeowners on Wildfire Defensible Home Space	3	3	3	3	3	3	18	1	Y	Outreach and Education
Outreach Program During High Fire Conditions	3	3	3	3	3	3	18	1	Y	Outreach and Education
Landslides										
Stabilize Brook Road Landslide	3	3	3	3	3	3	18	3	Y	Structures and infrastructure
Stabilize McCullough Hill Road Landslide	3	3	3	3	3	3	18	3	Y	Structures and infrastructure
Stabilize Culver Hill Road Landslide	3	3	3	3	3	3	18	3	Y	Structures and infrastructure
Stabilize Portal Road Landslide at 156 Portal Road Area	3	3	3	3	3	3	18	3	Y	Structures and infrastructure
Stabilize Center Road Landslide	3	3	3	3	3	3	18	3	Y	Structures and infrastructure
Infectious Disease Outbreak										
Educate the Public About the Risks of Infectious Disease and	1	1	1	1	1	1	6	1	N	Outreach and Education

Vectors such as Lyme Disease and West Nile Virus										
Train with VDH Emergency Specialist Staff for Outbreak Response	1	1	1	1	1	1	6	1	N	Outreach and Education
Invasive Species										
Outreach on Programs for Management and Care of Aging and Diseased Trees by Tree Warden to Prevent Power Outages and Road Debris	2	2	2	2	2	2	12	1	Y	Outreach and Education
Outreach and Education Program on Invasive Pests and Risks of Ticks	3	3	3	3	3	3	18	1	Y	Outreach and Education
Outreach/Education Program on Native Plants and Invasive Plant Removal	3	3	3	3	3	3	18	1	Y	Outreach and Education
Heat										
Designate Cooling Shelter/Location	1	1	1	1	1	1	6	1	N	Local Plans and Regulations
Hot Weather Planning	1	1	1	1	1	1	6	1	N	Local Plans and Regulations
Cold										
Cold Weather Planning	1	1	1	1	1	1	6	1	Y	Local Plans and Regulations
Designate Heating Shelter/Location	1	1	1	1	1	1	6	1	N	Local Plans and Regulations
Drought										
Outreach and education program on water efficiency opportunities	1	1	1	1	1	1	6	1	N	Outreach and Education
All Hazards										
Address Mud Season Road Locations/for First Responder Access	3	3	3	3	3	3	18	2	Y	Structures and infrastructure
Integrate Mitigation into Capital Improvement Programs and Planning	2	2	2	2	2	2	12	2	Y	Local Plans and Regulations
Plan for Road Right-of-Way Vegetation Management	2	2	2	2	2	2	12	2	Y	Local Plans and Regulations
Develop 5 yr. Strategic or Capital Plan with Climate Focus for Infrastructure	3	3	3	3	3	3	18	2	Y	Local Plans and Regulations
Add Emergency Management Fund as Budget Item to Town Budget with Yearly Rollover to Save For Large Mitigation Projects	2	2	2	2	2	2	12	2	Y	Local Plans and Regulations

Table 6 Evaluation Criteria:
Life Safety –Will the action be effective at protecting lives and preventing injuries?
Property Protection –Will the action be effective at eliminating or reducing damage to structures and infrastructure?
Technical – Is the action a long-term, technically feasible solution?
Political – Is there overall public support/political will for the action?
Administrative – Does the community have the administrative capacity to implement the action?
Other Community Objectives – Does the action advance other community objectives, such as capital improvements, economic development, benefit a vulnerable population, environmental quality, or open space preservation?

Rank each of the above criteria in Table 6 with a 1, 2, or 3 using the following table:
3 = Highly effective or feasible
2 = Neutral
1 = Ineffective or not feasible

Estimated Cost:
1 = less than $50,000
2 = $50,000 to $100,000
3 = more than $100,000
C/B – Are the costs reasonable compared to the probable benefits? Yes or No

Table 7: Mitigation Action Plan

Middlesex		Who	Funding	Timeline
Mitigation Action	Mitigation Type			
Fluvial Erosion				
Update Road Erosion and Culvert Inventories	Local Plans and Regulations	Road Crew and CVRPC	CVRPC Transportation Planning Initiative ("TPI") Budget, Town Budget	2026
Study Watersheds of Shady Rill and Great Brook	Local Plans and Regulations	Public Works, Town Planning Commission, CVRPC	FEMA Hazard Mitigation Grant Program ("HMGP") Grants, FEMA Building Resilient Infrastructure and Communities ("BRIC") Grants	2025
Bolduc Road by Portal Road Culvert Hydrology Study	Structures and Infrastructure	Public Works, Town Planning Commission, CVRPC	HMGP, BRIC, VTrans Better Roads Grants	2025
Center Road by Molly Supple Road Culvert Study and Replacement	Structures and Infrastructure	Public Works, Town Planning Commission, CVRPC	Town Budget, HMGP, BRIC, Better Roads Grants	2025
Dolan Road Culvert Hydrologic and Hydraulic Study and Replacement	Structures and Infrastructure	Public Works, Town Planning Commission, CVRPC	HMGP, BRIC, Better Roads Grants	2025
Shady Rill Herrick Brook Culvert Hydrologic and Hydraulic Study and Replacement	Structures and Infrastructure	Public Works, Town Planning Commission, CVRPC	Town Budget, HMGP, BRIC, Better Roads Grants	2025

Daniels Farm Road Bridge Hydrologic and Hydraulic Study and Replacement	Structures and Infrastructure	Public Works, Town Planning Commission, CVRPC	HMGP, BRIC, Better Roads Grants	2025
Macey Road Feasibility Study	Structures and Infrastructure	Public Works, Town Planning Commission, CVRPC	HMGP, BRIC, Better Roads Grants	2025
Stabilize Stream Banks Where Necessary	Natural Systems	Public Works	Town Budget, HMGP, BRIC, Better Roads Grants	2025
Utilize Voluntary Buyouts in Problem Locations	Structures and Infrastructure	Town Administration, Planning Commission, Select Board	Town Budget, HMGP, VT Department of Environmental Conservation Clean Water Initiative Program ("CWIP") Grants	2025-2029
Education Program About Rain Gardens and Wetland and What Individuals Can Do To Lessen Runoff	Outreach and Education	Friends of the Winooski	Town Budget, CWIP Grants	2025-2029
Develop A Hazard Mitigation Plan for the Great Brook and Brook Road Corridors	Local Plans and Regulations	Town Planning Commission, Select Board, Public Works, CVRPC	Town Budget, BRIC, HMGP, CWIP Grants	2025-2029
Hydraulic Study of Shady Rill/Hill Road Bridge + Possible Replacement and Realignment	Structures and Infrastructure	Public Works, Town Planning Commission, CVRPC	Town Budget, BRIC, HMGP Grants	2025-2029
Inundation Flooding				
Utilize Voluntary Buyouts in Problem Locations	Local Plans and Regulations	Town Administration, Planning Commission, Select Board	Town Budget, HMGP, CWIP Grants	2025-2029
Increase Dimension of Drainage Culverts to Bank Full Width Standard	Structures and Infrastructure	Public Works	Town Budget, BRIC, HMGP, Better Roads Grants	2025-2029
Routinely Clean and Repair Stormwater Infrastructure	Structures and Infrastructure	Public Works	Town Budget, Better Roads, CWIP Grants	2025-2029
Snow				
Protect Power Lines and Roads by Inspecting and Removing Hazardous Trees in Road ROW	Structures and Infrastructure	Public Works, GMP, WEC	Town Budget, Green Mountain Power ("GMP"), Washington Electric Coop ("WEC")	2025-2029
Educate Homeowners on the Importance of Carbon Monoxide Monitors and Alarms	Outreach and Education	Fire Dept.	Town Budget	2025-2029
Ice				

Protect Power Lines and Roads by Inspecting and Removing Hazardous Trees in Road ROW	Structures and Infrastructure	Public Works, GMP, WEC	Town Budget, GMP, WEC	2025-2029
Educate Homeowners on the Importance of Carbon Monoxide Monitors and Alarms	Outreach and Education	Fire Dept.	Town Budget	2025-2029
High Winds				
Educate Homeowners on Tree Maintenance Around Homes and Utilities	Outreach and Education	Tree Warden	Town Budget	2025-2029
Coordinate with Utilities to Encourage Them to Bury New and Upgraded Power Lines	Outreach and Education	Town Administration, Planning Commission, Select Board, GMP, WEC	Town Budget, GMP, WEC	2025
Update Zoning Ordinance to Require New Subdivision Development or Planned Unit Development to Bury Power Lines	Local Plans and Regulations	Town Administration, Planning, Select Board	Town Budget, VT Agency of Commerce and Community Development Municipal Planning Grants ("MPG")	2025
Protect Power Lines and Roads by Inspecting and Removing Hazardous Trees in Road ROW	Structures and Infrastructure	Public Works, GMP, WEC	Town Budget, GMP, WEC	2025-2029
Wildfires				
Educate Homeowners on Wildfire Defensible Home Space	Outreach and Education	Fire Dept.	Town Budget	2025
Outreach Program During High Fire Conditions	Outreach and Education	Fire Dept.	Town Budget	2025
Landslides				
Stabilize Brook Road Landslide	Structures and Infrastructure	Public Works	Town Budget, BRIC, HMGP, Betters Roads Grants	2025
Stabilize McCullough Hill Road Landslide	Structures and Infrastructure	Public Works	Town Budget, BRIC, HMGP, Betters Roads Grants	2025
Stabilize Culver Hill Road Landslide	Structures and Infrastructure	Public Works	Town Budget, BRIC, HMGP, Betters Roads Grants	2025
Stabilize Portal Road Landslide at 156 Portal Road Area	Structures and Infrastructure	Public Works	Town Budget, BRIC, HMGP, Betters Roads Grants	2025
Stabilize Center Road Landslide	Structures and Infrastructure	Public Works	Town Budget, BRIC, HMGP, Betters Roads Grants	2025
Infectious Disease Outbreak				

Educate the Public About the Risks of Infectious Disease and Vectors such as Lyme Disease and West Nile Virus	Outreach and Education	Health Officer	Town Budget, VT Department of Health ("VDOH")	2025
Invasive Species				
Outreach on Programs for Management and Care of Aging and Diseased Trees by Tree Warden to Prevent Power Outages and Road Debris	Outreach and Education	Tree Warden	Town Budget	2025
Outreach and Education Program on Invasive Pests and Risks of Ticks	Outreach and Education	Health Officer	Town Budget, VDOH	2025
Outreach/Education Program on Native Plants and Invasive Plant Removal	Outreach and Education	Tree Warden	Town Budget	2025-2029
Heat				
Cold				
Cold Weather Planning	Local Plans and Regulations	Town Planning Commission, Fire Dept.	Town Budget	2025
Drought				
All Hazards				
Address Mud Season Road Locations/for First Responder Access	Structures and Infrastructure	Town Planning Commission, Fire Dept.	Town Budget	2025
Integrate Mitigation into Capital Improvement Programs and Planning	Local Plans and Regulations	Town Administration, Planning Commission, Select Board	Town Budget, MPG Grants	2026
Plan for Road Right-of-Way Vegetation Management	Local Plans and Regulations	Public Works	Town Budget	2025
Develop 5 yr. Strategic or Capital Plan with Climate Focus for Infrastructure	Local Plans and Regulations	Town Administration, Planning Commission, Select Board	Town Budget, MPG Grants	2026
Add Emergency Management Fund as Budget Item to Town Budget with Yearly Rollover to Save For Large Mitigation Projects	Local Plans and Regulations	Town Administration, Planning Commission, Select Board	Town Budget	2025

*ALL HAZARDS MITIGATIONS MEANT TO ADDRESS MITIGATION ACTIONS FOR THOSE WITHOUT A CHOSEN MITIGATION ACTION ABOVE.

The Town will make every effort to maximize use of future Public Assistance Section 406 Mitigation opportunities when available during federally declared disasters.

Integrating Into Existing Plans and Procedures

For Middlesex to succeed in reducing long-term risk, information from this Plan should be integrated throughout government operations. When activities are connected, they can not only reduce risk and increase resilience, but also accomplish other objectives such as environmental protection, economic development, financial stability, and land use planning.

There are several ways the Town can achieve integration into existing plans and procedures to support risk-informed community planning. They can include the community's primary mitigation goal as stated on page 28, information from the risk assessment, and mitigation actions as follows:

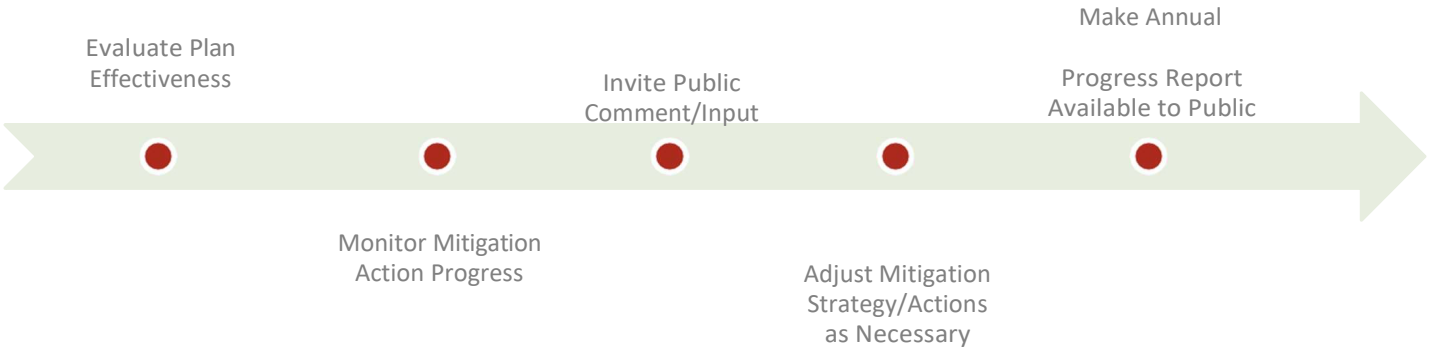
- *Funding for mitigation actions can be prioritized in the annual budget process and in capital planning.*
- *The mitigation goal and risk assessment information can be incorporated into the next Municipal Plan update (Land Use and Flood Resilience chapters in particular) to help steer growth and redevelopment away from high-risk locations.*
- *The mitigation goal and risk assessment information can be incorporated into future zoning ordinance updates.*
- *Several flood-related mitigation actions for increasing road resiliency can be implemented utilizing the Hazard Mitigation Grant Program Funding.*

7 PLAN MAINTENANCE

This Plan is dynamic. To ensure it remains current and relevant, it should be annually evaluated and monitored, and updated every five years, in accordance with FEMA guidelines in effect at the time.

Annual Evaluation and Monitoring

Within 12 months of FEMA Final Approval, the Plan will be annually evaluated and monitored as follows:



1. The Town Administration will evaluate the effectiveness of the Plan in meeting the stated goals. The Town will seek continued public participation during the plan's implementation, monitoring, and evaluation by providing updates on the plan's progress and seeking public feedback at public meetings including the Town's annual meeting to update its LEMP and/or select board and planning commission

meetings. The Town will also post updates on Front Porch Forum and the Town's website. Things to consider during this evaluation:

- What disasters has the Town (or region) experienced?
- Should the list of highest risk natural hazard impacts be modified?
- Are new data sources, maps, plans, or reports available? If so, what have they revealed, and should the information be incorporated into this plan?
- Has development in the region occurred and could it create or reduce risk?
- Has the Town adopted new policies or regulations that could be incorporated into this plan?
- Have elements of this plan been incorporated into new plans, reports, policies, or regulations?
- Are there different or additional community capabilities available for mitigation implementation?

2. Next, the Town Administration will monitor mitigation action progress. Things to consider:

- Is the mitigation strategy being implemented as anticipated?
- Were the cost and timeline estimates accurate?
- Should new mitigation actions be added?
- Should proposed actions be revised or removed?
- Are there new funding sources to consider?

The status (e.g., in progress, complete) of each action should be recorded in **Table 8**. If the status is "in progress" note whether the action is on schedule. If not, describe any problems, delays, or adverse conditions that will impair the ability to complete the action.

3. The Town Administration will seek public comment from the Whole Community on plan implementation. Things to consider:

- Are there any new stakeholders to include?
- What public outreach activities have occurred?
- How can public involvement be improved?

4. Based on input received, the mitigation strategy and/or actions will be modified, if needed.

5. A report (or record in the form of meeting minutes) of the annual evaluation and monitoring will be made available to the public.

Table 8: Mitigation Action Status

Middlesex		Who	Timeline	Status
Mitigation Action	Mitigation Type			
Fluvial Erosion				
Update Road Erosion and Culvert Inventories	Local Plans and Regulations	CVRPC	2026	
Study watersheds of Shady Rill and Great Brook	Local Plans and Regulations	Public Works	2025	
Bolduc Road by Portal Road Culvert Hydrology Study	Structures and infrastructure	Public Works	2025	
Center Road by Molly Supple Road Culvert study and replace	Structures and infrastructure	Public Works	2025	
Dolan Road Culvert Hydrologic and Hydraulic Study and Replacement	Structures and infrastructure	Public Works	2025	

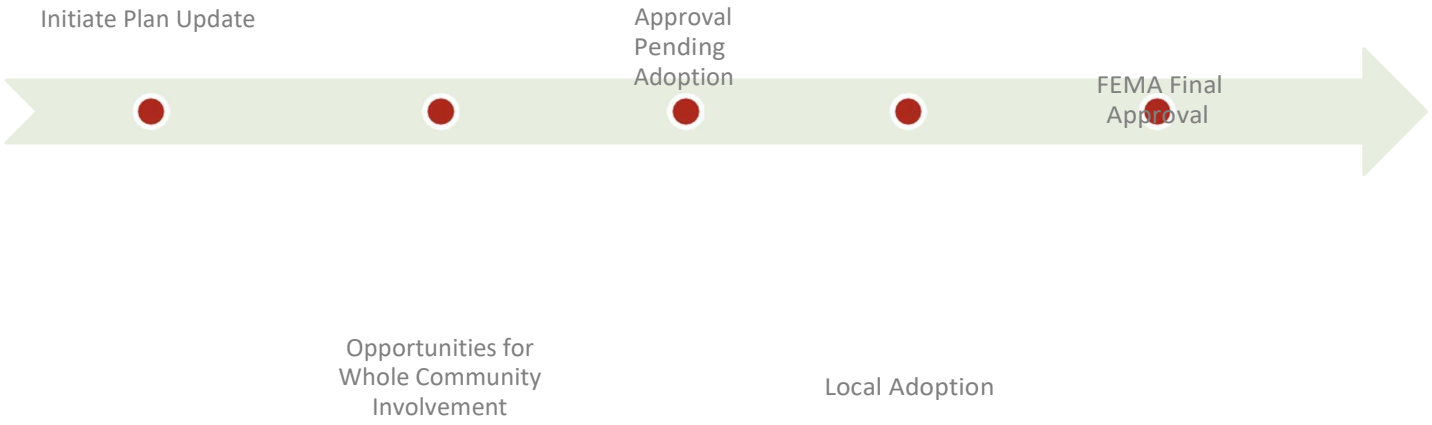
Shady Rill Herrick Brook Culvert Hydrologic and Hydraulic Study and Replacement	Structures and infrastructure	Public Works	2025	
Daniels Farm Road Bridge Hydrologic and Hydraulic Study and Replacement	Structures and infrastructure	Public Works	2025	
Macey Road Feasibility Study	Structures and infrastructure	Public Works	2025	
Stabilize Stream Banks Where Necessary	Natural Systems	Public Works	2025	
Floodproof Critical Facilities	Structures and infrastructure	Public Works	2025	
Utilize Voluntary Buyouts in Problem Locations	Structures and infrastructure	Town Administration, Town Planning Commission, Select Board	2025-2029	
Education Program About Rain Gardens and Wetland and What Individuals Can Do To Lessen Runoff	Outreach and Education	Friends of the Winooski	2025-2029	
Develop A Hazard Mitigation Plan for the Great Brook and Brook Road Corridors	Local Plans and Regulations	Town Planning Commission, Select Board, Public Works	2025-2029	
Hydraulic Study of Shady Rill/Hill Road Bridge + Possible Replacement and Realignment	Structures and infrastructure	Public Works	2025-2029	
Inundation Flooding				
Utilize Voluntary Buyouts in Problem Locations	Local Plans and Regulations	Town Administration, Town Planning Commission, Select Board	2025-2029	
Increase Dimension of Drainage Culverts to Bank Full Width Standard	Structures and infrastructure	Public Works	2025-2029	
Routinely Clean and Repair Stormwater Infrastructure	Structures and infrastructure	Public Works	2025-2029	
Snow				
Protect Power Lines and Roads by Inspecting and Removing Hazardous Trees in Road ROW	Structures and infrastructure	Public Works, GMP, WEC	2025-2029	
Backup Generators for Critical Town Infrastructure	Structures and infrastructure	Town Planning Commission, Public Works, Fire Dept.	2026	

Educate Homeowners on the Importance of Carbon Monoxide Monitors and Alarms	Outreach and Education	Fire Dept.	2025-2029	
Ice				
Protect Power Lines and Roads by Inspecting and Removing Hazardous Trees in Road ROW	Structures and infrastructure	Public Works, GMP, WEC	2025-2029	
Backup Generators for Critical Town Infrastructure	Structures and infrastructure	Town Planning Commission, Public Works, Fire Dept.	2026	
Educate Homeowners on the Importance of Carbon Monoxide Monitors and Alarms	Outreach and Education	Fire Dept.	2025-2029	
High Winds				
Educate Homeowners on Tree Maintenance Around Homes and Utilites	Outreach and Education	Tree Warden	2025-2029	
Coordinate with Utilities to Encourage Them to Bury New and Upgraded Power Lines	Outreach and Education	Town Administration, Town Planning Commission, Select Board, GMP, WEC	2025	
Update Zoning Ordinance to Require New Subdivision Development or Planned Unit Development to Bury Power Lines	Local Plans and Regulations	Town Administration, Town Planning Commission, Select Board	2025	
Protect Power Lines and Roads by Inspecting and Removing Hazardous Trees in Road ROW	Structures and infrastructure	Public Works, GMP, WEC	2025-2029	
Wildfires				
Educate Homeowners on Wildfire Defensible Home Space	Outreach and Education	Fire Dept.	2025	
Outreach Program During High Fire Conditions	Outreach and Education	Fire Dept.	2025	
Landslides				
Stabilize Brook Road Landslide	Structures and infrastructure	Public Works	2025	
Stabilize McCullough Hill Road Landslide	Structures and infrastructure	Public Works	2025	
Stabilize Culver Hill Road Landslide	Structures and infrastructure	Public Works	2025	
Stabilize Portal Road Landslide at 156 Portal Road Area	Structures and infrastructure	Public Works	2025	

Stabilize Center Road Landslide	Structures and infrastructure	Public Works	2025	
Infectious Disease Outbreak				
Educate the Public About the Risks of Infectious Disease and Vectors such as Lyme Disease, West Nile Virus	Outreach and Education	Health Officer	2025	
Train with VDH Emergency Specialist Staff for Outbreak Response	Outreach and Education	Fire Dept., Health Officer	2025-2029	
Invasive Species				
Outreach on Programs for Management and Care of Aging and Diseased Trees by Tree Warden to Prevent Power Outages and Road Debris	Outreach and Education	Tree Warden	2025	
Outreach and Education Program on Invasive Pests and Risks of Ticks	Outreach and Education	Health Officer	2025	
Outreach/Education Program on Native Plants and Invasive Plant Removal	Outreach and Education	Tree Warden	2025-2029	
Heat				
Designate Cooling Shelter/Location	Local Plans and Regulations	Town Administration, Town Planning Commission, Select Board	2025	
Hot Weather Planning	Local Plans and Regulations	Town Planning Commission, Fire Dept.	2025	
Cold				
Cold Weather Planning	Local Plans and Regulations	Town Planning Commission, Fire Dept.	2025	
Drought				
Outreach and education program on water efficiency opportunities	Outreach and Education	Public Works, Efficiency Vermont	2025	
All Hazards				
Address Mud Season Road Locations/for First Responder Access	Structures and infrastructure	Town Planning Commission, Fire Dept.	2025	
Integrate Mitigation into Capital Improvement Programs and Planning	Local Plans and Regulations	Town Administration, Town Planning Commission, Select Board	2026	

Plan for Road Right-of-Way Vegetation Management	Local Plans and Regulations	Public Works	2025	
Develop 5 yr. Strategic or Capital Plan with Climate Focus for Infrastructure	Local Plans and Regulations	Town Administration, Town Planning Commission, Select Board	2026	
Add Emergency Management Fund as Budget Item to Town Budget with Yearly Rollover to Save For Large Mitigation Projects	Local Plans and Regulations	Town Administration, Town Planning Commission, Select Board	2025	

This Plan will be updated at a minimum every five (5) years as follows:



1 Currently, funding to assist municipalities in paying for planning services to update the Local Hazard Mitigation Plan is available through FEMA's Building Resilient Infrastructure and Communities grant program. If using this grant, the Town of Middlesex should contact Vermont Emergency Management (VEM) to apply for funding in 2027 – approximately 2 years before the Plan expires.

Once funding is secured and the grant agreement between the Town and State is in place, the Town Clerk can issue a request for proposals (RFP) to procure planning services in accordance with the grant agreement. The RFP should be issued approximately 14 months before the Plan expires.

Once a consultant is procured, the Plan update can begin with a kick-off meeting including the consultant and local hazard mitigation planning team. The kick-off meeting should be scheduled approximately 12 months before the Plan expires. The Town should allot approximately 8 months for the Plan update process.

2 Opportunities for Whole Community involvement throughout the Plan update process need to be factored into the schedule. These opportunities may include a community survey, planning workshop, and public meetings at critical milestones agreed to at the project kick-off meeting.

3 Once the local hazard mitigation planning team has prepared a final draft, they can seek authorization from the Select Board to submit the Plan for VEM/FEMA approval. Plan approval is accomplished in two steps – the first is Approval Pending Adoption. The Town should submit for Approval Pending Adoption approximately 4 months before the Plan expires to allow for time to respond to any review comments received from VEM/FEMA.

4 Once the Town receives Approval Pending Adoption, the Select Board should adopt the Plan as soon as their next regular meeting.

5 Once adopted, the Town can submit the Plan for VEM/FEMA Final Approval. The Townshould submit for Final Approval approximately 1 month before the Plan expires to ensure there is no gap in coverage between updates. The FEMA Final Approval date starts the clock on the effective dates of the 5-year Plan.

MITIGATION ACTIONS FROM 2018 PLAN

Hazard	Mitigation Action (MA) or Preparedness Action (PA)	Local Leadership	Prioritization	Possible Resources	Time Frame	Status
All Hazards	**PA**- Ensure Local Emergency Operations Plan is maintained and up to date	Middlesex Town Select Board, Emergency Management Coordinator ("EMC"), Town Clerk	High	Local resources with support and assistance from CVRPC and Vermont Emergency Management ("VEM")	Annually, March-May 2018-2023	Complete.
Dam Failure	**MA** Work with the state to develop inundation modeling of Wrightsville Dam and develop mitigation strategies	Select Board, Town Planning Commission	High	Local resources with support and assistance from VT Agency of Natural Resources ("ANR"), VEM, and Vermont Center for Geographic Information ("VCGI")	2 years (2019-2020)	No longer a municipal priority. Not included in 2025 mitigation action plan.
Dam Failure	**MA-** Work with Green Mountain Power to develop inundation modeling of Marshfield Dam and Middlesex Dam #2 and develop mitigation strategies	Select Board, Town Planning Commission	High	Local resources with support and assistance from ANR and VCGI	2 years (2019-2020)	No longer a municipal priority. Not included in 2025 mitigation action plan.
Dam Failure	**PA-** Meet with Dam owners to discuss maintenance, EAP, and evacuation procedures. Add Middlesex to Notification Contact list and emergency	Select Board, EMC, Town Clerk, Road Foreman, School Principal	Medium	Local resources, CVRPC, ANR Dam Safety Program, VEM Critical Infrastructure Planner, Green Mountain	At each update of EAP public participation process; Spring 2018 initial meeting.	Town participates in VT Alerts.

	procedures flow chart in EAP for all three dames. Open line of communication between dam owners and the Town			Power ("GMP")		
Dam Failure	**PA-** Attend trainings and seminars on Dam Safety provided by the state, Army Corp of Engineers and CVPRC, as offered.	Select Board, EMC, Town Clerk, Road Foreman, School Principal	High	ANR Dam Safety Program, VEM Critical Infrastructure Planner, local resources	As offered	No longer a municipal priority. Not included in 2025 mitigation action plan.
Winter Storms/ Severe Cold/ Ice Storms	**MA/ PA-** Provide educational materials to residents and sensitive populations on how to insulate homes (pipes, attics) for extreme cold spells; protect against snow loads; inform residents about the access services of Capstone Community Action	Select Board, Town Clerk	Medium	Hazard Mitigation Grant Program ("HMGP") - Planning, local funds	Available at the town office.	Capstone posts to Front Porch Forum to inform residents about services.
All Hazards	**PA-** Develop a citizen group with a Coordinator to activate volunteers as needed to assist with town wide emergencies such as traffic control, help open roads where debris, trees, have blocked roadways, and similar matters.	Town Clerk, EMC, Select Board, Road Foreman	Medium	VEM, local funds	2-3 years (2019-2020)	Town is not soliciting volunteers to assisting with traffic control or maintenance as this could open the Town to legal liability. There is a large Road Committee in town, which uses Front Porch Forum for outreach.

Flood	**MA/PA-** Work with elected officials, the State and FEMA to promote and support NFIP compliance through communications, training, and education	Town Planning Commission and ANR	Medium	HMGP	2 years (2019-2020)	See Flood Hazard Bylaws and Town Plan (which go beyond NFIP minimum standards). The Zoning Administrator is the Substantial Damages Administrator.
Flood	**MA** Select and implement Flood Plain restoration projects from North Branch Corridor Plan to complete	Planning Commission and ANR	Medium	ANR, EPA	3 year (2021-2023)	The Town is still interested in this work (See Worcester Plan for North Branch RCP project types & summary).
All Hazards	**PA** Maintain and improve the Emergency Management Committee	EMC and Select Board	High	None	Annually 2018-2023	Select Board Chair/Emergency Management Director Liz Scharf and Emergency Management Coordinator Stephen Dennis staff this committee.
All Hazards	**PA-** Obtain and keep copies available for distribution to local residents of the VEM publication booklet, "Vermont Family Emergency Preparedness"	Town Clerk	Medium	VEM, CVRPC	New printing Fall 2017	No progress. Not included in 2025 mitigation action plan.
All Hazards	**PA-** Explore Town of Middlesex participation in VT Alert System	Select Board, EMC, Town Clerk	High	VEM, local resources	Summer 2018	Town participates in VT Alerts including homes on 3-Mile Bridge Rd.
All Hazards	**MA** Updated Middlesex Town Plan before it expires in May 2018 and include a Flood Resiliency element with will	Town Planning Commission, Select Board, and CVRPC	High	Local resources, VT Community Development Program ("VCDP") Municipal	June 2017-May 2018	Complete.

	identify goals, policies, and recommendations to mitigate risks to public health and infrastructure. Integrate this 2018 LHMP into the updated Municipal Plan			Planning Grant funds, CVPRC		
All Hazards	**PA**- enter into and execute an Agreement to have Rumney School certified as a Shelter	EMC, Select Board, and Red Cross	Medium	Emergency Management Performance Grant ("EMPG"); local funding, ARC funding	1 year (2018)	Town is still interested but School is now under the jurisdiction of Washington Unified School District. Not included in 2025 mitigation action plan.
Extreme Cold/Winter Storm/Ice Storm; Severe Weather/ Hurricanes	**PA**- Work with GMP to continue regular tree line trimming and cutting along power lines though their service area to ensure clear and maintained utility corridors and to protect all customers, town and utility infrastructure.	Select Board, Road Foreman	Medium	Utility resources, local resources	Annually, fall or spring when leaves are off the trees is the best time to cut.	In progress. Many areas in town still vulnerable, especially Brook Road (three power lines went down during July 2024 storm). Included in 2025 mitigation action plan.
Flooding	**PA**- Establish a communication alert system to residents on 3 Mile Bridge Rd	EMC; Fire Department; VEM	High	VT-Alert, Telephone Tree	Ongoing	Emergency Management Coordinator is working on a local phone tree and would like to train municipal leaders in utilizing VT Alerts for local announcements.
Flooding	**MA**-Expansion and upgrade of Sunny Brook Road Culvert	Select Board, Road Foreman	High	HMGP, Town Funds	2 years (2019-2020)	In progress. Not included in 2025 mitigation action plan.

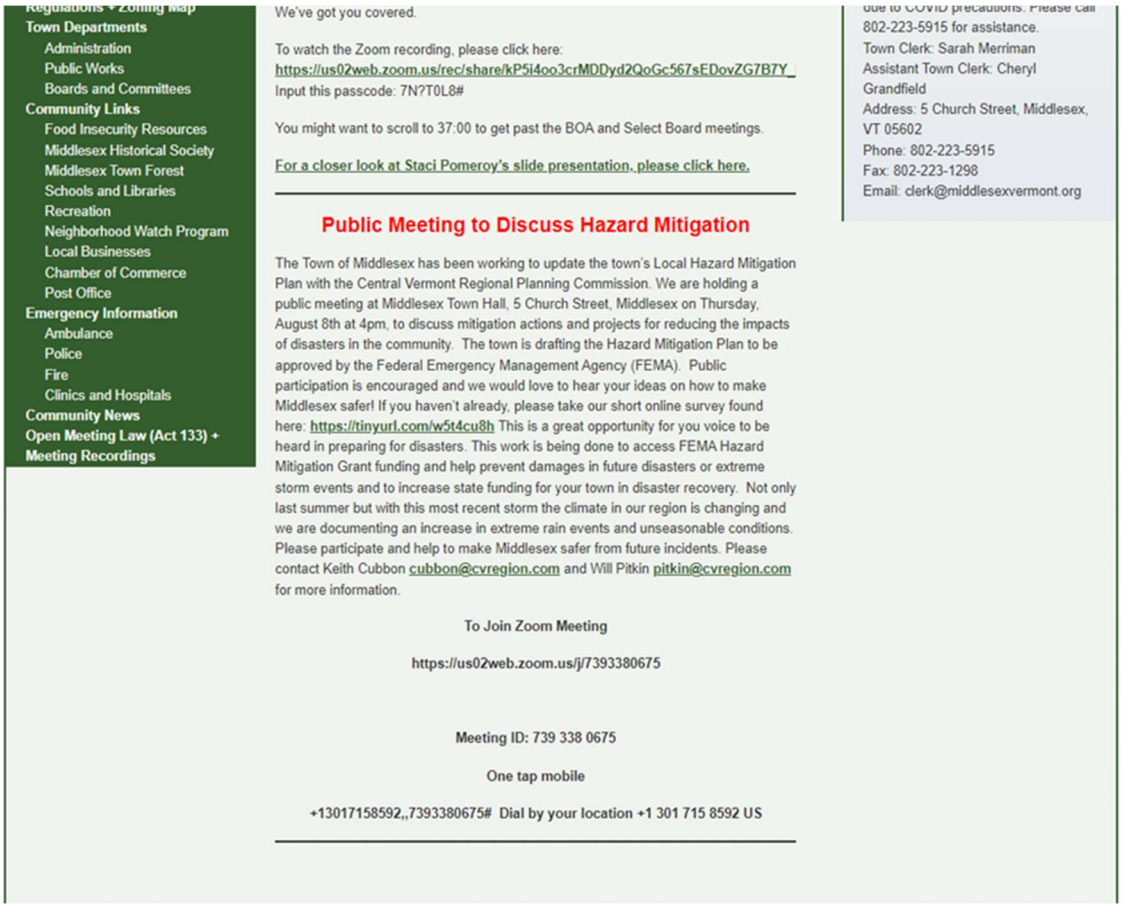
Flooding	**MA-** Buyout of remaining repetitive loss properties in Middlesex VT	Select Board, Town Clerk, and Homeowners	High	HMGP 4330	1 year (2018-2019)	Three buyouts completed, 16 in progress. Included in 2025 mitigation action plan.
Severe Weather/ Hurricanes; Flood/Flash Flood	**MA** - Upgrade and improve 3 Mile Bridge Road culvert based on recommendations in Hydraulic Study.	Select Board, Road Foreman	High	HMGP, Town Funds, AOT funding Better Roads grant	2 years (2019-2020)	Pending. Not included in 2025 mitigation action plan.
Severe Weather/ Hurricanes	**PA –** Update and adopt Middlesex Forest Plan	Select Board, Town Forest Warden, EMC, UVM Extension Service Forestry Program, ANR FPR	Medium - Low	Local funds, UVM Extension Service, ANR	3-5 years 2020-2023	Complete.
All Hazards	**PA-** Install generator at Town Hall	Select Board, Town Clerk	Medium	HMGP, Town funds	2 years (2019-2020)	Pending – plans for Town Hall upgrades, including generator, on hold because grant funding was unavailable due to July 2024 floods. Town will continue to pursue funding.
All Hazards	**PA/MA-**Upgrade electrical systems in municipal buildings and shelters to prevent surge/equipment damage from fluctuating current during ice and windstorms	Select Board	Medium	Town funds, other federal funding	2 years (2019-2020)	Highway / Fire buildings have generators. New Town Hall plans will include automatic generator.

SUMMARY OF PUBLIC COMMENTS ON DRAFT PLAN

Public comments received throughout the plan development process are summarized here. For detailed information about how the whole community was invited to participate reference **Table 2**.

The Town posted a link to the survey that follows on the town website.

All planning meetings were open to the public.



Regulations + Zoning Map
Town Departments
Administration
Public Works
Boards and Committees
Community Links
Food Insecurity Resources
Middlesex Historical Society
Middlesex Town Forest
Schools and Libraries
Recreation
Neighborhood Watch Program
Local Businesses
Chamber of Commerce
Post Office
Emergency Information
Ambulance
Police
Fire
Clinics and Hospitals
Community News
Open Meeting Law (Act 133) + Meeting Recordings

We've got you covered.

To watch the Zoom recording, please click here:
https://us02web.zoom.us/rec/share/kP5i4oo3crMDDyd2QoGc567sEDovZG7B7Y_
Input this passcode: 7N?T0L8#

You might want to scroll to 37:00 to get past the BOA and Select Board meetings.

For a closer look at Staci Pomeroy's slide presentation, please click here.

Public Meeting to Discuss Hazard Mitigation

The Town of Middlesex has been working to update the town's Local Hazard Mitigation Plan with the Central Vermont Regional Planning Commission. We are holding a public meeting at Middlesex Town Hall, 5 Church Street, Middlesex on Thursday, August 8th at 4pm, to discuss mitigation actions and projects for reducing the impacts of disasters in the community. The town is drafting the Hazard Mitigation Plan to be approved by the Federal Emergency Management Agency (FEMA). Public participation is encouraged and we would love to hear your ideas on how to make Middlesex safer! If you haven't already, please take our short online survey found here: https://tinyurl.com/w5t4cu8h This is a great opportunity for you voice to be heard in preparing for disasters. This work is being done to access FEMA Hazard Mitigation Grant funding and help prevent damages in future disasters or extreme storm events and to increase state funding for your town in disaster recovery. Not only last summer but with this most recent storm the climate in our region is changing and we are documenting an increase in extreme rain events and unseasonable conditions. Please participate and help to make Middlesex safer from future incidents. Please contact Keith Cubbon cubbon@cvregion.com and Will Pitkin pitkin@cvregion.com for more information.

To Join Zoom Meeting

https://us02web.zoom.us/j/7393380675

Meeting ID: 739 338 0675

One tap mobile

+13017158592,,7393380675# Dial by your location +1 301 715 8592 US

due to COVID precautions. Please call 802-223-5915 for assistance.
Town Clerk: Sarah Merriman
Assistant Town Clerk: Cheryl Grandfield
Address: 5 Church Street, Middlesex, VT 05602
Phone: 802-223-5915
Fax: 802-223-1298
Email: clerk@middlesexvermont.org

The hazard review meeting was announced and promoted with posters at the town office and with Front Porch Forum posts notifying residents of the meeting.


Middlesex, Vermont
Official website for the Town of Middlesex
MIDDLESEX
MIDDLESEX
72°
clear sky
80%
humidity
wind: 1m/s
WSW
H 75 • L 68
Weather from OpenWeatherMap
Home
Minutes/Agendas
Town Forms & Audit Reports & Grand Lists
Events Calendar
Contact Us
Search
Permits/Ordinances/Zoning
Search Middlesex Land Records & Survey Maps
Interesting & Helpful Links
Online Tax Map
Online Payment Portal
2023Town Report
2024 Grand List
2024 Middlesex Property Tax Bills
Minutes/Agendas
Open Meeting Law (Act 133) + Meeting Recordings
2023 Updated Land Use Regulations + Zoning Map
Town Departments
Administration
Public Works
Boards and Committees
Community Links
Food Insecurity Resources
Middlesex Historical Society
Middlesex Town Forest
Schools and Libraries
Recreation
Neighborhood Watch Program
Local Businesses
Home
Community News
Middlesex Local Hazard Mitigation Plan Update!
We at the Central Vermont Regional Planning Commission are working with the Town of Middlesex to update their Local Hazard Mitigation Plan. We are reaching out to you to ask if there is any information or locations of risk that you may be aware of or would like to see addressed in this update. We also have a brief survey that we are using as an additional way to gather input from the community at large. If you have any concerns, please contact me and can have a discussion to make sure your voice is heard.
The survey can be found here: https://tinyurl.com/w5t4cu8h
Thanks,
Will Pitkin
Planner, Central Vermont Regional Planning Commission
pitkin@cvregion.com (802)-262-1048
Town Clerk's Office
Hours & Contact Info.
OFFICE HOURS: The Middlesex Town Clerk's Office is open to the public from 9 AM to 5 PM, Monday through Thursday. The office is closed on Fridays. We no longer require appointments unless you request one due to COVID precautions. Please call 802-223-5915 for assistance.
Town Clerk: Sarah Merriman
Assistant Town Clerk: Cheryl Grandfield
Address: 5 Church Street, Middlesex, VT 05602
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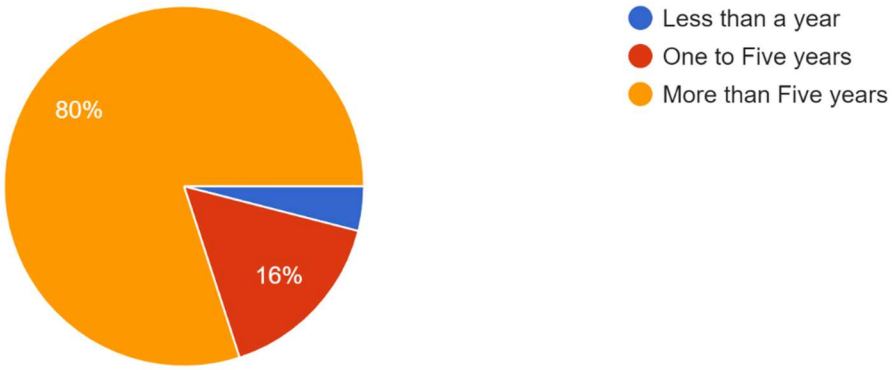
Email: clerk@middlesexvermont.org

COMMUNITY SURVEY RESULTS

The Town of Middlesex utilized a survey to solicit public input on 1) potential natural hazard impacts and 2) mitigation strategies to reduce these impacts in the future. The survey was made available online from August 5th until September 12th, 2024. The Town received 25 responses, and a summary of the input received is provided below.

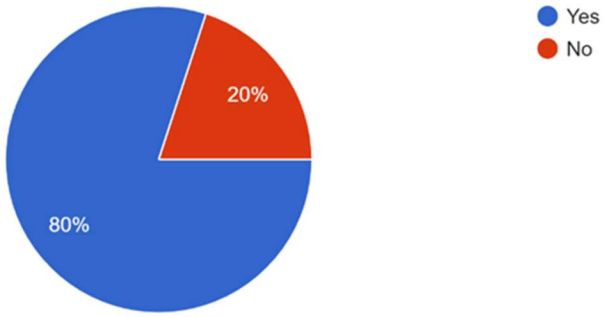
1) How long have you lived in or owned a business or property in Middlesex?

25 responses



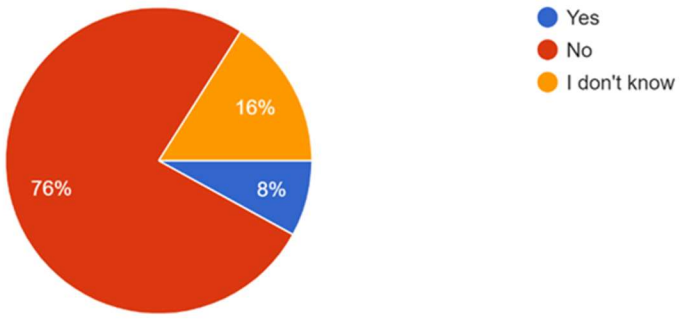
2) Have you experienced damage during a past severe weather event?

25 responses



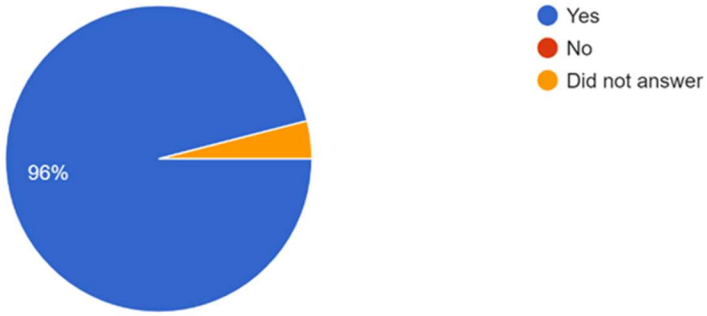
3) Is your home or business property located in a FEMA designated floodplain? If yes, do you have insurance through the National Flood Insurance Program (NFIP)?

25 responses



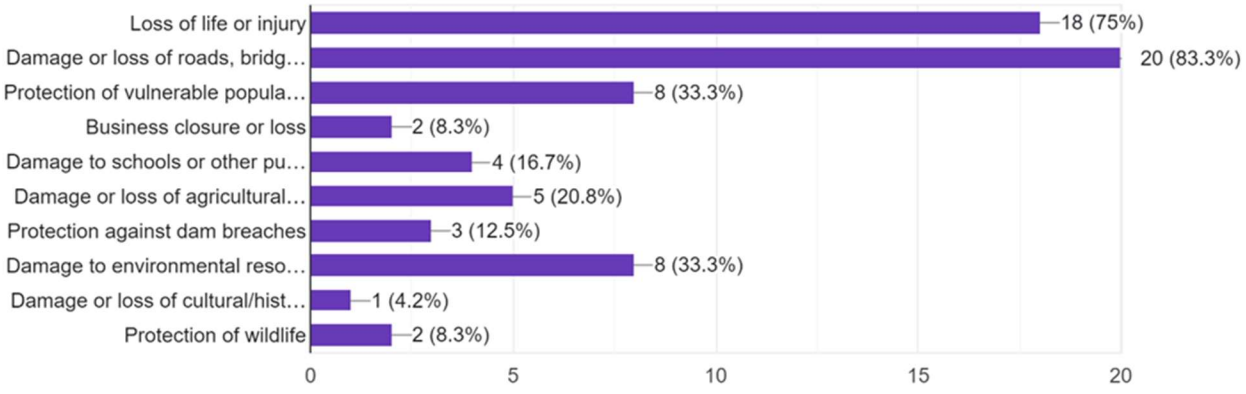
4) Have you seen areas in the community damaged during a past severe weather event?

25 responses



5) In your opinion, which of the following are most important to protect against potential future severe weather impacts in Middlesex? Please check up to 3 boxes.

24 responses



6) In this context, hazard mitigation is a sustained measure that reduces or eliminates long-term risk to people and property from the effects of natural hazards (defined as severe weather events). What types of hazard mitigation measures would you like to see the community prioritize?

20 responses

flooding and erosion

Repair roads and culverts to mitigate future flood damage.

Flooding

Forestry management

Slowly releasing water from Wrightsville dam to keep it from backing up into Putnamville and flooding property there

Rethink our roads and bridges. Are there roads that need to be reinforced, moved or outright abandoned? And how do we fairly and caringly take care of those who may be hugely negatively impacted by road changes.

Buried power and communication lines. Actual cell coverage would be nice too.

Clearing tree ps and debris from brooks, rivers and culverts.

Stop burning stuff!

We have fuel tanks on Three Mile Bridge Rd barely above flood zone.

Protect as best we can against the 'small' streams in our area that seem to overwhelm property and roads.

Buy outs of homes in vulnerable sites along the Great Brook and other town flood plains.
Abandon Brook Road and Old Brook Road if 2024 flood repairs fail during a future flood of the Great Brook.
Plant cottonwoods, willows, and river birch along town streams to slow erosion/soil loss.

Stream alteration to manage the speed and flow of the streams. Bridge and road reinforcements and repair. Ditching and clearly of debris from ditches.

replacement and upgrade of culverts (IE- LARGER) and bridges (also larger). also, flood plain restoration.

Long term road revamping to this new normal

safeguard surface and ground water resources, e.g. from contamination &toxics pollution

Those without resources to recover quickly struggle the most and sometimes never recover. Damage that causes loss for the most vulnerable would be the highest priority, including their livelihoods, be they agricultural or other business. Damage that demands we raise taxes, making Middlesex unaffordable for those with the least resources, should also be considered when allocating mitigation investments.

Making sure we are flowing water properly to reduce damages to driveways and roads

Dredging (I know this is controversial) and Culver Clean Out -- particularly the the Lower Sunny Brook needs to be dredged to allow for the capacity of flow to return to what it was when I moved here 4+ years ago. There has been innumerable debris and sediment that has caused the brook bottom to rise considerably, especially around the first two culverts that have washed out in July 2023 and July 2024. Culvert clean out of these two culverts that cross under Lower Sunny Brook Road is also dire. These brand new culverts became significantly plugged with sediment from July 2024 storm and I fear will not hold up to any significant future storm.

Find a way to work with the State and use Public Assistance FEMA funding to permit the removal of logjams and other dangerous woody debris in our rivers. On Brook Road, we have over 200 downed trees lodged in our brook. These logjams trap water and debris that build pressure on vital infrastructure, such as roads, culverts, bridges, and homes. When these logjams got caught on my 50' private bridge, the logjam wiped it out entirely, causing over $500,000 in damage. All we need is one more flash flood event and the resulting surge from new logjams will certainly destroy anything in its path, including homes, bridges, and roads. The Brook is primed in a very dangerous way to cause an even more catastrophic scenario, with so many downed trees lining the length of it.
We need to establish a town or state-level woody debris management plan that focuses on clearing logjams from flood-prone areas before they cause irreversible damage. This program should prioritize high-risk areas, allocate funding for ongoing debris removal, and streamline the permit process for communities that need immediate action. Proactive removal will save lives, protect infrastructure, and prevent costly repairs, ensuring that Vermont is better prepared for future storms.

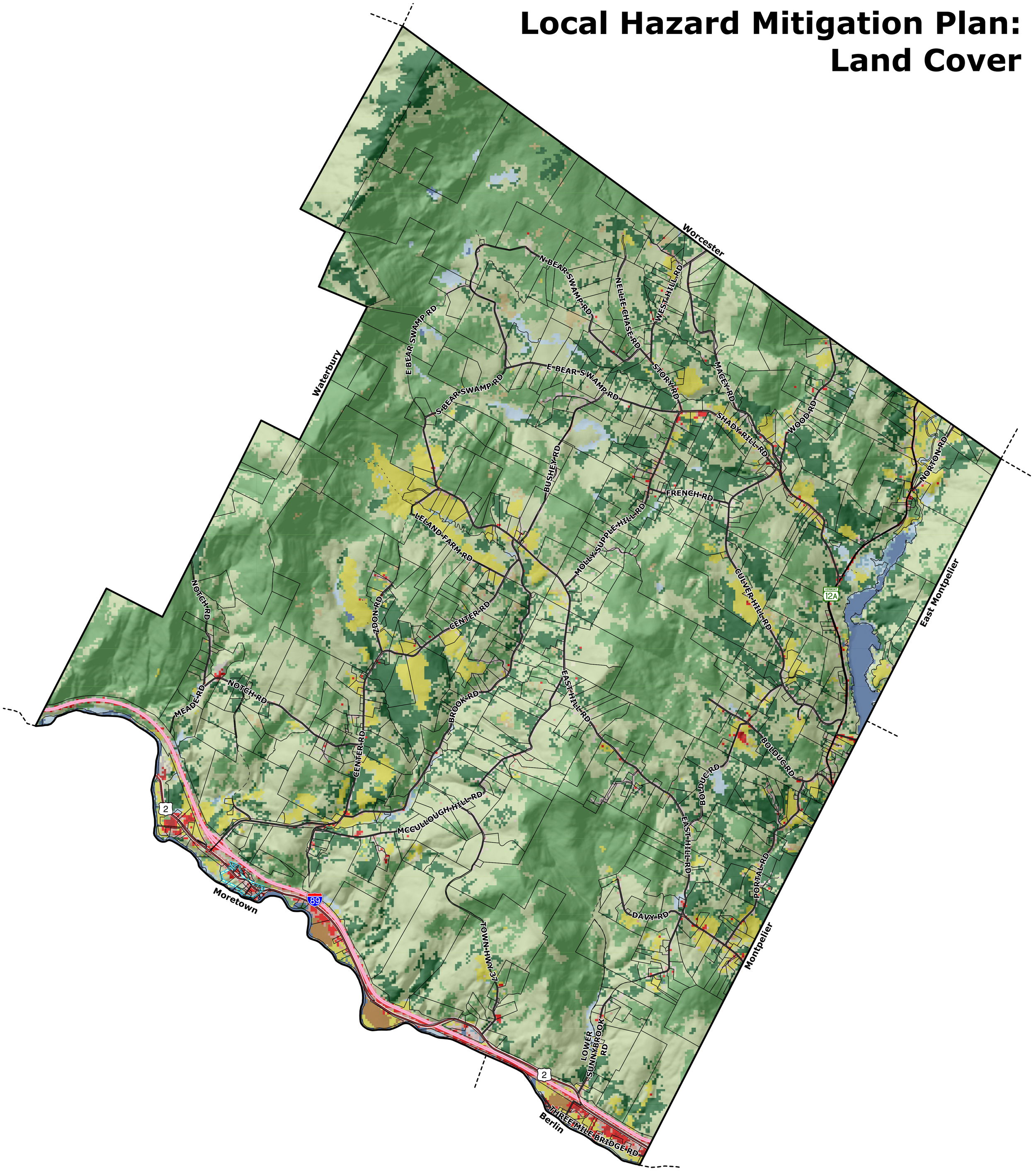
EXTENT OF RISK TABLE

Table 9: Extent of Risk – All Hazards

Extent of Risk for Waitsfield	Risk	Area/Type of risk	~ $ of damages possible	Disasters
Fluvial Erosion	Anything greater than 1"/ hr for more than 2 hours	Special Flood Hazard Area and within 50' of stream channels or stormwater inlets/structures, people, transportation	$11,292,000	See Table in Section 5
Inundation Flooding	4-6" of rain in 24hrs	Special Flood Hazard Area and within 50' of stream channels or stormwater inlets/structures, people	$5,079,600	See Table in Section 5
Snow	up to 30"	Town wide/structures, utilities, transportation	Undetermined	See Table in Section 5
Ice	1/4" or greater	Town wide/structures, utilities, transportation	Undetermined	See Table in Section 5
High Winds	60 mph	Town wide, but more prominent on higher slopes/structures, utilities	Undetermined	See Table in Section 5
Wildfires	15 acres	Town wide/people, structures, environment	Minimal	None
Landslides	0.1 acres	Steep sloped areas of unstable soils, often undercut by stream or waterway/structures, transportation	Undetermined / currently just timber loss.	No disaster records but 19 documented landslides within the town boundaries.
Infectious Disease Outbreak	206 cases of COVID/weekly avg./ at CVMC for region.	Town wide/people	Undetermined	DR-4532
Invasive Species	Unknown/ determinate by type (plant, insect, fungus)	Town wide/environment, agriculture	Undetermined	None
Heat	97 degrees	Town wide/people	Undetermined	None
Cold	-20 degrees/ -30 to-60 degrees with windchill	Town wide/people	Undetermined	See Table in Section 5
Drought	D3	Town wide/people, agriculture	Undetermined	None

MAPS

Local Hazard Mitigation Plan: Land Cover



Data Resources

Parcels: Middlesex Parcel Boundaries (2020, VCGI)
State Village Center Designation: Village Center Boundary (2024, ACCD)
Roads: Vermont Agency of Transportation - Road Centerlines (2021, VCGI)
National Land Cover Dataset - (2021, Multi-Resolution Land Cover Consortium)

Map Notes

Date: 18 September 2024
File: N:\Towns\Middlesex\Middlesex.aprx
Contact: cvrpc@cvregion.com

Disclaimer

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Legend

Boundaries
- Parcel Boundary
- Designated Village Center
- Town Boundary

Roads
- Class I, II & III Town Highways
- Class IV & Forest Highways
- Legal Trail
- Private Road
- Interstate Highway
- US Route
- VT Route
- Discontinued Road

National Land Cover Dataset (2021)
- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed High Intensity
- Barren Land (Rock/Sand/Clay)
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Grassland/Herbaceous
- Pasture/Hay
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands

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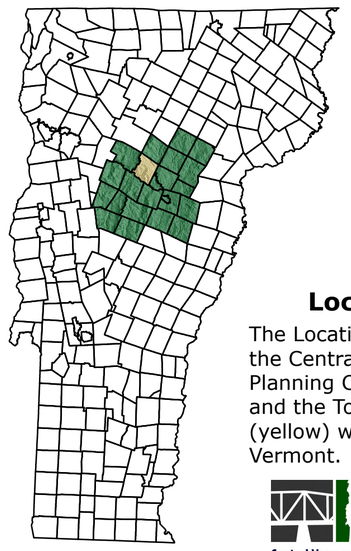
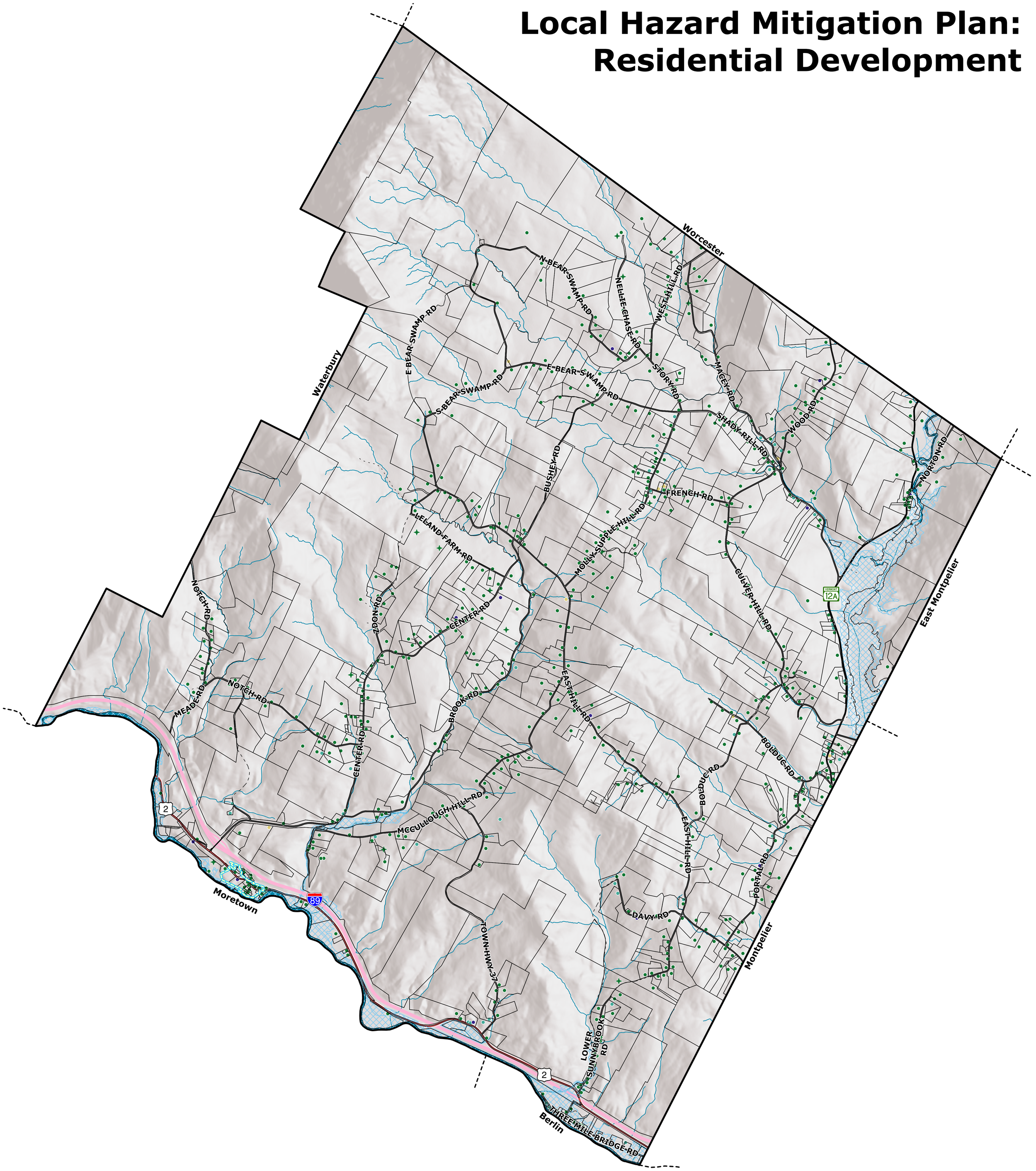


Location Map

The Location Map displays the Central Vermont Regional Planning Commission (green) and the Town of Middlesex (yellow) within the State of Vermont.

Central Vermont Regional Planning Commission

Local Hazard Mitigation Plan: Residential Development



Data Resources

Parcels: Middlesex Parcel Boundaries (2020, VCGI)
Roads: Vermont Agency of Transportation - Road Centerlines (2021, VCGI)
Surface Water: Vermont Hydrography Dataset (2020, VCGI)
FEMA Flood Hazard Area: National Flood Hazard Layer (2015, FEMA)
Structures: E911 Site Location (address points) (2024, VCGI)

Map Notes

Date: 18 September 2024
File: N:\Towns\Middlesex\Middlesex.aprx
Contact: cvrpc@cvregion.com

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Legend

Boundaries
- Parcel Boundary
- Designated Village Center
- Town Boundary
- Special Flood Hazard Area

Surface Water
- Rivers & Streams
- Lakes & Ponds

Residential Development

Pre-2019
- Mobile Home
- Single Family Dwelling
- Multi-Family Dwelling
- Other Residential

Post-2019
- Single Family Dwelling
- Other Residential

Roads
- Class I, II & III Town Highways
- Class IV & Forest Highways
- Legal Trail
- Private Road
- Interstate Highway
- US Route
- VT Route
- Discontinued Road

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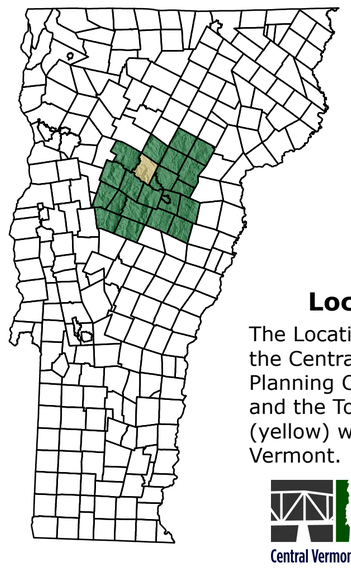

Location Map

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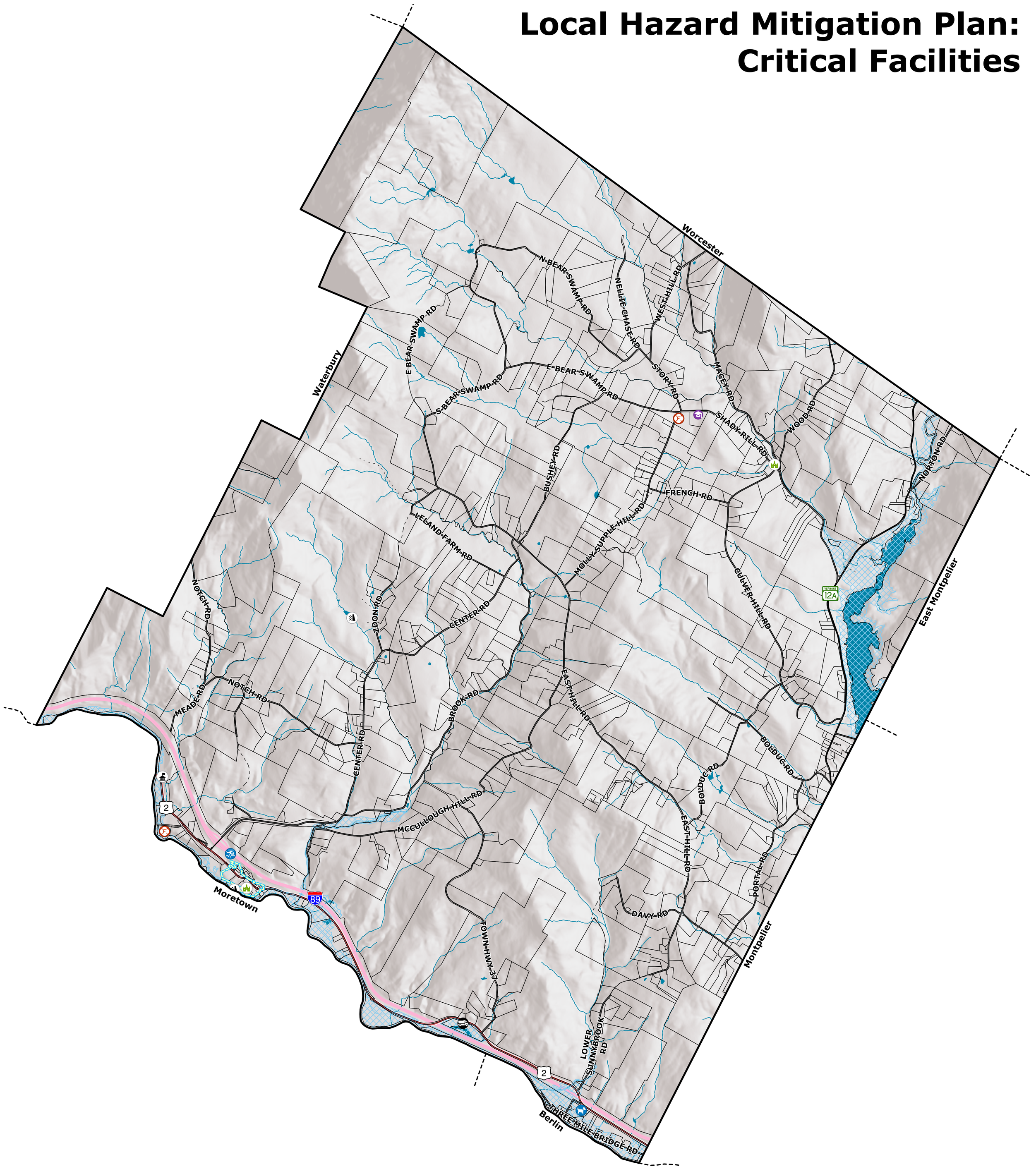
Central Vermont Regional Planning Commission

Local Hazard Mitigation Plan: Critical Facilities



Data Resources

Parcels: Middlesex Parcel Boundaries (2020, VCGI)
State Village Center Designation: Village Center Boundary (2024, ACCD)
Surface Water: Vermont Hydrography Dataset (2020, VCGI)
Special Flood Hazard Area: National Flood Hazard Layer (2015, FEMA)
Dam Inventory: DEC Dam Safety and Hydrology (VCGI, 2022)
Critical Facilities: E911 Site Location (2022, VCGI)
Roads: Vermont Agency of Transportation - Road Centerlines (2021, VCGI)

Map Notes

Date: 18 September 2024
File: N:\Towns\Middlesex\Middlesex.aprx
Contact: cvrpc@cvregion.com

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Legend

Boundaries
- Parcel Boundary
- Designated Village Center
- Town Boundary
- Special Flood Hazard Area

Surface Water
- Rivers & Streams
- Lakes & Ponds

Cultural Facilities
- Recreation
- House of Worship
- School (K - 12)

Emergency Services
- Fire Station
- Helipad / Heliport
- Veterinary Hospital

Government Facility
- State / Federal Government
- State Garage

Dams
- In Service

Roads
- Class I, II & III Town Highways
- Class IV & Forest Highways
- Legal Trail
- Private Road
- Interstate Highway
- US Route
- VT Route
- Discontinued Road

0 0.5 1 1.5 2 mi
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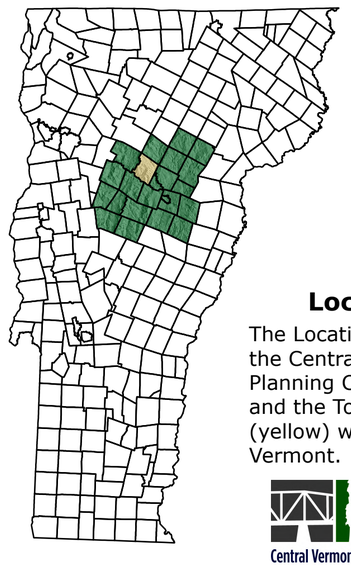

Location Map

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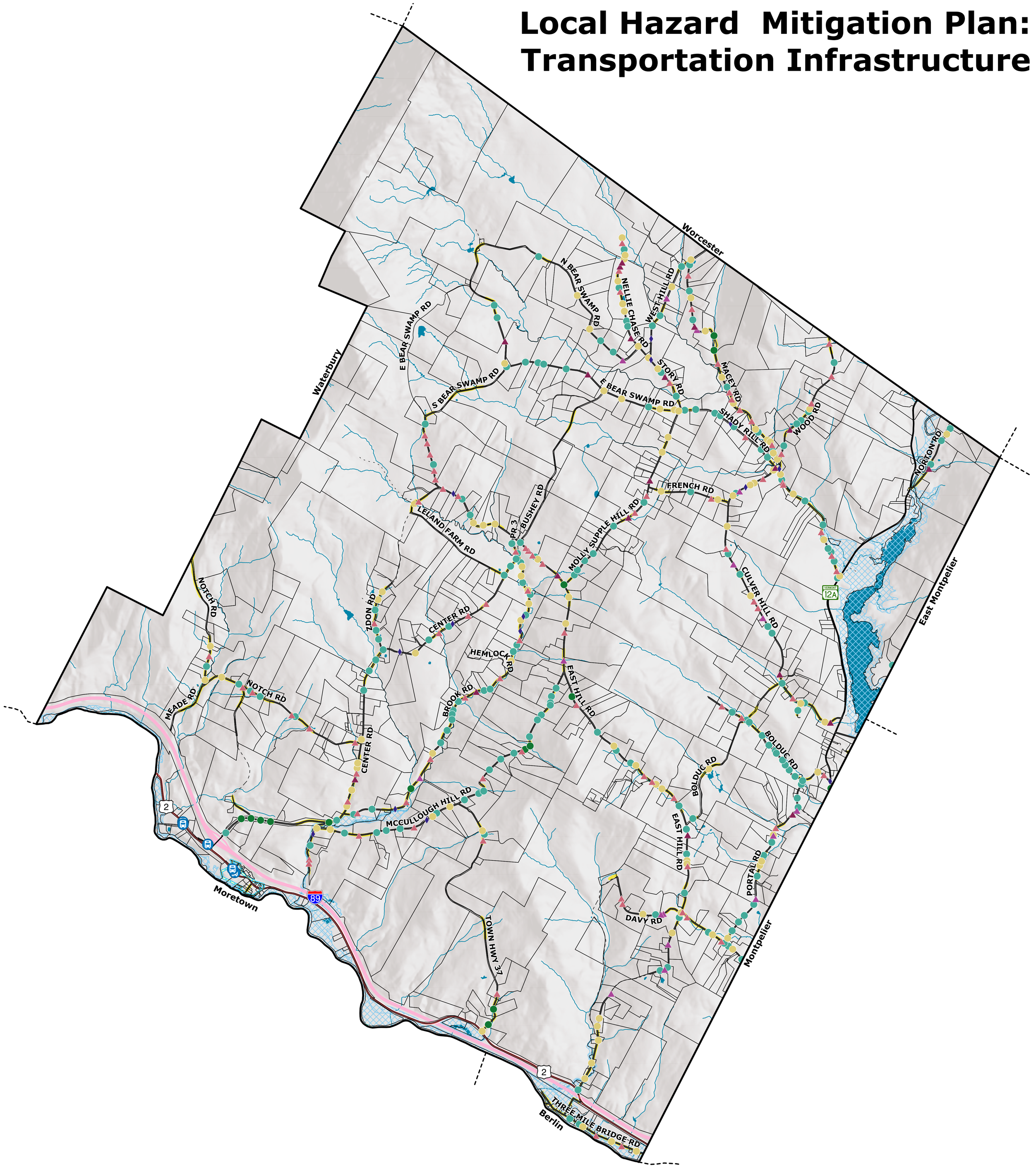
Central Vermont Regional Planning Commission

Local Hazard Mitigation Plan: Transportation Infrastructure



Data Resources

Parcels: Middlesex Parcel Boundaries (2020, VCGI)
State Village Center Designation: Village Center Boundary (2024, ACCD)
Surface Water: Vermont Hydrography Dataset (2020, VCGI)
Special Flood Hazard Area: National Flood Hazard Layer (2015, FEMA)
Infrastructure Condition: Bridge & Culvert Inventory (2023, CVRPC)
Roads: Vermont Agency of Transportation - Road Centerlines (2021, VCGI)
Hydrologically Connected Road Segments: Agency of Natural Resources (2019, VCGI)

Map Notes

Date: 18 September 2024
File: N:\Towns\Middlesex\Middlesex.aprx
Contact: cvrpc@cvregion.com

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Legend

Boundaries
- Parcel Boundary
- Designated Village Center
- Town Boundary
- Special Flood Hazard Area

Surface Water
- Rivers & Streams
- Lakes & Ponds

Public Transit
- Bus Stops

Culverts
- Excellent
- Good
- Fair
- Poor
- Closed
- Urgent / Critical
- Unknown

Bridges
- Fair

Roads
- Class I, II & III Town Highways
- Class IV & Forest Highways
- Legal Trail
- Private Road
- Interstate Highway
- US Route
- VT Route
- Discontinued Road
- Hydrologically Connected Road Segment

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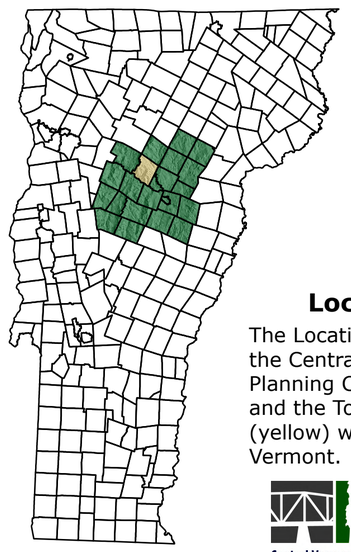

Location Map

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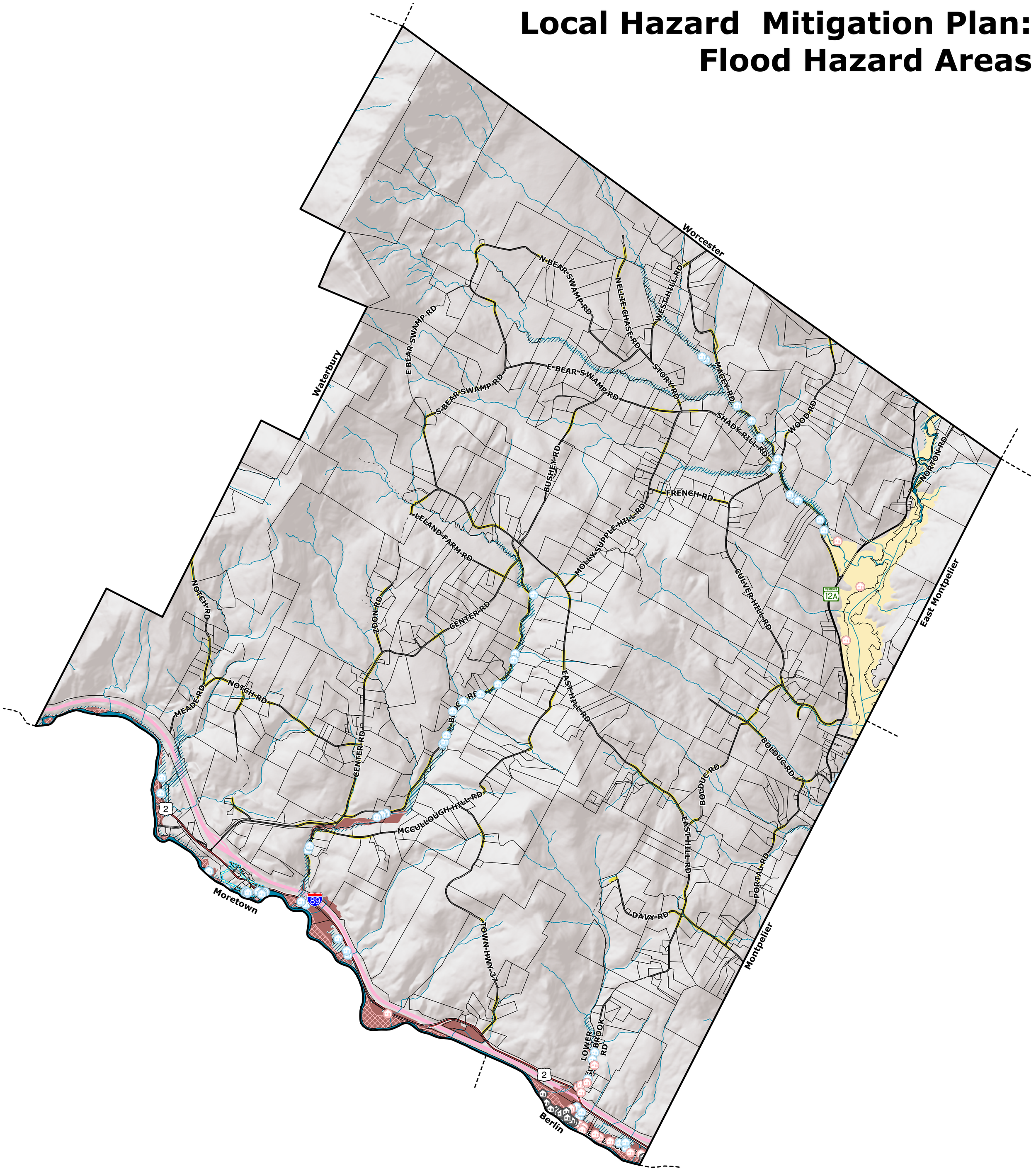
Central Vermont Regional Planning Commission

Local Hazard Mitigation Plan: Flood Hazard Areas



Data Resources

Parcels: Middlesex Parcel Boundaries (2020, VCGI)
State Village Center Designation: Village Center Boundary (2024, ACCD)
Surface Water: Vermont Hydrography Dataset (2020, VCGI)
At-risk Structures: Derived data (CVRPC, 2024)
FEMA Flood Hazard Area: National Flood Hazard Layer (2015, FEMA)
Roads: Vermont Agency of Transportation - Road Centerlines (2021, VCGI)
Hydrologically Connected Road Segments: Agency of Natural Resources (2019, VCGI)

Map Notes

Date: 18 September 2024
File: N:\Towns\Middlesex\Middlesex.aprx
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Legend

Boundaries
- Parcel Boundary
- Designated Village Center

Surface Water
- Rivers & Streams
- Lakes & Ponds

At-risk Structures
- River Corridor
- Flood Hazard Area
- Floodway

Flood Hazard Areas
- Zone A
- Zone AE
- Zone X
- Floodway
- River Corridor

Roads
- Class I, II & III Town Highways
- Class IV & Forest Highways
- Legal Trail
- Private Road
- Interstate Highway
- US Route
- VT Route
- Discontinued Road
- Hydrologically Connected Road Segment

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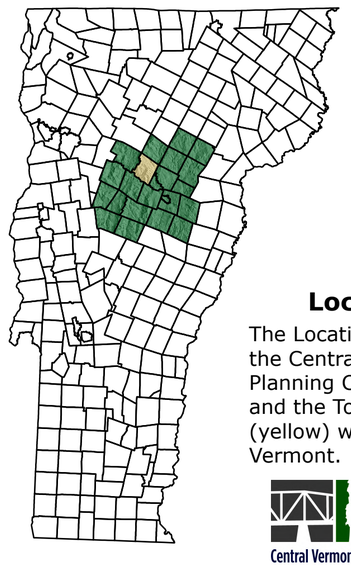
0 0.75 1.5 3 km



Location Map

The Location Map displays the Central Vermont Regional Planning Commission (green) and the Town of Middlesex (yellow) within the State of Vermont.

Central Vermont Regional Planning Commission

CERTIFICATE OF ADOPTION

Town of Middlesex,
Vermont Select Board

A Resolution Adopting the Middlesex, Vermont 2025 Local Hazard Mitigation Plan

WHEREAS the Town of Middlesex, Select Board recognizes the threat that natural hazards pose to people and property within the Town of Middlesex; and

WHEREAS the Town of Middlesex has prepared a natural hazard mitigation plan, hereby known as the Middlesex, Vermont 2025 Local Hazard Mitigation Plan, in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS the Middlesex, VT 2025 Local Hazard Mitigation Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the Town of Middlesex from the impacts of future hazards and disasters; and

WHEREAS adoption by the Town of Middlesex, Select Board demonstrates its commitment to hazard mitigation and achieving the goals outlined in the Middlesex, Vermont 2025 Local Hazard Mitigation Plan.

NOW THEREFORE, BE IT RESOLVED BY THE TOWN OF MIDDLESEX, VERMONT, THAT:

Section 1. In accordance with 24 VSA §872, the Town of Middlesex, Select Board adopts the Middlesex, Vermont 2025 Local Hazard Mitigation Plan. While content related to the Town of Middlesex may require revisions to meet the plan approval requirements, changes occurring after adoption will not require the Town of Middlesex to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

ADOPTED by a vote of 5 in favor and 0 against, and 0 abstaining, this January, 4th day of 2025.

By: _____ (print name) ELIZABETH SCHARF
Select Board Chair

ATTEST: By: _____ (print name) Sarah Merriman
Town Clerk