Adopted by the Town of Concord Selectboard on February 5, 2019

Town of Concord, Vermont

All-Hazards Mitigation Plan Update

Town of Concord
Selectboard
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Prepared by:

Town of Concord, Vermont

CERTIFICATE OF LOCAL ADOPTION

Town of Concord, Vermont

A Resolution Adopting the All-Hazards Mitigation Plan Update

WHEREAS, the Town of Concord has worked with its residents and stakeholders to identify its hazards and vulnerabilities, analyze past and potential future losses due to natural and human-caused hazards, and identify strategies for mitigating future losses; and ...

WHEREAS, the Town of Concord All-Hazards Mitigation Plan contains recommendations, potential actions and future projects to mitigate damage from disasters in Concord; and

WHEREAS, the Town of Concord and the respective officials will pursue implementation of the strategy and follow the maintenance process described in this plan to assure that the plan stays up to date and compliant; and...

WHEREAS, a meeting was held by the Town of Concord Selectboard to formally approve and adopt the Town of Concord All Hazards Mitigation Plan.

NOW, THEREFORE BE IT RESOLVED that the Town of Concord adopts this All-Hazards Mitigation Plan for the town.

02-05-19
Date

Selectboard Chairman

Selectman

Selectman

Selectman

Selectman

Attested to by Town Clerk

Executive Summary

In 2015, the Town of Concord began to develop the Town of Concord's Local All-Hazard Mitigation Plan update from the last approved plan, which was an annex to the 2005 multi-jurisdictional; NVDA Caledonia, Essex and Orleans Counties VT Regional All-Hazards Mitigation Plan. Mitigation planning requirements have changed considerably since 2005 and what once constituted an approved plan for the town holds little value in the current planning environment. While the 2005 plan was certainly reviewed in the update planning process, its value was considered low in moving the town forward with its future mitigation efforts. The results contained herein represent the collaborative efforts of the Town of Concord Hazard Mitigation Planning Team and associated residents, towns and agencies that contributed to the development of this plan. As hazard mitigation is a sustained effort to permanently reduce or eliminate long-term risks to people and property from the effects of reasonably predictable hazards, the town has communicated its efforts related to developing this plan to its residents and surrounding municipalities, providing a formal opportunity to provide input and review relevant sections of the plan. Along these lines, the town has documented the planning process so that future updates can follow an efficient pattern in addition to capturing this important component as means of establishing institutional memory. In realization that eligibility to receive federal hazard mitigation grants and optimize state-level reimburse or "match" dollars during a federally declared disaster is dependent on a federally approved plan, the town remains committed to sustaining its mitigation efforts and by developing this plan, will have a guide for action that will foster enhanced emphasis on mitigation in the years to come. The town realizes the importance of mitigation inherent to its own resilience as well as means to establishing strong partnerships with regional support agencies and associations, state government and FEMA. As the town moves towards formally adopting this Local All-Hazards Mitigation Plan, the purpose of this plan is to:

- Identify specific natural, technological and societal hazards that impact the Town of Concord
- Prioritize hazards for mitigation planning
- Recommend town-level goals and strategies to reduce losses from those hazards
- Establish a coordinated process to implement goals and their associated strategies by taking advantage of available resources and creating achievable action steps

This plan is organized into 5 Sections:

Section 1: Introduction and Purpose explains the purpose, benefits, implications and goals of this plan. This section also describes demographics and characteristics specific to Concord and describes the planning process used to develop this plan.

Section 2: Hazard Identification expands on the hazard identification in the Concord Town Plan (2012) with specific municipal-level details on selected hazards.

Section 3: Risk Assessment discusses identified hazard areas in the town and reviews previous federally-declared disasters to identify what risks are likely in the future. This section presents a hazard risk assessment for the municipality, identifying the most significant and most likely hazards which merit mitigation activity. The most significant hazards for Concord have been profiled and are introduced in the grid below:

Severe winter/Ice storm	Flooding
Extreme Cold	

Section 4: Vulnerability Assessment discusses buildings, critical facilities and infrastructure in designated hazard areas and estimates potential losses.

Section 5: Mitigation Strategies begins with an overview of goals and policies in the most recent Town Plan that support hazard mitigation and utilizes a current road inventory to formulate a work plan around major infrastructure projects. An analysis of existing municipal actions that support hazard mitigation, such as planning, emergency services and actions of the highway department are also included. The following all-hazards mitigation goals are summarized below: Reduce at a minimum, and prevent to the maximum extent possible, the loss of life and injury resulting from all hazards.

1) Reduce at a minimum, and prevent to the maximum extent possible, the loss of life and injury resulting from all hazards.
2) Mitigate financial losses and environmental degradation incurred by municipal, educational, residential, commercial, industrial and agricultural establishments due to various hazards.
3) Maintain and increase awareness amongst the town's residents and businesses of the damages caused by previous and potential future hazard events as identified specifically in this Local All-Hazards Mitigation Plan.
4) Recognize the linkages between the relative frequency and severity of disaster events and the design, development, use and maintenance of infrastructure such as roads, utilities and storm water management and the planning and development of various land uses.
5) Maintain existing municipal plans, programs and ordinances that directly or indirectly support hazard mitigation.
6) Develop a mechanism for formal incorporation of this Local All-Hazards Mitigation Plan into the municipal comprehensive plan as described in 24 VSA, Section 4403(5). This mechanism will be developed by the Planning Commission, Selectboard and NVDA and integrate the strategies into the existing town plan as annexes until the next formal update occurs, where a section devoted to mitigation planning will be integrated into the plan.
7) Develop a mechanism for formal incorporation of this Local All-Hazards Mitigation Plan particularly the recommended mitigation actions, into the municipal/town operating and capital plans & programs as they relate to public facilities and infrastructure. With the development of the road erosion site inventory, the town will begin a process that incorporates the budgetary requirements of the defined mitigation strategies into its formal budgeting paradigm. The Planning Commission will review the LHMP and use language/actions from it to inform the integration and update process. Town Meeting Day will serve as the formal time that mitigation strategy budgetary considerations will be approved and incorporated into the town budget.

Section 5 also identifies and provides a detailed discussion on the following mitigation actions:

Action #1: Reduce flood-related impacts through infrastructure upgrades, improvement projects and floodplain management activities.
Action #2: Improve resilience to severe winter storms

Action #3: Reduce impact of extreme cold durations
Action #4: Raise public awareness of hazards and hazard mitigation actions
Action #5: Continue fluvial geomorphology assessments in collaboration with DEC and develop strategies and regulatory actions in response to identified risk

In conclusion, Section 5 provides an Implementation Matrix to aid the municipality in implementing the outlined mitigation actions with an annual evaluation process to be coordinated and administered by the Concord Planning Commission.

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SECTION 1: INTRODUCTION AND PURPOSE

1.1 Purpose and Scope of this Plan

The purpose of this Local All-Hazards Mitigation Plan is to assist this municipality in identifying all hazards facing their community and in identifying strategies to begin to reduce the impacts of those hazards. The plan also seeks to better integrate and consolidate efforts of the municipality with those outlined in the Town Plan as well as efforts of NVDA, Vermont State agencies, FEMA and the State Hazard Mitigation Plan. The town is aware that community planning can aid significantly in reducing the impact of expected, but unpredictable natural and human-caused events. This document constitutes an All-Hazards Mitigation Plan for the Town of Concord. Community planning can aid significantly in reducing the impact of expected, but unpredictable natural and human-caused events. The goal of this plan is to provide hazard mitigation strategies to aid in creating disaster resistant communities throughout Essex County.

1.2 Hazard Mitigation

The Vermont State All-Hazards Mitigation Plan of 2013 defines hazard mitigation as:

> *"Any sustained action that reduces or eliminates long-term risk to people and property from natural and human-caused hazards and their effects. The Federal Emergency Management Agency (FEMA) and state agencies recognize that it is less expensive to prevent disaster or mitigate its effects than to repeatedly repair damage after a disaster has struck. This plan recognizes that communities have opportunities to identify mitigation strategies and measures during all of the other phases of Emergency Management—Preparedness, Response and Recovery. Hazards cannot be eliminated, but it is possible to determine what the hazards are, where they are, where they are most severe and to identify actions that can reduce the severity of the hazard."*

Hazard mitigation strategies and measures can reduce or eliminate the frequency of a specific hazard, lessen the impact of a hazard, modify standards and structures to adapt to a hazard, or limit development in identified hazardous areas. This plan aligns and/or benefits from the 5 goals accomplished as a State since 2010 and as referenced in Section 5 of the State's 2013 Hazard Mitigation Plan and as part of the newly created Emergency Relief Assistance Funding (ERAF) requirements. With enhanced emphasis on community resiliency, many state agencies and local organizations have an increased awareness of the importance of mitigation planning and have produced plans and resources that towns can use to support their planning efforts. This plan will reference, when relevant, pertinent tools and resources that can be used to enhance mitigation strategies.

1.3 Hazard Mitigation Planning Required by the Disaster Mitigation Act of 2000

Hazard mitigation planning is the process that analyzes a community's risk from natural hazards, coordinates available resources, and implements actions to reduce risks. Per *44 CFR Part 201: Hazard Mitigation Planning,* this planning process establishes criteria for State and local hazard mitigation planning authorized by Section 322 of the Stafford Act as amended by Section 104 of the *Disaster Mitigation Act of 2000*. Effective November 1, 2003, local governments now must have an approved local mitigation plan prior to the approval of a local mitigation project funded through federal Pre-Disaster Mitigation funds. Furthermore, the State of Vermont is required to

adopt a State Pre-Disaster Mitigation Plan for Pre-Disaster Mitigation funds or grants to be released for either a state or local mitigation project after November 1, 2004.

There are several implications if the plan is not adopted:

- After November 1, 2004, Flood Mitigation Assistance Grant Program (FMAGP) funds will be available only to communities that have adopted a local Plan
- For disasters declared after November 1, 2004, a community without a plan is not eligible for HMGP project grants but may apply for planning grants under the 7% of HMGP available for planning
- For the Pre-Disaster Mitigation (PDM) program, a community may apply for PDM funding but must have an approved plan to receive a PDM project grant
- For disasters declared after October 14th, 2014, a community without a plan will be required to meet a greater state match when public assistance is awarded under the ERAF requirements (Emergency Relief Assistance Funding)

1.4 Benefits

Adoption and maintenance of this Hazard Mitigation Plan will:

- Make certain funding sources available to complete the identified mitigation initiatives that would not otherwise be available if the plan was not in place
- Lessen the receipt of post-disaster state and federal funding because the list of mitigation initiatives is already identified
- Support effective pre-and post-disaster decision making efforts
- Lessen each local government's vulnerability to disasters by focusing limited financial resources to specifically identified initiatives whose importance have been ranked
- Connect hazard mitigation planning to community planning where possible

1.5 All-Hazards Mitigation Plan Goals

This All-Hazards Mitigation Plan establishes the following general goals for the town and its residents:

1) Reduce at a minimum, and prevent to the maximum extent possible, the loss of life and injury resulting from all hazards.
2) Mitigate financial losses and environmental degradation incurred by municipal, educational, residential, commercial, industrial and agricultural establishments due to various hazards.
3) Maintain and increase awareness amongst the town's residents and businesses of the damages caused by previous and potential future hazard events as identified specifically in this Local All-Hazards Mitigation Plan.
4) Recognize the linkages between the relative frequency and severity of disaster events and the design, development, use and maintenance of infrastructure such as roads, utilities and storm water management and the planning and development of various land uses.

5) Maintain existing municipal plans, programs and ordinances that directly or indirectly support hazard mitigation.
6) Develop a mechanism for formal incorporation of this Local All-Hazards Mitigation Plan into the municipal comprehensive plan as described in 24 VSA, Section 4403(5). This mechanism will be developed by the Planning Commission, Selectboard and NVDA and integrate the strategies into the existing town plan as annexes until the next formal update occurs, where a section devoted to mitigation planning will be integrated into the plan.
7) Develop a mechanism for formal incorporation of this Local All-Hazards Mitigation Plan particularly the recommended mitigation actions, into the municipal/town operating and capital plans & programs as they relate to public facilities and infrastructure. With the development of the road erosion site inventory, the town will begin a process that incorporates the budgetary requirements of the defined mitigation strategies into its formal budgeting paradigm. The Planning Commission will review the LHMP and use language/actions from it to inform the integration and update process. Town Meeting Day will serve as the formal time that mitigation strategy budgetary considerations will be approved and incorporated into the town budget.

1.6 Town of Concord Population and Characteristics

The Town of Concord covers 34,209 contiguous acres and is located at the south-eastern end of the Northeastern Vermont Development Association's district. There are five distinct villages established within Concord's borders: West Concord, North Concord, Miles Pond, East Concord and Concord Corners. Most of the development in Concord is concentrated along the major east-west transportation corridor, Vermont Highway 2. The majority of the town's road system is gravel surfaced. These roads provide an adequate and energy efficient transportation system. The town roads are maintained by the town road maintenance crew. I-93 and I-91 intersections are located in the neighboring town of St., Johnsbury. These major interstate highways provide easy access to the Town of Concord. The Moore Reservoir, a large body of dammed water on the Connecticut River, is the southern border of Concord.

The majority of the town is sparsely populated. The Village of Concord, North Concord, Miles Pond and East Concord represent the only areas supporting medium to high density development. Many of the town's seasonal homes and camps are located in properties around Miles Pond and Shadow Lake.

Northern Concord landscape is dominated by the Miles Mountain range which sports the town's highest elevations (2,432 feet). This undeveloped area is composed of steep forested slopes. Central Concord's Goudreault Hill (2,012 feet) has gentler slopes which guide the area's rain and snow runoff into natural watershed collection areas including Miles Pond. Shadow Lake is a collection area for the Shaw Mountain (1,800 feet) watershed. East Concord's elevations average between 800 and 1,100 feet. These lands are made up of rolling hills and some fairly level zones. West Concord's lowlands are separated by the Moose River (elev. 800 feet). The higher elevations in western Concord, averaging 1,100 feet in elevation, are predominantly rolling hills that melt into the town's only meadow lands. The town's highlands have provided Concord's residents and wildlife with a number of water supplies. At the same time, multiple elevation

changes within the town's lowlands tend to restrict the area's development and agricultural potential.

The 2010 U.S. Census reports a population of 1235 residents, 50.5% male and 49.5% female, indicating a population density of 23 people per square mile. The Town's population has shown slow to moderate growth over the past 50 years—a rate that has increased somewhat over the past decade. About 24% of the population is younger than 20 years, about 22% is between 20 and 40 years of age, about 32% is between 40 and 60 years, and 22% is aged 60 or older. The median age is 43 years.

Table 1-1 Town of Concord, selected population characteristics, 2010 Census

Category	Number	%
Total Population	1235	100
Median Age	42.8	--
Population age 60 years and over	272	22
Population under 20 years old	293	24
Population between 20 and 40	269	22
Population between 40 and 60	401	32

Housing:
The entire population of Concord is housed, with more than half living in traditional nuclear families, a third living in non-family households, and about one-quarter living alone. The average family size is 2.8 and the average household size is 2.3. About 65% of Town residents are in the civilian labor force and 35% are not, with an unemployment rate of 3.7%, which is lower than state and national unemployment rates. About 30% of households have annual incomes below $25,000, about 35% between $25,000 and $50,000, 19% between $50,000 and $75,000, and 9% above $75,000. The average annual household income is about $55,000. About one-quarter of the Town's housing stock was built before 1950. Almost half was built between 1960 and 1990. About 25% has been built since 1990. About half of the housing is valued between $50,000 and $150,000, with another half valued between $150,000 and $300,000. More than 80% of the housing is owner-occupied, with about 20% rented. Rental costs range from $500 to $1500 per monthThe following shows the types of housing within Concord, also based on the 2010 U.S. Census data:

Table1-2 Town of Concord, selected housing unit data, 2010 Census Block Group 2

Category	Number	%
Total Housing Units	806	--
Occupied housing units	522	64
Vacant housing units	294	36
Owner-Occupied	439	84
Renter Occupied	83	16
Population in Renter-occupied	226	
Households with individuals under 18	143	27

Town of Concord All-Hazards Mitigation Plan adopted _____ 4

1.6.4. Town Locations and Services:

Hospitals and medical centers near Concord:

- Northeastern Vermont Regional Hospital: Critical Access Hospital
- St. Johnsbury, VT Health and Rehab
- FMC OF ST. Johnsbury Dialysis
- Essex Home Health Care
- Pines Rehab and Health Center
- North Country Home Health and Hospice Agency (Littleton, NH)
- Lafayette Center, Genesis Healthcare (Franconia, NH)

Electric power is provided to the town by Central Vermont Public Service. The majority of the electric service is provided along the town's road system. Three phase power is available at all three of the town's village areas. With few exceptions, power is provided via overhead transmission lines.

Concord offers no municipal water or sewage services. The town's zoning regulations currently allow high density development in the village areas and a small area around Miles Pond. At some point in the future, municipal water or sewage services may be required in one or more of these zones. The Town of Concord supports two school buildings and a gymnasium, a town office/library building, a town hall which is the home of the town museum, a fire station, town garage, a state certified waste transfer station, six cemeteries, a recreation area, two state owned boat launch sites located on Shadow Lake and Miles Pond and a Community Park, donated by the Bona Family, that includes a ball park and an outdoor ice skating rink. The town owns several other undeveloped plots of land within the community.

The town's volunteer fire department and FAST squad serve the community under the umbrella of the area's mutual aid organization. Training, at all levels of emergency service, has a high priority within these organizations. The department has four fire trucks, two tankers and two pumpers. Concord maintains three (3) dry hydrants. St. Johnsbury, Concord and Lunenburg are back-up responders as part of a mutual aid district.

The town does not maintain a police department. The town elects a Town Constable each year. The constable is backed up by the Vermont State Police and the Sheriff's Department. The Concord Health Center is the community's only health care facility. It provides general and emergency services. Emergency ambulance services are provided by a number of out of town agencies including the Calex Ambulance service.

Concord maintains its own K - 12 school system. This system also provides educational services to neighboring communities on a tuition basis. The town's two school buildings have been identified as structures that require both structural and internal upgrading. The Concord school system has a student population of approximately 250 children. The system provides K-12 services for both Concord students and children from neighboring communities. Grades 1-3 attend the school facility located in East Concord and the remainder of the grades attend school in the facility located in the Village of Concord. Both of the school facilities currently require

major upgrading to meet the safety and operational requirements set by the town and state governments. The school is the community emergency shelter but does not have a generator. Concord is working on a shelter pre-agreement with Vermont Red Cross. The school has its own public water supply and requires a certified water operator.

Logging within the town's 4,065 wooded acres still represents an important part in the town's economic structure. Most of the town's seasonal homes are built around Miles Pond and Shadow Lake. The Connecticut River and the Moore Reservoir also offers recreational opportunities for locals and vacationers alike. All of these systems are part of the watershed system that supplies surface and subsurface waters to Concord and neighboring towns and cities. While the recreational value of these waters is well known, their true value lies in their ability to collect, filter, store and deliver water to thousands of regional residents.

High risk populations include two nursing homes and six day care facilities. Some of the day care facilities only operate on a seasonal basis. There are a few elderly people on Lifeline and some have extra tanks of oxygen. Generators at nursing homes are unknown. There are some residences that would be inaccessible if severe flooding were to take place on some of the back roads. The populations along Miles Pond and Shadow Lake may be cut off from access.

1.7 Summary of Planning Process

In October, 2015, NVDA signed a Memorandum of Understanding with the town of Concord, Vermont to develop their Local Hazard Mitigation Plan Update. NVDA staff worked with the town to obtain the required data and public input to develop the draft. In 2017, a local technical support consultant assisted the town in preparing the update for submission. Monthly updates on plan development were included in each Selectboard meeting as well during plan development. These updates coincided with frequent emails and phone calls to planning team members. The planning team appointed and approved by the selectboard and developed/reviewed each section of the plan as it was drafted. As with all selectboard meetings, the community is welcome. However, no specific input from the community in adjunct to the survey was received, therefore inclusion of the record of attendance is omitted. The April 2018 warned selectboard meeting with planning team members reviewed the risk assessment and specific vulnerabilities. The Concord Hazard Mitigation Planning Team included:

Judy Kurtz	Planning Board
George Morehouse	Selectboard Chair
Cynthia Stuart	Planning and School Board, health center represtative
Richard Fisher	Fire Chief
Alan Smith	Zoning Admin
Dane Thorgalsen	Road Foreman
Heather Robinson	Essex County Natural Resources Conservation district
Susan LaMadeleine	Selectboard Administration
Frank Malony	NVDA

The team represented the community as best as possible, including the school, long-standing residents, town staff, planners and community-based organizations. In warned selectboard meetings and in correspondence with the NVDA and consultant, the planning team discussed the planning process and facts related to the town. Additionally, a survey was drafted asking for community input and made available through the town's standard public notification process and via online survey platform Survey Monkey. The survey introduced the importance and informational needs of a LHMP and asked for more town-specific concerns the residents and/or business owner had. 20 responses were received with detailed inclusion of questions and responses in Appendix F. In summary, the town concerns should, for the most part, reflect the concerns of the residents and that is reflected in the quantitative risk assessment, profiled hazards and subsequent mitigation strategies. Monthly updates on plan development were included in each Selectboard meeting as well during plan development. These updates coincided with frequent emails and phone calls to planning team members. The planning team was involved and reviewed each section of the plan. Specifically, the April 2018 warned selectboard meeting with planning team members reviewed the risk assessment and specific vulnerabilities. Following FEMA guidance in Local Mitigation Plan Review Tool Regulation Checklist and FEMA informational resources, the plan was written using data sources that included:

- Surveys and warned, public meetings collecting public comment (issues raised were addressed in plan and the public meeting)
- 2012 CONCORD Town Plan (provided town data, current goals and regulations supporting mitigation, recent capital expenditures and infrastructure value helped to drive vulnerability assessment)
- 2016 CONCORD Zoning Regulations Draft (Used for current flood hazard regulations and land use planning)
- 2013 Vermont State Hazard Mitigation Plan (provided key guidance language and definitions throughout the plan).
- Vermont Agency of Natural Resources (ANR) and Transportation (VTrans) (Provided key policy recommendations on environmental conservation, high accident locations, climate change and fluvial erosion data).
- Vermont Departments of Health (VDH) and Environmental Conservation (DEC) (provided information related with public health services that could be impacted during a disaster and state support functions designated to both VDH and DEC. DEC also provided river corridor data for mapping purposes.
- FEMA Open Source (data.gov) Data for Disaster History and PA funding (provided comprehensive declared disaster by year and type as well as project descriptions and cost per event).
- FEMA NFIP "Bureau.Net" database (provided detailed information on repetitive loss properties and associated flood insurance claims).
- EPA's Incident Action Checklist for cold weather resilience of water systems (provides a guidance tool for public works to cross-reference actions on the system).

- 2013 ACCD Mobile Home Resilience Plan (served as resource for future mitigation actions)

While many small communities in Vermont face similar circumstances (e.g. flooding, winter storms and remote residents), each one has unique considerations and opportunities. There was a point made to capture the subtle characteristics of the town, its history and its residents. From this, the specific risks, vulnerabilities and mitigation strategies were developed.

NVDA's role in assisting the entire region with all facets of planning provided crucial information and NVDA's Emergency Management Planning representative attended planning team meetings and provided guidance. While the LEPC provides the best platform to engage representatives from various towns and agencies, all bordering towns to Concord (Kirby, Victory, Waterford and Lunenburg) were contacted with planning objectives and asked to provide input in addition to receiving a draft plan with an invitation to comment via email through the town clerk. No comments were received. DEMHS also has representation at the LEPC meetings and will continue to provide input and guidance as the town moves forward with their mitigation strategies.

On May 1st, 2018, the town held a warned public meeting to review the identified hazards and associated mitigation strategies. The draft plan was then revised based on input and presented to the town. Much of input from residents (e.g. survey results) focused on road infrastructure washouts, extended power failure, lack of cell service and emergency notification (full survey included in appendix). The revised draft was made available for review at the town office and residents were informed via meeting minutes and the town bulletin board of the ability to review the draft and additional opportunity for formal comment and suggestions. All neighboring town offices (via town clerk) were sent the draft for review and comment. With each email notification, the neighboring town was asked to share the information with their selectboards and given instructions how to respond with questions, comments or concerns (via email to the Concord Town Clerk). Minor edits were made to the plan following state recommendations and the final draft was submitted to DEMHS and then to FEMA for formal review and approval pending municipal adoption. A resolution of adoption is anticipated following final FEMA approval.

SECTION 2: HAZARD IDENTIFICATION

The 2005 Plan profiled the following hazards (bold indicates continued inclusion in this update):

Review last approved plan and list profiled hazards here:

- **Flooding**
- Hazardous Materials
- Power Failure
- **Severe Winter/Ice Storm**
- Highway Incidents
- Fire: Urban and Wildfires/Forest Fires

- School Safety Issues

For this update, the planning team considered the continued inclusion or deletion of the 2005 hazards profiled and for each, considered prior history, current trends and available data to estimate risk. As highlighted above, some profiled hazards remain a risk for the town. However, other hazards, due to lack of occurrence frequency, risk and/or vulnerability have been removed in this update.

Because this plan represents the first of its kind for the town and is intended to provide a comprehensive resource for understanding the relationship between hazards, vulnerabilities and subsequent mitigation efforts, the profiled hazards will form the basis of mitigation actions for the next five-year planning cycle. The following represents the profiled hazards in Concord. The definitions of each hazard, along with historical occurrence and impact, will be described in this section.

• **Natural Hazards:** weather / climate hazards (drought, hurricane/tornado, high winds, severe winter storm, extreme temperatures, climate change, lightning, hail), flooding, geological hazards (landslide / erosion, earthquake, naturally-occurring radiation), and fire hazards.

Profiled Natural Hazards: Severe Winter Storm, Flooding, Extreme Cold Temperature

2.1 Disaster History

The number of natural disasters in Essex County since 1998 (16) is above the US average (12). There have been 16 major disasters (Presidential) declared and 3 Emergencies declared. The causes of natural disasters have been; Floods: 11; Storms: 7; Winds: 2; Heavy Rain; 1 Landslide: 1; Snowstorm: 3; Tropical Storm: 1 (Note: Some incidents may be assigned to more than one category). The following discussion on natural hazards is based upon information from several sources. General descriptions are based upon the *2013 Vermont State Hazard Mitigation Plan.* Due to rural nature of Northeast Kingdom, there is little historical data available for presentation related to all hazards but when available, relevant data is included.

The highest risk hazards (Severe Winter/Ice Storm, Flooding, Extreme Cold Temperature) have been profiled to provide the basis of future mitigation strategies. It should be noted here that the town has only received disaster funding for flood-related events. However, lower risk natural hazards (drought, tornado, tornado, high winds, extreme heat, hail, landslide, earthquake, naturally-occurring radiation and fire hazards) are omitted from full profiling because they do not pose enough risk to substantiate mitigation efforts at this time.

Table 2-1: Summary of Vermont Emergency Declarations

Number	Year	Type
3338	2011	Hurricane Irene
3167	2001	Snowstorm
3053	1977	Drought

Source: FEMA

Table 2-2: Summary of Vermont Major Disaster Declarations since 1998 (Essex County in Bold with events that resulted in PA funding for the town with an "(*)")

4380	2018	Severe Storms and Flooding
4356	2017	**Severe Storms and Flooding**
4330	2017	Severe Storms and Flooding
4207	2015	Severe Winter Storm
4178	2014	Severe Storms and Flooding
4232	2015	Severe Storms and Flooding
4163	2014	Severe Winter Storm
4140	2013	Severe Storms and Flooding
4120	2013	Severe Storms and Flooding
4066	2012	Severe Storms, Tornado and Flooding
4043	2011	Severe Storms and Flooding
4022	2011	Tropical Storm Irene
4001*	**2011**	**Severe Storms and Flooding**
1995*	**2011**	**Severe Storms and Flooding**
1951	2010	Severe Storm
1816	2009	Severe Winter Storm
1790	2008	Severe Storms and Flooding
1784	2008	Severe Storms, Tornado and Flooding
1778	2008	Severe Storms and Flooding
1715	**2007**	**Severe Storm, Tornado and Flooding**
1698*	**2007**	**Severe Storms and Flooding**
1559	2004	Severe Storms and Flooding
1488	2003	Severe Storms and Flooding
1428	**2002**	**Severe Storms and Flooding**
1358	2001	Severe Winter Storm
1336	2000	Severe Storms and Flooding
1307	**1999**	**Tropical Storm Floyd**
1228	1999	Severe Storms and Flooding
1201	1998	Ice Storm

Source: FEMA

Disaster Number	Declaration Date	Incident Type	Applicant Name	Number of Projects	Federal Share Obligated
1698	05/04/2007	Severe Storm(s)	CONCORD (TOWN OF)	2	$14,110.55
1995	06/15/2011	Severe Storm(s)	CONCORD (TOWN OF)	2	$33,656.48
4001	07/08/2011	Severe Storm(s)	CONCORD (TOWN OF)	40	$579,281.38

Table 2-2.1. Summary of Concord Declared Disaster where PA was Received

2.1.1. Profiled Hazards:

An Introduction to Climate Change:

From 1962 to 2006, each five-year period resulted in 0-6 Major Disaster Declarations in Vermont. From 2007-2018, there were 21 (5 in Essex County). It is commonly accepted that weather extremes are becoming more commonplace in Vermont. Since 2011, record setting snow, rain and cold have been experienced in the state. In recent years, it has become evident that human activities, mostly associated with the combustion of fuel, have added to the natural concentration of greenhouse gases in the atmosphere and are contributing to rapid climate change on a global scale. While projections of the effects of climate change vary, it is generally predicted that Vermont will have warmer temperatures year-round, with wetter winters and drier summers. An increase in the size and frequency of storms is also predicted. Thus, climate change in the next century will likely increase the chance of weather-related hazards occurring. An increase in precipitation may also result in increased flooding and fluvial erosion. Drier summers may increase the chance of drought and wildfire. A warmer climate may also result in the influx of diseases and pests that cold winters previously prevented. The severity of climate change is also difficult to predict, though the effects may be mitigated somewhat if greenhouse gas emissions are reduced soon. In 2011, Governor Shumlin formed the *Vermont Climate Cabinet*. The Cabinet, chaired by the Secretary of Natural Resources, is a multidisciplinary approach to enhance collaboration between various state Agencies. Its primary objectives include providing the Governor with advisory information and facilitating climate change policy adoption and implementation. In 2013, the Vermont Agency of Natural Resources (ANR) released the Climate Change Adaptation Framework which addresses climate change exposures, vulnerability-specific elements within each of the natural resource sectors, and ongoing and proposed actions that can be or have been taken to prepare for the expected changes. In line and

in conjunction with the ANR report, the primary goal of a VTrans climate change adaptation policy is to minimize long-term societal and economic costs stemming from climate change impacts on transportation infrastructure.

Arguably, Essex County is the most rural of the three counties in the Northeast Kingdom. With that, much of weather data available to Caledonia and Orleans County is absent for Essex County. When applicable, and since Concord shares its entire western border with Caledonia County, weather data from the county is used in adjunct to the local historical knowledge related to extreme weather events.

Severe Winter Storm

Winter storm frequency and distribution varies from year to year depending on the climatological patterns. Because such storms are expected during a Vermont winter, the town is well-equipped to deal with snow removal and traffic incidents. The most damaging types of snowstorms are ice-storms caused by heavy wet snow or rain followed by freezing temperatures. This leads to widespread and numerous power and telephone outages as lines either collapse due to the ice weight or are brought down by falling trees and branches. According to the *2013 Vermont State All-Hazards Mitigation Plan*:

> *"A winter storm can range from moderate snow to blizzard conditions. A severe winter storm deposits four or more inches of snow during a 12-hour period or six inches of snow during a 24-hour period. A blizzard is a snowstorm with sustained winds of 40 miles per hour or more with heavy falling or blowing snow and temperatures of ten degrees Fahrenheit or colder. An ice storm involves rain, which freezes upon impact. Ice coating at least one-fourth inch in thickness is heavy enough to damage trees, overhead wires, and similar objects and to produce widespread power outages."*

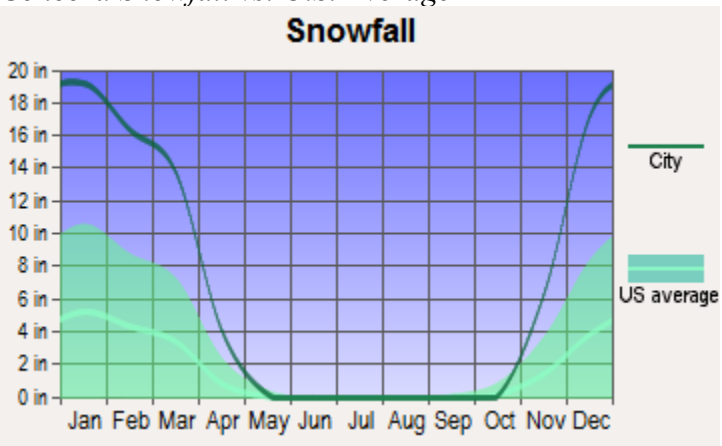
The winters of 1969-72 produced record snowfalls for nearby St. Johnsbury, and greater than normal precipitation was recorded in 8 of the 11 years during 1969-79. The closest available data was collected in nearby Waterford, which shares its eastern border with Concord, where the max 24-hour snowfall occurred February 24-25, 1969 at 34'' with an additional 2.12'' of rain during the period. Regionally, the winter of 2010-2011 was the third-snowiest on record with a total of 124.3 inches for the county. The record for the county was 145.4 inches set in 1970-1971. The potential for a major snowstorm that exceeds the capabilities of town exists every year but with the recent increase in snow fall totals and cold temperature duration, the town realizes the further consideration are required. NOAA's National Centers for Environmental Information is now producing the Regional Snowfall Index (RSI) for significant snowstorms that impact the eastern two thirds of the U.S. The RSI ranks snowstorm impacts on a scale from 1 to 5, similar to the Fujita scale for tornadoes or the Saffir-Simpson scale for hurricanes. NCEI has analyzed and assigned RSI values to over 500 storms going as far back as 1900. New storms are added operationally. As such, RSI puts the regional impacts of snowstorms into a century-scale historical perspective. The index is useful for the media, emergency managers, the public and others who wish to compare regional impacts between different snowstorms. The RSI and Societal Impacts Section allows one to see the regional RSI values for particular storms as well as the area and population of snowfall for those storms. The area and population are cumulative

values above regional specific thresholds. For example, the thresholds for the Southeast are 2", 5", 10", and 15" of snowfall while the thresholds for the Northeast are 4", 10", 20", and 30" of snowfall. 2010, 2012 and 2015 have some of the highest rankings for notable storms. These rankings are based, in part on the severity of the storm using the following system. Since 2000, there has only been one event that reached a category 4 in the Northeast, five reached Category 3, eight were "significant" and all others were notable. Despite having considerably more snow than the U.S. average, Concord has had no major PA funding related to damage from snow events.

Table 2-4: NOAA's Regional Snowfall Index (RSI) and Concord Snowfall vs. U.S. Average

CATEGORY	RSI VALUE	DESCRIPTION
1	1–3	Notable
2	3–6	Significant
3	6–10	Major
4	10–18	Crippling
5	18.0+	Extreme

Concord Snowfall vs. U.S. Average



While declared snow storm disaster have been declared for the county, Concord has not received PA funding for these events. Because such storms are expected during a Vermont winter, the town is well-equipped to deal with snow removal and traffic incidents. The most damaging types of snowstorms are ice-storms caused by heavy wet snow or rain followed by freezing temperatures. This leads to widespread and numerous power and telephone outages as lines either collapse due to the ice weight or are brought down by falling trees and branches.
Sources: www.ncdc.noaa.gov www.nws.noaa.gov

Ice Storm
Major Ice Storms occurred in January 1998 and again in December 2013. The North American Ice Storm of 1998 was produced by a series of surface low pressure systems between January 5 and January 10, 1998. For more than 80 hours, steady freezing rain and drizzle fell over an area of several thousand square miles of the Northeast, causing ice accumulation upwards of 2'' in some areas. Concord received .5 to 1 inch of ice. On December 13th, 2013, another ice storm hit portions of Essex County, including Concord but the extent of this storm is unknown. While there is evidence that supports an increase in weather and precipitation severity, the incidence of ice storms remains fairly spaced out. The town expects to have another ice storm but unlike rain and snow events, the occurrence of a major ice storm is not expected every year. *Source: www.wrh.noaa.gov/map/?wfo=sto*

Extreme Temperatures
While there is no historical evidence to support a concern over the consequences of extremely hot temperatures on human health and safety in Concord, high temperatures can help to create severe storms as the one evidenced on September 11th, 2013, where record heat (90F) helped to produce damaging hail and winds in parts of the NEK and other areas of Vermont and NY. Recent extremes in cold temperatures is a concern. 2015 tied the coldest winter (January to March) on record (1923) for Vermont as a whole according to the NOAA's National Climatic Data Center whose dataset dates to 1895. Temperatures by early evening of January 7th, 2015 were zero to 10 above zero with winds of 15 to 30 mph that created wind chills colder than 20 to 30 below zero through the overnight into the morning hours of January 8th. Actual morning low temperatures on January 8th were 20 below to 30 below zero in Essex county. Cold temperatures are expected in the Northeast but they can pose a serious threat to health and safety, especially as the severity and duration increases in conjunction with other technological (e.g. power outage, fuel oil delivery disruption) and societal (ability to purchase heating fuel) factors. Maintaining a safe living environment for livestock during extreme temperatures, especially cold extremes, is a concern for the region and Concord. Concord's winter of 2015 was the coldest anyone could remember with a mean temperature of 7.8 degrees Fahrenheit and a max-low of -26 degrees Fahrenheit in February. However, the January of 1970 had a mean temperature of 6.6 degrees Fahrenheit which is the coldest mean temperature for the county and January is the statistically coldest month in all of Vermont. Since 1900, January produced temperatures in the negative 20's and 30's consistently for Essex County with record cold temperatures occurring in 1914 (-38). There is no evidence to support concern over increases in high temperatures for the town as it relates to health and human safety at this time.

Flooding
For Concord, flooding mainly occurs when small streams overflow and run down into town where the population is concentrated. Concord is logging town and copious deforestation has reduced the natural drainage protection that forest stands provide. Overall, flooding is the most common recurring hazard event in the state of Vermont. June, 2015 broke records across the state for the wettest on record. Concord received nearly 6 inches of rain in June, 2015 but flooding did not result. This amount is high but not highest for the region. 9.65'' fell in 1973 in Saint Johnsbury and the greatest 24-hour rainfall records for the area occurred in May 30th, 2011 at 6.47''. Recent history, including the flooding events of 2011; where the town sustained historic levels of damage with over 40 areas needing repair, most of which receiving Federal

assistance to repair and the records set in 2015 suggest that increases in total rain fall and severity are to be expected along the lines seen with the records set across the state recently. There are three sources of historical precipitation data for Vermont. The data are reported at the county level: 1) recurrence time intervals for 24-hour rainfall storm depth, 2) annualized daily frequency of rainfall, and 3) rainfall-intensity frequencies. The first source of data is the recurrence time intervals for 24-hour rainfall storm depth. The recurrence depth data describes the expected intensity of major rainfall events with respect to both rainfall depth and frequency of occurrence.

Table 2-8: 24-Hour Rainfall Depths (inches) for Common Recurrence Intervals (ANR, 2002)

County: Essex
1-yr, 24-hr Rainfall Depth: 2.2''
2-yr, 24-hr Rainfall Depth: 2.3''
10-yr, 24-hr Rainfall Depth: 3.1''
100-yr, 24-hr Rainfall Depth: 5.1''

The second source of data are the annualized daily frequencies of rainfall, which were obtained from the National Climatic Data Center (NCDC), Climate Normals program for 1981 – 2010. The data provides the average number of days per year with measurable precipitation (greater than 0.01 inches) on a county by county basis. This data allows for the conversion of the annual probabilities derived from the recurrence time intervals to daily probabilities. The annualized estimated daily frequency of measurable rainfall for Essex County is 157 days (4th highest in the state) with 107 days of rain and 50 days of snow (data is correct for Essex County). The final source of data are rainfall-intensity frequencies. Hourly precipitation totals throughout the state of Vermont were obtained from the NCDC's Cooperative Observer Program (COOP). Hourly rainfall data were available for 26 COOP locations between 1962 through 2012. Each station is associated with the specific county in which it was located, and the hourly precipitation totals for each station are aggregated by county to yield a frequency distribution of hourly rainfall intensities.

Table: 2-9: Essex County Rainfall-Intensity Range (in. /hr.)

County: Essex
$x \leq 0.01$: 22.5%
$0.01 < x \leq 0.05$: 25.6%
$0.05 < x \leq 0.10$: 38%
$0.10 < x \leq 0.15$: 3.2%
$0.15 < x \leq 0.20$: 5.9%
$0.2 < x \leq 0.25$: .8%
$0.25 < x$: 4.7%

There are three main types of flooding that occur in Vermont: flooding from rain or snow melt, flash flooding and urban flooding. Flooding has also been known to occur as a result of ice jams

in rivers adjoining developed towns and cities. These events may result in widespread damage in major river floodplains or localized flash flooding caused by unusually large rainstorms over a small area. The effects of all types of events can be worsened by ice or debris dams and the failure of infrastructure (especially culverts), private and/or beaver dams. Rain storms are the cause of most flooding in Concord. Winter and spring thaws, occasionally exacerbated by ice jams, are another significant source of flooding, especially when coupled with high rain levels. Much of this flooding is flash flooding, occurring within hours of a rainstorm or other event. Flash flooding, as opposed to flooding with a gradual onset, causes the largest amount of damage to property and infrastructure. Floods cause two major types of damage: water damage from inundation and erosion damage to property and infrastructure. The *2013 Vermont State All-Hazards Mitigation Plan* discusses flooding extensively. While that plan is concerned with all of Vermont, the information on flooding is all relevant to Concord in that:

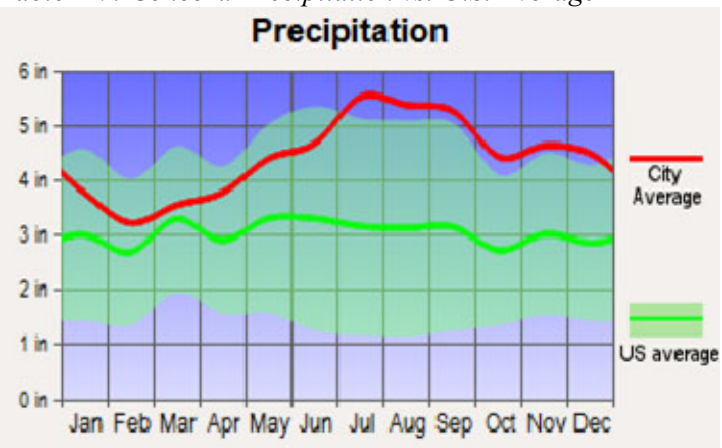
"Recent studies have shown that most flooding in Vermont occurs in upland streams and road drainage systems that fail to handle the amount of water they receive. Due to steep gradients, flooding may inundate these areas severely, but only briefly. Flooding in these areas generally has enough force to cause erosion capable of destroying roads and collapsing buildings. These areas are often not mapped as being flood prone and property owners in these areas typically do not have flood insurance (DHCA, 1998). Furthermore, precipitation trend analysis suggests that intense local storms are occurring more frequently. Additionally, irresponsible land use and development will exacerbate the preexisting vulnerability. Urban flooding usually occurs when drainage systems are overwhelmed and damages homes and businesses. This flooding happens in all urban areas, but specifically in Burlington where the downtown area is located at the bottom of a gradient, which adds to the intensity of this localized flooding….
…Over the past two decades, flood damage costs have risen dramatically in Vermont due to increasing occurrences of flooding and increases in vulnerability associated with unwise land use development in flood plains or within stream corridors. The geography and topography are right for a significant localized storm with extreme damage at almost any location in Vermont. Heavy rains with previous ground saturation, which causes runoff, are a significant part of the flooding formula in Vermont. Steep topography and narrow, inhabited, stream and river valleys further increase the dangerous nature of this hazard. Furthermore, precipitation trend analysis suggests that intense, localized storms that can cause flash flooding are occurring with greater frequency. While flooding will continue, planning and other mitigation measures can help minimize damages.
All of Vermont's major rivers have inhabited flood plains. While residents in mountain valleys are at risk, they may not be aware of the danger or may choose to ignore it. There are many reasons property owners are reluctant to relocate to less flood prone ground, not the least of which is the lack of personal experience of flooding. In addition, many communities originated beside rivers and streams; some of the most attractive property is located in vulnerable areas. Lakeshore property in Vermont is vulnerable to flooding from high water levels, either by surface water erosion or flooding. Occasionally, water-saturated ground and high water tables cause flooding to basements and other low lying areas. Lakeshore property is highly desirable and valuable, making the development of lakeshore areas very likely, even with the high potential for flooding. Restrictions on lakeshore property development have significant negative economic and tax revenue impacts that must be carefully weighed against the gains in personal safety and protection of property."

Vermont experienced major floods long before Federal disaster assistance became available. The most destructive recorded event was in November of 1927. In the month before the flood, rains in excess of 150% of normal precipitation fell after the ground had frozen. The flood itself was precipitated by 10 inches of rain falling over the course of a few days. The flood inundated parts of many towns and damaged or destroyed numerous bridges in the county. As the history of the flooding cited above bears out, the geography and topography are right for a significant localized storm with extreme damage at almost any location in Vermont. Numerous floods have resulted in Presidentially-declared disasters and an influx of Federal disaster assistance. Of these disasters, 1973 flood inflicted widespread damage across the state and the residual rains of Hurricane Belle in 1976 resulted in substantial federal disaster assistance in Vermont. The following chart provides the history of recent PA funding related to flooding events in Concord. While this does not reflect the total impact of flooding on the town, PA funding history does provide a reference for vulnerable areas in the town and those areas will be addressed. DR 1995 was characterized by a breech of Beaver Pond caused by a Beaver Dam. Shadow Lake Road and Prospect (a heavily populated area) sustained damage along with cottages. Beaver are allowed to be controlled after legal action was sought by the town. DR 4001 saw most damage on Brook and Laclair Roads, both needing a complete rebuild from damage sustained when upstream ponds (Kirby and Shadow Lake) overflowed.

Table 2-5: Bulk PA Funding related to Flooding in Concord since 2004
Source: FEMA

Disaster Number	Declaration Date	Incident Type	Applicant Name	Number of Projects	Federal Share Obligated
1698	05/04/2007	Severe Storm(s)	CONCORD (TOWN OF)	2	$14,110.55
1995	06/15/2011	Severe Storm(s)	CONCORD (TOWN OF)	2	$33,656.48
4001	07/08/2011	Severe Storm(s)	CONCORD (TOWN OF)	40	$579,281.38

Table 2-7: Concord Precipitation vs. U.S. Average



Previous experiences have proven to the town that flooding is the greatest risk and another flood event is probable by the time this plan requires an update. With this conviction, the need to complete viable mitigation actions to town infrastructure becomes incredibly important and the town remains aware of this. The estimated Capacity-Disruption Levels Given a Measured Rainfall Event can be interpreted as the conditional probability that a particular roadway capacity disruption occurs, given that a rainfall event occurs. For Essex County, the probability that the intensity of a rain event will result in approximately a 2%, 7.5%, or 13.5% roadway capacity reduction are 28.2%, 69.2%, or 2.6%, respectively *(Source: A Risk-Based Flood-Planning Strategy for Vermont's Roadway Network, 2015).*

Inundation and Floodplains

Regarding flood inundation issues, the *2013 Vermont State All-Hazards Mitigation Plan* states:

> *"While inundation-related flood loss is a significant component of flood disasters, the predominant mode of damage is associated with the dynamic, and often times catastrophic, physical adjustment of stream channel dimensions and location during storm events due to bed and bank erosion, debris and ice jams, structural failures, flow diversion, or flow modification by man-made structures. Channel adjustments with devastating consequences have frequently been documented wherein such adjustments are linked to historic channel management activities, flood plain encroachments, adjacent land use practices and/or changes in watershed hydrology associated with conversion of land cover and drainage activities. The 100-year, or "base" floodplain is the national standard for floodplain management. The area is shown on City Flood Insurance Rate Maps (FIRMs) as issued by FEMA. The 100-year floodplain has one chance in a hundred of being flooded in any given year. The probability that a 100-year flood will occur is a statistical determination based on past flooding in an area. This is not to say that a flood of such magnitude cannot occur two years in a row or twice in the same year. The term only means that in any given year, the odds are 1% that the area will be flooded. The same logic holds true for defining a 500- year flood. In this case, a flood of the 500-year magnitude has a 0.2% chance of occurring in a year. Much flood damage in Vermont occurs along upland streams, damaging private property and infrastructure such as bridges, roads, and culverts. The failure of beaver dams, private ponds and public and private culvert crossings contributes to flood surges and often dramatically increased damage downstream. Homes and other private investments along these streams are generally not recognized as a flood area on FEMA maps of flood hazard zones and, thus, are not typically identified as being vulnerable to flooding or erosion. Town plans and zoning regulations have generally not identified these stream corridors as areas needing protective setbacks for development or zoning."*

In general, floods in the area are caused by heavy rains. Springtime rains are often associated with snowmelt. A winter thaw, accompanied by rain often leads to ice jams which also cause riverine flooding. Hurricanes traveling up the east coast of the country produce occasional flooding situations. The most frequent flooding occurs in early spring as a result of snowmelt and heavy rains, but flooding has historically occurred in every season. Notable floods in this area have occurred in the last several years. Steep slopes, culvert failure and inadequate ditching have resulted in the bulk of damage and subsequent repairs.

Fluvial Erosion

Erosion occurs on a consistent, but small-scale, basis within the riparian corridor of the town's streams and rivers. This is a part of normal natural processes and as such is necessary for the proper functioning of the ecosystem of these waterways. However, fluvial erosion on a large scale can damage stream banks and undercut infrastructure such as roads, bridges and culverts as well as agricultural land and structures, causing severe damage. Erosion can cause stream bank collapses, which are generally classified as landslides. Most flood damage is associated with fluvial erosion rather than inundation. The *2013 Vermont State All-Hazards Mitigation Plan* contains the following discussion of fluvial erosion:

> *"Vermont's landscape has historically contributed greatly to the widespread practice of the channelization of rivers and streams in order to maximize agricultural land uses and facilitate the development of transportation infrastructure. Channelization, in combination with widespread flood plain encroachment, has contributed significantly to the disconnection of as much as 70% of Vermont's streams from their flood plains. In this unsustainable condition and when energized by flood events, catastrophic adjustments of the channel frequently occur, usually with consequent fluvial erosion damage to adjacent or nearby human investments. All areas of the state suffer equally from fluvial erosion hazards. Some areas have suffered more than others simply because of the location of storm tracks. Transportation infrastructure and agricultural property are the most frequently endangered types of human investment affected by fluvial erosion hazards. Residential, commercial and other municipal properties are also frequently endangered. Changes in watershed hydrology that significantly influence fluvial stability are commonly associated with urbanization or with silvicultural practices. However, watershed scale hydrologic changes have been observed in Vermont as a localized phenomenon either in small, highly urbanized watersheds or in small, rural sub watersheds where clear cutting of a large percentage of the watershed land area has recently occurred. Stream geomorphic assessments and a fluvial geomorphic database maintained by the Agency of Natural Resources have identified main stem rivers typically channelized from 60-95% of their lengths. When human investments and land use expectations include all the land in the valley up to the river banks, there results extreme public interest in maintaining this unsustainable morphological condition despite its great cost and resultant hazard to public safety."*

The Vermont Agency of Transportation (VTrans) applies the term "scour critical" to stream crossing structures especially vulnerable to streambed scour—the undermining of bridge supports by water action and erosion. A spreadsheet database is maintained by VTrans and continually updated by the Bridge Inspection Program. Structures inspected are only those of 20 ft. or longer owned by a municipality or the state. The scour critical rating is based on the structure itself, and does not consider debris jams, outflanking, channel change, or other issues commonly associated with fluvial erosion. Water supply source and distribution systems are also endangered by fluvial erosion. Many water distribution systems involve buried pipes that cross streams, which are vulnerable to fluvial erosion. In December 2014 the Vermont Department of Environmental Conservation (DEC) released the "Flood Hazard Area and River Corridor Protection Procedures" guide, outlining specific actions and considerations. While fluvial erosion potential has not been addressed yet, new data is constantly becoming available, such as the

recently released River Corridors Base Map by the Agency of Natural Resources. While Concord's exposure is limited by the length and character of the rivers within the town, the potential for significant property damage under unique circumstances is a concern. Therefore, new river corridor data will be evaluated as it becomes available to identify any potential problem areas and any measures that will minimize or eliminate the impact of fluvial erosion shall be implemented. No extent data is available for the town of Concord.

Ice Jams

Ice jams, which can cause rapid and catastrophic flooding, are considered increasingly hazardous in parts of Vermont. In addition to the inundation damage they cause, ice jams can block infrastructure such as roads and culverts. Ice jams pose a risk in the town. Jams on the Moose River near Fornier Road can block the road in one example. A list of historic ice jams, including municipalities and streams, is maintained by DEMHS and the Vermont Agency of Natural Resources (ANR). The US Army Corps of Engineers Cold Regions Research and Engineering Laboratory maintains a more specific database of ice jams, which includes over 987 events in Vermont with the latest occurring in 2018. Historic events in Concord include an ice jam recorded at USGS gage Kirby Brook at Concord VT on March 17, 1968 with a discharge of 5.0 cfs. Another on Kirby Brook on March 9th, 1966 at 6.63 feet due to an ice jam with discharge at 14 cfs. Regionally, nearby Passumpsic had 19 (10th highest in the state) and St. Johnsbury had 38 (5th highest in the state) with the Connecticut River being number one in the state with 84 recorded ice jams. There is a man-made dam on Miles Pond and a natural dam on Shadow Lake. Upstream on the Connecticut River there is the Gilman Dam and the Stratford Dam. There is little or no residential or business population along Connecticut River. There are occasional beaver dam flooding related problems, especially near Moose River Bridge. If water gets high enough the school may be inaccessible.

(Source: http://rsgisias.crrel.usace.army.mil/apex/f?p=524:39:10954063060296::NO::P39_STATE:VT)

SECTION 3: RISK ASSESSMENT

3.1 Designated Hazard Areas

3.1.1. Flood Hazard Areas

The northwestern portion of Concord is located in Basin 15, The Passumpsic River Watershed and the remainder of Town is located in Basin 16, the upper Connecticut River Watershed. Within the Upper Connecticut Watershed, there are two subwatersheds in Concord: the "Commerford and Moore Reservoir" and the "CT River Direct – Taylor Brook to Miles Stream." Within the Passumpsic River Watershed, Concord is within the Moose River subwatershed. Concord has several bodies of water within its boundaries including Halls Brook, Mink Brook, Cutting Brook, Carr Brook, Dudley Brook, Roaring Brook, Miles Stream, and the Moose River. There are also numerous unnamed brooks, streams and small ponds. There are also three bodies of open water: Shadow Lake, Miles Pond, and the Moore Reservoir. The Connecticut River runs along the Southerly border of Concord for approximately eight and one-half mile and is accessible at the end of Cozy Nook Road and Walker Pit Road. Areas that have been flooded in

the past include sections of Prospect Street, Willson Road, Ranney Road, George Street, Shadow Lake Road, Fournier Road, Brook Road, Long Hill Road and Folsom Ave/High Street. There is little or no residential or business population along Connecticut River. There is one property in the A-Zone (*source: Concord Town Plan/NFIP Insurance Report: Vermont)*

3.1.2. Fluvial Erosion Hazard Areas

In 2009 the Essex County Natural Resources Conservation District completed a Phase II Stream Geomorphic Assessment report on six reaches (or sections) of the Moose River. Recommendations included the establishment of forested riparian buffers in reaches M7, M9, M10 and M13 and fencing and installation of riparian buffer in Reach M08 below Concord village, where grazing areas are adjacent to the stream. About two-thirds of Vermont's flood-related losses occur outside of mapped floodplains, and this reveals the fundamental limitations of the FEMA FIRMs. A mapped floodplain makes the dangerous assumption that the river channel is static, that the river bends will never shift up or down valley, that the river channel will never move laterally, or that river beds will never scour down or build up. River channels are constantly undergoing some physical adjustment process. This might be gradual, resulting in gradual stream bank erosion or sediment deposit – or it might be sudden and dramatic, resulting a stream bank collapse. In fact, this type of flood-related damage occurs frequently in Vermont, due in part to the state's mountainous terrain. Land near stream banks are particularly vulnerable to erosion damage by flash flooding, bank collapse, and stream channel dynamics. The Vermont Department of Environmental Conservation, Agency of Natural Resources, has identified river corridors, which consist of the minimum area adjacent to a river that is required to accommodate the dimensions, slope, planform, and buffer of the naturally stable channel and that is necessary for the natural maintenance or natural restoration of a dynamic equilibrium condition. In other words, the river corridor provides "wiggle room" for a stream as its channel changes over time. Keeping development out of the river corridors therefore reduces vulnerability to erosion. Development is prohibited in Special Flood Hazard Area and Fluvial Erosion Hazard Zones and is specifically defined in the Town's Zoning Regulations. No extent data is available for the town of Concord.

Repetitive Loss Properties

The town has no repetitive loss properties (buildings or homes).

source: FEMA Repetitive Loss/BCX Claims provided with packet. NOTE: BCX claims are ones located out of the SFHA.

3.2 Non-designated Hazard Areas

3.2.1. Ice Storm Damage

Historic impacts of ice storms in Concord were minimal in comparison to other areas of the state.

1998 data: https://www.fema.gov/disaster/1201

3.2.2. High Winds and Lightning

Ridgeline and hilltop homes as well as homes located in the midst of mature forests are the most vulnerable to damage from falling trees and tree limbs. The Vermont Agency of Transportation works to keep limbs trimmed. As with many Vermont communities characterized by natural terrain, the issue of downed trees creating power loss and property damage is more common compared to urban areas. Historically, these instances are short in duration and have not posed a serious risk for the town or its residents. There have been three events recorded by NOAA in recent years for the county, but specific wind speeds and damage incurred at the town level are unknown.

Table 3.1 NOAA Recorded Wind Events: Essex County

ESSEX (ZONE)	VT	02/29/2016	22:00	Strong Wind	35 kts. MG	5.00K
ESSEX (ZONE)	VT	05/05/2017	16:15	Strong Wind	43 kts. EG	10.00K
ESSEX (ZONE)	VT	10/30/2017	00:00	Strong Wind	40 kts. MG	75.00K

3.3 Previous FEMA-Declared Natural Disasters and Non-Declared Disasters

While the Town of Concord has had a history of flooding, losses to public infrastructure have intensified in recent years. The summers of 1996, 1998 and 2002 saw moderate road damage throughout the town and in the village areas. Damage was largely contained to local back roads (unpaved) due to washouts. The town has been fortunate that its buildings and residential property has remained unaffected by recent disasters. Additionally, recent County declarations (DR 4356 and 4207) did not result in any funding for the town. Concord has received public assistance funding from FEMA for the following natural disasters

Table 3-1: KEY:

DR	Date	Type
1698	05/04/2007	Severe Storm(s)
1995	06/15/2011	Severe Storm(s)
4001	07/08/2011	Severe Storm(s)

Table 1-2: Town of Concord, FEMA-declared disasters and snow emergencies, 2004-Current:

Disaster Number	PW Number	Application Title	Damage Category Code	Project Amount	Federal Share Obligated	Total Obligated
1698	2	DEBRIS REMOVAL	A - Debris Removal	$8,847.43	$6,635.57	$7,108.02
1698	33	ROADS AND BRIDGES	C - Roads & Bridges	$9,966.64	$7,474.98	$7,929.46
1995	41	pdesxcon02c	C - Roads & Bridges	$24,015.89	$18,011.92	$18,011.92
1995	43	pdesxcon01c	C - Roads & Bridges	$20,859.41	$15,644.56	$15,644.56
4001	168	mgesxcon01c leonard 1	C - Roads & Bridges	$5,378.85	$4,034.14	$4,034.14
4001	171	mgesxcon01c leonard 4	C - Roads & Bridges	$5,595.28	$4,196.46	$4,196.46
4001	177	mgesxcon01c leonard 2	C - Roads & Bridges	$8,237.01	$6,177.76	$6,177.76
4001	178	mgesxcon01c leonard 3	C - Roads & Bridges	$2,155.08	$1,616.31	$1,616.31
4001	179	mgesxcon01c partridge	C - Roads & Bridges	$3,901.17	$2,925.88	$2,925.88
4001	180	mgesxcon01c formor	C - Roads & Bridges	$1,136.80	$852.60	$852.60
4001	181	mgesxcon01c prospect	C - Roads & Bridges	$1,641.14	$1,230.86	$1,230.86
4001	182	mgesxcon01c south	C - Roads & Bridges	$2,679.91	$2,009.93	$2,009.93
4001	183	mgesxcon01c ladd	C - Roads & Bridges	$21,902.73	$16,427.05	$16,427.05
4001	184	mgesxcon01c kirby town	C - Roads & Bridges	$16,805.07	$12,603.80	$12,603.80
4001	193	mgesxcon01c kirby mooneys	C - Roads & Bridges	$15,893.50	$11,920.13	$11,920.13
4001	194	mgesxcon01c campers	G - Recreational or Other	$1,544.38	$1,158.29	$1,158.29
4001	195	mgesxcon01c leonard 5	C - Roads & Bridges	$7,487.30	$5,615.48	$5,615.48
4001	213	mgesxcon01c ranny	C - Roads & Bridges	$2,642.61	$1,981.96	$1,981.96
4001	214	mgesxcon01c beede	C - Roads & Bridges	$2,542.91	$1,907.18	$1,907.18
4001	215	mgesxcon01c george	C - Roads & Bridges	$2,121.28	$1,590.96	$1,590.96

4001	261	mgesxcon01c woodward	C - Roads & Bridges	$3,830.38	$2,872.79	$2,872.79
4001	262	mgesxcon01c shadow beede	C - Roads & Bridges	$22,186.38	$16,639.79	$16,639.79
4001	263	mgesxcon01c shadow baker	C - Roads & Bridges	$13,354.73	$10,016.05	$10,016.05
4001	264	mgesxcon01c royallston 1	C - Roads & Bridges	$31,119.24	$23,339.43	$23,339.43
4001	265	mgesxcon01c shadow school	C - Roads & Bridges	$18,415.78	$13,811.84	$13,811.84
4001	270	mgesxcon01 b concord	B - Protective Measures	$6,094.52	$4,570.89	$4,570.89
4001	271	mgesxcon01c goudreault	C - Roads & Bridges	$9,532.52	$7,149.39	$7,149.39
4001	280	mgesxcon01c cozy nook 2	C - Roads & Bridges	$2,597.79	$1,948.34	$1,948.34
4001	281	mgesxcon01c royalston school	C - Roads & Bridges	$11,567.89	$8,675.92	$8,675.92
4001	310	mgesxcon01c sy lewis	C - Roads & Bridges	$2,000.07	$1,500.05	$1,500.05
4001	311	mgesxcon01c bona	C - Roads & Bridges	$4,415.71	$3,311.78	$3,311.78
4001	312	mgesxcon01c cozy nook 1	C - Roads & Bridges	$7,818.38	$5,863.79	$5,863.79
4001	314	mgesxcon01c wilson edith	C - Roads & Bridges	$3,525.62	$2,644.22	$2,644.22
4001	379	mgesxcon01c long hill	C - Roads & Bridges	$40,190.89	$30,143.17	$30,143.17
4001	380	mgesxcon01c high ridge bunnell	C - Roads & Bridges	$4,917.16	$3,687.87	$3,687.87
4001	381	mgesxcon01c leclaire	C - Roads & Bridges	$65,544.79	$49,158.59	$49,158.59
4001	385	mgesxcon01c high ridge last hill	C - Roads & Bridges	$18,524.89	$13,893.67	$13,893.67
4001	388	mgesxcon01c wilson	C - Roads & Bridges	$8,390.96	$6,293.22	$6,293.22
4001	425	MGCOC03 cross	C - Roads & Bridges	$3,997.30	$2,997.98	$2,997.98
4001	437	MGCOC01 bombard	C - Roads & Bridges	$27,301.50	$20,476.13	$20,476.13

4001	438	MGCOC05 grist mill	C - Roads & Bridges	$63,828.01	$47,871.01	$47,871.01
4001	439	MGCOC04 brook 1	C - Roads & Bridges	$5,466.00	$4,099.50	$4,099.50
4001	543	JCCO73 Cozy Nook Bridge #3	C - Roads & Bridges	$11,389.94	$8,542.46	$8,542.46
4001	544	JCCO75 Brook Road Bridge	C - Roads & Bridges	$284,699.61	$213,524.71	$213,524.71

Sources: FEMA and the 2015Concord Town Plan

Non-declared disasters (e.g. snow and rain storms) have not resulted in damage above and beyond normal maintenance. Extreme, long-lasting cold temperatures during winter months do pose a concern for the town as in many communities where the price of heating fuel often exceeds resident's ability to pay. Coupled with high unemployment, there is an increased risk for the town's residents to not meet the financial requirements for adequate heat, especially during long periods of extremely cold temperatures. Without adequate provisions, 48 hours of extremely cold temperatures could create a serious health hazard.

3.3 Hazard Assessment and Risk Analysis

Although estimating the risk of future events is far from an exact science, the Planning Team used best available data and best professional judgment to conduct an updated Hazards Risk Estimate analysis, which was subsequently reviewed and revised by town officials in May, 2018. This analysis assigns numerical values to a hazard's affected area, expected consequences, and probability and supports the inclusion of all profiled hazards in this plan. This quantification allows direct comparison of very different kinds of hazards and their effect on the town and serves as a method of identifying which hazards hold the greatest risk based on prior experience and best available data. The following scoring system was used in this assessment:

Area Impacted: scored from 0-4, rates how much of the municipality's developed area would be impacted.

Consequences: consists of the sum of estimated damages or severity for four items, each of which are scored on a scale of 0-3:

- Health and Safety Consequences
- Property Damage
- Environmental Damage
- Economic Disruption

Probability of Occurrence: (scored 1-5) estimates an anticipated frequency of occurrence based on prior experience and current information.

To arrive at the Overall Risk Value, the sum of the Area and Consequence ratings was multiplied by the Probability rating. The highest possible risk score is 80.

3.3.1. Natural Hazards

According to the updated Hazard and Risk Estimation for Concord, the following natural hazards received the highest risk ratings out of a possible high score of 80:

- Severe Winter Storm (30)
- Flooding (44)
- Extreme Cold (36)

Flood-related disasters have had the greatest financial impact on the town. While no deaths or injuries have been recorded for declared or non-declared disasters, the potential for health and safety risk during a severe winter storm and/or extreme cold are considered higher than that posed by a flooding event.

Table 3-2 Natural hazards risk estimation matrix

Concord, VT Hazard & Risk Analysis: NATURAL HAZARDS with Hazardous Material Incident	Drought	Flooding	High Winds	Fluvial Erosion	Landslide	Lightning	Multi-Structure Urban Fire	Hazardous Materials Incident	Winter Storm	Extreme Cold	
Area Impacted											
Key: 0 = No developed area impacted											
1 = Less than 25% of developed area impacted											
2 = Less than 50% of developed area impacted											
3 = Less than 75% of developed area impacted											
4 = Over 75% of developed area impacted	2	3	4	1	1	1	1	2	4	4	
Consequences											
Health & Safety Consequences											
Key: 0 = No health and safety impact											
1 = Few injuries or illnesses											
2 = Few fatalities or illnesses											
3 = Numerous fatalities	0	1	1	0	0	1	2	2	1	1	
Property Damage											
Key: 0 = No property damage											
1 = Few properties destroyed or damaged											
2 = Few destroyed but many damaged											
3 = Few damaged but many destroyed											
4 = Many properties destroyed and damaged	0	2	1	1	1	1	2	1	2	1	
Environmental Damage											
Key: 0 = Little or no environmental damage											
1 = Resources damaged with short-term recovery											
2 = Resources damaged with long-term recovery											
3 = Resource damaged beyond recovery	2	2	1	1	1	1	1	2	0	1	
Economic Disruption											
Key: 0 = No economic impact											
1 = Low direct and/or indirect costs											
2 = High direct and low indirect costs											
2 = Low direct and high indirect costs											
3 = High direct and high indirect costs	1	3	1	1	1	1	3	3	3	2	
Sum of Area & Consequence Scores	5	11	8	4	4	5	9	10	10	9	
Probability of Occurrence											
Key: 1 = Unknown but rare occurrence											
2 = Unknown but anticipate an occurrence											
3 = 100 years or less occurrence											
4 = 25 years or less occurrence											
5 = Once a year or more occurrence	1	4	4	2	1	2	1	1	3	4	
TOTAL RISK RATING											
Total Risk Rating =	**5**	**44**	**32**	**8**	**4**	**10**	**9**	**10**	**30**	**36**	
Sum of Area & Consequence Scores											
x Probability of Occurrence											0

The town is vulnerable to power loss and in colder months, this could place the residents of the town in harm's way. While the history of major power loss over extended periods of time is minimal, there have been repetitive short-term outages, the greatest lasting 3 hours. This duration poses a health and safety risk to residents as well as limiting response capabilities of town staff. The concern for a hazardous substance spill resulting from a transportation accident is a concern. There have been many accidents along Route 2 mainly due to speed, the curves in the road and a heavy moose population. Carbrook Bridge is considered a high accident location. Fixed-sites for hazardous materials in town include sites with batteries, furniture refinishing glues and other materials, and an underground gas tank. A worst case scenario would involve a spill on Main St. (Route 2) that could block the fire station. With the recent severity of cold temperatures lasting for longer durations, accessibility of heating fuel is a concern and this accessibility is defined by transportation issues resulting from a major storm where roads are impassable and from resident's ability to pay for the fuel. As with many disaster scenarios, the hazards categories are related to one another. Natural hazards can cause a technological problem which can then cause a societal problem.

3.4 Hazard Summary

According to the risk estimation analysis, the highest rated hazards for Concord are:

1. Flooding
2. Severe Winter/Ice Storm
3. Extreme Cold

Flooding is the highest rated hazard for Concord due to previous damage events and subsequent costs to repair. With 36 locations needing repair to the combined cost of just over $380,000 following DR4001, the potential for significant, town-wide damage is possible with a severe rain event. Within each of the highest rated hazards, there exists the potential for the secondary, but no less important, consequence of increased financial demand on residents as a result of an event. While winters in Vermont are characterized by cold weather, recent increases in the duration of extremely cold temperatures increase the costs of heating energy and this is a challenge that the state and local communities are being forced to address.

SECTION 4: VULNERABILITY ASSESSMENT

Vulnerability refers to the potential impact of a specific loss related to an identified risk. Concord is a small town with very few buildings aside from residential. While the loss of any one facility would cause a disruption in town services and operations, the overall vulnerability is low. There are roads, bridges and culverts vulnerable to flooding and those are identified below. Loss of equipment function for the highway department is a vulnerability for the town but the risk is not

due or predicted to be a result of a disaster, merely, the required maintenance expected of highway-related machinery.

For this section of the plan, the planning team looked at prior history and worst-case scenarios. Additional considerations include seasonal patterns, areas likely to be most affected, probable duration of the hazard, and speed of onset. A combination of the risk ranking, disaster history expenditures and frequency of the hazard was used to classify the community vulnerability as HIGH (25 years or less-low end), MODERATE (unknown but anticipate occurrence or 25 years or less-high end) or LOW (100 years or less). For example, a flood event is highly likely in many communities, but the degree of impact varies. A highly likely flood with critical or catastrophic impact rates the community vulnerability as HIGH. Another community with a highly likely or likely flood with a limited impact would receive a vulnerability rating of MODERATE. The vulnerability of a community having the occurrence of an event as possible or unlikely with limited or negligible impact would be classified as LOW.

Vulnerability Narrative for Profiled Hazards:

Severe winter storm: 25 Years or Less
Summary: While all structures are vulnerable to major snow loads, there is little evidence to support concern over structure failure due to snow loads on roofs, ice on gutters, etc. Town snow removal equipment is vulnerable to damage with greater use, especially during emergency situations as well as road damage from plowing. Populations caught outdoors, commuting or working outside during a serve winter storm are more vulnerable to cold-related injury and/or snow related accidents but winter comes every year and residents and the town are accustomed to making intelligent decisions regarding safety and protection of infrastructure. Special populations (e.g. aging, disabled, etc.) are more vulnerable in terms of mitigating structure loads, hazardous travel and relocating to safety.

Flooding: 25 Years or Less
Flooding is the most common recurring hazard event in the state of Vermont. There are three main types of flooding that occur in Vermont: flooding from rain or snow melt, flash flooding and urban flooding. Flooding has also been known to occur as a result of ice jams in rivers adjoining developed towns and cities. These events may result in widespread damage in major river floodplains or localized flash flooding caused by unusually large rainstorms over a small area. The effects of all types of events can be worsened by ice or debris dams and the failure of infrastructure (especially culverts), private and/or beaver dams. Rain storms are the cause of most flooding in Concord. Winter and spring thaws, occasionally exacerbated by ice jams, are another significant source of flooding, especially when coupled with high rain levels. Much of this flooding is flash flooding, occurring within hours of a rainstorm or other event. Flash flooding, as opposed to flooding with a gradual onset, causes the largest amount of damage to property and infrastructure. Floods cause two major types of damage: water damage from inundation and erosion damage to property and infrastructure. The *2013 Vermont State All-Hazards Mitigation Plan* discusses flooding extensively. While that plan is concerned with all of Vermont, the information on flooding is all relevant to Concord in that:

"Recent studies have shown that most flooding in Vermont occurs in upland streams and road drainage systems that fail to handle the amount of water they receive. Due to steep gradients, flooding may inundate these areas severely, but only briefly. Flooding in these areas generally has enough force to cause erosion capable of destroying roads and collapsing buildings. These areas are often not mapped as being flood prone and property owners in these areas typically do not have flood insurance (DHCA, 1998). Furthermore, precipitation trend analysis suggests that intense local storms are occurring more frequently. Additionally, irresponsible land use and development will exacerbate the preexisting vulnerability. Urban flooding usually occurs when drainage systems are overwhelmed and damages homes and businesses. This flooding happens in all urban areas, but specifically in Burlington where the downtown area is located at the bottom of a gradient, which adds to the intensity of this localized flooding….
…Over the past two decades, flood damage costs have risen dramatically in Vermont due to increasing occurrences of flooding and increases in vulnerability associated with unwise land use development in flood plains or within stream corridors. The geography and topography are right for a significant localized storm with extreme damage at almost any location in Vermont. Heavy rains with previous ground saturation, which causes runoff, are a significant part of the flooding formula in Vermont. Steep topography and narrow, inhabited, stream and river valleys further increase the dangerous nature of this hazard. Furthermore, precipitation trend analysis suggests that intense, localized storms that can cause flash flooding are occurring with greater frequency. While flooding will continue, planning and other mitigation measures can help minimize damages.
All of Vermont's major rivers have inhabited flood plains. While residents in mountain valleys are at risk, they may not be aware of the danger or may choose to ignore it. There are many reasons property owners are reluctant to relocate to less flood prone ground, not the least of which is the lack of personal experience of flooding. In addition, many communities originated beside rivers and streams; some of the most attractive property is located in vulnerable areas. Lakeshore property in Vermont is vulnerable to flooding from high water levels, either by surface water erosion or flooding. Occasionally, water-saturated ground and high-water tables cause flooding to basements and other low-lying areas. Lakeshore property is highly desirable and valuable, making the development of lakeshore areas very likely, even with the high potential for flooding. Restrictions on lakeshore property development have significant negative economic and tax revenue impacts that must be carefully weighed against the gains in personal safety and protection of property."

Vermont experienced major floods long before Federal disaster assistance became available. The most destructive recorded event was in November of 1927. In the month before the flood, rains in excess of 150% of normal precipitation fell after the ground had frozen. The flood itself was precipitated by 10 inches of rain falling over the course of a few days. The flood inundated parts of many towns and damaged or destroyed numerous bridges in the county. As the history of the flooding cited above bears out, the geography and topography are right for a significant localized storm with extreme damage at almost any location in Vermont. Numerous floods have resulted in Presidentially-declared disasters and an influx of Federal disaster assistance. Of these disasters, 1973 flood inflicted widespread damage across the state and the residual rains of Hurricane Belle in 1976 resulted in substantial federal disaster assistance in Vermont. The following chart provides the history of recent PA funding related to flooding events in Concord.

While this does not reflect the total impact of flooding on the town, PA funding history does provide a reference for vulnerable areas in the town and those areas will be addressed.

Previous experiences have proven to the town that flooding is the greatest risk and another flood event is probable by the time this plan requires an update. With this conviction, the need to complete viable mitigation actions to town infrastructure becomes incredibly important and the town remains aware of this. The estimated Capacity-Disruption Levels Given a Measured Rainfall Event can be interpreted as the conditional probability that a particular roadway capacity disruption occurs, given that a rainfall event occurs. For Essex County, the probability that the intensity of a rain event will result in approximately a 2%, 7.5%, or 13.5% roadway capacity reduction are 28.2%, 69.2%, or 2.6%, respectively *(Source: A Risk-Based Flood-Planning Strategy for Vermont's Roadway Network, 2015).*

Extreme Cold: 25 Years or Less
Summary: Recent evidence shows that greater extremes in temperature and overall weather fluctuation are occurring with increased frequency. A long-duration cold snap can cause significant damage to structures due to bursting pipes and the residential health and safety considerations include factors related to financial resources, fuel supply, sheltering, provisions and employment.

Table 4-2: Vulnerability Summary Table

Hazard	Vulnerability	Extent (Storm Data from most severe event)	Impact (economic/health and safety consequence)	Probability
Flood	Culverts, bridges, road infrastructure,	The greatest 24-hour rainfall record for the immediate region occurred in late August 2011 at 4.01''. The greatest level of precipitation in any month occurred in August 2011 at 11.12'' No detailed data was available for fluvial erosion damage in town in terms of numbers of acres lost during each event.	DR 4011 (7/2011) resulted in greatest financial impact and damage to roads and bridges with about $579,000 in FEMA funding for 40 projects. With 15% of total housing being mobile home, there is increased vulnerability to both residents and town tax base. Enhanced logging activity decreases natural protection from flooding.	25 years or less

Extreme Cold/ Snow/Ice Storm	The entire Town is vulnerable, including road infrastructure, town and privately-owned buildings, utility infrastructure	Snowfall has varied, from a few inches to over a foot or more. Heavy snow and wind may down trees and power lines. Snow/ice contributes to hazardous driving conditions. Regionally, the winter of 2010-2011 was the third-snowiest on record with a total of 124.3 inches.	For roof collapse: monetary damages will depend on each structure but, collapse of barn roof is often a total loss. This does not include the loss of livestock. Collapse of a house roof may be at a 50% loss. For car crashes due to poor driving conditions: minimal damage to vehicle to totaled vehicle and operator injury. Health impacts could vary significantly. Loss of energy or communication capabilities may occur and impede recovery. !5% of housing is in mobile, which are impacted more during most, if not all, weather hazards.	25 years or less

4.1 Critical Facilities

The Center for Disaster Management and Humanitarian Assistance defines critical facilities as: "Those structures critical to the operation of a community and the key installations of the economic sector." Table 4-1 identifies critical facilities in Concord. As mentioned in the summaries above, some critical facilities have increased vulnerability during specific hazard events. However, there is no evidence to suggest that any critical facility is highly vulnerable during any hazard event. All critical facilities in the town are outside the designated flood hazard areas and have no history of damage due to a disaster. In this regard, the town is resilient to critical facility damage during a natural disaster most likely to affect the region.

4.2 Infrastructure

Flooding is the highest risk profiled hazard and town infrastructure has high vulnerability to damage during major flood events. The Natural Resources Atlas contains a "road erosion risk" layer, which ranks the erosion risk of unpaved Class 2, 3 and 4 Town roads as well as driveways longer than 1,000 feet. Features considered in assessing risk include undersized culverts, elevation and slopes, soil types, and proximity to rivers, lakes, and wetlands. The result is an identification of road segments that have a "low", "moderate" or "high" erosion risk. This is a useful tool to identify potential road hazards during storm events. It can also be useful to the road commission as a starting point in prioritizing road infrastructure maintenance projects (source:

http://anrmaps.vermont.gov/websites/anra/). The information presented below summarizes town infrastructure and high vulnerability areas.

4.2.1 Town Highways

There is a total of 78.225 miles of public roadways in Concord classified as follows:

- *Class 1 highways* – 10.765 *miles:* Class I highways are those town highways that form the extension of a state highway route. The Agency of Transportation shall determine which highways are Class I highways.
- *Class II Town highways -11.710 miles:* These are the most important highways in each town. As far as practicable, they shall be selected with the purpose of securing main lines of improved highways from town to town and to places which by their nature have more than the normal amount of traffic. They are designated by the Select Board and approved by the Vermont State Highway Board.
- *Class III Town highways* -43.10 *miles:* These are all traveled highways other than Class I or II. The Select Board, after conferencing with a representative of the State Agency of Transportation, shall determine Class III highways. The minimum standards for Class III highways are that they be negotiable under normal conditions all seasons of the year. This would include, but not be limited to, sufficient surface and base, adequate drainage, and sufficient width to permit winter maintenance.
- *Class IV Town highways* -12.71 *miles:* Class IV town highways include all other town highways as designated by the Select Board. These roads are typically 3 rods wide (unless otherwise recorded), are not eligible for state aid funds and are not maintained for winter use. These highways are maintained for summer service only; persons erecting dwellings served by these roads cannot expect winter service. There has been little change in the classification of roads in the past ten years, and there is no anticipated change during the current planning period.

Table 4-2 Town highway mileage by class, Town of Concord

Class 1	Class 2	Class 3	Class 4	State Hwy	Fed Hwy	Interstate	Total 1, 2, 3, State Hwy
10.765	11.710	43.10	12.71	0	0	0	78.285 Miles

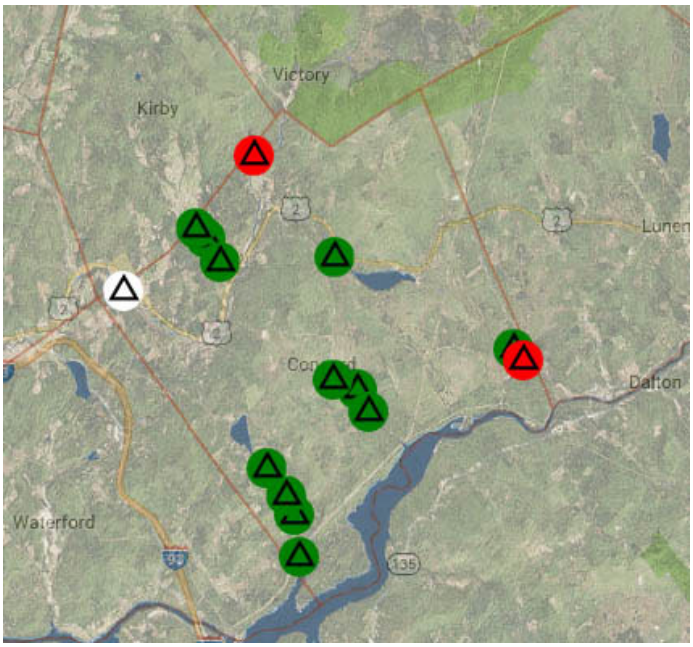
Source: data derived from VTrans TransRDS GIS data/Concord Town Plan

4.2.2 Bridges, Culverts, and Dams

Bridges:

There are 15 bridges located in the town. Two are rated with High Importance, 12 as Low and one unknown. The conditions, however, are not listed on VTCulverts site. The bridges are contained in an inventory maintained by VCGI, VTrans and the NVDA and represent those of greatest concern for the town. This analysis does not take into account the fluvial geomorphology or the elevation of the bridge above the floodplain.

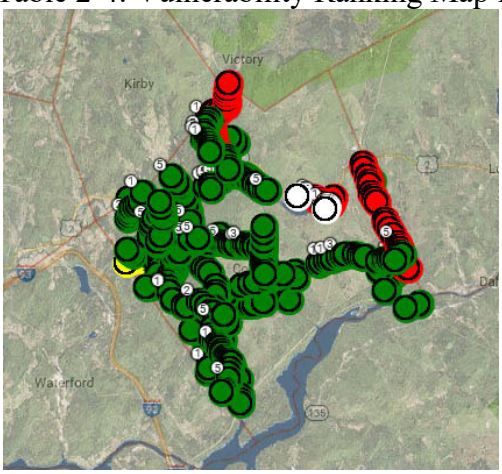
Table 4-4 Inventoried bridges in the Town of Concord with identified importance
The entire Bridge Inventory with maps for the town can be found on the state site: https://vtculverts.org/bridges#list



Culverts:

There are currently 443 culverts in the town and are classified in the VTCulverts.org system. The majority of the culverts are in GOOD condition (238), 6 are rated as EXCELLENT. The remainder are FAIR (119) or POOR (76) with 1 CRITICAL (ID 190: Long Hill Rd), 1 UNKNOWN (ID 379: Walker Pit Rd), 1 URGENT (ID: 268 Royalston Corner Rd) and 1 CLOSED (ID 274: Royalston Corner). This inventory is updated by the Town. VTCULVERTS.ORG also ranks culverts with an interactive map, the following roads contain culverts that are rated high risk (denoted with Red on the map):

Table 2-4: Vulnerability Ranking Map for Concord Culverts



Source: https://www.vtculverts.org/structures

Dams:

There is a man-made dam on Miles Pond and a natural dam on Shadow Lake. Upstream on the Connecticut River there is the Gilman Dam and the Stratford Dam

4.2.3 Water, Wastewater and Solid Waste Removal

There is no municipally-owned community water system in the town of Concord at the present time, although there is a water system serving the Concord School. Water for domestic use is obtained from individual drilled wells, dug wells, or springs. In North Concord a privately-owned system from a spring on Ladd Road feeds 12 units, including mobile homes on Wesley Road and Rte 2. The Mobile Home Park at Glenside Lane is supplied by a private artesian well, with a storage building and treatment facility, feeding 24 units. There are also other small, shared water sources in town. There is no municipal septic service offered at this time in the town of Concord. Domestic sewage is disposed of individually by means of septic tanks and leach fields. The Town's zoning regulations currently allow high-density development in the village areas and a small area around Miles Pond. However, these areas are limited to development that can provide adequate sewage disposal. These high-density zones were established to allow the continued use of pre-existing homes and businesses that are established in these areas. The Town's current zoning by-laws recognize the limitations of the soils and natural water supplies in these areas. The Town of Concord is a member of the Northeast Kingdom Waste Management District (NEKWMD) and works cooperatively with the District to manage the solid and hazardous wastes in accordance with the District's Solid Waste Implementation Plan. The Town maintains a solid waste Transfer Station at the Town Highway property on Brook Road.

4.2.4 Electric Power Transmission Lines and Telecommunications Land Lines

Green Mountain Power Corp is the sole provider of electricity in Concord. Landline phone service is widely available; however, cell phone service is limited in town.

4.3 Estimating Potential Losses in Designated Hazard Areas

According to most current American Community Survey 5-Year averages, the median value of an owner-occupied housing unit in Concord is $162,500. With no repetitive loss properties, the town does not believe that even during a flooding event similar to those of 2011 that there would substantial damage to buildings or residential housing that exceeded 1%. However, given the magnitude of damage to town roads, the potential for costs exceeding annual budgeting allotments is possible. However, the repairs and upgraded resilience of these locations associated with these prior expenses greatly reduces the potential for a recurrence.

4.4 Land Use and Development Trends Related to Mitigation

Traditionally, the town's steep slopes and rolling terrains have limited Concord's residential, commercial, industrial, and agricultural expansion. Concord's landscape is dominated by the Miles Mountain range, which has the town's highest elevations at 2,432 feet. This undeveloped area is composed of steep forested slopes which drain into a significant watershed area that

encompasses many tributaries and wetland areas in Concord and in neighboring towns. This area includes Victory Bog. Goudreault Hill at 2,012 feet, has gentler slopes which guide the area's rain and snow runoff into natural watershed collection areas, including Miles Pond and the Moose River. Shadow Lake is a collection area for Shaw Mountain, 1,800 feet, and surrounding hills. East Concord's elevations average between 800 and 1,100 feet. The town's highlands have provided Concord's residents and wildlife with a number of water supplies. At the same time, multiple elevation changes within the town's lowlands tend to restrict the area's development and agricultural potential. The town's development districts, or corridors, should be designed to make the best use of these moderately sloped areas.

The town's bylaws currently include provisions for development within the 100 year floodplain, but there are no local provisions for runoff and erosion control, such as vegetation buffers around surface waters and erosion and sediment control during construction, especially for small scale projects that will not be regulated by the state (e.g. stormwater management, Act 250.). This issue can be best addressed by developing and implementing low-impact development standards for the Town of Concord. In addition, as noted in the Land Use section of this Plan, the State's recently enacted Shoreland Protection Act now establishes a regulated area of 250 feet around lakes greater than 10 acres. Setback requirements, and limitation on impervious coverage and clearing are addressed by these state regulations.

Since 2005, the Town of Concord has not seen a change in development that has increased vulnerability and this has allowed the town to focus on planning for possible future development. However, Concord is a major transportation route between St. Johnsbury, VT, New Hampshire, and Maine, making the Town very attractive for residential, commercial, and second-home buyers. On the downside, with more use of transportation infrastructure, the repair requirement and accident potential increases. Although growth in population and housing has been modest in the last 10 years in Concord, Essex County as a whole actually lost population from 2000 to 2010. Concord's development pressure may continue to grow due to the Burke Mountain ski resort expansion, as well as continued development in Littleton, NH. Concord is also experiencing increased development around the Miles Pond and Shadow Lake areas with increased upgrades to existing properties and conversion of single owner seasonal properties to year-round residential and rental properties. Because of this forecasted increase in development pressure, the Town of Concord should look to guide the development to appropriate areas that will maintain the character of Concord, foster economic development, maintain a mixture of uses in the village areas, and protect local natural resources. The Town of Concord welcomes an increase in development. The Town has experienced an increase in small business growth but attracting larger commercial or industrial development has been difficult. The Town recognizes there is significant potential to build upon the local tourism industry as Burke Mountain expands and other recreational activities such as camping, swimming, boating, hunting, fishing, ATV riding, and snowmobiling increase within our borders.

4.4.1. Proposed Land Use

Floodway limits are incorporated into the town's zoning bylaws, as is site plan review to ensure a site and its soils can support the proposed development. Under Concord's bylaws no structure or

site may be used or occupied until a Certificate of Compliance is issued by the Administrative Officer. These bylaws tend to restrict residential and commercial development to areas within the community which are served by town roads and utilities. The current bylaws do not address or restrict development within wetlands, along stream beds, or in areas where the topography tends to create potential erosion and water pollution conditions. Although these zones have been adequate over the past several years, Concord needs to re-evaluate the current zoning bylaws in light of future development and current land use trends.

The Zoning Bylaws hold to the recommended practices under the NFIP and all continued compliance and participatory requirements are managed by the Zoning Administrator. The Administrative Officer (AO) enforces the flood hazard regulations, which are integrated with the City's zoning regulations. The AO receives, and reviews permit applications and forwards for board review as appropriate. In accordance with FEMA requirements, the AO maintains records of all permits issued for development in areas of special flood hazard; elevations, in relation to mean sea level, of the lowest floor, including basement, of all new or substantially improved buildings; elevations, in relation to mean sea level, to which buildings have been flood proofed; flood proofing certifications; and all variance actions, including justification for their issuance. There are no repetitive loss properties in the town. There is one policy with $3,100 in coverage with $0 paid out since 1978.
Source: http://bsa.nfipstat.fema.gov/reports/reports.html
(Source: Repetitive Losses / BCX Claims Federal Emergency Management Agency: VERMONT).

4.4.2. Land Use Goals
In 2011 the Concord Planning Commission held public work sessions to explore how the Town's zoning could be updated to protect Concord's rural and scenic areas, while encouraging and directing growth to nodes which were historically the centers of development activity in the Town. Several ideas were explored at the work sessions, which were summarized in a report dated July 25, 2011. Recommendations that emerged were:

- the creation of a conservation overlay zone;
- the establishment of shoreland and riparian buffer zones;
- the use of planned unit developments to preserve open space through clustering of lots;
- design standards that would minimize the visual impact of new development;
- downzoning (reducing the permitted density) of land in the Goudreau Hill and Streeter Road areas to preserve scenic viewsheds;
- Revising of lot width requirements and setbacks in the Low-Density district so as to better achieve the stated land use objectives of this district;
- Village Center Designation as a means to encourage revitalization of business properties.

4.4.3. Land Use Strategies
The town believes it is important to concentrate growth in the village areas throughout the town. The villages have a significant amount of development potential, which may ultimately help to lessen the tax burden on residents. Concord's villages should maintain their traditional design through small-lot sizes, mixed uses, pedestrian elements (such as sidewalks and cross walks), and neighborhood green spaces. Adaptive reuse is encouraged in order to revitalize neglected and under-utilized properties before adding on to existing neighborhoods. The villages should

also see the commercial sections of their main streets become popular public gathering areas with additional shops, restaurants, and service businesses. As the villages grow, areas for new residential blocks and streets should be designated to attract development that will fit in with design of existing neighborhoods. The town would like the villages of North Concord, East Concord, and Concord Corners to maintain and/or develop its mixture of uses (mostly residential and/or small businesses), encouraging commercial and industrial development in appropriate locations along Route 2, while avoiding "strip" commercial development – that is, linear commercial development along highways with limited pedestrian access and lack of connection to other land uses. The Town would like to accommodate new rural and tourism-oriented businesses throughout, without sacrificing the rural landscape and scenic views that attract both new residents and tourists.

4.4.4 Future Development and Housing

Concord is experiencing increased development around the Miles Pond and Shadow Lake areas with increased upgrades to existing properties and conversion of single owner seasonal properties to year-round residential and rental properties. Because of this forecasted increase in development pressure, the Town of Concord should look to guide the development to appropriate areas that will maintain the character of Concord, foster economic development, maintain a mixture of uses in the village areas, and protect local natural resources. The Town of Concord welcomes an increase in development. The Town has experienced an increase in small business growth but attracting larger commercial or industrial development has been difficult. The Town recognizes there is significant potential to build upon the local tourism industry as Burke Mountain expands and other recreational activities such as camping, swimming, boating, hunting, fishing, ATV riding, and snowmobiling increase within our borders.

SECTION 5: MITIGATION STRATEGIES

5.1 Town Goals and Policies that support Hazard Mitigation

The Town Zoning Regulations are designed to implement the goals and objectives of the Town Plan. Furthermore, they are meant to promote the health, safety, and general welfare of the inhabitants of the Town of Concord through two main goals:

a. Manage all flood hazard areas designated pursuant to 10 V.S.A. Chapter 32 § 753, the municipal hazard mitigation plan and make the Town of Concord, its citizens, and businesses eligible for enrollment in the National Flood Insurance Program (NFIP) and federal flood insurance, federal disaster recovery funds, and hazard mitigation funds as may be available; and

b. Implement the goals, policies, and recommendations of the current Town Plan.
c. The 2005 Mitigation Plan had the following mitigation goals:

2005 Project/Priority	Mitigation Action	Who is Responsible	Time Frame and Potential Funding	Initial Implementation Steps
1. Road and bridge upgrades	Continue upgrade road and bridge conditions to avoid future damage.	Road Foreman	2005 – HMGP, Bridge and Culvert Program	Seek engineering solution and cost estimates.
2. GIS mapping of NFIP areas	Identify flood areas with vulnerable structures consistent with Vermont GIS mapping effort.	Northeastern Vermont Development Association	2006/7 – FEMA FMA funds, HMGP or EMPG funds	Coordinated statewide NFIP mapping effort for all towns.

d. Progress since 2005:
While general, action 1 occurs as part of normal operating procedures for the town. No specific projects were listed in the 2005 plan and to list each project accomplished in this category since 2005 is out of the scope of this plan's intent. NVDA has mapped the river corridor for the town and is working with the planning commission closely to assess risk and develop policy to mitigate to the greatest degree possible.
e. Priorities:
The 2005 plan, as mentioned, lacked specificity in actions and was very broad in terms of what the town's priorities would be. Several of the 2005 "hazards" were, in fact, vulnerabilities (some of which not always connected to natural hazards). With this, the town priorities have shifted with this update to remain focused on mitigation of the profiled natural hazards shown to impact the town to the greatest degree. The flooding events of 2011 resulted in the majority of Vermont communities understanding the risk, vulnerability and importance of mitigation related to infrastructure. While infrastructure focus and work remains a large part of the town's operations, there has been more emphasis on identification, rating and repair of vulnerable infrastructure since 2011. And this effort has been accomplished and will continue to be through a coordinated effort between local and state partners and in some cases, FEMA as well.

5.1.1. Community Goals

a. Continue supporting state standards with local, POS water/sewer sources.

b. Take advantage of the UVM/ACCD mobile home park preparedness programs to support resiliency of this disproportionally impacted population during disasters if applicable.

c. Consider implementation of special population tracking within the community where-by residents unable to drive or that have no one to depend on can self-identify for inclusion in a maintained data-base so that rescue personal and emergency managers can account for this demographic.

d. Work with residents, NVDA, rescue services, Vermont EMS and the LEPC to accomplish community outreach to develop understanding of the scope of practice of EMS in rural Vermont.

e. The Selectboard and Planning Commission shall pursue grant funding for shelter emergency generators.

f. Selectboard and Planning Commission shall continue to study the availability of firefighting water supplies, recommend locations and install dry hydrants where needed.

h. The Selectboard and Planning Commission shall pursue grants and program participation for the provision of wireless and broadband communications.

5.1.2. Capital Improvement Goals

a. Provide services and facilities deemed necessary for the orderly and rational development of the Town.

b. Selectboard shall investigate options for the construction of public building or buildings to house Road Department equipment and operations and possibly an animal holding facility for dogs impounded by the Town and propose such facility to the voters.

5.1.3. Public Participation Goals

a. Continue to solicit input regarding planning issues from town residents and from other entities which can help to offer solutions and insight into the problems the Town faces both now and in the future via formal meetings and advertised opportunities for input.

b. Utilize the LEPC and NVDA to increase awareness, enhance planning and engage in exercises that address needs in the community.

5.1.4. Regulatory Devices Goals

a. Continue to use the Zoning Bylaws. The bylaws have been established to conform to, and be in harmony with, the Vermont Municipal and Regional Planning and Development Act. Any conflicts that are identified between the two documents will defer to Title 24 VSA, Chapter 117 as the prevailing authority.

b. Maintain and continue a Capital Expense Budget and Program for the purpose of ensuring that the rate of growth does not outstrip the town's ability to pay for the associated necessary services such as roads, schools, police and fire protection, solid waste, etc.

c. Develop and maintain a "No Adverse Impact" (NAI) approach to flood hazard management by institutionalizing the best practices set forth by the ASFPM.

d. Utilize best practices in flood-plain management for farm-related development in town.

5.1.5. Land Use

a. Work to develop a Flood Hazard Area Overlay District to include all designated flood hazard areas. The purpose of the Flood Hazard Area Overlay District is to (1) protect public health, safety, and welfare by preventing or minimizing hazards to life and property due to flooding, and (2) to ensure that private property owners within

designated flood hazard areas are eligible for flood insurance under the National Flood Insurance Program (NFIP).

5.1.6 Natural Resources

a. Ensure that the existing health ordinance is enforced to maintain protection of both surface and groundwater supplies.

b. Ensure that permits issued for development near sensitive areas, such as steep slopes, high elevations, wetlands, scenic vistas and wildlife habitats, contain conditions assuring conformance to the goals set forth by the state of Vermont and when applicable and feasible, those defined as best practices by floodplain management organizations such as the ASFPM as well as those set forth in this plan and the most recent town plan.

c. The town should work with the NVDA and ACCD to continue the process of identifying the Town's land conservation priorities, and to the degree possible, link them to broader regional conservation work.

d. In line with the VTrans mission statement regarding climate change, the town remains committed to:

- Ensure that there are viable alternative routes around vulnerable infrastructure such as bridges and roadways
- Make safety a critical component in the development, implementation, operation and maintenance of the transportation system
- Develop contingency plans for a wide-variety of climate impacts to be implemented as data/information becomes available
- Utilize information technology to inform stakeholders during times of emergency
- Educate of the public and other stakeholders on the threats posed by climate change and fluvial erosion hazards
- Increase inspection of infrastructure if warranted by climate change indicators
- Apply a decision-making framework to incorporate cost-benefit analyses into adaptive plans and policy
- Work to protect essential ecosystem functions that mitigate the risks associated with climate change
- Educate individuals within the agency to use best-practices during recovery periods to avoid ecological damage that may further exacerbate risk
- Recognize the interconnected nature of our built environment with ecological processes
- Protect the state's investment in its transportation system and adapting transportation infrastructure to the future impacts of climate change

e. In line with DEC's best practices regarding fluvial erosion, the town will work to:

- Slowing, Spreading, and Infiltrating Runoff (The State Surface Water Management Strategy is found at http://www.watershedmanagement.vt.gov/swms.html and http://www.watershedmanagement.vt.gov/stormwater.htm)

- Avoiding and Removing Encroachments.
  http://www.watershedmanagement.vt.gov/rivers/htm/rv_floodhazard.htm
  http://www.watershedmanagement.vt.gov/rivers/docs/rv_RiverCorridorEasementGuide.pdf
- River and Riparian Management: DEC has prepared a compendium of *Standard River Management Principles and Practices* to support more effective flood recovery implementation; improve the practice of river management; and codify best river management practices in Vermont. The document compiles the most current river management practices based on the best available science and engineering methods to create consistent practice and language for risk reduction while maintaining river and floodplain function. Best practices are established to address common flood damages, including:
  - Erosion of banks adjacent to houses and infrastructure
  - Erosion of road embankments
  - Channel movement across the river corridor
  - River bed down-cutting that destabilizes banks, undermines structure foundations, exposes utility crossings, and vertically disconnects rivers from adjacent floodplains
  - Bridge and culvert failure

  Source: http://www.watershedmanagement.vt.gov/permits/htm/pm_streamcrossing.htm

5.1.7. Policies

a. Through both town and state-level management, the town will work to:

- Encourage and maintain naturally vegetated shorelines, buffers and setbacks for all rivers, ponds and streams
- Allow higher density or cluster development in existing and designated settlement areas and low-density development in the remaining areas
- Reduce flood hazard and repetitive road and driveway washout through continued updates and adherence to priorities in road, bridge and culvert improvement projects
- Identify and manage pollution, flooding and fluvial erosion hazards along rivers and streams as they arise

5.1.8. Transportation Plan

In adjunct to town-specific planning, the town is committed to continually subscribing to all current state standards related to:

a. Maintaining safe operating conditions on the present system of town roads through design and modification to keep traffic at appropriate speeds and to assure the safest possible driving conditions, including consideration of additional paving (though only on portions of roads prone to damage) should state funding become available.

b. Protection of existing town roads from flood damage and uncontrolled storm water runoff.

c. Preserving the capacity of town roads and maintain adequate traffic flows and safety.

d. Support the road maintenance crew through Town-provided training sessions. This includes ICS training along with the Road Commission (Selectboard).

e. Support policies and procedures that ensure longevity of essential town-equipment and develop and maintain MOU's with neighboring towns related to equipment use during emergencies.

f. Continue long term access opportunities to gravel and sand deposits for future road maintenance use.

g. Consider developing a standard operating procedure (SOP) based on ICS principles for highway department response events were coordination, communication and support are at a heightened level.

5.1.9. Utilities and Facilities Goals

a. Maintain current relationships with the Vermont State Police and Rescue for police and emergency medical services, respectively.

b. Develop policies and procedure that ensures equipment longevity to the greatest extent possible.

c. Ensure adequate provision of water sources for fire suppression by requiring dry hydrants, fire ponds, water storage, or other measures where appropriate.

5.1.9.1. Educational Goals

a. The School Board should work with the Selectboard, the American Red Cross and Fire Department to ensure that the necessary equipment exists at the school for its use as an emergency shelter.

b. Increase emergency planning cohesion between school and town EOPs through mutual participation and presentation at scheduled LEPC meetings and town and/or school meetings.

c. Continue collaboration with the Vermont Chapter of the American Red Cross on their sheltering initiative program to further readiness with training and supplies related to sheltering operations.

5.2 Existing Town of Concord Actions that Support Hazard Mitigation

The town has done an excellent job at monitoring and addressing transportation issues, engaging in a documented and systematic approach to mitigation actions. The Selectboard has successfully pursued funding to address needs. Exampled by a 2018 Pilot and Aid Grant from NVDA (15K) and an approved and adopted Financial Plan for the upcoming fiscal year specific to road improvement (equating to $300/mile from town taxes). Additional funding relationships are establish and ongoing with Better Back Roads, Structures Grants and FEMA. The town has been able to enhance its resilience and overall preparedness. The town has addressed its current and future needs and by and large, road improvement projects remain the primary focus for the town and the areas identified were selected based on the condition of culverts and ditches and

primarily focused on runoff issues particularly as the incidence of heavy storms has increased. In many cases, culverts properly sized for normal rain events are overwhelmed by the severe ones. The town will seek local, state and federal funds to address the sites identified as priorities. Concord will earmark the funds necessary to complete one major project each year for the next 5 years and will keep its culvert inventory current to improve its institutional memory. The town has also adopted municipal road and bridge standards that meet or exceed the 2013 standards and has an approved and annually adopted Local Emergency Operations Plan and Town Plan.

Table 5: Existing Town Actions that Support Hazard Mitigation:

Type of Existing Protection	**Description /Details/Comments**	**Issues or Concerns**
Emergency Response		
Police Services	Vermont State Police/Essex County Sheriff	None at this time
Fire Services	Concord	Continued training for fire and rescue personnel, along with maintaining and updating of equipment is essential.
Fire Department Mutual Aid Agreements	Northeast International Mutual Aid (19 participants)	None at this time
EMS Services	Concord	Continued training for fire and rescue personnel, along with maintaining and updating of equipment is essential.
Other Municipal Services		
Highway Services	Town Highway Department	Has completed 5-year scoping of priority mitigation projects and budgets work each fiscal year.
Highway personnel	3 FTE field personnel	MOU's completed with residents to avoid future conflict and liability over culvert and ditching work and other towns to assure equipment availability
Water / Sewer Department	None	None at this time
Planning and Zoning personnel	Town positions filled	None at this time
Residential Building Code / Inspection	Yes	None at this time
Emergency Plans		
Local Emergency Operations Plan (LEOP)	2018	Assure sheltering plans and contact information is up to date and vulnerable populations are addressed.

School Emergency/Evacuation Plan(s)	2017	Increased collaboration (with town staff, school, LEPC, NVDA), knowledge of roles and drills are next step.
Municipal HAZMAT Plan	None	None at this time
Shelter, Primary	Concord School	Working with ARC's Shelter Initiative and have obtained certification, training and supplies. Include volunteer staff in planning communication and schedule drills to test efficacy.
Replacement Power, backup generator	Acquired	Stay proactive with state and FEMA regarding town interests.
Municipal Plans		
Town / Municipal Comprehensive Plan	2015	Update in process
Town of Concord Road Erosion Site Inventory	2017	Created with assistance from ANR
Hazard Specific Zoning (slope, wetland, conservation, industrial, etc.)	Utilize most current state regulations. Latest bylaws updated: 2012	Consider using current best practices to guide actions for achieving a "No Adverse Impact" policy as well as assuring future farm development occurs with defined best practices
Participation in National Flood Insurance Program (NFIP) and Floodplain/Flood Hazard Area Ordinance	Active Participation and in good standing with NFIP.	Concord needs to re-evaluate the current zoning bylaws in light of future development and current land use trends
Culvert and bridge Inventory	2017	https://vtculverts.org/map https://vtculverts.org/bridges#list Strive to coordinate lists and keep up to date

5.2.1. Flood Resilience Goals:

- Mitigate flood hazards and maintain good water quality by undertaking restoration projects, reducing stormwater runoff from new development, and assuring long-term protection of the River Corridor from incompatible development and uses.
- Create a capital improvement plan to address the projects identified for Concord, beginning with the highest priority projects.
- Amend the Flood Hazard regulations to regulate development within the River Corridor areas mapped by DEC, in order to mitigate flood hazard risks and protect investments made in restoration projects.
- Consider establishing impervious coverage limitations as part of the town's zoning district standards to limit stormwater runoff that can contribute to flooding and degrade water quality.

- Include Planned Unit Development provisions in the Town's zoning bylaws to better enable developments that have reduced clearing and impervious coverage, and enable flexibility in siting developments outside of floodplains and river corridors.
- Hold a flood hazard area education event to inform local residents.

5.2.2. Flood Resilience Strategies:

- Identify and protect Concord's natural flood protection assets, including floodplains, river corridors, other lands adjacent to streams, wetlands, and upland forested cover
- Adopt flood hazard regulations that at a minimum, protect property from known risks
- Review and evaluate statewide river corridor information, when it becomes available
- Consider adopting regulations that will protect erosion prone areas for additional Development and encroachment
- Maintain and regularly update the Local Emergency Operations Plan.
- Continue to meet the VTrans Road and Bridge standards. Participate in regional Road Foreman trainings and Transportation Advisory Committee meetings to stay abreast of flood resilience measures for the Town's roads and bridges
- Continue to update the Town's transportation infrastructure information in the Vermont Online Bridge and Culvert Inventory Tool
- Upgrade undersized and failing culverts
- Develop and maintain a Local All-Hazard Mitigation Plan
- Equip the town's emergency shelter (the school) with a generator and/or solar panel

5.3 Town of Concord All-Hazards Mitigation Goals

The following goals were developed by the planning team, vetted during a warned community meeting and approved by the Town of Concord during the development of this plan:

1. Reduce at a minimum, and prevent to the maximum extent possible, the loss of life and injury resulting from all hazards.
2. Mitigate financial losses and environmental degradation incurred by municipal, educational, residential, commercial, industrial and agricultural establishments due to various hazards.
3. Maintain and increase awareness amongst the town's residents and businesses of the damages caused by previous and potential future hazard events as identified specifically in this Local All-Hazards Mitigation Plan.
4. Recognize the linkages between the relative frequency and severity of disaster events and the design, development, use and maintenance of infrastructure such as roads, utilities and storm water management and the planning and development of various land uses.
5. Maintain existing municipal plans, programs and ordinances that directly or indirectly support hazard mitigation.
6. Develop a mechanism for formal incorporation of this Local All-Hazards Mitigation Plan into the municipal comprehensive plan as described in 24 VSA, Section 4403(5). This mechanism will be developed by the Planning Commission, Selectboard and NVDA and integrate the strategies into the existing town plan as annexes until the next formal update occurs, where a section devoted to mitigation planning will be integrated into the plan.

7. Develop a mechanism for formal incorporation of this Local All-Hazards Mitigation Plan particularly the recommended mitigation actions, into the municipal/town operating and capital plans & programs as they relate to public facilities and infrastructure. With the development of the road erosion site inventory, the town will begin a process that incorporates the budgetary requirements of the defined mitigation strategies into its formal budgeting paradigm. The Planning Commission will review the LHMP and use language/actions from it to inform the integration and update process. Town Meeting Day will serve as the formal time that mitigation strategy budgetary considerations will be approved and incorporated into the town budget.

5.4 Mitigation Actions

In following FEMA guidance, the following mitigation action categories form the basis of the town's future mitigation actions. The planning team decided to adopt this approach for all future mitigation work. For each mitigation action to follow, an indication of group will be given with the abbreviations below:

Mitigation Action Groups:

(P) Prevention: Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.

(PP) Property Protection: Actions that involve the modification of existing buildings or infrastructure to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, flood proofing, storm shutters, and shatter-resistant glass.

(PEA) Public Education & Awareness: Actions to inform and educate citizens, elected officials, and property owners about potential risks from hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

(NRP) Natural Resource Protection: Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

(SP) Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include storm water controls (e.g., culverts), floodwalls, seawalls, retaining walls, and safe rooms

5.4.1. Current Capabilities and Need for Mitigation Actions
The Town Plan's goals and policies that support hazard mitigation and the existing mitigation actions demonstrate the variety of policies and actions forming the foundation of this All Hazards Mitigation Plan. Within the boundaries of both financial and political capabilities, the town will work on the following actions in the next five-year planning cycle

5.4.2. Specific Mitigation Actions

The following seven actions define the mitigation measures to be taken by the town in the next five years:

Action #1: Reduce flood-related impacts through infrastructure upgrades, improvement projects and floodplain management activities.
Action #2: Improve resilience to severe winter storms
Action #3: Reduce impact of extreme cold durations
Action #4: Raise public awareness of hazards and hazard mitigation actions
Action #5: Reduce impact of high wind events
Action #6: Continue fluvial geomorphology assessments in collaboration with DEC and develop strategies and regulatory actions in response to identified risk

Each of the seven actions listed above are explained below in regard to progress, project leads and partner agencies and specific action steps:

Action #1: Reduce flood-related impacts through infrastructure upgrades, improvement projects and floodplain management activities.

Group: SP, NRP, PP

Risk or Hazard Addressed: Risk to property, residents
Lead Responsible Entity: Town of Concord Road Foreman and Selectboard
Potential Partner Entities: Vermont Agency of Natural Resources; Vermont Agency of Transportation; NVDA, DEMHS, FEMA and the Agency of Commerce and Community Development
Timeframe: 2018 – 2023
Funding Requirements and Sources: FEMA or other hazard mitigation grants; FHWA grants; VAOT grants; Municipal Operating and Capital budgets.
Progress: The Road Foreman continually monitors road and storm water management capabilities. All bridges and culverts have been electronically accounted for and the town is diligent in maintaining a comprehensive and newly-formed, Road Erosion Site Inventory Plan that serves to guide action by identifying areas of road erosion, estimated costs of repair and future needs. In 2015, the University of Vermont released Scour research and opportunities for scour sensors.

Specific Identified Tasks:
1) Infrastructure Assessment for Storm Water Vulnerability – Funding and staff resources permitting, assess the vulnerability and operational capability of municipal-owned roads,

culverts and other storm water management infrastructure to predicted storm water and snowmelt in areas with a documented history of recurring problems. The infrastructure will be evaluated regularly prior to replacement or upsizing of the existing infrastructure.

2) Continued Monitoring of Vulnerable Infrastructure - Monitor bridges and culvert locations that have erosion and scouring concerns and track via the Road Erosion Site Inventory.
3) Road Improvements - Within political and financial restraints, re-engineer certain sections of roads to lower overall maintenance costs, improving snow plowing speeds and improve overall capability of roads to handle current and projected traffic volumes. Specific projects, numbered by priority include:
    1. Ranney Road Culvert (off Victory Rd.): 300' from Moose River
       Problem: Culvert too small. Spring melt will washout road and leave one resident isolated.
       Solution: Upgrade to 6X6 concrete culvert
    2. Fornier Road: Bridge crosses Moose River
       Problem: Ice jam can block road and bridge can be cut off for a week during spring melt
       Solution: Bridge elevation study and/or increase flow capacity (needs hydraulics study)
    3. Wilson Road Culvert at Cherry Tree Road Intersection: Drains directly into Moose River
       Problem: Culvert too small: 2'' rain event can cut off 10-bed Nursing Home. May, 2011 floods cut off for 3 days.
       Solution: Upgrade to 6X6 Box Culvert
    4. Victory Road Culvert (North of Wilson Rd. intersection): 100' from Moose River
       Problem: Culvert too small
       Solution: Waiting on hydraulics study, likely needs 8X12 Box Culvert
    5. Cross Road at Shadow Lake Intersection
       Problem: Drains directly into River and can block access to 20 resident apartment building.
       Solution: Upgrade to 6x6 Box Culvert
    6. George St. Culvert (off Shadow Lake Rd: 1000' from Moose River
       Problem: Has washed out twice since May 2011, isolates apartment building on dead end street.
       Solution: 6X6 Box Culvert needed. Plan to apply for structures grant
    7. Woodard Rd. (.25 mile from Route 2): 500' from Moose River
       Problem: Lacks adequate ditching and requires new culverts
       Solution: Better Back Roads Grant obtained for lower section. Pursue funding for upper section concurrently after hydraulics study
    8. South St. Culvert (between Eastern Ave. and Long Hill): 50' from Moose River
       Problem: High Priority project. Culvert is rotted through and neighboring home's basement flooding as result.
       Solution: Applying for structures grant through VTrans
    9. Folsum Ave and High Street: 500' from Moose River
       Problem: High Priority project. There is no drainage and road washes out with 1'' of rain.
       Solution: Currently in Engineering phase

Additional areas requiring investigation during planning cycle:

1. Railroad-area culverts are aging. There are 9 culverts that cross through town. With only a 25'' right-of-way, the town is unable to mitigate without some agreement with rail lines.
2. Bridge 32 (Shadow Lake Rd) and 38 (Rawlston Corner Rd): Key bridges link main artery from Waterford and Littleton (route 2). While no history of highway incidents, with the school being on the route, there is concern for bridges being compromised by accident or flooding.

4) Documenting – Develop a methodology that serves to efficiently capture work and expenditures on sites and keep this information at the town office
5) Increase Awareness of Funding Opportunities - Increase understanding of FEMA's HMGP program so that this potential funding source can be utilized through trainings and communication with the State Mitigation Office.
6) ICS Training and Emergency Operations (SOP) Plan Development – Enhance knowledge of the principles of ICS and develop a Standard Operating Procedures that details the relationship, roles and responsibilities of the Highway Department and Road Commission during major events.

Rationale / Cost-Benefit Review: Conducting vulnerability assessments facilitates a targeted and effective approach to road and storm water management infrastructure. This will prove useful in the development and implementation of municipal capital and operating plans as well as the development and implementation of grant-funded mitigation projects. Some areas suffer low-level but consistent damage during heavy rains and snowmelt. Mitigating against these problems would reduce short and long-term maintenance costs and improve the flow of traffic for personal and commercial purposes during flooding events. Tracking road work and understanding the HMGP program can open funding streams into the town and can make the application process much easier when required information is already available. A basis understanding of ICS will serve the town and at little or no cost. As a requirement for an approved LEOP, municipal ICS-awareness is seen as necessary state-wide. During an emergency event when the Highway Department personnel are required to work beyond normal capacity, increased communication and collaboration between the Highway Department and local entities can be enhanced with a basic SOP. An SOP can also serve to increase institutional memory when there are staff changes at every level as well as provide a template from which tabletops and drills can be based off of.

Action #2: Maintain and improve resilience to severe winter storms

Group: SP, PP, PEA

Risk or Hazard Addressed: Risk to property, infrastructure and residents
Primary Responsible Entities: Town of Concord Selectboard, Planning Commission and Emergency Management director;
Potential Partner Entities: LEPC, Concord Fire Chief, ARC's Sheltering Initiative Program
Timeframe: 2018 – 2023
Funding Requirements and Sources: DEMHS or FEMA hazard mitigation funding; existing programs, contingent on available resources and funding.
Progress: Roads are monitored and altered, when necessary so that plowing can occur without damage to trucks and/or road. The Concord School has been identified as the primary emergency

shelter. The school does not have an emergency generator. The fire department building is the secondary shelter and it does have a generator in place. Snow clearing equipment is regularly serviced, and the town maintains an adequate supply of salt.

Specific Identified Tasks:

1) Maintain Existing Shelter Capability: Maintain and improve capabilities of existing shelters. Notification procedures and shelter staffing is a priority for the town and intends to move forward on planning and public involvement. More formalized training is required and the ARC's "Shelter Initiative Program" can be used at no cost to the town to enhance both shelter management knowledge and sheltering supply cache.
2) Reduce risk of power failure due to ice storms: Enhance collaboration between town road foreman and electric company related to down-limbed induced power failure. Maintain function of generators.
3) Notification: Develop a notification/communication plan that conveys essential sheltering information using school phone system and back-up methodology (email, text, etc.)
4) Residential Programs: Provide guidance and communication to residents on the structural and mechanical actions that can occur to reduce risk to severe winter storms (e.g. weather-proofing, anchoring, alternative heating sources, tree trimming, financial programs, etc.)
5) Continue to monitor roads for safe and effective plowing: Efficient snow removal is the foundation to winter storm (snow) events, assuring roads are plowable before winter remains an important facet of highway department functions
6) Increase awareness of ICS structure and recommended practices: The town can mitigate the effects of a severe winter by understanding how a large-scale storm is managed when the State EOC is operational. Additional awareness of local-level roles and responsibilities during statewide event is a mitigation action.

Rationale / Cost-Benefit Review:

This mitigation action serves to reduce the economic impact and risk to both human and animal (livestock and pet) health and safety during severe winter storm events by reducing risk and enhancing the mechanisms of winter storm mitigation in the long term. More formalized policy formation in both staffing and notification procedures, especially pertaining to vulnerable populations where transportation and special needs are a concern could potentially significantly reduce the physical, psychological and social impacts of a disaster.

Action #3: Reduce impact of extreme cold durations

Group: PEA, PP, SP

Risk or Hazard Addressed: Risk to infrastructure, livestock and residents

Primary Responsible Entities: Town of Concord Selectboard and planning commission, NVDA, Concord School, local/regional assistance organizations.

Potential Partner Entities: Vermont DMEHS, LEPC

Timeframe: 2018-2023

Funding Requirements and Sources: Financial factors may produce barriers to change. Strategic planning and understanding of the total scope of needs and potential for change is logical first-step.

Specific Identified Tasks:

1) Economic Resilience: Establish program for assistance in paying heating bills during crisis situations, if not already required by state law. Develop and sustain a program that serves to connect resource organizations with residents in need of support services.
2) Maintain Existing Shelter Capability: Maintain and improve capabilities of existing shelters. Notification procedures and shelter staffing is a priority for the city and intends to move forward on planning and public involvement. More formalized training is required and the ARC's "Shelter Initiative Program" can be used at no cost to the town to enhance both shelter management knowledge and sheltering supply cache.
3) Assess Vulnerable Population— Develop an awareness of the most at-risk community members during an evacuation and/or sheltering event. Focusing on those that lack resources or capability to reach facilities when in need and create plans, including outreach protocol on how to address this potential hurdle.
4) Notification and Education – Investigate and develop a notification/communication plan that conveys essential sheltering information. Educating citizens regarding the dangers of extreme cold and the steps they can take to protect themselves when extreme temperatures occur by sustaining a process that serves to disseminate educational resources for homeowners and builders on how to protect pipes, including locating water pipes on the inside of building insulation or keeping them out of attics, crawl spaces, and vulnerable outside walls. Inform homeowners that letting a faucet drip during extreme cold weather can prevent the buildup of excessive pressure in the pipeline and avoid bursting through a yearly public service campaign.

Rationale / Cost-Benefit Review:
With an increase in extreme weather, including cold, there is a need to protect property and the population. Given the magnitude of population dependence on social services, indicating economic and other social vulnerabilities, effective outreach, education and collaboration with resources supports this mitigation action category.

Action #4: Raise public awareness of hazards and hazard mitigation actions

Group: PEA

Risk or Hazard Addressed: Risk to property, residents
Lead Responsible Entities: Town of Concord, Fire Chief, LEPC, NVDA
Potential Partner Entities: Vermont state agencies and regional organizations
Timeframe: 2018-2023
Funding Requirements and Sources: Majority of information is available and both state agencies and organizations can provide materials for outreach
Progress: As mitigation planning continues to integrate into normal, day-to-day operations, the town has an opportunity to engage its residents with information that will serve to mitigate several risks. The LEPC meets regularly and covers a host of topics related to emergency preparedness and raises awareness in the community about what organizations are doing around emergency response planning and chemical safety. Town meeting day can serve as an annual update and outreach opportunity as well.
Specific Identified Tasks:

1) Hazard Resilience for Property Owners- Develop and maintain education materials to inform property owners on how to protect their homes and businesses through accepted

hazard resilience actions (e.g. securing their structures from high winds, elevating their electrical equipment/furnaces in basements, protecting from lightning strikes by grounding electrical outlets, etc.).

2) HMGP Awareness: Attend informational sessions on the HMGP funding opportunities for acquisition, elevation and flood-proofing projects. Work with NVDA to develop an information brochure for residents.
3) School Programs – Assure the school is structurally ready to handle natural hazard risks to the greatest extent possible. Continue school programs to raise student awareness of hazards, safety, preparedness and prevention. Explore establishing the school emergency notification system as the primary methodology for all emergency notification procedures and build in the contact information accordingly.
4) Family Programs – Continue family programs, such as car safety seat and bike safety programs, to raise family awareness of hazards, safety, preparedness and prevention.
5) Fire Prevention Programs – Continue National Fire Prevention Week and other programs to raise public awareness of fire hazards, safety, preparedness and prevention.
6) Other hazard awareness programs – Develop public awareness programs, based on all-hazards needs. Programs to address pandemic hazards, preparedness and mitigation may be appropriate as directed by the state department of health and its jurisdictional offices of local health

Rationale / Cost-Benefit Review: Improved public awareness could potentially significantly reduce the loss of life and property damage through ongoing, formal, ongoing, public information campaigns that address property protection actions (flood proofing, elevation, anchoring mobile homes/propane tanks, electric and water system elevation, electric grounding, etc.) Improved awareness would also build understanding and public support for municipal mitigation actions to reduce potential infrastructure and liability costs.

Action #5: Continue fluvial geomorphology assessments in collaboration with DEC and develop strategies and regulatory actions in response to identified risks

Group: P, NRP, PEA, PP

Risk or Hazard Addressed: Risk to property, residents
Status: Ongoing
Primary Responsible Entities: Department of Environmental Conservation District Representative, NVDA Planners, Agency of Natural Resources (VT ANR) District Representative, Town of Concord Planning Commission.
Potential Partner Entities: Nonprofits, other Town of Concord officials, and other appropriate entities.
Timeframe: 2018–2023

Progress: DEC has completed assessments for Basin ID 15 (Passumpsic). NVDA can assist in enhanced mapping of the floodplain within the town and has provided the town with updated River Corridor Maps. The town has adopted flood hazard area zoning regulations and is considering a "no development" policy in the SFHA for the future.

Specific Identified Tasks

1) Fluvial Geomorphic Assessments – The town will work with DEC through coordinated meetings, workshops and communication to increase understanding of current findings and develop an applicable framework to help guide decisions related to priority infrastructure work and vulnerability.
2) Fluvial Erosion Hazard Mapping – Develop a fluvial erosion hazard map for the waterways, using the GIS extension known as SGAT (or Stream Geomorphic Assessment Tool) for assessed stream reaches. As assessments are completed, a map of all assessed waterways in the town will be created.
3) River Corridor Management Plans – Using the River Corridor Maps, the town will develop an outreach strategy to residents/structures in or near the defined corridor. This communication should focus on flood resilience measures and opportunities. With the lack of repetitive loss properties in the town, the likelihood of viable HMGP acquisition projects is low but increasing awareness of this program can serve the town well.
4) Fluvial Erosion Hazard Mitigation Implementation - The town will draft strategies to avoid or mitigate losses from the identified fluvial erosion hazards. These strategies may include the adoption and implementation of programs, mechanisms or regulations to prevent endangerment of persons and property in riparian corridor areas from fluvial adjustment processes. Efforts could range from a relatively simple, public information campaign about the map to the adoption of a municipal ordinance or by-law that restricts development in such hazard areas.
5) Administrative and Zoning Regulations: Zoning administrator will work with town officials and residents to determine if a "Zero Development" policy in high flood/erosion risk areas is required in the town and progress accordingly.

Rationale / Cost-Benefit Review:
Continuing this project will require a sustained succession of grants, state appropriations and other funding to complete assessments in Concord. Successful completion will provide municipal and regional benefits. The municipality's fluvial erosion areas would be adequately and electronically mapped. This will enable the municipality to make residents and businesses aware of fluvial erosion hazards and potentially lead to municipally-directed programs, mechanisms and regulations that further mitigate against this hazard, protecting existing structures and infrastructure. Identifying fluvial erosion hazard areas could also help the municipality restrict future development in hazardous areas, if that should be an advantage to the town in the future. More accurate knowledge of fluvial geomorphology will enable the community to have a better understanding of hazard areas and what mitigation measures might most effectively address those concerns. Flooding is the most common and most significant hazard that can trigger a Federal disaster declaration in Concord. Along with an update to the flood hazard area maps, identifying the fluvial erosion hazard areas provides improved opportunities for the community to mitigate potential losses and gauge future development initiatives. With the upcoming advent of an advanced software system (CAI), the town can begin to develop enhanced mapping in-house using currently available data and use this resource as a guide for communication, planning and policy formation.

5.4.3. Prioritization of Mitigation Strategies

Because of the difficulties in quantifying benefits and costs, it was necessary to utilize a simple "*Action Evaluation and Prioritization Matrix*" in order to affect a simple prioritization of the mitigation actions identified by the town. This method is in line with FEMA's STAPLEE method. The following list identifies the questions (criteria) considered in the matrix so as to establish an order of priority. Each of the following criteria was rated according to a numeric score of "1" (indicating poor), "2" (indicating below average or unknown), "3" (indicating good), "4" (indicating above average), or "5" (excellent).

- Does the action respond to a significant (i.e. likely or high risk) hazard?
- What is the likelihood of securing funding for the action?
- Does the action protect threatened infrastructure?
- Can the action be implemented quickly?
- Is the action socially and politically acceptable?
- Is the action technically feasible?
- Is the action administratively realistic given capabilities of responsible parties?
- Does the action offer reasonable benefit compared to its cost of implementation?
- Is the action environmentally sound and/or improve ecological functions?

The ranking of these criteria is largely based on best available information and best judgment of project leads. For example, all road improvement projects were initially identified by Road Foreman and approved for inclusion in this plan by the road commission. It is anticipated that, as the town begins to implement the goals and actions of their Mitigation Strategies, they will undertake their own analysis in order to determine whether or not the benefits justify the cost of the project. Also, most proposed FEMA HMGP mitigation projects will undergo a benefit-cost analysis using a FEMA BCA template and approved methodology.

Table 5.1: *Concord Mitigation Action Prioritization Matrix*

Rank	Mitigation Action	Responds to high hazard	Funding potential	Protection value	Time to implement	Social and Political acceptance	Technical feasibility	Admin feasibility	Benefit to Cost	Environmental advantage	TOTAL
2	Reduce flood-related impacts through infrastructure upgrades, improvement projects and floodplain management activities	5	4	5	2	5	4	4	5	4	38
3	Improve resilience to severe winter storms	2	5	5	4	5	5	4	5	2	37
5	Reduce impact of extreme cold durations	3	2	4	2	3	2	2	3	3	24
4	Reduce impact of high wind events	3	4	5	2	5	3	3	5	1	27
1	Raise public awareness of hazards, hazard mitigation and disaster preparedness	4	5	5	5	5	5	5	5	3	43
6	Continue fluvial geomorphology (in coordination with state recommendations and protocol) assessments and develop strategies in response to any identified risk	3	2	4	2	2	2	2	3	3	23

5.5 Implementation and Monitoring of Mitigation Strategies

5.5.1. Public Involvement Following Plan Approval

After adoption, the town will continue to maintain web-presence of the mitigation plan with an opportunity for community input available on its website. Additionally, the town will hold an annual public meeting after performing the annual progress report for the mitigation plan to discuss achievements and the following year's implementation plan. At town meeting, the town will present mitigation information and provide the public an opportunity to increase understanding and involvement with planning efforts. The LEPC will also host an annual mitigation plan presentation where response/state agencies, neighboring communities and other stakeholders can provide input. The town will also notify its neighboring municipalities of the availability of information for review and any significant risks and/or mitigation actions that have an impact on surrounding towns.

5.5.2. Project Lead and Monitoring Process

The town's Selectboard chair is the project lead and will work in conjunction with the Selectboard, town clerk and NVDA to complete the yearly progress report included in the plan. The town will create a mitigation action collection system that will be used as the source of future updates following the annual evaluation that will occur in conjunction with the progress report using the Plan Implementation Matrix provided below. While mitigation actions are, by default, often addressed at monthly Selectboard meetings, the town will schedule one meeting annually to formally assess the plan and adopt updates following the annual progress report and community meeting regarding the LHMP. Once the plan is approved by FEMA, the calendar will begin for annual review. The town will take the following implementation matrix and add actions to it each year, modifying tasks and/or needs as required so that the next LHMP update will be populated with the specific actions related to each mitigation strategy by year.

5.5.3 Plan Evaluation and Update Process

The town's Selectboard chair will lead the plan evaluation process as part of the annual progress report. Prior to town meeting and in preparation for the annual town report, a mitigation section will be included that provides an executive summary for the public that addresses the following topics:

- Status of recommended mitigation actions for the five-year planning period
- Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk
- Identification of a lead person to take ownership of, and champion the Plan if different from Selectboard Chair
- An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.)
- Discussion of how changing conditions and opportunities could impact community resilience in the long term
- Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience

By engaging in the annual evaluation, the town will have a viable method for capturing the facets of efficacy and areas needing revision and improvement in its mitigation plan. The town is committed to "institutionalizing" mitigation into its normal operating procedures and with approval of this plan, embarks on the formal incorporation of mitigation actions and discussion, maintaining an awareness that involves not only the Selectboard, Town Clerk and Road Foreman but also the community at large, including the organizations represented by the current planning team. Along these lines, the town will maintain a contact list of the current planning team and make revisions as required, including the team on the evaluation process each year. Through this consistent attention resulting from the evaluation process, progress reports and communication in the annual town report, the town will achieve the consistency required to enhance resilience through planning, assessment and actions devoted to mitigation.

5.5.4. Plan Update Process

The Plan update will be led by the Selectboard Chair and Town Clerk. Depending on funding availability, the town may elect to acquire the assistance of NVDA and/or a consultant to update the plan following a declared disaster and/or the next five-year planning cycle. To assure that the Plan does not expire, the town will begin the update process within no less than six months of the current Plan's expiration date. Following a disaster and during the recovery phase, the town will use the experience to assess the current Plan's ability to address the impact of the most recent disaster and edit the plan accordingly. Using the annual progress reports and evaluation narratives as a guide, along with perceived changes in risk or vulnerabilities supported by data and/or observation, strategies will be captured in accordance with FEMA guidelines, which includes reconvening the planning team during the update process. The town will establish a "Mitigation File" that documents all evaluations and progress reports, along with actions, especially related to infrastructure improvement projects. While the progress reports are designed to capture the specific actions the town has accomplished related to implementation, keeping a narrative list with dates on all actions relatable to mitigation (e.g. school drills, LEOP updates, Fire Safety Awareness, meetings, etc.), will provide the town the bulk of information required in the update process.

5.5.5. Implementation Matrix for Annual Review of Progress

The following table is intended to aid municipal officials in implementing the mitigation actions for Concord and to facilitate the annual monitoring and progress reporting. Progress has been included as a guide to future updates. Each year, the town will reserve a Selectboard meeting to review and update the Implementation Matrix as means to establishing an accurate evaluation of the plan's efficacy and the information required for the succeeding update to the plan.

Table 5.2: Local All-Hazards Mitigation Plan Implementation Matrix (following pages)

Action	Primary Responsible Entity	Timeline	Task	Brief Description	Progress
Continue fluvial geomorphology assessments and develop strategies in response to identified risk.	VT DEC, NVDA, VT ANR	Spring 2019-Spring 2023	Fluvial Geomorphic Assessments and assessment-based mapping/action	Continue Phase I and Phase II fluvial geomorphic assessments on streams and waterways in Concord.	DEC has a comprehensive and interactive database for Basin 15 and hat the town can build from.
	NVDA, VT ANR	Fall 2018-Fall 2019	Fluvial Erosion Hazard Mapping	Rate the fluvial erosion hazard for each assessed reach and develop a fluvial erosion hazard map for the waterway using SGAT. Create map of all assessed reaches. Submit to VT ANR for QA/QC.	River Corridor maps have been completed by NVDA
	Planning Commission and Selectboard	Spring 2019-Spring 2021	River Corridor Management Plans	Where Phase I and II assessments are complete, develop a River Corridor Management Plan.	River Corridor maps are first step in planning process. Town reviews current zoning regulations for necessary changes annually
	Concord Planning Commission	Spring 2019-Spring 2021	Fluvial Erosion Hazard Mitigation Implementation	Develop strategies to mitigate losses from identified fluvial erosion hazards.	Problems areas have been identified
	Concord Planning Commission	Summer 2020	Flood Insurance Rating Map Updates	Review draft FIRM data. Update floodplain regulations/zoning.	See above
Action	**Primary Responsible Entity**	**Timeline**	**Task**	**Brief Description**	**Progress**
Reduce flood-related impacts through infrastructure upgrades, improvement projects and floodplain management activities.	Road Foreman, Commission	Spring 2018-Winter 2023	Infrastructure Assessment for Storm water Vulnerability	Funding and staff resources permitting, assess the vulnerability and operational capability of municipal-owned roads, culverts and other storm water management infrastructure to predicted storm water and snowmelt in areas with a documented history of recurring problems. The infrastructure will be evaluated regularly prior to replacement or upsizing of the existing infrastructure.	Town has developed a Road Erosion Site Inventory with problem, priority and estimated budget. With great institutional memory of town infrastructure, the highway department is well-equipped to assess, monitor and prioritize needs.

	Road Foreman, Commission	Spring 2018-Winter 2023	Continued Monitoring of Vulnerable Infrastructure	Monitor bridges and culvert locations that have erosion and scouring concerns and track via the Road Erosion Site Inventory.	Road and Bridge Standards adopted and meet or exceed 2013 standards.
	Road Foreman	Spring 2018-Winter 2023	Road Improvements	Within political and financial restraints, re-engineer certain sections of roads to lower overall maintenance costs, improving snow plowing speeds and improve overall capability of roads to handle current and projected traffic volumes. Specific projects, numbered by priority include Projects: 1. Ranney Road Culvert (off Victory Rd.): 300' from Moose River Problem: Culvert too small. Spring melt will washout road and leave one resident isolated. Solution: Upgrade to 6X6 concrete culvert 2. Fornier Road: Bridge crosses Moose River Problem: Ice jam can block road and bridge can be cut off for a week during spring melt Solution: Bridge elevation study and/or increase flow capacity (needs hydraulics study) 3. Wilson Road Culvert at Cherry Tree Road Intersection: Drains directly into Moose River Problem: Culvert too small: 2'' rain event can cut off 10-bed Nursing Home. May, 2011 floods cut off for 3 days. Solution: Upgrade to 6X6 Box Culvert 4. Victory Road	VTCULVERTS.ORG Culvert and Bridge Inventory has been populated. Town has developed a Road Erosion Site Inventory with problem, priority and estimated budget.

				Culvert (North of Wilson Rd. intersection): 100' from Moose River Problem: Culvert too small Solution: Waiting on hydraulics study, likely needs 8X12 Box Culvert 5. Cross Road at Shadow Lake Intersection Problem: Drains directly into River and can block access to 20 resident apartment building. Solution: Upgrade to 6x6 Box Culvert 6. George St. Culvert (off Shadow Lake Rd: 1000' from Moose River Problem: Has washed out twice since May 2011, isolates apartment building on dead end street. Solution: 6X6 Box Culvert needed. Plan to apply for structures grant 7. Woodard Rd. (.25 mile from Route 2): 500' from Moose River Problem: Lacks adequate ditching and requires new culverts Solution: Better Back Roads Grant obtained for lower section. Pursue funding for upper section concurrently after hydraulics study 8. South St. Culvert (between Eastern Ave. and Long Hill): 50' from Moose River Problem: High Priority project. Culvert is rotted through and neighboring home's basement flooding as result. Solution: Applying for structures grant through VTrans	

				9. Folsum Ave and High Street: 500’ from Moose River Problem: High Priority project. There is no drainage and road washes out with 1’’ of rain. Solution: Currently in Engineering phase Additional areas requiring investigation during planning cycle: 1. Railroad-area culverts are aging. There are 9 culverts that cross through town. With only a 25’’ right-of-way, the town is unable to mitigate without some agreement with rail lines. 2. Bridge 32 (Shadow Lake Rd) and 38 (Rawlston Corner Rd): Key bridges link main artery from Waterford and Littleton (route 2). While no history of highway incidents, with the school being on the route, there is concern for bridges being compromised by accident or flooding.	

Action	Primary Responsible Entity	Timeline	Task	Brief Description	Progress
continued	Selectboard, Road Foreman	Fall 2018-Winter 2019	Documenting	Develop a methodology that serves to efficiently capture work and expenditures on sites and keep this information at the town office and/or current "Grater Log" used by Road Foreman	Communication between Highway Department and Road Commission is ongoing.
	Road Foreman	Fall 2018-Winter 2023	Increase Awareness of Funding Opportunities	Increase understanding of FEMA's HMGP program so that this potential funding source can be utilized through trainings and communication with the State Mitigation Office.	ongoing
	Road Foreman	Spring 2018-Winter 2023	ICS Training and Emergency Operations (SOP) Plan Development	Enhance knowledge of the principles of ICS and develop a Standard Operating Procedures that details the relationship, roles and responsibilities of the Highway Department and Road Commission during major events.	ongoing
Action	**Primary Responsible Entity**	**Timeline**	**Task**	**Brief Description**	**Progress**
Maintain and improve resilience to severe winter storms	Emergency Management Director	Spring 2018-Winter 2023	Improve Existing Shelter Capability	Maintain and improve on capabilities of existing emergency shelter capability, including emergency generator functionality	The School has a generator. Explore other sheltering options and secure funding for emergency power/solar panels as required
	Emergency Management Director	Winter 2018-Winter 2023	Reduce risk of power failure due to ice storms	Enhance collaboration between town road foreman and electric company related to down-limbed induced power failure. Maintain function of generators	new
	Emergency Management	Fall 2018	Notification	Develop a notification/communication plan	new

	Director			that conveys essential sheltering information using school phone system and back-up methodology (email, text, etc.)	
	Emergency Management Director	Fall 2018	Residential Programs:	Provide guidance and communication to residents on the structural and mechanical actions that can occur to reduce risk to severe winter storms (e.g. weather-proofing, anchoring, alternative heating sources, tree trimming, financial programs, etc.)	new
	Road Commission	Fall 2018, 2019, 2020, 2021, 2022, 2023	Continue to monitor roads for safe and effective plowing	Efficient snow removal is the foundation to winter storm (snow) events, assuring roads are plowable before winter remains an important facet of highway department functions	Needs assessment required
	Road Commission, Selectboard, EMD	State training calendar dependent	increase awareness of ICS structure and recommended practices:	The town can mitigate the effects of a severe winter by understanding how a large-scale storm is managed when the State EOC is operational. Additional awareness of local-level roles and responsibilities during statewide event is a mitigation action.	new
Action	**Primary Responsible Entity**	**Timeline**	**Task**	**Brief Description**	**Progress**
Reduce impact of extreme cold durations	Selectboard, EMD	Fall of each planning cycle year	Economic Resilience	Establish program for assistance in paying heating bills during crisis situations, if not already required by state law. Develop and sustain a program that serves to connect resource organizations with residents in need of support services.	**new**
	Selectboard, EMD	Fall of each planning cycle year	Maintain Existing Shelter Capability	Maintain and improve capabilities of existing shelters. Notification procedures and shelter staffing is a priority for	**new**

				the city and intends to move forward on planning and public involvement. More formalized training is required and the ARC's "Shelter Initiative Program" can be used at no cost to the town to enhance both shelter management knowledge and sheltering supply cache.	
	EMD	**Fall 2019-Fall 2020**	Assess Vulnerable Population	Develop an awareness of the most at-risk community members during an evacuation and/or sheltering event. Focusing on those that lack resources or capability to reach facilities when in need and create plans, including outreach protocol on how to address this potential hurdle.	**new**
	Fire Chief, Selectboard, EMD	**Fall 2019-Fall 2020**	Notification and Education	Investigate and develop a notification/communication plan that conveys essential sheltering information. Educating citizens regarding the dangers of extreme cold and the steps they can take to protect themselves when extreme temperatures occur by sustaining a process that serves to disseminate educational resources for homeowners and builders on how to protect pipes, including locating water pipes on the inside of building insulation or keeping them out of attics, crawl spaces, and vulnerable outside walls. Inform homeowners that letting a faucet drip during extreme cold weather can prevent the buildup of excessive pressure in the pipeline and avoid bursting through a yearly public service campaign.	**new**
Action	**Primary Responsible Entity**	**Timeline**	**Task**	**Brief Description**	**Progress**

Action	Primary Responsible Entity	Timeline	Task	Brief Description	Progress
Raise public awareness of hazards, hazard mitigation and disaster preparedness.	Emergency Management Director; Concord Fire Chief	2017-2022	Residential Programs	Develop and maintain education materials to inform property owners on how to protect their homes and businesses through accepted hazard resilience actions (e.g. securing their structures from high winds, elevating their electrical equipment/furnaces in basements, protecting from lightning strikes by grounding electrical outlets, etc.).	New
	Emergency Management Director; Concord Fire Chief	2017-2022	Family Programs	Continue family programs, such as car safety seat and bike safety programs, to raise family awareness of hazards, safety, preparedness and prevention.	Ongoing
	Emergency Management Director; Concord Fire Chief	2017-2022	Fire Prevention Programs	Continue National Fire Prevention Week and other programs to raise public awareness of fire hazards, safety, preparedness and prevention.	Ongoing
	Emergency Management Director; Concord Fire Chief	2017-2022	Other hazard awareness programs	Develop public awareness programs, based on all-hazards needs.	Ongoing
	Emergency Management Director; Concord Fire Chief, School, Selectboard	2017-2018	Moore Dam Preparedness	Use inundation maps to develop emergency notification procedures in line with those of TransCanada based on likely breach scenarios by using the school system.	In progress

APPENDICES

NOTE: Appendices A-D not included with State submission or for FEMA review)

Appendix A: Community Reports: Town of Concord(Flood Ready Vermont)
Appendix B: Culvert Locator: Town of Concord(VTrans)
Appendix C: No Adverse Impact Floodplain Management Fact Sheet (ASFPM)
Appendix D: Farm Structures in Designated Flood Hazard Area Planning Checklist (VAAFM

APPENDIX F: Community Outreach Survey Results:

Q1 Have you ever been impacted, physically or financially, by a natural disaster in Concord?

Answered: 18 Skipped: 2

ANSWER CHOICES	RESPONSES	
Yes	22.22%	4
No	77.78%	14
TOTAL		18

Q2 Which hazard was the cause of the disaster you experienced in Concord? (check all that apply)

Answered: 5 Skipped: 15

ANSWER CHOICES	RESPONSES	
Flooding or Stream Bank Erosion	80.00%	4
Earthquake	0.00%	0
Hurricane/Tropical Storm	0.00%	0
High winds	20.00%	1
Landslide/Rockslide	0.00%	0
Severe Thunderstorm	20.00%	1
Severe Winter Storm (ice storms/snowstorms)	20.00%	1
Extreme Cold	0.00%	0
Hail	0.00%	0
Drought	0.00%	0
Wildfire	20.00%	1
Other (please specify)	20.00%	1
Total Respondents: 5		

#	OTHER (PLEASE SPECIFY)	DATE
1	BEEDE SUB DIVISION FLOODING WITH HIGHLY CONTAMINATED WATER	3/6/2016 11:49 AM

Q3 How concerned are you about the following hazards?

Answered: 11 Skipped: 9

	VERY CONCERNED	MODERATELY CONCERNED	NOT CONCERNED	TOTAL
Flooding or Stream Bank Erosion	36.36% 4	27.27% 3	36.36% 4	11
Earthquake	0.00% 0	0.00% 0	100.00% 10	10
Hurricane/Tropical Storm	9.09% 1	27.27% 3	63.64% 7	11
High Winds	20.00% 2	70.00% 7	10.00% 1	10
Landslide/Rockslide	0.00% 0	0.00% 0	100.00% 10	10
Severe Thunderstorm	45.45% 5	45.45% 5	9.09% 1	11
Severe Winter Storm (ice storms, snowstorms)	11.11% 1	77.78% 7	11.11% 1	9
Extreme Cold	0.00% 0	66.67% 6	33.33% 3	9
Hail	0.00% 0	77.78% 7	22.22% 2	9
Drought	11.11% 1	44.44% 4	44.44% 4	9
Wildfire	22.22% 2	55.56% 5	22.22% 2	9

Q4 In terms of vulnerability to hazards, how concerned are you about the following categories?

Answered: 10 Skipped: 10

	VERY CONCERNED	MODERATELY CONCERNED	NOT CONCERNED	TOTAL
People (Loss of life or injury)	30.00% 3	40.00% 4	30.00% 3	10
Economic (Business interruptions, crop damage, equipment damage)	0.00% 0	55.56% 5	44.44% 4	9
Infrastructure (damage/loss of roads, bridges, utilities, schools)	40.00% 4	60.00% 6	0.00% 0	10
Cultural/Historic Resources	11.11% 1	44.44% 4	44.44% 4	9
Environmental (damage to trees, contamination of surface waters)	20.00% 2	70.00% 7	10.00% 1	10
Governance (ability to provide municipal services)	11.11% 1	33.33% 3	55.56% 5	9

Q5 What community assets are important to you? (for example, school, church, historic buildings, recreational resources)

Answered: 7 Skipped: 13

#	RESPONSES	DATE
1	Historic buildings	4/27/2016 9:41 AM
2	Condition of roads; maintenance of beaver dam on Shadow Lake	3/18/2016 8:21 PM
3	None at this time.	3/16/2016 10:06 AM
4	PRIVATE PROPERTY FLOODING WITH CONTAMINATED WATER THAT END UP IN SHADOW LAKE	3/6/2016 11:54 AM
5	Fire Dept.	3/6/2016 11:14 AM
6	Bridges, Town Hall, Shadow Lake, Miles Pond	3/6/2016 11:14 AM
7	school, church, town hall, lakes,	2/10/2016 11:30 AM

Q6 In your opinion, how effective would the following actions be to reduce or eliminate the risk of future damage from natural hazards?

	VERY IMPORTANT	MODERATELY IMPORTANT	NOT IMPORTANT	TOTAL	WEIGHTED AVERAGE
Improve Infrastructure (e.g., upgrades to roads and bridges)	60.00% 6	30.00% 3	10.00% 1	10	1.50
Avoid new construction in areas subject to flooding and erosion	80.00% 8	20.00% 2	0.00% 0	10	1.20
Manage stormwater runoff from new development	70.00% 7	10.00% 1	20.00% 2	10	1.50
Plant windbreaks to protect structures from wind damage	11.11% 1	55.56% 5	33.33% 3	9	2.22
Conduct Education and Awareness Programs	30.00% 3	60.00% 6	10.00% 1	10	1.80

#	OTHER (PLEASE SPECIFY)	DATE
1	INFORM STATE OF VT HEALTH DEPT & EPA	3/6/2016 11:54 AM

Q7 What have you done to prepare for a disaster?

	HAVE DONE	PLAN TO DO	NOT DONE	UNABLE TO DO	TOTAL
Developed a "Family Emergency Plan" (where to go, what to do in the event of emergency)	40.00% 4	20.00% 2	40.00% 4	0.00% 0	10
Prepared a disaster supply kit	55.56% 5	0.00% 0	44.44% 4	0.00% 0	9
Been trained in first aid or CPR	60.00% 6	10.00% 1	30.00% 3	0.00% 0	10
Installed smoke detectors and carbon monoxide detectors on each level of home	81.82% 9	9.09% 1	9.09% 1	0.00% 0	11
Develop a utility shutoff procedure in the event of a disaster	60.00% 6	10.00% 1	30.00% 3	0.00% 0	10
Have access to a backup generator for temporary power	80.00% 8	10.00% 1	0.00% 0	10.00% 1	10

Q8 What is the most effective way for you to receive information about how to make your home and town more resistant to natural hazards?

ANSWER CHOICES	RESPONSES	
Phone call	20.00%	2
Newspaper	10.00%	1
Television	30.00%	3
Radio	30.00%	3
Mail	40.00%	4
Email	60.00%	6
Text message	40.00%	4
Public workshop	20.00%	
Total Respondents: 10		

Q9 The planning and Zoning Board is looking for alternative members and volunteers, please list your name and best contact if you are interested in assisting the PZB.

Answered: 1 Skipped: 19

#	RESPONSES	DATE
1	ROBERT PAQUETTE- 802-695-8148- robertepaquette@yahoo.com	3/6/2016 11:56 AM