

**TOWN OF MILTON, Vermont
All-Hazards Mitigation Plan**

**Annex 10
to the
2017 Chittenden County Multi-Jurisdictional
All-Hazards Mitigation Plan**

Yellow text is for additions of dates, etc. after final FEMA approval

**Prepared by:
The Chittenden County Regional Planning Commission
and the
Town of Milton, Vermont**

*Adopted by the Town of Milton Selectboard
on April 3, 2017*

Approved by FEMA effective _____

Executive Summary

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 purposes of this updated Local All-Hazards Mitigation Plan are to:

- Identify specific natural, technological and societal hazards that impact the Town of Milton;
- Prioritize hazards for mitigation planning;
- Recommend town-level goals and strategies to reduce losses from those hazards; and
- Establish a coordinated process to implement the plan, taking advantage of a wide range of resources.

This plan is a local annex to the *Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan*. **In order to become eligible to receive various forms of Federal hazard mitigation grants, a Chittenden County municipality must formally adopt its Local All-Hazards Mitigation Plan along with the *Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan*, or develop and adopt an independent, stand-alone Local All-Hazards Mitigation Plan.**

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

Section 2: Hazard Identification expands on the hazard identification in the *Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan* with specific municipal-level details on selected hazards.

Section 3: Risk Assessment discusses identified hazard areas in the municipality and reviews previous federally-declared disasters as a means 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 three top Hazards by type with the most risk in Milton are:

Natural Hazards

- Severe Winter Storm Flooding Fluvial Erosion

Technological Hazards

- Water Pollution Hazardous Materials Incident Power Loss

Societal Hazards

- Economic Recession Terrorism Epidemic

Section 4: Vulnerability Assessment discusses buildings, critical facilities and infrastructure in designated hazard areas, vulnerable populations and the issue of estimating potential losses.

Section 5: Mitigation Strategies is the heart of this All Hazards Mitigation Plan. This section begins with an overview of goals and policies in the *2013 Milton Comprehensive Town Plan* that support hazard mitigation. This is followed by an analysis of existing municipal actions that support hazard mitigation, such as planning and zoning and public works.

This section presents the following all-hazards mitigation goals:

- 1) Reduce at a minimum, and prevent to the maximum extent possible, the loss of life and injury resulting from all hazards.
- 2) Mitigation 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 and as identified generally in the Chittenden County Multi-Jurisdictional 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 stormwater management and the planning and development of various land uses.
- 5) Maintain existing municipal plans, programs, regulations, bylaws and ordinances that directly or indirectly support hazard mitigation.
- 6) Consider formal incorporation of this Local All-Hazards Mitigation Plan into the municipal comprehensive plan as described in 24 VSA, Section 4403(5), as well as incorporation of proposed new mitigation actions into the municipality's/town's bylaws, regulations and ordinances, including, but not limited to, zoning bylaws and subdivision regulations and building codes.
- 7) Consider formal incorporation of this Local All-Hazards Mitigation Plan, particularly the recommended mitigation actions, into the municipal/town operating and capital plans and infrastructure, utilities, highways and emergency services.

This section concludes with following Mitigation Actions planned by the municipality

Category A: Upgrade Stormwater Systems to mitigate against Severe Rainstorms and Water Pollution

- Action A-1: Catch Basin cleaning & Street Sweeping
- Action A-2: Land development proposal review & regulation
- Action A-3: Develop Phosphorus Control Plan

Category B: Upgrade Transportation Infrastructure to mitigate against Severe Rainstorms, Fluvial Erosion and Water Pollution

- Action B-1: Complete 5 to 15 culvert upgrade projects each year from 2017-2021.
- Action B-2: Complete drainage improvement projects
- Action B-3: Seek funding to upgrade Town Bridge #6, Mallets Creek

Finally, this section includes an Implementation Matrix to aid the municipality in implementing the Mitigation Actions and annual monitoring & evaluation of this Plan.

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[Note: See appendices of Chittenden County Multi-Jurisdictional AHMP for weblinks to the various data sources used to generate many of the tables noted above.]

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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 reduce the impacts of those hazards. The plan also seeks to coordinate the mitigation efforts of this municipality with those outlined in the *Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan* as well as efforts of quasi-governmental organizations such as Local Emergency Planning Committee, District #1 and the Chittenden County Regional Planning Commission.

This annex, when used with the appropriate sections of the Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan, constitutes an All-Hazards Mitigation Plan for the Town of Milton. Community planning can aid significantly reducing the impact of expected, but unpredictable natural and human-caused events. The goal of this plan is provide hazard mitigation strategies to aid in creating disaster resistant communities throughout Chittenden County.

1.2 Hazard Mitigation

The *2013 Vermont State All-Hazards Mitigation Plan* 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, Mitigation Response, and Recovery. Hazards cannot be eliminated, but it is possible to determine what the hazards are, where they are most severe and to identify actions that can be taken to 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.

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. According to 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 have to 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 in order 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.

- Flood Mitigation Assistance Grant Program (FMAGP) funds will be available only to communities that have adopted a local Plan
- 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 in order to receive a PDM project grant.
- Under Vermont's Emergency Relief Assistance Fund rules, contributions from the State to cover the non-Federal share of a municipality's FEMA Public Assistance project costs varies depending on whether a community has a plan. A community without a plan would have to cover 17.5% of the overall project cost compared to only 7.5% to 12.5% of the cost if it had a plan in place.

1.4 Benefits

Adoption and maintenance of this 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.
- Ease 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 has been ranked.
- Connect hazard mitigation planning to municipal planning where possible such as emergency operations plans, comprehensive plans (aka "town plans:), capital plans and budgeting, open space plans and stormwater master plans.

1.5 All-Hazards Mitigation Plan Goals

The Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan establishes the following general goals for the county as a whole and its municipalities:

- 1) Hazard mitigation planning should take into account the multiple risks and vulnerabilities of the significant hazards in the County due to its mixed urban-suburban-rural nature, its

economic importance to the State and its significant presence of public and private infrastructure.

- 2) Promote awareness amongst municipalities, residents and business in the county of 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 stormwater management and the planning and development of various land uses.
- 3) Ensure that regionally-initiated mitigation measures are consistent with municipal plans and the capacity of municipalities to implement them.
- 4) Encourage municipalities to formally incorporate their individual Local All-Hazards Mitigation Plan into their municipal plan as described in 24 VSA, Section 4403(5), as well as incorporate their proposed mitigation actions into their various bylaws, regulations and ordinances, including, but not limited to, zoning bylaws and subdivision regulations and building codes.
- 5) Encourage municipalities to formally incorporate elements of their Local All-Hazards Mitigation Plan, particularly their recommended mitigation strategies, into their municipal operating and capital plans and programs, especially, but not limited to, as they relate to public facilities and infrastructure, utilities, highways and emergency services.
- 6) Educate regional entities on the damage to public infrastructure resulting from all hazards and work to further incorporate hazard mitigation planning into the regional land use and transportation planning program conducted by the Chittenden County Regional Planning Commission.
- 7) Maintain existing mechanisms, develop additional processes, or explore funding mechanisms and sources to foster regional cooperation in hazard mitigation, specifically and emergency management planning, generally.

1.6 Town of Milton: Demographics and Development Characteristics

The Town of Milton is located in the northwestern corner of Chittenden County (*cf. Figure 1.1.*). The town is bounded on the south by Colchester and Essex, on the east by Westford, on the north by Georgia and Fairfax (in Franklin County), and on the west by Lake Champlain and South Hero (in Grand Isle County). Milton encompasses 53.23 square miles.

Based on U.S. Census data, the University of Vermont’s Center for Rural Studies reports a population of 10,352 people in 2010. Selected population characteristics are as follows:

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

Category	Number	%
Total Population	10,352	--
Median Age	38.9 years	--
Population age 65 years and over	907	8.8
Population (and %) under 10 years old	1,262	13.2
Population (and %) in group quarters	0	0.0

U.S. Census Bureau, 2010 Census of Population and Housing, Population and Housing Unit Counts

The following shows the types of housing within Milton, also based on the 2010 U.S. Census data:

Table 1- 2 Town of Milton, selected housing unit data, 2010 Census

Category	Number	%
Total Housing Units	4,147	--
Occupied housing units	3,889	93.8
Vacant housing units	258	6.2
Vacant housing units used for seasonal, recreational or occasional use	145	3.5
Detached 1-unit housing units	2,624	74.7
Housing units with 5 or more units in structure	43	1.3
Mobile homes	529	15.1
Housing structures built in 1939 or earlier	404	11.5

U.S. Census Bureau, 2010 Census of Population and Housing, Population and Housing Unit Counts

Housing is concentrated in the north-south running corridor east of Interstate 89, along the US Route 7 corridor, and west of East Rd./North Rd. (cf. *Figure 1.2*). Smaller population concentrations are located west of the highway along West Milton Rd., Lake Rd. and Murray Av. Small clusters of homes and seasonal camps can also be found on the lake shore.

Population trends for the Town are as follows:

Table 1- 3 Town of Milton, Historic Population Trends

Year	Population
1960	2,022
1970	4,495
1980	6,829
1990	8,404
2000	9,479
2010	10,352
2014	10,667

April 1 census counts for 1960, 1970, 1980, 1990, 2000 and 2010; July 1 estimates for 2014

1.7 Summary of Planning Process

As noted above the update of this municipal All Hazard Mitigation Plan (AHMP) was part of the planned update of the Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan and the municipal AHMPs that are annexes to the Multi-Jurisdictional Plan. The CCRPC, with funding provided by the State of Vermont via a FEMA Hazard Mitigation Grant, began this update process in the spring of 2015.

1.7.1 Planning and Development of the 2017 All-Hazards Mitigation Plan Milton Annex

CCRPC staff met several times with various Town staff and officials during the course of the development of this plan. Initial Meetings focused on the following issues:

1. Reviewing the matrix used in 2011 to identify and prioritize hazards facing the Town, and determining whether the overall scoring still makes sense
2. Discussing any newly significant hazards in the Town and identifying any new actions that could be taken to address them.
3. Discussing any progress that has been made on the strategies and tasks from the 2011 plan.

These first set of meetings were held on:

- October 30, 2015 with Brett Van Noordt (Police Chief), Don Turner (Fire Chief), Roger Hunt (Public Works Director) and Jacob Hemmerick (Director of Planning & Zoning)
- March 23, 2016 with Dustin Keelty (acting Public Works Supervisor)

Additionally, an early version of this Plan was presented by CCRPC staff and discussed at a meeting of the Town of Milton Planning Commission on August 16, 2016.

In addition, the following materials were reviewed:

1. Town of Milton Land Development Regulations
2. Town of Milton Comprehensive Plan
3. FEMA information on prior disasters
4. Information from Vermont Agency of Natural Resources on fluvial erosion hazards and flood hazards
5. Information from the Vermont Agency of Transportation on town roads, bridges, culverts and high crash locations.
6. Information from the Vermont Department of Emergency Management and Homeland Security on prior disaster and hazardous materials reporting.

Demographic information for this Plan was updated by a CCRPC intern in 2015. New information, relative to the 2011 AHMP, from review of the Land Development regulations and the Comprehensive Plan was incorporated into Section 5. Information on prior disasters, fluvial erosion hazards and flood hazards and various transportation data was incorporated into Sections 2, 3 and 4. Throughout the plan development process CCRPC staff sent rough drafts of the plan to numerous town staff to review for accuracy and conferred with these same staff regularly via phone and email. CCRPC staff produced new versions of the 2011 maps and also produced new maps desired in this 2017 update.

1.7.2 Opportunities for involvement in the planning process and formal public review and governing body approval

Emergency management planners are obligated to provide opportunities for the general public, neighboring communities, local, regional and state agencies, development regulation agencies and other interests to be involved in the review and development of Hazard Mitigation Plans. Additionally, the CCRPC, as a public agency is obligated to provide public notice and opportunities for input into its programming and processes. With regards for public involvement in the develop of the first drafts of this Municipal AHMP *prior to release of public drafts*, there was no formal solicitation process to recruit or invite the public to come to staff level meetings wherein the first process of updating data in the old 2011 Plan. That being said, however, the public has been free to review the 2011 Plans on the CCRPC website since they were first posted in 2011. Additionally as noted in Section 1.10.2.4 of the Multi-Jurisdictional AHMP, in the period before the first municipal draft AHMPs were publicly released in August 2016 (see below) there were twelve public meetings held by the CCRPC Board and the Plan Update Committee wherein the overall Hazard Mitigation planning process was discussed including the content and purpose of the local, Municipal AHMPs as well as the planned timeline for their development starting in 2015 and extending well into 2016. [Note that opportunities for public review and development of the Multi-Jurisdictional AHMP are described in Section 1.10.2 of the that document.]

Commencing with an August 5, 2016 press release and with a comment deadline of August 19, 2016, the CCRPC issued a press release and also posted to all of the electronic bulletin boards of Front Porch Forum in every municipality in the County to solicit and receive comments on the first drafts of this Town of Milton All-Hazards Mitigation Plan as well as the AHMPs of the other 18 municipalities in the County. On August 5, 2016, emails to the same state agency staff and executive directors of neighboring Regional Planning Commissions as noted above, were also sent to encourage their review and comment. The public, agency staff and RPC staff were directed to provide comments to Dan Albrecht, Senior Planner at the CCRPC.

With regards to opportunities for public involvement and input from neighboring communities in development of individual Local All-Hazards Mitigation Plans including this Plan for the **Town of Milton**, opportunities were as follows:

- a) On August 5, 2016, the CCRPC posted all the first drafts of the 18 local AHMPs on the CCRPC website and via various means (press release, electronic newsletter, etc) made the public aware of the opportunity to comment. The public was advised to send comments directly to Dan Albrecht, CCRPC Senior Planner by August 19, 2016.
- b) On August 5, 2016 the CCRPC staff sent direct emails to the Agency staff noted above notifying them as well of the opportunity to review the 18 local AHMPs posted on the CCRPC website and encouraging them to send any comments directly to Dan Albrecht, CCRPC Senior Planner by August 19, 2016.
- c) On August 5, 2016 direct emails were also sent to the municipal Mayors/ Managers/ Administrators and/or Clerks of the abutting 12 communities outside of Chittenden County (South Hero, Georgia, Fairfax, Cambridge, Stowe, Waterbury, Duxbury, Fayston, Lincoln, Starksboro, Monkton and Ferrisburgh) that about the County notifying them of the opportunity to review the 18 local AHMPs posted on the CCRPC website and encouraging them to send any comments directly to Dan Albrecht, CCRPC Senior Planner by August 19, 2016.

No comments were received on the draft Town of Milton AHMP prior to the August 19th deadline. Additionally, no inquiries were received concerning this AHMP after August 19th through December 31, 2016 while the Plan was posted on the CCRPC website.

1.7.3 Review and adoption process

On July 1, 2016 the first draft of this local Town of Milton AHMP was sent to the Vermont Department of Emergency Management and Homeland Security (VDEMHS) for review.

Comment and required revisions were received from VDEMHS on August 4, 2016.

CCRPC staff, working in concert with municipal staff, then made revisions to the Plan to address the required revisions.

On February 28, 2017, the revised final draft annex was submitted to VDEMHS for review and forwarding to FEMA for formal review and approval pending municipal adoption

On March 24, 2017 FEMA Region One issued a notice that the Town of Milton AHMP was approved pending adoption by the relevant municipal governing body.

On March 27, 2017, CCRPC staff provided the final versions of the Multi-Jurisdictional Plan and this Municipal Annex to the Town manager for distribution to the Town of Milton Selectboard members and also provided draft language for a resolution of adoption to be discussed at a regularly scheduled and properly warned Town of Milton Selectboard meeting on April 3, 2017.

On April 3, 2017 the revised annex was adopted by the Selectboard and a copy of the resolution sent to VDEMHS and FEMA Region One on April 13, 2017.

On **Month Day, 2017** issued a letter that the Town of Milton's Plan was approved effective **Month Day, 2017**.

1.7.4. Monitoring, Evaluation and Updating of the Plan

Section 6 of the Multi-Jurisdictional AHMP document provides extensive details on the role each municipality and the Chittenden County RPC will play to be certain that progress on the implementation of this local AHMP is monitored and evaluated and that the AHMP is updated as needed and no later than its anticipated expiration in early 2022. In short, the Town of Milton will:

- in the fall of 2017 and each fall thereafter, the municipal departments as noted in Section 5.5 as the conclusion of this document shall respond to CCRPC's questionnaire seeking information on the status (progress, problems if any, etc.) of each identified mitigation strategy detailed in Section 5;
- in the fall of 2018 and the fall of 2020, provide information to aid CCRPC in its more comprehensive review of the Multi-Jurisdictional AHMP and this local AHMP which will address issues such as goals, risks, resources, implementation problems, and partners; in partnership with the municipalities, the CCRPC will make the public aware of the availability of these review documents (via press releases, posting on the CCRPC

website, electronic newsletters, one formal announcement in a paper of general circulation in the County, and other mechanisms) and provide detailed instructions on how to provide comment on these reviews;

- provide at least one representative of the municipality to participate as a member of the Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan Update and Review Committee which, after the current Plan update process is completed, will resume meeting in 2018; and
- participate in the Plan update process (assumed to commence in 2020 and conclude by early 2022).

Finally, it should be reemphasized that the Town of Milton may review and update their own programs, initiatives and projects more often by working directly with the State Hazard Mitigation Officer (SHMO) based on changing local needs and priorities. Formal changes to individual municipal annexes may be made at any time by each municipality's governing body in order to reflect changing conditions, priorities, and opportunities during the 5-year life cycle of their single jurisdiction plan.

SECTION 2: HAZARD IDENTIFICATION

Detailed descriptions of the natural, technological, and societal hazards affecting the municipalities of Chittenden County are contained in Section 2 of the *Multi-Jurisdictional All-Hazards Mitigation Plan (MJAHP)*. Designated and non-designated hazard areas are described in Section 3 of this annex. Vulnerability of structures and infrastructure to hazards is also described in Section 4 and depicted in *Figure 4.1*.

2.1.1 Profiled Hazards

This Plan profiles six (6) Natural Hazards: Severe Winter Storm, Flooding, Fluvial Erosion, Severe Rainstorm, Extreme Temperatures and Wildfire. Prior to this discussion of Hazards and the subsequent analysis of Risk and Vulnerability, it will be first helpful to summarize the general state of knowledge regarding Location, Extent and Impact in the Town for these hazards:

Hazard (section of MJAHP where discussed)	Is Location data available?	Are Extent data available?	Is Impact data available?
Severe Winter Storm (2.1.1.1)	No, occurs across the municipality and not mapped	No, only long-term data is at single point of National Weather Service station in South Burlington. Data may or not be applicable to the Town of Milton	Yes, if FEMA declares disaster. See 3.3 below.
Flooding (2.1.1.3)	Yes, 100 & 500 year flood areas delineated in the municipality. See <i>Figure 2.1</i> .	*Yes but only at a few discrete locations with gauge data. With regards to applicability to Milton, consistent and long-term data on Lake Champlain water levels is maintained at Burlington (See <i>Figure 2.2</i> below).	Yes, if FEMA declares disaster but co-mingled with fluvial erosion and severe rainstorm hazards events. See 3.3 below.
Fluvial Erosion (2.1.1.4)	Yes, fluvial erosion hazards areas (now termed river corridor protection areas) are mapped in the municipality. See <i>Figure 2.1</i> .	Though fluvial erosion is considered a significant hazard in the municipality, the number of feet-acres of soil lost in any one event has not been recorded nor is there a record with	Yes, if FEMA declares disaster but data co-mingled with flood and severe rainstorm events. See 3.3 below.

		such data.	
Severe Rainstorm (2.1.1.2)	No, occurs across the municipality and not mapped. Damage locations are mapped but damages can just as easily be a function of poorly designed road and/or driveway drainage as it is a function of heavy rain.	*Yes but only long-term data is at single point of National Weather Service station in South Burlington.	Yes, if FEMA declares disaster but data co-mingled with flood and fluvial erosion events. See 3.3 below.
Extreme Temperatures (2.1.1.5)	No, occurs across the municipality and not mapped.	*Yes but only at single point of National Weather Service station in South Burlington.	‡Data not systematically collected on impacts.
Wildfire (2.1.1.6)	No, can occur across the municipality and not mapped.	Some compiled data on a countywide basis as shown in the Multi-Jurisdictional Plan but no systematic data collected after 2010.	‡Data not systematically collected on impacts.

** It is useful to note that while this NWS data is reliable it represents one discrete location in a county that has an area of 620 square miles in area. Likewise, while there are likely other systematic point-specific records being collected by individuals, business or organizations these data do not appear to be easily accessible. Finally, even if such data were accessible, only if the data was collected by mutually compatible means would it be useful.*

‡An intensive search of municipal public works records may reveal documentation of some prior repair or labor costs associated with frozen or burst sewer and/or water pipes caused by Extreme Cold. However, such analysis would show where past events happened not the location of inadequately buried pipes which might be vulnerable to future events.

‡ An intensive search of fire department records may reveal documentation of locations and acres burned caused by Wildfire. However, such analysis would show where past events happened but would not show the location of areas susceptible to future events (warnings by the US Forest Service and local fire departments are not location-specific) nor the location of individuals who are likely to unwisely burn trash or leaves or fail to extinguish a campfire during dry conditions.

This Plan profiles several Technological Hazards. Prior to this discussion of Hazards and the subsequent analysis of Risk and Vulnerability, it will be first helpful to summarize the general state of knowledge regarding Location, Extent and Impact in the Town for these hazards:

Hazard (section of MJAHMP where discussed)	Is Location data available?	Are Extent data available?	Is Impact data available?
Water Pollution (2.2.1)	The Town is subject to the requirements of a Municipal Separate	Phosphorus-loading for general locations is known but non-point sources are	Annual budgetary impacts to individual municipalities are significant but vary

	Storm Sewer System (MS4) Permit as well as the Vermont Clean Water Act.	varied and dispersed. Road segments that could discharge runoff into local streams have been identified but not field-verified. A road erosion inventory is planned during 2017-2019.	depending upon location and whether or not they are an MS4 permitted community. Milton is an MS4 permittee.
Hazardous Materials Incident (2.2.2)	Storage locations are known. (see listing below of addresses) Incidents occurring during transportation could occur anywhere.	Rough estimates of spill amounts are recorded.	No formal data readily available on cleanup costs.
Power Loss (2.2.3)	Outage locations are not mapped.	During an actual outage some data is recorded on duration although typically this is stated as “x,000 customers within the power company’s service area”.	Outage data is broad and refers to total customers within a county.
Invasive Species (2.2.4)	Several species of fish, mollusks, crustaceans and plants known to occur in Lake Champlain. No systematic mapping of occurrences appears to be in place. Water milfoils is present in Arrowhead Mountain Lake.	No formal damage has been documented to date	No formal damage has been documented to date
Multi-Structure Fire (2.2.5)	Could happen anywhere within the more developed portions of the municipality.	Data not formally collated across agencies	Data not formally collated across agencies

Major Transportation Incident (2.2.6)	Depending upon type of incident, could happen anywhere.	No formal database of damages.	Varies depending upon type of incident.
Water Supply Loss (2.2.7)	Water distribution systems are mapped (See <i>Figure 1.4</i>). Specific locations of temporary service outages are not known to be mapped.	Data not formally collated across agencies	Data not formally collated across agencies
Sewer Service Loss (2.2.8)	Sewer lines are mapped (See <i>Figure 1.4</i>). Specific locations of temporary service outages are not known to be mapped.	Data not formally collated across agencies	Data not formally collated across agencies
Natural Gas Service Loss (2.2.9)	General areas of services are known (See <i>Figure 1.4</i>) but specific locations of service outages are not recorded.	Information for this rare occurrence not publicly available.	No formal damage has been documented to date.
Telecommunications Failure (2.2.10)	Depending upon type of incident, could happen anywhere	Information for this rare occurrence not publicly available.	No formal damage has been documented to date
Other Fuel Service Loss (2.2.11)	Distribution points of fuels such as firewood, fuel oil and propane are individual addresses and not mapped nor publicly available.	No formal loss of service has been documented.	No formal damage has been documented to date

The following discussion of societal hazards is based upon qualitative information from discussions with Chittenden County law enforcement professionals as well as quantitative data from the State of Vermont.

Hazard (section of MJAHP where discussed)	Are Location data available?	Are Extent data available?	Are Impact data available?
Crime (2.4.1.1)	Significant incidents could happen anywhere in the municipality. Most municipalities maintain a database but	Data collection is not standardized across municipalities.	Significant socio-economic impacts
Economic Recession (2.4.1.2)	Would occur across the community.	Historic data on unemployment levels & poverty rates	Longer lasting impacts hard to measure below county level
Terrorism (2.4.1.3)	The FBI does not share a list of potential targets.	Unknown but assumed to be significant if incident occurs	Unknown but assumed to be significant if incident occurs
Civil Disturbance (2.4.1.4)	County-wide. Significant incidents can happen anywhere. The likelihood of an event may not be geographically likely but rather related to the type of event (political event, sporting event, protest, etc.)	No formal damage has been documented to date	No formal damage has been documented to date
Epidemic (2.4.1.5)	Could happen anywhere	Data not formally collated across agencies	Other than 1917 Influenza epidemic no formal damage has been documented to date
Key Employer Loss (2.4.1.6)	Depending upon type of employer	No formal database of damages.	No formal database of key employer loss is maintained

SECTION 3: RISK ASSESSMENT

3.1 Mapped Hazard Areas

3.1.1 Flood Hazard Areas

According to the Milton Town Plan, certain areas have been designated flood hazard areas, based upon 100-year floodplain data. Primary areas within the floodplain include land along the banks of Lake Champlain, the Lamoille River, the Lamoille delta, Mallets Creek, other small creeks, and wetlands along Murray Avenue and Duffy Road.

A simple GIS intersection analysis reveals that portions of town roads are located within the 100-year floodplain, as are culverts, bridges, and utility poles. Unfortunately, this level of analysis does not take into account the fluvial geomorphology (volume, velocity, direction, etc.) nor, more importantly, does it factor in the elevation of the road relative to flood elevation. Analysis also reveals farmland located within the floodplain. However, without an accurate fluvial geomorphology assessment at each location it is not currently possible to predict how many cubic yards of productive soils would be a net loss during a flood event.

Lakeshore erosion due to wave action and land development is creating cliffs along several areas on Lake Champlain, particularly on Eagle Mountain Harbor Road. Property owners have responded by installing retaining walls, which tends to shift erosion to adjacent shoreline areas. Town officials are also concerned about damage to town roads along the shoreline, particularly Eagle Mountain Harbor Road.

Figure 2.1 shows the current extent of the FEMA-FIRM flood hazard area in Milton, as well as structures, infrastructure, and critical facilities located in the flood hazard area.

Note that a good portion of this area consists of the shoreland of Lake Champlain. The Base Flood Elevation of Lake Champlain established by FEMA is 102.0 feet while flood stage established by the National Weather Service is 100 ft. These stages are defined as follows:

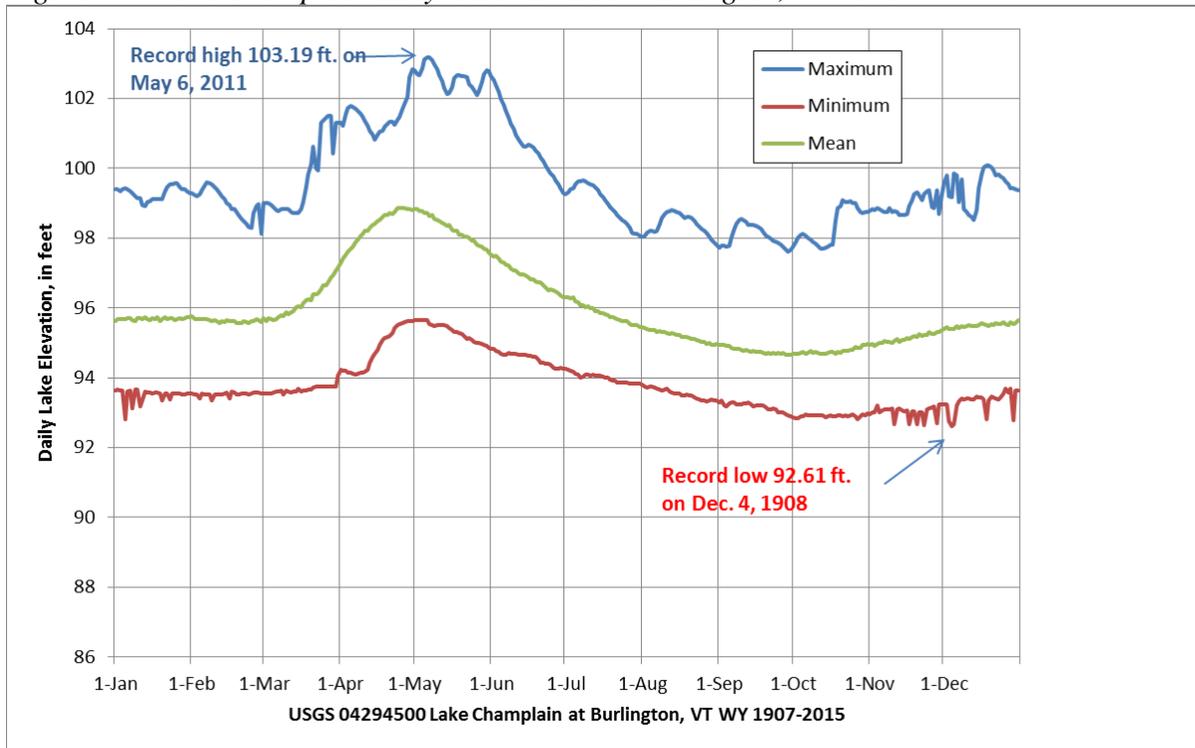
100 ft. Water begins to enter some lake front properties. Water also begins to threaten low lying roads, piers, and docks. Wave action can compound flooding on windward facing shorelines.

101. Flooding becomes serious, and wave erosion on windward shores becomes a problem. If lake ice is present, structural damage can occur.

102 ft. Severe flooding occurs, with widespread inundation of lake side properties, and closure of low lying roads.

The following graph shows the water levels measured along the Burlington waterfront over the last 100+ years.

Figure 3.2. Lake Champlain daily water levels at Burlington, VT 1907-2015



The winter of 2015-2016 experienced relatively little snowfall and the summer of 2016 (as of July 31, 2016) has been relatively dry in terms of rainfall. Water levels in Lake Champlain dropped quite low in the fall of 2016 almost matching the record low of 1908 with a peak trough of 93.26 ft. on both October 16th and October 17th before climbing back to 94 ft. on October 31st.

3.1.2 Fluvial Erosion Hazard and River Corridor Areas

Some level of geomorphic assessment has been completed for some of the streams that run through Milton and Fluvial Erosion Hazard areas have been identified notably Allen (Petty) Brook and Mallett's Creek and the Lamoille River. *Figure 2.1* shows identified Fluvial Erosion Hazard and River Corridor areas in Milton.

During development and adoption of both the 2005 and 2011 Multi-Jurisdictional Plan and the municipal AHMPs, threats from stream erosion were identified as Fluvial Erosion Hazard (FEH) Areas through the analytical lens of Stream Geomorphic Assessment (SGA). The SGA approach is still used by the Vermont Agency of Natural Resources but the Vermont General Assembly adopted two related terms that are now used in managing fluvial erosion hazards. ANR now identifies and maps

- *River Corridor* which is the land 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, as that term is defined in 10 V.S.A. §1422, and for minimization of fluvial erosion hazards, as delineated by the Agency in accordance with the ANR Flood Hazard Area and River Corridor Protection Procedures.

- *River Corridor Protection Area* means the area within a delineated river corridor subject to fluvial erosion that may occur as a river establishes and maintains the dimensions, pattern, and profile associated with its dynamic equilibrium condition and that would represent a hazard to life, property, and infrastructure placed within the area. The river corridor protection area is the meander belt portion of the river corridor without an additional allowance for a riparian buffer to serve the functions of bank stability and slowing flood water velocities in the near-bank region .

3.1.3 Repetitive Loss Properties and National Flood Insurance Program

Repetitive loss properties are public or private buildings insured under the National Flood Insurance Program that have made at least two insurance claims of more than \$1,000 each during a ten year period.

There are two such properties in the Town of Milton:

one on Rainbow Place which last suffered a loss on April 28, 2011 and another at an undisclosed location which last suffered a loss on April 27, 2011. Both are residential properties.

The status of the town participation’s in the National Flood Insurance Program is as follows:

Initial Flood Hazard Boundary Map	Initial Flood Insurance Rate Map	Current effective Map Date	Date of joining Regular NFIP	Date of most recent Community Assistance Visit
07/26/74	01/06/82	07/18/11	01/06/82	01/08/92

The Town Zoning Administrator and the Town’s Development Review Board (DRB) monitor compliance with the National Flood Insurance Program. The DRB reviews and adjudicates applications for development within the floodplain. The Town also works with DEC to respond to any local requests for Floodplain identification including questions about mapping.

3.2 Other Information

3.2.1 1998 Ice Storm Damage

Impacts of the January 1998 ice storm (#DR-1201) in Milton were significant. High damage to vegetation occurred in the lowlands adjacent to Lake Champlain – areas west of Beebe Hill Rd., Cadreact Rd. and Bear Trap Rd. Less severe damage to vegetation occurred in the Lamoille River valley, and in certain neighborhoods of Milton Centre, including south of US Route 7 between Bartlett Rd. and Bombardier Rd., the Haydenberry development, and the Wood Ridge Circle/Beaver Brook Dr. subdivision.

3.2.2 Severe rainstorms

In prior versions of this Annex and the County Plan, damage to roads, culverts and bridges from thunderstorm events was discussed as either the result of flooding or fluvial erosion. It was assumed that overflowing nearby streams, rivers or lakes were the cause of the damage. Analysis

has shown that this damage is caused by intense, localized thunderstorms which cause excessive and rapid water flows on and over paved and gravel roads, roadside ditches, driveway culverts, stormwater systems, etc. In many cases, damaged infrastructure is located nowhere near a formally mapped Floodplain or Fluvial Erosion Hazard Area or River Corridor. This was the case in more recent FEMA-declared disasters in the summer of 2013 and 2015. Because of this new information, CCRPC has decided to add “Severe rainstorm” to the 2016 Update to the County Plan and its annexed local AHMPs. While past damage locations can sometimes be mapped (depending upon the degree and accuracy of data collection efforts) this may or may not provide any degree of predictability of the potential locations for future events.

3.2.3 Extreme Temperatures

As noted in the Multi-Jurisdictional Plan, “*in light of the significant damage incurred by the County’s municipalities in early 2015 to repair frozen and burst water and sewer pipes, this plan now addresses extreme cold in addition to drought.*” In the case of the 2015 “deep-freeze”, the Town of Milton incurred costs estimated at \$83,636 to repair broken water pipes as well as cover the cost of approximately 10 million gallons of water allowed to run to prevent further pipe freezes. Damages were concentrated in areas wherein pipes were buried shallower than normal due to site specific conditions such as buried rock ledge-

3.2.4 High Crash Locations

The following High Crash Locations have been identified by the Vermont Agency of Transportation in the Town of Milton.

Table 3-1 Town of Milton high crash road sections, 2010-2014

			Severity Index
Route	System	Mileage	(\$/Accident/1.)
MIDDLE ROAD, MILTON, RAILROAD STREET, MILTON	Urban Collector (u)	2.960 - 3.020	\$16,448
MIDDLE ROAD, MILTON, RAILROAD STREET, MILTON	Urban Collector (u)	2.960 - 3.020	\$27,048

Source: Vermont Agency of Transportation

Note: /1--Average Cost per fatality, injury or PDO is based on 2012 National Safety Council Estimates:

Fatality \$1,410,000; Injury \$78,900; Property Damage Only \$8900.

3.2.5 Road Infrastructure Failure

There are nine long bridges in Milton inventoried by the Vermont Agency of Transportation.

One of these bridges (over the Lamoille River) in the Town are rated Scour Critical with regards to fluvial undermining of the bridge structure however a 2013 inspection report considers the bridge itself to be in good condition. Some of the most vulnerable pieces of infrastructure are road culverts. For a listing of culverts identified as “geomorphically-incompatible” either due to inadequate size or improper alignment, see Section 4.2.2.

3.2.6 Hazardous Substances

Hazardous material release is discussed as a possible hazard in the Multi-Jurisdictional All-Hazards Mitigation Plan. According to VDEMHS, as of May 2016 there are numerous reported hazardous material and petroleum product storage sites in Milton. Sites that contain large amounts of fuel or store what VEM calls Extremely Hazardous Substances are more likely to cause significant problems in a hazardous materials incident. (Note that sites are listed twice in the table below contain both petroleum products and hazardous materials.)

Table 3-2 Town of Milton, Hazardous Materials and Petroleum Products storage and/or use locations

Amerigas	44 Kienle Rd
Comcast of CT/GA/MA/NH/NY/NC/VA/VT, LLC-67 West Milton Road	67 West Milton Road
Fairpoint MILTON CO (FPT- VT474507)	6 CHERRY ST
Fairpoint MILTON GARAGE (FPT- VT474506)	131 CATAMOUNT DR
Fairpoint MILTON GARAGE (FPT- VT474506)	131 CATAMOUNT DR
GMP Clark Falls Station	16 Howard Dr.
GMP Milton generating station	85 Ritchie Ave.
GMP Peterson Station	197 West Milton Rd.
Hood Distribution - McQuesten Group	67 Catamount Drive
Hood Distribution - McQuesten Group	67 Catamount Drive
Husky Injection Molding Systems Inc.	288 North Road
Husky Injection Molding Systems Inc.	288 North Road
Kenneth R Adams, Inc.	18 Adams Park
Middle Road Market	69 Middle Road
Milton Amerigas	44 Kienle Road

Milton Amerigas	44 Kienle Road
Milton Compression Facility (NG Advantage)	121 Gonyeau Road
Milton Hannaford #8304	209 Route 7 South
Premier Coach	946 Route 7 South
Premier Coach	946 Route 7 South
RCC - GEORGIA MTN - USID102894	TED ROAD
RCC - MILTON	72 West Milton Road
Rowley Fuels Office & Truck Garage	789 Rte 7 South
Rowley Fuels Office & Truck Garage	789 Rte 7 South
Rowley Fuels Propane Inc	11 Checkerberry Square
Rowley Fuels Propane Inc	11 Checkerberry Square
Rowley Fuels Terminal Inc	8 River Street
S. B. Collins, Inc - (Redwood Mobil) - Milton	250 Route 7
S. B. Collins, Inc. - (Midtown Mobil) -Milton	Route 7 Midtown Plaza
Simons Milton	6 River St
Student Transportation of America - Milton	19 Precast Road
Student Transportation of America - Milton	19 Precast Road
TERRY HILL TRANSPORT, INC.	59 CATAMOUNT DRIVE
TERRY HILL TRANSPORT, INC.	59 CATAMOUNT DRIVE
Tri-Angle Metal Fab	103 Gonyeau Road
VELCO SANDBAR SUBSTATION	586 BEAR TRAP ROAD

Verizon Wireless GEORGIA 2 VT (ID:19600583)	15 Joy Rd
Verizon Wireless Milton (VT53614)	30 Ted Road

3.3 Previous FEMA-Declared Natural Disasters and Snow Emergencies

Since 1990, Milton has received public assistance funding from FEMA for the following natural disasters:

Table 3-3 Town of Milton, FEMA-declared disasters and snow emergencies, 1990-2016

Date (FEMA ID#)	Type of Event	Total repair estimates
June 1990 (DR 875)	Flooding	\$21,399
March 1992 (DR 938)	Flooding	\$21,795
January 1996 (DR 1101)	Flooding/high winds	\$100,887
January 1998 (DR 1201)	Ice Storm	\$85,384
July 1998 (DR 1228)	Flooding	\$29,601
April 2001 (EM3167)	snow emergency	\$8,105
August 2004 (DR 1559)	flooding	\$39,221
June 2011 (DR 1995)	flooding	\$16,675
September 2011 (DR 4022)	Tropical Storm	\$46,440
August 2013 (DR 4140)	Flooding	\$8,959
January 2014 (DR 4163)	Ice Storm	\$14,315
July 2015 (DR 4232)	Severe storm and flooding	\$8,176 (estimate)

Sources: Vermont Department of Housing & Community Affairs; Vermont Agency of Transportation. Dollar value Figures represent the total estimated repair costs for damages suffered to municipal resources. This Table does not include damage claims submitted to FEMA by non-municipal organizations or by private individuals or businesses.

The Town of Milton was reimbursed at a rate of 75 percent by FEMA for the estimated repair costs. Funds provided in response to these natural disasters were used as follows:

- March 1992: Repairs at Kingsbury Road such as new gravel, stone, new culverts and storm drains.
- January 1996: Kingsbury Road repaired again, plus Irish and Beebe Hill. Roads washed out at Hardscrabble, North, and a big washout occurred at Brigham Hill Road. Water also rose above bridges.
- January 1998: Hired contractors to help with debris removal. Hardest hit areas were the west side of town and washouts east of Route 7.
- July 1998: Kingsbury Road repaired again.

See *Figure 3.1.* to see locations where repairs took place for disasters between 2001 and 2016.

- April 2001: Increased contractual costs for snow removal.

- August 2004: Gravel road washouts at Cadreact Road; paved road washouts on East Road, Rollin Irish and Duffy Road.
- June 2011: locations of FEMA Public Assistance projects were as follows:

A - Debris Removal	Debris Removal Town Wide - McNeal Power Station
C - Roads & Bridges	John Rowley Road, 22½ Gravel Class III Town Road - Damage Area Location Rowley Road
C - Roads & Bridges	Cadreact Road, 22½ Gravel Class III Town Roadway - End Cadreact Damage River Street Wastewater Pump Station Generator Pad US RT t, Milton Vermont. - Milton Pump Station Pad
F - Public Utilities	West Milton Road Class II Paved Town Road - West Milton Road Damage Area
C - Roads & Bridges	
C - Roads & Bridges	Cadreact Road, 22½ Gravel Class III Town Roadway - Start Cadreact Damage
A - Debris Removal	Debris Removal Town Wide - Town Office Milton 43 bombardier Road
G - Recreational or Other	CVPS Park, 35 US RT t, Milton Vermont. - CVPS Park 35 US RT 7

- September 2011: locations of FEMA Public Assistance projects were as follows:

C - Roads & Bridges	Town of Milton 15 Plastic Pipe Drainage easement outfall. - Milton Damage Site
---------------------	--

- August 2013: locations of FEMA Public Assistance projects were as follows:

C - Roads & Bridges	WEST MILTON ROAD - West Milton Road
C - Roads & Bridges	CADREACT ROAD - Cadreact Road
C - Roads & Bridges	EVEREST ROAD - Everest Road

- January 2014: locations of FEMA Public Assistance projects were as follows:

A - Debris Removal	Town Wide Debris Removal - Milton Town Hall 43 Bombardier Road, Milton, VT 05468
A - Debris Removal	Town Wide Debris Removal - Location 1: Rollin Irish Road
A - Debris Removal	Town Wide Debris Removal - Location 3: Checkerberry Square
A - Debris Removal	Town Wide Debris Removal - Location 2: Duffy Road

- July 2015: locations of FEMA Public Assistance projects were as follows:

C - Roads & Bridges	West Milton Road (TH 6) - West Milton Road (TH 6)
C - Roads & Bridges	Ethan Allen Detention Basin - Ethan Allen Detention Basin

See *Figure 3.1.* to see locations where repairs funded in part with FEMA Public Assistance took place for disasters between 2001 and 2015. Note that some Debris Removal and Protective

Measures locations are shown at the location of the municipal office. This indicates assistance was at various locations throughout the municipality not that damage were incurred at the office.

Individual Assistance funds

As noted in Section 3.3 of the County Plan, due to privacy concerns, the individual homes or businesses which received Individual Assistance funds in connection with the two Federal disasters in 2011 (Spring flooding and Tropical Storm Irene in September) are not public information. However, the names of the streets of such homes or businesses from which claims are filed is available as are the funds provided. With regards to the Town, individual claims were filed at residences or business located on the following streets. These streets are shown in *Figure 3.1.1*.

As the data shows, in some cases, on numerous streets, several properties were damaged in connection with the Spring 2011 flooding:

Table 3-4 Town of Milton, location of individual assistance claims, Spring 2011 flood

ALGONQUIN REEF RD	1	\$1,225.50
ANDREA LN	1	\$554.29
BARNUM ST	1	\$385.87
BEAR TRAP RD	1	\$3,373.98
BOMBARDIER RD	1	\$708.59
CHRISEMILY LN	1	\$392.00
EAGLE MOUNTAIN HARBOR RD	1	\$521.34
FIELDRIDGE DR	1	\$7,872.19
GARDNER RD	1	\$1,905.16
HEMLOCK RD	1	\$8,594.29
LAMOILLE TER	1	\$826.66
MEADOW RD	2	\$1,144.34
MIDDLE RD	1	\$1,450.91
MORGAN RD	1	\$7,032.89
RAINBOW PL	1	\$5,324.60
RITCHIE AVE	1	\$11,867.02
RIVER ST	1	\$3,405.87
RUSSELL CIR	1	\$524.84
TRAYAH LN	1	\$9,185.13
US ROUTE 7 S	2	\$411.89
W MILTON RD	1	\$840.40
WINTER LN	1	\$2,170.76
WOODCREST CIR	1	\$1,368.54

Properties in a different part of the Town suffered damages as a result of Tropical Storm Irene in the fall of 2011:

Table 3-5 Town of Milton, location of individual assistance claims, Fall 2011

CLIFFORD DRIVE	1	\$2,853.12
STONE BRIDGE RD	1	\$4,244.27

3.4 Future Events

Although estimating the risk of future events is far from an exact science, CCRPC staff 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 at various meetings in 2016. This analysis assigns numerical values to a hazard’s affected area, expected consequences, and probability. This quantification allows direct comparison of very different kinds of hazards and their effect on the county, and serves as a rough method of identifying which hazards hold the greatest risk. CCRPC staff applied the following scoring system:

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.

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

As explained in detail in Section 3.4 of the Multi-Jurisdictional Plan, for the 2011 Plan, the following Hazards were considered to occur or have the potential to occur with sufficient frequency and/or severity for to be profiled for Risk Estimation in that Plan.

Natural Hazards:

- Drought
- Flooding
- Fluvial erosion
- High winds
- Landslide
- Lightning
- Multi-structure urban fire
- Radiological (natural)
- Wildfire
- Winter storm

Technological Hazards:

- Gas service loss
- Hazardous materials incident
- Major transportation incident
- Military ordnance incident
- Power loss
- Radiological incident
- Sewer service loss
- Telecommunications failure
- Water service loss

Societal Hazards:

- Crime
- Civil disturbance
- Economic recession
- Epidemic
- Key employer loss
- Terrorism

For the 2017 update, the CCRPC and its All-Hazards Mitigation Plan Update Committee made slight changes to this list by consolidating some hazards or delineating hazards with more specificity as follows:

Natural Hazards:

- Flooding
- Fluvial erosion
- Severe rainstorm
- Wildfire
- Severe winter storm
- Extreme Temperatures

Technological Hazards:

- Hazardous materials incident
- Major transportation incident
- Multi-structure fire
- Natural gas service loss
- Pollution
- Power loss
- Sewer service loss
- Telecommunications failure
- Water service loss
- Invasive Species

Societal Hazards:

- Crime
- Civil disturbance
- Economic recession
- Epidemic
- Key employer loss
- Terrorism

3.4.1 Natural Hazards

For the 2011 Hazard and Risk Estimation analysis for Milton, the following natural hazards received the highest risk ratings out of a possible high score of 80:

- Severe Winter Storm (40)
- Flooding (32)
- High Winds (28)

For this 2016 update, the following natural hazards received the highest risk ratings out of a possible high score of 80 (see Table below):

- Severe Winter Storm (40)
- Severe Rainstorm (40)
- Flooding (28)

While flooding is likely to have a significant impact over a smaller area, both severe winter storms and severe rainstorms tend to affect the entire town and are more common, hence the higher rating. Town officials are concerned with shoreline flooding, which threatens both lakeshore residences and municipal roads.

Table 3-6 Natural hazards risk estimation matrix, Milton

		Winter Storm	Severe Rainstorm	Flooding	Fluvial Erosion	Multi-Structure Fire	Extreme Temperatures	Wildfire
Area Impacted								
Key:	0 = No developed area impacted							0
	1 = Less than 25% of developed area impacted		1	1	1	1		
	2 = Less than 50% of developed area impacted							
	3 = Less than 75% of developed area impacted							
	4 = Over 75% of developed area impacted	4	4					
Consequences								
<i>Health & Safety Consequences</i>								
Key:	0 = No health and safety impact					0		0
	1 = Few injuries or illnesses	1	1	1	1			
	2 = Few fatalities or illnesses							
	3 = Numerous Fatalities							
<i>Property Damage</i>								
Key:	0 = No property damage							
	1 = Few properties destroyed or damaged	1	1			1	1	1
	2 = Few destroyed but many damaged			2	2			
	2 = Few damaged and many destroyed							
	3 = Many properties destroyed and damaged							
<i>Environmental Damage</i>								
Key:	0 = Little or no environmental damage					0	0	
	1 = Resources damaged with short-term recovery	1	1	1	1			1
	2 = Resources damaged with long-term recovery							
	3 = Resources destroyed beyond recovery							
<i>Economic Disruption</i>								
Key:	0 = No economic impact							
	1 = Low direct and/or indirect costs	1	1			1	1	1
	2 = High direct and low indirect costs					2		
	2 = Low direct and high indirect costs			2				
	3 = High direct and high indirect costs							
Sum of Area & Consequences Scores		8	8	7	6	5	3	3
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			4	4	4	4	4
	5 = Once a year or more occurrence	5	5					
TOTAL RISK RATING								
	Total Risk Rating =	40	40	28	24	20	12	12
	Sum of Area & Consequences Scores							
	x Probability of Occurrence							

3.4.2 Technological Hazards

For the 2011 Hazard and Risk Estimation analysis for Milton, the following Technological hazards received the highest risk ratings out of a possible high score of 80:

- Power Loss (35)
- Major Transportation Incident (28)
- Hazardous Materials Incident (24)

For this 2016 update, the following Technological hazards received the highest risk ratings out of a possible high score of 80 (see Table below):

- Major Transportation Incident (28)
- Power Loss (25)
- Hazardous Materials Incident (24)

The railroad and Interstate 89 run through the town, which raises the risk of a major transportation incident. Due to a lack of alternative routes, transportation incidents that close US 2 over the Lamoille River or US 7 over Clark Falls would effectively cut off access to portions of the town or adjoining communities. Milton is vulnerable to Power Loss because the population is dispersed and repairing utility infrastructure in rural areas can take more time. Milton has some significant industrial development, and hazardous materials are transported through the town center on the railroad, raising the risk of a hazardous materials incident.

Table 3-7 Technological hazards risk estimation matrix, Milton

	Major Transportation Incident	Power Loss	Hazardous Materials Incident	Water Service Loss	Gas Service Loss	Telecommunications Failure	Other Fuel Service Loss	Sewer Service Loss	Water Pollution	Invasive Species
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									
	1	1	1	1	1	1	2	1	0	0
Consequences										
<i>Health & Safety Consequences</i>										
Key:	0 = No health and safety impact									
	1 = Few injuries or illnesses									
	2 = Few fatalities or illnesses									
	3 = Numerous Fatalities									
	2	1	1	1	1	1	0	0	0	0
<i>Property Damage</i>										
Key:	0 = No property damage									
	1 = Few properties destroyed or damaged									
	2 = Few destroyed but many damaged									
	3 = Few damaged and many destroyed									
	4 = Many properties destroyed and damaged									
	1	1	1	1	1	0	1	0	0	1
<i>Environmental Damage</i>										
Key:	0 = Little or no environmental damage									
	1 = Resources damaged with short-term recovery									
	2 = Resources damaged with long-term recovery									
	3 = Resources destroyed beyond recovery									
	1	0	1	0	0	0	0	0	1	0
<i>Economic Disruption</i>										
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									
	2	2	2	1	2	1	1	2	1	0
Sum of Area & Consequences Scores										
	7	5	6	4	5	3	4	3	2	1
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									
	4	5	4	4	3	4	3	4	5	5
TOTAL RISK RATING										
Total Risk Rating =	28	25	24	16	15	12	12	12	10	5
Sum of Area & Consequences Scores										
x Probability of Occurrence										

3.4.3 Societal Hazards

For the 2011 Hazard and Risk Estimation analysis for Milton, the following Societal hazards received the highest risk ratings out of a possible high score of 80:

- Epidemic (24)
- Key Employer Loss (20)
- Crime (20)

For this 2016 update, the following Societal hazards received the highest risk ratings out of a possible high score of 80 (see Table below):

- Crime (30)
- Epidemic (24)
- Key Employer Loss (20)

Town officials are concerned about crime, much of which seems to a symptom of opiate abuse. The likelihood of an epidemic is difficult to gauge, but its consequences could be severe. Husky Injection Molding System is the largest single employer in Milton; loss of this employer would significantly affect the employees, related businesses and the town's tax base.

Table 3-8 Societal hazards risk estimation matrix, Milton

		Crime	Epidemic	Key Employer Loss	Economic Recession	Civil Disturbance	Terrorism
Area Impacted							
Key:	0 = No developed area impacted						
	1 = Less than 25% of developed area impacted					1	1
	2 = Less than 50% of developed area impacted	2		2			
	3 = Less than 75% of developed area impacted		3		3		
	4 = Over 75% of developed area impacted						
Consequences							
Health & Safety Consequences							
Key:	0 = No health and safety impact			0			
	1 = Few injuries or illnesses				1	1	
	2 = Few fatalities or illnesses	2	2				2
	3 = Numerous Fatalities						
Property Damage							
Key:	0 = No property damage		0	0	0		
	1 = Few properties destroyed or damaged	1				1	
	2 = Few destroyed but many damaged						2
	3 = Few damaged and many destroyed						
	4 = Many properties destroyed and damaged						
Environmental Damage							
Key:	0 = Little or no environmental damage	0	0	0	0	0	0
	1 = Resources damaged with short-term recovery						
	2 = Resources damaged with long-term recovery						
	3 = Resources destroyed beyond recovery						
Economic Disruption							
Key:	0 = No economic impact						
	1 = Low direct and/or indirect costs	1				1	
	2 = High direct and low indirect costs						2
	2 = Low direct and high indirect costs				2		
	3 = High direct and high indirect costs		3	3			
Sum of Area & Consequences Scores		6	8	5	6	4	7
Probability of Occurrence							
Key:	1 = Unknown but rare occurrence						1
	2 = Unknown but anticipate an occurrence					2	
	3 = 100 years or less occurrence		3				
	4 = 25 years or less occurrence			4	4		
	5 = Once a year or more occurrence	5					
TOTAL RISK RATING							
	Total Risk Rating =	30	24	20	24	8	7
	Sum of Area & Consequences Scores						
	x Probability of Occurrence						

3.4.4 Hazard Summary

According to the risk estimation analysis, the three highest rated hazards by type for Milton are:

Natural Hazards:

- Severe Winter Storm (40)
- Severe Rainstorm (40)
- Flooding (28)

Technological Hazards:

- Major Transportation Incident (28)
- Power Loss (25)
- Hazardous Materials Incident (24)

Societal Hazards:

- Crime (30)
- Epidemic (24)
- Key Employer Loss (20)

It should be noted that the two most severe natural hazards on the list—severe winter storm and severe rainstorms—could also be a major transportation incident or power loss. Milton's risk for societal hazards is generally less than for natural and technological hazards.

SECTION 4: VULNERABILITY ASSESSMENT

4.1 Overview of typical vulnerabilities

As discussed in Section 4 of the County Plan, typical vulnerabilities from the County’s common hazards consist primarily of:

- damage to public infrastructure especially roads and culverts;
- temporary closures of roads and bridges including from debris;
- temporary loss of power and/or telecommunications, and
- temporary isolation of vulnerable individuals such as the elderly or those in poverty.

More specifically, these vulnerabilities typically occur in association with the Profiled Natural Hazards as follows:

Table 4-1 Town of Milton: Natural Hazards and typical vulnerabilities

Hazard	Typical vulnerabilities	Occasional additional vulnerability
Severe Winter Storm	-temporary closures of roads and bridges including from debris; -temporary loss of power and/or telecommunications, and -temporary isolation of vulnerable individuals	-budget impacts from debris cleanup
Flooding	-temporary closures of roads and bridges including from debris; -temporary loss of power and/or telecommunications, and -temporary isolation of vulnerable individuals -damage to public infrastructure	-budget impacts from road/bridge closures and repairs to public infrastructure -damages to individuals’ properties and businesses
Fluvial Erosion	-temporary closures of roads and bridges including from debris; -temporary loss of power and/or telecommunications, and -temporary isolation of vulnerable individuals -damage to public infrastructure	-budget impacts from road/bridge closures and repairs to public infrastructure -damages to individuals’ properties and businesses
Severe Rainstorm	-temporary closures of roads and bridges including from debris; -temporary loss of power and/or telecommunications, and -temporary isolation of vulnerable individuals -damage to public infrastructure	-budget impacts from road/bridge closures and repairs to public infrastructure -damages to individuals’ properties and businesses

Extreme Temperatures	-damage to public infrastructure -loss of water service	-budget impacts due to needed repairs
Wildfire	-damage to private property	

Relative to the County as a whole the Town of Milton has a slightly higher vulnerability to:

- Severe Rainstorms and Fluvial Erosion as it has some gravel roads and older culverts.
- Flooding due to its proximity to Lake Champlain and the Lamoille River (although the latter is mitigated by several dams).

Vulnerabilities with regards to Technological Hazards are harder to project as these incidents occur with less frequency and less predictability.

Table 4-2 Town of Milton: Technological Hazards and typical vulnerabilities

Hazard	Typical vulnerabilities	Occasional additional vulnerability
Major Transportation Incident	-temporary closures of transportation infrastructure -injuries, deaths	-if major event, potential long term closure of infrastructure.
Power Loss	-temporary loss of electrical service -temporary impacts to vulnerable individuals -damage to public infrastructure	-if extended event, damage to perishable goods or business income. -if extensive loss, potential budget impacts to service providers.
Hazardous Materials Incident	-temporary closures of roads and bridges during cleanup.	-if large event, potential high cleanup costs. -injuries to persons
Water Service Loss	-temporary loss of service -temporary impacts to vulnerable individuals	-if extensive loss, potential budget impacts to service providers.
Gas Service Loss	-temporary loss of service -temporary impacts to vulnerable individuals	-if extensive loss, potential budget impacts to service providers.
Telecommunications Failure	-temporary loss of service -temporary impacts to vulnerable individuals	-if extensive loss, potential budget impacts to service providers.

Other Fuel Service Loss	-temporary loss of service -temporary impacts to vulnerable individuals	-if extensive loss, potential budget impacts to service providers.
Sewer Service Loss	-temporary loss of service -temporary impacts to vulnerable individuals	-if extensive loss, potential budget impacts to service providers.
Water Pollution	-ongoing budgetary impacts due to permit requirements.	-if repeat events, impacts to tourism-based businesses
Invasive Species	-small but ongoing cost to monitoring level of occurrence	-unknown at this point.

Relative to the County as a whole the Town of Milton has a slightly higher vulnerability to:

- Major Transportation Incident due to the transit of a railroad line and Interstate 89 through the Town.
- Water Pollution due to its designation as an MS4 permittee

With regards to Societal Hazards, vulnerabilities are typically more dispersed among individuals and societal sectors compared to the natural environment and to technology which is fixed.

Table 4-3 Town of Milton: Societal Hazards and typical vulnerabilities

Hazard	Typical vulnerabilities	Occasional additional vulnerability
Crime	-increased demands on police services and social services	-injuries -deaths
Epidemic	-temporary closures of schools, businesses, places of assembly -increased demand on medical services	-if an epidemic is widespread and long-lasting, impact could be severe
Key Employer Loss	-loss of economic activity -loss of portion of tax base -increased demands on social services	-effects increased if employer is of significant size
Economic Recession	-loss of economic activity -increased demands on social services -some loss of tax revenue	-effects increased if event is of extended duration

Civil Disturbance	-injuries to persons -damage to public and private property	-budget impacts to police services depending upon severity of event -deaths
Terrorism	-injuries to persons -damage to public and private property	-budget impacts to police services depending upon severity of event -deaths

Relative to the County as a whole there is insufficient data to conclude whether or not the Town is more vulnerable to one of the six Societal Hazards noted above.

With regards to the vulnerability of critical facilities, infrastructure and vulnerable populations, quantitative and locational data for the Town is available as follows.

4.2 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.” *Figure 1.4* shows the geographic distribution of some critical facilities and utilities. *Table 4-1* identifies critical facilities in Milton, excluding critical facilities designated as hazardous materials and petroleum storage sites, which are shown in Section 3.2.5. This list includes all critical facilities, not only the facilities located in designated hazard areas.

Table 4-4 Critical facilities in the Town of Milton

Facility Type	Number of Facilities
Veterinary Hospital / Clinic	2
Education Facility	2
EMS Station	1
Fire Station	1
Emergency Shelters	2
Emergency Operations Center	1
Energy	1
Government and Military	2
Information and Communications	1
Police Station	1
Mail and Shipping	1

Public Attractions and Landmark Buildings	1
Water Supply and Treatment	2

Source: Vermont Center for Geographic Information

None of these facilities are located in mapped hazard areas such as the Special Flood Hazard Area and/or River Corridors.

4.3 Infrastructure

The following is a statistical overview of roads in the Town of Milton. These *Tables* show the range of road types within the town, from Interstate 89 to minor local roads. The different road types have different hazard vulnerabilities. Unpaved roads are more vulnerable to being washed out in a flood or heavy storm, while traffic incidents are more likely to occur on large, arterial roads.

Municipal highways, bridges and dams are well mapped in Chittenden County. The following three *Tables* show the diversity of municipal highways and road surface in the Town:

The Vermont Agency of Transportation divides municipal (town) highways into various classes as follows:

Class 1 town highways are subject to concurrent responsibility and jurisdiction between the municipality and VTrans. Class 1 town highways are state highways in which a municipality has assumed responsibility for most of the day to day maintenance (pot hole patching, crack filling, etc.). The state is still responsible for scheduled surface maintenance or resurfacing. In Chittenden County Class 1 highways are generally paved.

Class 2 town highways are primarily the responsibility of the municipality. The state is responsible for center line pavement markings if the municipality notifies VTrans of the need. The municipality designates highways as Class 2 with approval from VTrans. These are generally speaking the busier roads in a given town second to Class 1. In Chittenden County, most Class 2 highways are generally paved although in the more isolated areas these are gravel roads.

Class 3 town highways are the responsibility of and designated by the municipality. These are to be maintained to an acceptable standard and open to travel during all seasons. In Chittenden County, Class 3 roads are both paved or gravel.

Class 4 town highways are all other highways and the responsibility of the municipality. However, pursuant to Vermont State Statutes, municipalities are not responsible for maintenance of Class 4 town highways. These are generally closed during the winter and minimally maintained and almost exclusively dirt.

4.3.1 Town Highways

The following is a statistical overview of roads in the Town of Milton. These *Tables* show the range of road types within the town, from interstate highway to unimproved unpaved roads. The different road types have different hazard vulnerabilities. Unpaved roads are more vulnerable to

being washed out in a flood or heavy storm, while traffic incidents are more likely to occur on large, arterial roads.

Table 4-5 Town highway mileage by class, Town of Milton

Class 1	Class 2	Class 3	Class 4	State Hwy	Fed Hwy	Interstate	Total 1, 2, 3, State Hwy
	33.570	65.710	5.650		11.516	6.601	99.280

Source: derived from VTrans TransRDS GIS data – surface class and arc length

Table 4-6 Town highway mileage by surface type, Town of Milton

Paved	Gravel	Soil or Graded	Unimproved	Impassable	Unknown	Total
104.236	11.868	4.952	0.13	3.671	1.61	124.857
Total Known	Total Unpaved	% Paved	% Unpaved			
123.247	19.011	84.6%	15.4%			

Source: derived from VTrans TransRDS GIS data – surface class and AOTmiles

See Figure 3.2 for locations of paved vs. gravel and/or soil roads.

4.3.2 Bridges, Culverts, and Dams

There are a variety of bridges, culverts and dams located in the municipality. The following bridges are contained in an inventory maintained by VCGI, VTrans and the CCRPC. A GIS intersection was performed to determine which bridges are located in the designated flood hazard area (aka Special Flood Hazard Area or 100-year floodplain.) and /or the River Corridor Protection Area (aka Fluvial Erosion Hazard Area)

As noted in Section 4 of the County Plan, a large portion of the County’s stream have had detailed Phase II Stream Geomorphic Assessments conducted. With regards to Milton, studies identify specific stream reaches where fluvial erosion is a concern as well as where infrastructure, primarily culverts, as noted in the Table below (and illustrated in Figure 2.1) is at risk.

Table 4-7 Culverts with a geomorphic compatibility rating of “Mostly Incompatible” or “Incompatible”

Bankfull Width	Compatibility Score	Town	Location	GisRoadName	StreamName
36.36	6	Milton	.85 Mi S Mars Hollow Rd.	DUFFY RD	Unnamed
18.10	7	Milton	At Cadreact Farm	CADREACT RD	Trout Brook
19.09	7	Milton	.1 Mi W Cadreact rd.	EVEREST RD	Unnamed
20.67	7	Milton	Jct. W/ Hardscrabble rd.	DEVINO RD	Unnamed

50.00	8	Milton	.3 Mi W of East Rd.		Malletts Creek
45.00	8	Milton	.1 Mi S Westford rd.	FOREST RD (PVT)	Malletts Creek
28.57	8	Milton	Driveway #333 off Hardscrabbl rd.		Unnamed
32.78	9	Milton	Sweeny Farm Road Crossing	SWEENY FARM RD	Allen (Petty) Brook
29.07	9	Milton	.3 Miles South Lake Road	SANDERSON RD	Streeter Brook
28.00	9	Milton	Jct. W/ Ted Rd.	WESTFORD RD	Unnamed
19.61	9	Milton	at entry gate to Peterson Rd power dam on Lamoille	W MILTON RD	Unnamed trib to Lamoille
26.32	9	Milton	.25 Mi S Everest Rd.	CADREACT RD	Trout Brook
47.83	9	Milton	Forest Road Crossing (Private)	FOREST RD (PVT)	Malletts Creek Main Stem
22.14	9	Milton	Just DS Willow Farm Driveway		Unnamed
29.23	9	Milton	.5 Miles N Main St.		Unnamed
36.47	9	Milton	.2 Miles S Main St.		Unnamed
48.61	10	Milton	.9 miles South Bear Trap r.	W MILTON RD	Unnamed
26.67	10	Milton	.5 Mi S Everest	CADREACT RD	Unnamed
48.00	10	Milton	Driveway #431 off Westford rd.		Unnamed
41.33	10	Milton	.1 Mile S Cooper Rd.		Unnamed

Mostly incompatible $5 < GC < 10$

% Bankfull Width + Approach Angle scores < 2 Structure mostly incompatible with current form and process, with a moderate to high risk of structure failure. Re-design and replacement planning should be initiated to improve geomorphic compatibility.

Fully incompatible $0 < GC < 5$

% Bankfull Width + Approach Angle scores < 2 AND Sediment Continuity + Erosion and Armoring scores < 2 Structure fully incompatible with channel and high risk of failure. Re-design and replacement should be performed as soon as possible to improve geomorphic compatibility.

Information on dams is available from two sources: a database of dams regulated by the Vermont Department of Environmental Conservation and the National Dam Inventory maintain by the U.S. Army Corps of Engineers. Information from the DEC is as follows:

Table 4-8 Dams under the jurisdiction of VT Department of Environmental Conservation

DamName	StateID	Location (Town)	Hazard Class	Owner
Milton Pond	128.04	Milton	Low	Town of Milton
Long Pond	128.07	Milton	Low	Private

*Dams under the jurisdiction of VT Department of Environmental Conservation (DEC) pursuant to 10 VSA Chapter 43 §1081 and subject to 10 VSA Chapter 43 §1082 Authorization (i.e. dams capable of impounding more than 500,000 cubic feet of water or other liquid. Hazard class is defined as:
 High Hazard – High probability of loss of life and damage to infrastructure
 Significant Hazard – Significant probability of loss of life and damage to infrastructure
 Low Hazard – Low probability of loss of life and damage to infrastructure*

The National Dam Inventory identifies four dams in the municipality, shown in *Table 4-6*.

Table 4-9 National Dam Inventory: Dams located in the Town of Milton

Name	Owner	River	Description	Maximum Storage (acre/feet)	Hazard Potential
Peterson Dam	CVPS	Lamoille	Concrete gravity dam built in 1949 for hydroelectric power and still used for same	3,500	Low-losses limited to owner's property.
Milton Pond	Town	Mallets Creek	Earthfill dam built in 1900 for water supply. Still in service. 2004 report by VT Dam inspection program recommended improvements.	150	Low-losses limited to owner's property.
Name	Owner	River	Description	Maximum Storage (acre/feet)	Hazard Potential
Milton Dam	CVPS	Lamoille	Concrete gravity dam built in 1929 for hydroelectric power and still used for same.	27	Low-losses limited to owner's property.
Clark Falls	CVPS	Lamoille	Concrete gravity dam built in 1937 for hydroelectric power and still used for same	10,000	Significant-no probable loss of human life but can cause significant economic or environmental damage and disrupt lifeline concerns.

Source: National Dam Inventory

The three dams owned by Central Vermont Power Systems (CVPS) are part of the Lamoille Hydroelectric Project and operate under a license from the Federal Energy Regulatory Commission. This license was reissued in 2005 for 30 years. Town officials indicate that failure of the Clark Falls dam would have the potential to impact residential areas. CVPS has an agreement with the Vermont Public Service Board to remove the Peterson Dam by 2025.

4.3.3 Water, Wastewater and Natural Gas Service Areas

The town operates wastewater and water delivery systems, both of which have municipal departments (cf. *Figure 1.4*). The municipal water service area is centered around US Route 7, with satellite lines extending service to North Rd., Westford Rd, and Lake Road. The municipal sewer service area is currently limited to the village center, with additional lines serving the Maplewood Av. and Hunting Ridge subdivisions. A southerly expansion along Route 7 is complete to Checkerberry Village, and further expansion is underway towards Catamount Industrial Park. All residents and businesses outside the service areas receive water from wells and dispose of wastewater through septic systems. Gas lines serve neighborhoods along Route 7, Poor Farm Rd., Hobbs Rd., Middle Rd., and North Rd.

4.3.4 Electric Power Transmission Lines and Telecommunications Land Lines

Several high tension power lines are located in the Town of Milton (cf. *Figure 1.4*). A VELCO line bisects the Town, running north-south from Colchester along Middle Rd. to the Georgia town line along Hibbard Rd. A second VELCO line parallels US Route 2 from the Colchester town line out along the South Hero Causeway. A northeast/southwest-running VELCO line connects the two. A CVPS high tension line runs east from the Peterson Dam generating station to the Westford town line. Another CVPS line parallels US Route 7, running north from the Milton Falls generating facility to the Georgia border. Above ground telecommunication land lines and electrical distribution lines run along the street grid.

4.4 Estimating Potential Losses in Designated Hazard Areas.

A simple GIS intersection of esite data (2014) with the FIRM floodplain data indicates the following with regards to structures located in mapped flood hazard areas (cf. *Figure 2-1*):

- There are a total of 4,687 structures within the municipality.
- There are ten residential structures and three commercial/industrial structures located within the 100-year floodplain along Lake Champlain.
- Based on 2014 median grand list value, the estimated potential losses due to a major flood event inundating the floodplain and destroying all of these structures is \$173,889,439.
- Note that this estimate only takes structures into account, however. It does not account for loss of building contents or business losses.

A simple GIS intersection of esite data with the 2016 River Corridor Protection Area (RCPA) data indicates the following with regards to structures vulnerable to Fluvial Erosion (cf. *Figure 2-1*):

- There are a total of 4,687 structures within the municipality.

- There is one residential structure and no commercial/industrial structures located in the RCPA. Based on 2014 median grand list value, the estimated potential losses due to a major stream erosion event in the area destroying that single structure is \$421,280.
- Note that this estimate only takes structures into account, however. It does not account for loss of building contents or business losses.

At this time, a more detailed analysis of potential losses to structures, infrastructure, and agricultural lands cannot be made. Such an analysis would require individual site visits and analysis conducted by both river geomorphologists and structural engineers which is beyond the capacity of the CCRPC due to funding limitations.

4.5 Vulnerable Populations

Like most of the county, census data more detailed than the Town’s boundaries is not available to see if there are concentrations of either elderly populations or low-income populations. In other words, the City’s boundaries form one single census tract. Demographic information on the relative percentages of vulnerable populations is as follows:

Table 4-10 Vulnerable populations, Milton

	Milton	Chittenden County	Vermont	National
Percent Minority (non-white)	4.4 %	7.7%	4.8%	26.7%
Children <18 in poverty	7.3 %	11.1%	14.8%	21.6%
Families w/children in poverty	4.8 %	10.5%	13.4%	17.8%
Families w/ female householder, no husband present w/children in poverty	21.8 %	37.0%	37.4%	40%
Population, age 65+ in poverty	7.8 %	6.5%	7.5%	13.4%

US Census Bureau, 2010-2014 5-Year Estimates, American Community Survey

Given the coarseness of the available data, namely that there are only two large census tracts in the Town, CCRPC is not able to determine specific locations with a concentration of vulnerable individuals within individual municipalities. However, a useful analysis known as a Social Vulnerability Analysis has been prepared by the Vermont Department of Health. Data for the Town is shown in *Figure 4.1*.

The Social Vulnerability Index (SVI) draws together 16 different measures of vulnerability in three different themes: socioeconomic, demographic, and housing/transportation. The 16 individual measures include poverty, unemployment, per capita income, educational attainment, health insurance, children/elderly, single parent households, disability, minority, limited English, location of apartment buildings, mobile homes, crowding, no vehicle access, and population

living in group quarters. The measures are combined to create relative vulnerability index. For every vulnerability measure, census tracts above the 90th percentile, or the mostvulnerable 10%, are assigned a flag. The vulnerability index is created by counting the total number of flags in each census tract. It is important to remember that this Social Vulnerability Index is just a first step in screening for populations that may be more or less vulnerable to a variety of hazard. Depending on the situation, different measures could be more or less important and should be looked at more closely. These data are NOT saying that one census tract is more vulnerable than another. Rather it is saying that there is a higher concentration of various vulnerable populations living within a tract and seeks to identify the conditions that make a population vulnerable.

4.6 Land Use and Development Trends Related to Mitigation

As noted in the introduction, Milton’s land use is primary residential and agricultural/natural resources related. An analysis of GIS data shows the following percentages for land use and the percentages of land allocated to each zoning district.

Table 4-11 Structures compared to zoning, Town of Milton

Milton Structures	Esite Count	Percent		Milton Zoning	Area (mi ²)	Percent
Residential	4048	86.37%		Agricultural/Rural Residential	28.78519	53.96%
Commercial	148	3.16%		Beaverbrook Residential	0.599751	1.12%
Industrial	32	0.68%		Checkerberry	0.938521	1.76%
Institutional / Infrastructure	22	0.47%		Downtown Business	0.298756	0.56%
Mass Assembly	11	0.23%		Flood Hazard	6.141348	11.51%
Leisure / Recreation	3	0.06%		Forestry/Conservation/Scenic Ridgeline	5.589314	10.48%
Natural Resources	6	0.13%		General Industrial	1.279019	2.40%
Total:	4270	91.10%		Industrial Conservation	1.043281	1.96%
				Interstate Commercial	0.092247	0.17%
				Light Industrial	0.087386	0.16%
				Low Density Residential	1.945057	3.65%
				Medium Density Residential	1.771251	3.32%
				Main Street	0.063061	0.12%
				MCMP Center	0.11236	0.21%
				MCMP Municipal/Recreation	0.293998	0.55%
				MCMP West	0.081346	0.15%
				Old Towne Residential	1.463959	2.74%
				Old Towne Residential/Commercial	0.162672	0.30%
				Shoreland Residential	1.03533	1.94%
				Transitional Residential	1.565211	2.93%
Total Esites:	4687			Total Area:	53.34906	

Source: 2015 e911 Data and Town of Milton Zoning Regulations, Note: The structure categories relate to the Land Based Classification System (LBCS) used in the 2011 AHMP not E-911 site types. E-911 site types were assigned to each LBCS category to create synergy between the 2011 AHMP and 2017 AHMP.

4.6.1 Conserved or Undevelopable Parcels

There are a few conserved parcels in Milton. Most parcels have been conserved for their scenic, agricultural, or natural resource values. The Town of Milton owns the Milton Town Forest, comprising approximately 318 acres just south of Westford Road and abutting the Westford town line. The Vermont Land Trust owns a conservation easement on 102 acres abutting the Town Forest. The Town also owns 3 parcels known as the Eagle Mountain Natural Area. The Lake Champlain Land Trust, which donated these parcels to the town, holds a conservation easement on the area that comprises approximately 238 acres west of Beebe Hill Road and north of Cold Spring Road.

Several parcels are conserved in the southwest portion of Milton. The State of Vermont owns and manages the Lamoille River Wildlife Management Area, consisting of 230 acres on two parcels west of West Milton Road and north of Watkins Road. The Vermont Land Trust holds conservation easements on 4 parcels comprising 740 acres near the Wildlife Management Area. One parcel abuts the area, while the other three are located on the opposite bank of the river, surrounding the intersection of Bear Trap Road and Cadreact Road. Finally, near Lake Champlain is the 1,520 acre Sandbar Wildlife Management Area, located on both sides of U.S. Route 2, the 20 acre Sandbar State Park on the north side of Route 2, and two parcels comprising 15 acres owned by the Town of Milton on either side of Route 2.

Formal information is as follows:

Table 4-12 Conserved Land, Town of Milton

Acres	Acres of Public Land	Percent Public	Acres of Conserved Land	Percent Conserved	Total Public & Conserved	Percent Conserved Land
33,950.20	2,464.07	7%	1,266.17	4%	3,730.31	11%

Source: VLT Data and ANR Public Lands

4.6.2 Recent & Future Development

At this time, the main way CCRPC has to predict future development is by analysis of municipal zoning bylaws. As the municipality participates in the NFIP, zoning bylaws heavily regulate development in designated flood hazard areas. Additionally, the Town also regulates development near other waterbodies and wetlands. As a result, little to no development is likely to take place in flood hazard areas or river corridor protection areas. These zoning requirements mitigate flood hazards to future structures.

From 2011 through 2014, the municipality has seen 133 housing units (in single family and multi-family structures) and five new commercial/industrial buildings constructed. As shown in Figure 4.2, none of these units or structures were constructed in the Special Flood Hazard Area nor in the River Corridor Protection Area.

As best can be ascertained based upon data maintained by the Chittenden County RPC and the Town of Milton, since the adoption of the last municipal AHMP in 2011, development activity in the Town has not increased vulnerability. Additionally, through at least 2021, there is no known or projected development of new buildings or infrastructure anticipated to be constructed in areas vulnerable to Natural Hazards.

SECTION 5: MITIGATION STRATEGY

The Town considered a range of mitigation actions across the categories of Planning and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, and Education and Awareness Programs. As is demonstrated in the discussion that follows the Town carries out numerous efforts as part of its day-to-day operations that fit within these categories and address and serve to mitigate the impacts of various hazards. The section concludes within an analysis of which vulnerabilities need additional attention and therefore stipulates discrete tasks to be carried out by the Town during the 5-year period this Plan is in effect to address these vulnerabilities.

5.1 Existing 2013 Milton Comprehensive Plan Goals and Objectives That Support Hazard Mitigation

These tasks are described in the Town's 2013 Comprehensive Plan. The following selected excerpts illustrate how mitigation planning and activities is formally promoted and supported through the Town Plan.

5.1.1 Vision Statement and Goals

In 1998, the following Vision Statement was first established for the Town of Milton Comprehensive Plan:

"Enhance the quality of life in Milton by developing a greater sense of community and promoting greater citizen participation in the affairs of the town. New growth must recognize, integrate and enhance traditional settlement patterns. Milton's sense of community must include protecting the quality of the environment, promoting the vitality of the local economy, and improving education."

In order to execute this vision statement, seven more specific goals were established. These address community involvement, land use and development patterns, economic growth, housing, transportation, public facilities and services, and resource use and protection. With a few adjustments, these goals remain the foundation of this Plan.

Key goals related to Hazard Mitigation include

Land Use and Development Patterns

Direct the most intensive development to the downtown area where services, utilities, transportation, and other supporting facilities are most readily available. Furthermore, enable a more diverse mix of uses emphasizing less intensive development in the transitional areas. The transitional areas are defined as the areas between the downtown area and the rural areas. Agriculture, forestry, mineral extraction, clustered residential development, and outdoor recreation are encouraged in the rural areas.

Economic Growth

Develop a diverse economic base emphasizing high quality job creation. The economic base shall focus on providing high value and rewarding job opportunities commensurate with available and planned infrastructure and services while minimizing impacts on the environment.

Housing

Provide for a variety of quality housing to meet the needs of the community for all income levels, including housing options for elderly and disabled residents in the downtown area.

Transportation

Provide connected transportation facilities for the movement of goods and people and linking developments throughout the community. Additionally, alternative transportation, such as public transit, sidewalks and bike paths should be made available.

Public Facilities and Services

Continue to develop public facilities and services that complement existing and future development patterns and that keep pace with population growth. Educational and recreational programs should be provided to enhance opportunities for Milton residents.

Resource Use and Protection

Protect, preserve, maintain, and enhance Milton's natural, historical and cultural resources for the enjoyment and use of existing and future generations. Natural resource based operations, including traditional and non-traditional agriculture, forestry, and mineral extraction, will be located outside the Town Core Area of Milton. In addition, provide for the wise and efficient use of Milton's natural resources and facilitate the appropriate extraction of earth resources and the proper restoration and preservation of the aesthetic qualities of the area. Emphasis is placed on preservation of Milton's scenic ridgelines and water resources including the Lamoille River and Lake Champlain watershed and wetlands.

Excerpted below are more specific goals that have a direct relationship to Hazard Mitigation:

Economic Development: Goals and Objectives

Goal 3.2.1. Continue to pursue expansion of public infrastructure including water, wastewater, sidewalks, and an expanded road network throughout the Town Core and into immediately-adjacent areas.

Goal 3.5.7. Create incentives to attract green business, and use local land use planning to influence development and site design in an energy efficient manner.

Public Works Goals:

Goal 4.6.1. Update the wastewater facilities study based on current conditions in order to prioritize wastewater collection expansion areas.

Public Safety Goals

Goal 4.7.1. Continually evaluate capacity of Police, Fire and EMS as the demand for services increases.

Goal 4.7.2. Establish a Public Safety Ordinance.

Telecommunications/Wireless Communications Facility Goals

Goal 4.9.1. Facilitate the ability of the providers of telecommunications services to provide such services to Town residents and businesses in a manner consistent with the community values and goals contained in the Comprehensive Plan.

Land Use Planning Goals:

Goal 5.1.1. Through its Zoning Regulations and other Town policies, the Town shall continue to encourage development in the Town Core, which is close to Town services and where higher-density, mixed-uses are allowed, as a first step in reducing transportation-related energy consumption in Town.

Goal 5.1.2. The Town shall also continue to encourage the use of clustering, which is encouraged even in the more rural parts of Town, to help reduce the energy costs associated with building roads and utilities.

Renewable Energy Resources Goals:

Goal 5.3.1. The Town shall continue to support renewable energy projects of an appropriate scale for the community, and when feasible, assist with grant opportunities or provide other Town resources in support of such projects.

Goal 5.3.2. Due to ongoing changes in technology, the Town will continue to review and revise the Zoning Regulations as necessary to encourage the use of renewable energy resources while carefully weighing the benefits of such projects against their potential impacts on other resources, including cultural, historical, environmental/natural, and aesthetic resources.

Future Utilities Siting Goals

Goal 5.4.1. The Town will continue to encourage the co-location of telecommunication facilities and the appropriate siting and screening of these facilities.

Goal 5.4.2. The Town of Milton should encourage the Public Service Board to require that new regional transmission lines, substations, and similar facilities are located within existing utility corridors to minimize their impact on the community and its natural, scenic, and historic resources.

Goal 5.4.3. In general, the placement of utility poles, transmission lines, substations, and other facilities should minimize disturbance to natural resources (including wetlands, streams, and wildlife habitat), scenic ridgelines and viewsheds (such as Georgia Mountain, Cobble Hill, Arrowhead Mountain, the Forestry/Conservation/Scenic Ridgeline Zoning District, and Lake Champlain shoreline), and other natural and historical resources. In cases where it is feasible to do so, they should be placed underground.

Goal 5.4.4. The Town will encourage and support the extension of natural gas service to areas not currently served.

Goal 5.4.5. The Town of Milton Zoning Regulations state that the placement of electrical service lines to outdoor-lighting fixtures should be placed underground. The Zoning Regulations should be revised to require, where appropriate, that all new and relocated local utility lines be placed underground, including, but not limited to, electric, cable, telephone, and natural gas lines. Aboveground utility placement for new development should only be allowed in cases where environmental constraints would make it cost-prohibitive or impossible to place underground.

Goal 5.4.6. Siting and screening requirements should be adopted for regulating aboveground utility lines.

Future Housing Growth Goals

Goal 6.1.2. The Town should continue to promote infill development within the appropriate locations within the Town Core in order to meet the demand for housing, establish a downtown and make use of the municipal services that are available.

Location and Density of Housing

Goal 6.2.1. Use developed land more efficiently to increase the housing stock in Milton.

Goal 6.2.2. Continue to allow for further development where municipal water and sewer are available or are planned for the future since onsite limitations exist in East and West Milton.

Coordination of Public Utility Services and Housing Goals

Goal 6.3.2. Continue to make use of phasing when necessary and impact fees for residential development to help ensure that the pace of housing development does not overburden municipal services, including schools, recreational facilities and transportation infrastructure.

Resource Use and Protection Goals

Goal 8.1. Continue protection of existing natural resources identified in this chapter.

Goal 8.2. Establish specific criteria to determine the best method to control the cause of lakeshore erosion and to limit any negative impacts on surrounding properties from lakeshore stabilization projects.

Goal 8.3. The Subdivision Regulations and/or Zoning Regulations should be amended to include a provision that developments that require a State postconstruction stormwater permit must include language in their Homeowners Association's covenants that the Association will maintain stormwater systems and permits in perpetuity.

Goal 8.4. Make residents aware of mapped Fluvial Erosion Hazard areas and Stream Setbacks and consider establishing a Riparian Buffer Ordinance if mapping indicates a need.

Goal 8.5. Establish standards for more appropriate, useful, and usable open space that is set-aside as a result of cluster subdivisions, such as Planned Unit Developments.

Goal 8.6. Better define the boundary of the Forestry/Conservation/Scenic Ridgeline (FC) District so that it more closely corresponds with sensitive areas.

Goal 8.7. Section 691 of the Zoning Regulations should be amended to state that the 50-foot setback from surface waters shall be measured from the top of bank or top of slope (top of slope is used on streams with very steep bank walls), and diagrams illustrating these characteristics should be included to assist residents with identifying the top of bank or top of slope.

5.2 Existing Town of Milton Policies & Programs That Support Hazard Mitigation

The following table illustrates how mitigation activities and plans are carried out by various municipal departments and whether such capabilities are adequate to address hazard vulnerabilities and whether the department, if needed, has the ability to improve policies and programs and programs to unmitigated vulnerabilities.

Table 5-1 Existing municipal capabilities addressing hazard mitigation, Town of Milton

Type of Programs & Policies	Description /Details/Comments	1) Adequacy of municipal capabilities to address hazards 2) and ability to expand upon or improve policies & programs
Highway Services	Town Highway Department	1) Generally adequate with regards to mitigating against common hazards 2) However, the Public Works Department, through the strategies noted below is taking on a stronger role to mitigate against damages caused by Severe Rainstorm and Water Pollution.
Highway personnel	1 FTE Admin, .5 FTE Engineer, 7 FTE Highway field personnel	1) Generally adequate with regards to mitigating against common hazards 2) However, the Public Works Department, through the strategies noted below is taking on a stronger role to mitigate against damages caused by Severe Rainstorm and Water Pollution.
Water / Sewer Department	Public Works Department	1) Generally adequate with regards to mitigating against common hazards 2) However, the Public Works Department, through the strategies noted below is taking on a stronger role to mitigate against damages caused by Severe Rainstorm and Water Pollution.
Water / Sewer Personnel	5 FTE Water/Sewer personnel	1) Generally adequate with regards to mitigating against common hazards. 2) No need to expand upon or improve policies & programs with regard to hazards under its purview.
Planning and Zoning personnel	3 FTE Planners, 1 FTE Zoning Administrator	1) Generally adequate with regards to mitigating against common hazards. 2) No need to expand upon or improve policies & programs with regard to hazards under its purview.
Residential Building Code / Inspection	No local building code.	1) Generally adequate with regards to mitigating against common hazards. 2) No need to expand upon or improve policies & programs with regard to hazards under its purview.
Town / Municipal Comprehensive Plan	2013	1) As noted at the start of Section 5, several elements of the municipal Comprehensive Plan promote Hazard Mitigation.

		2) The Town will be updating its Comprehensive Plan in 2018 and will be able to add relevant content from this 2017 AHMP
Zoning Bylaws and Subdivision Regulations	2015	1) Generally adequate with regards to mitigating against common hazards. 2) No need to expand upon or improve bylaws related to hazard mitigation.
Hazard Specific Zoning (slope, wetland, conservation, industrial, etc.)	Forestry/Conservation, Flood Hazard, Shoreland Residential	1) Generally adequate with regards to mitigating against common hazards. 2) No need to expand upon or improve policies & programs with regard to hazards under its purview.
Participation in National Flood Insurance Program (NFIP) and Floodplain/Flood Hazard Area Ordinance	Yes / Yes	1) New DFIRMS adopted in 2011. The Town Zoning Administrator and the Town's Development Review Board (DRB) monitor compliance with the National Flood Insurance Program. The DRB reviews and adjudicates applications for development within the floodplain. 2) No need to expand upon NFIP participation or Flood Hazard bylaws.
Open Space Plans; Conservation Funds	None	1) None 2) Municipality considers regulatory programs and voluntary conservation efforts as adequate to address any hazard mitigation concerns.

The following table illustrates how Emergency Preparedness, Response & Recovery actions are carried out in the Town.

Table 5-2 Existing municipal emergency services & plans, Town of Milton

Type of Existing Protection	Description /Details/Comments
Emergency Services	Emergency response personnel may have overlapping responsibilities with other town response organizations.
Police Services	Milton PD
Police Department Personnel	14 Paid FTE Officers, 1 Paid FTE Admin
Fire Services	Milton FD
Fire Department Personnel	.5 FTE personnel, 50 volunteers.
Fire Department Mutual Aid Agreements	Various
EMS Services	Milton Rescue
EMS Personnel	44 volunteers
EMS Mutual Aid Agreements	various through VT EMS District #3
Emergency Plans	
Local Emergency Operations Plan (LEOP)	2016
Primary Shelter	Milton Elementary School
Replacement Power, backup generator	No generator, no transfer panel. Backup battery power for lights only.

Secondary Shelter	Milton Junior/Senior High School
Replacement Power, backup generator	Has limited emergency generator capabilities.

5.3 Town of Milton All-Hazards Mitigation Goals

The following goals were first approved by the Town in its 2005 and 2011 AHMPs and approved by Town of Milton officials during the development of this 2017 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 and as identified generally in the *Chittenden County Multi-Jurisdictional 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 stormwater management and the planning and development of various land uses.
- 5) Maintain existing municipal plans, programs, regulations, bylaws and ordinances that directly or indirectly support hazard mitigation.
- 6) Consider formal incorporation of this Local All-Hazards Mitigation Plan into the municipal comprehensive plan as described in 24 VSA, Section 4403(5), as well as incorporation of proposed new mitigation actions into the municipality’s/town’s bylaws, regulations and ordinances, including, but not limited to, zoning bylaws and subdivision regulations and building codes.
- 7) Consider formal incorporation of this Local All-Hazards Mitigation Plan, particularly the recommended mitigation actions, into the municipal/town operating and capital plans & programs especially, but not limited to, as they relate to public facilities and infrastructure, utilities, highways and emergency services.

With regards to a more formal process by which the Town will integrate the requirements of this mitigation plan into the Town’s Comprehensive Plan, as required by Vermont law, municipalities must update their Comprehensive Plans every eight years. During any update process undertaken from 2017-2021, the Town will review the recommended Actions detailed below to see if formal incorporation within the Comprehensive Plan (or any Plan implementation tasks) is warranted. Based upon communication from the Town of Milton’s Planning Division Director, the Town has already integrated aspects of this Plan in its draft 2108 Town Plan.

Additionally, as the CCRPC is tasked with also reviewing and approving each such municipal comprehensive plan for consistency with various requirements in state statute and consistency with the Chittenden County Regional Plan (aka the ECOS 2013 Plan). This review includes a detailed staff critique with recommendations for improvement. This CCRPC review provides

another opportunity to formally integrate elements of this local AHMP into the Town’s Comprehensive Plan.

With regards to a more formal process by which the Town will integrate the requirements of this mitigation plan while developing the Town’s annual capital improvement plans/budgets, from 2017-2021, the Town will review the recommended Actions detailed below to see if formal incorporation within these annual capital plans is warranted prior to annual review and voting by Town residents. Additionally, CCRPC staff can assist the town with drafting grant applications to fund mitigation projects.

5.4 Mitigation Actions

The table below records the strategies from the 2011 Plan and progress on their implementation. This table also encapsulates the Town’s decision making with regards to which Actions to continue, which to establish as new actions and which to discontinue. During the development of this Municipal AHMP and its parent Multi-Jurisdictional AHMP, FEMA staff indicated to the CCRPC a need to separate out or remove strategies which are more properly considered to be Preparedness, Response or Recovery strategies rather than Mitigation. Additionally, upon revisiting and reviewing the 2011 actions and devising action for this 2017 local AHMP CCRPC and municipal staff thought it would be best to focus on known and likely actions with a high likelihood of implementation versus consideration of more expansive but largely aspirational strategies.

Table 5-3 Progress on the Actions of the 2011 Milton All-Hazards Mitigation Plan

Action Primary Responsible Entity	Task	Brief Description	Progress since 2011 and recommendations for 2017 Plan
Evaluate capabilities of existing road and stormwater management infrastructure Highway Foreman, Town Engineer	Infrastructure Assessment for Stormwater Vulnerability	Assess the vulnerability and operational capability of municipal roads, culverts and stormwater infrastructure.	In progress REMOVE FROM NEW PLAN AND REPLACE WITH SW OPERATIONS (SEE NEXT ROW)
Rename as: Upgrade Stormwater Systems to mitigate against Severe Rainstorms and Water Pollution Public Works Dept. Director	Stormwater Management	Develop strategies to mitigate impacts of runoff such as excessive flow, sediment load and excessive phosphorus discharge	For 2017 to 2021, the Town anticipates conducting the following projects to mitigate the impacts of Severe Rainstorms and Water Pollution: -Catch Basin cleaning -Street Sweeping -Review of land development proposals to assure proper stormwater management
Rename as: Replace and improve infrastructure to mitigates against Severe Rainstorms and Fluvial Erosion Highway Foreman, Town	Bridge Replacement	Assess the vulnerability and operational capability of municipal bridges/culverts and if necessary develop designs and budgets for retrofit or replacement.	Both Bridge #5 and Bridge #6 on East Road crossings of Mallets Creek are considered undersized. Town determined that Bridge #6 will not support widening and will have to be replaced. Bridge #5 is still a concern but a lower priority compared to

<p>Engineer</p>			<p>Bridge #6. Both Bridge #5 and Bridge #6 on East Road crossings of Mallets Creek are considered undersized. Bridge #6 is the priority for the Town and the Town will continue to seek to obtain grant funds to replace this bridge. In addition to seeking grant funding, the Town will consider including funding for elements of this project in long-term municipal capital plans.</p>
<p>#2 Continue and improve highway, culvert and bridge maintenance programs</p> <p>Highway Foreman, Town Engineer</p> <p>Rename as: #2 Replace and improve infrastructure to mitigate against Severe Rainstorms and Fluvial Erosion</p> <p>Public Works Department Director</p>	<p>Culvert Upgrades</p>	<p>Upgrade culverts and ditching along roads to mitigate against repeated damages from stormwater or spring snowmelt.</p>	<p>Ditching and culvert upgrades have been made throughout the year. Some culvert work is still in progress. A culvert of Lake Road crossing Trout Brook was improved since 2011. The culvert was upsized from 32" to 96". Ditching and culvert upgrades have been consistently at numerous locations in recent years as follows: 2013: 16-18 sites; 2014: 5-10 sites, 2015: 10 sites. 2016: 14-15 sites Similar numbers are anticipated to occur each year from 2017-2021 Specific project locations include North Road; Everest Road; Other Class II Town roads</p>
<p>Highway Foreman, Town Engineer</p>	<p>Continued Monitoring of Vulnerable Infrastructure</p>	<p>Monitor bridges and culverts with erosion and scouring concerns.</p>	<p>In progress. In 2015 a retaining wall was installed at a culvert on North Road. <u>MONITORING IS NOT CONSIDERED MITIGATION. REMOVE FROM NEW PLAN</u></p>
<p>Highway Foreman, Town Engineer</p>	<p>Erosion/Landslide Mitigation</p>	<p>Undertake erosion or landslide mitigation projects where roads regularly incur damage from adjacent rivers/streams and hillsides.</p>	<p>Everest Road: Work completed in 2014: 500 ft. of fabric lining and stone lining of ditches completed to address issue of poor drainage Cadreact Road: this road had been a consistent problem due to poor drainage. The Town fixed this issue two years ago. Sanderson Road/ North Road, in 2016 the Town improved drainage along these roads <u>For 2017-2021:</u> Beebe Hill Road: consistent problem with spring "mud season". In 2017 or 2018 the Town will be blasting adjacent rock faces and installing ditching along 1600 feet to address problems with heaving and eroding shoulders. -Quarry Lane (2017): drainage improvements</p>

			Eagle Mountain Harbor Road: Two State Geologists visited the site in late May 2015. Based upon their recommendations, the Town will be improving drainage in fall 2017 and spring 2018
Highway Foreman, Town Engineer	Bridge Concerns	Address narrow bridge traffic safety concerns.	Reference Bridge 6 above. No studies conducted on Bridge 5 nor anticipated. REMOVE THIS "BRIDGE CONCERNS" AS IT IS CAPTURED IN THE "BRIDGE REPLACEMENT" ACTION.
Complete fluvial geomorphology assessment and develop strategies in response to identified risk. CCRPC, VT ANR	Fluvial Geomorphic Assessments	Conduct Phase I and Phase II fluvial geomorphic assessments on streams and waterways.	Completed for Mallets Creek and Allen(Petty Brook) REMOVE FROM NEW PLAN.

Action Primary Responsible Entity	Task	Brief Description	Progress
#3, continued CCRPC, VT ANR	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.	Completed for Mallets Creek and Allen(Petty Brook) REMOVE FROM NEW PLAN.
TBD, determined by funding.	River Corridor Management Plans	Where Phase I and II assessments are complete, develop a River Corridor Management Plan.	FOR 2017-201: Project ideas already identified in Phase 2 FEH reports for Mallets Creek and Allen (Petty) Brook. No formal Plan required. REMOVE FROM NEW PLAN
Town Planner	Fluvial Erosion Hazard Mitigation Implementation	Develop strategies to mitigate losses from identified fluvial erosion hazards.	FEH reports did not identify any highly critical locations however as part of Stormwater Management and Infrastructure Upgrades actions described above various undersized culverts will be replaced. REMOVE FROM NEW PLAN.
Planning Director	Flood Insurance Rating Map Updates	Review draft FIRM data. Develop strategies to mitigate losses from identified flood hazards.	DFIRM maps completed by FEMA. Updated zoning bylaws adopted. TASK COMPLETED. REMOVE FROM NEW PLAN
#4 Maintain and improve capabilities of existing and potential public shelters/ relocation sites. Emergency Management Director; Fire Chief	Existing Shelters	Continue to maintain relationships with existing designated American Red Cross Shelters.	Ongoing. Milton High School has partial power. NOT A MITIGATION ACTION. REMOVE FROM NEW PLAN.
Emergency Management Director; Fire Chief	Investigate Alternate Shelters	Investigate capabilities of other buildings sufficient to serve as smaller shelters.	Have designated additional buildings/space as shelters. Milton FD Station, Rescue, Public Works and Town offices have full

Emergency Management Director; Fire Chief			backup power. NOT A MITIGATION ACTION. REMOVE FROM NEW PLAN.
	Shelter Generators	Work with schools and other shelters to obtain funding for the purchase of generators and/or electrical transfer panels. Maintain practice of shifting electrical power as needed to provide power to critical sites.	Have tried, however, not a priority for school budgeting. NOT A MITIGATION ACTION. REMOVE FROM NEW PLAN.
#5 Review and modify evacuation and sheltering plans based on the results of drills and exercises or procedures implemented in an actual incident Emergency Management Director, Fire Chief	Evacuation and Sheltering Exercises	Conduct evacuation drills or exercises and evaluate performance.	On to do list. Have participated in training for all departments on state emergency system. Monthly fire drills are held at Town offices. NOT A MITIGATION ACTION. REMOVE FROM NEW PLAN.
Emergency Management Director, Fire Chief	Evacuation and Sheltering Plans	Review evacuation, sheltering, and relocation plans based on results of drills, exercises, and actual incidents.	Trainings are expensive and mandatory trainings which can cost \$1,200-\$1,400 have priority. Town agencies will be participating in State's "Vigilant Guard" exercise in summer 2016. NOT A MITIGATION ACTION. REMOVE FROM NEW PLAN.

Action Primary Responsible Entity	Task	Brief Description	Progress
#6 Ensure town and school emergency plans are fully coordinated. Emergency Management Director, School Principals	Emergency Plan Coordination	Continue coordination of town and school emergency plans.	Ongoing. Establishment of a formal School Safety Committee under discussion. NOT A MITIGATION ACTION. REMOVE FROM NEW PLAN.
Emergency Management Director, School Principals	Information and Media Centers	Establish an Information Center to handle information requests from concerned parents and relatives and a Media Center to ensure consistency of information released.	Part of EOC function if needed. NOT A MITIGATION ACTION. REMOVE FROM NEW PLAN.
#7 Raise public awareness of hazards, hazard mitigation and disaster preparedness. Fire Chief, Emergency Management Director	School Programs	Continue school programs to raise student awareness of hazards, safety, preparedness and prevention.	Ongoing. NOT A MITIGATION ACTION. REMOVE FROM NEW PLAN.

Fire Chief, Emergency Management Director	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. NOT A MITIGATION ACTION. REMOVE FROM NEW PLAN.
Fire Chief, Emergency Management Director	Fire Prevention Programs	Continue National Fire Prevention Week and other programs to raise public awareness of fire hazards, safety, preparedness and prevention.	Ongoing. NOT A MITIGATION ACTION. REMOVE FROM NEW PLAN.
Fire Chief, Emergency Management Director	Other hazard awareness programs	Develop public awareness programs, based on all-hazards needs. Programs to address pandemic hazards, preparedness and mitigation may be appropriate.	Ongoing. NOT A MITIGATION ACTION. REMOVE FROM NEW PLAN.
#8 Complete landslide hazard assessments, and develop strategies in response to identified risk. Vermont Geological Survey	Landslide Hazard Assessment Protocol	Develop a landslide hazard protocol to evaluate county slopes and waterways.	Completed by Vermont Geological Survey with CCRPC as partner. Protocol development testing included the towns of Essex, South Burlington, Colchester, Bolton and Shelburne. REMOVE FROM NEW PLAN.
Vermont Geological Survey, other appropriate entities TBD	Landslide Hazard Assessment and Mapping	Funding available, landslide hazards should be assessed and mapped in participating municipalities.	Other than the testing mapping described in the previous row, no funding has been secured to prepare additional maps. No funding identified for future research and not considered as significant hazard. REMOVE FROM NEW PLAN
#8, continued Planning Director	Landslide Hazard Mitigation Implementation	Develop strategies to mitigate losses from identified landslide hazards.	No significant landslide concerns in Milton. REMOVE FROM NEW PLAN

5.4.1 Current Capabilities and Need for Mitigation Actions

The Town Comprehensive Plan’s policies that support hazard mitigation, and the existing mitigation actions noted above, demonstrate the variety of policies and actions forming the foundation of this All Hazards Mitigation Plan. As detailed in the Table below, generally, the Town considers its existing capabilities, regulatory structure and programs as adequate to address its vulnerabilities however continuation of existing mitigation actions or the implementation of new actions are warranted for the 5-year period this Plan is effect.

Table 5-4 Town of Milton: Capabilities to address vulnerabilities from natural hazards

Hazard	Adequacy of Municipal Capabilities to address associated vulnerabilities (Excellent, Good, Average, Below Average)	Additional expansion or improvement in policies & programs needed to address hazard given long-term vulnerability
Severe Winter Storm	Excellent	No
Flooding	Excellent	No
Fluvial Erosion	Good	Yes, see actions below
Severe Rainstorm	Good	Yes, see actions below
Extreme Temperatures	Good	No, rare occurrence and extent, impact & vulnerabilities are limited.
Wildfire	Excellent	No, rare occurrence and extent, impact & vulnerabilities are limited.

Table 5-5 Town of Milton: Capabilities to address vulnerabilities from technological hazards

Hazard	Adequacy of Municipal Capabilities to address vulnerabilities (Excellent, Average, Below Average)	Additional expansion or improvement needed to address hazard given long-term vulnerability
Major Transportation Incident	Good + State agencies provide support	No, rare occurrence and extent, impact & vulnerabilities are limited.
Power Loss	Average. Private utilities are primarily responsible	No given that events are limited in duration and vulnerabilities are short-lived.
Hazardous Materials Incident	Good + State agencies provide support	No, rare occurrence and extent, impact & vulnerabilities are limited.
Water Service Loss	Excellent	No, rare occurrence and extent, impact & vulnerabilities are limited.
Gas Service Loss	Average. Private utility is primarily responsible	No, rare occurrence and extent, impact & vulnerabilities are limited.
Telecommunications Failure	Private utilities are primarily responsible	No, rare occurrence and extent, impact & vulnerabilities are limited.
Other Fuel Service Loss	Private businesses are primarily responsible	No, rare occurrence and extent, impact & vulnerabilities are limited.
Sewer Service Loss	Excellent	No, rare occurrence and extent, impact & vulnerabilities are limited.
Water Pollution	Good	Yes, see actions below

Invasive Species	Average	No, rare occurrence and extent, impact & vulnerabilities are limited.
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Table 5-6 Town of Milton: Capabilities to address vulnerabilities from societal hazards

Hazard	Adequacy of Municipal Capabilities to address vulnerabilities (Excellent, Average, Below Average)	Additional expansion or improvement in policies & programs needed to address hazard given long-term vulnerability
Crime	Good +State agencies provide support	No. Municipality participates in programs lead by regional and state entities.
Economic Recession	Good +State Agencies provide support	No Diversity of county economy mitigates vulnerabilities.
Terrorism	Good +State & Federal agencies provide support	No, rare occurrence.
Civil Disturbance	Good + State agencies provide support	No, rare occurrence
Epidemic	Average +State & Federal agencies provide support	No, rare occurrence
Key Employer Loss	Good +State agencies provide support	No. Diversity of employers in municipality mitigates vulnerabilities.

Note that this Plan does not recommend a discrete mitigation action regarding “future development.” Our justification for this is as follows:

- The municipality’s regulations, programming and staffing have prevented and will prevent new buildings and infrastructure being constructed in areas vulnerable to hazards. As documented in detail in section 4.6.2, despite active residential and commercial development, no structures and infrastructure subject to municipal regulation, have been constructed in either the Special Flood Hazard Areas or mapped River Corridor Protection Areas.
- For the next five years, there are no known or anticipated plans for the construction of municipal infrastructure in areas vulnerable to hazards.
- There is no evidence that unwise or poorly regulated development in the municipality has been a significant contributor to putting people or property in harm’s way.

Therefore, the reader will note that the proposed Mitigation Actions for the next five years represent a much more focused and achievable list of actions focused on those hazards (e.g. Severe Rainstorm, Fluvial Erosion, Water Pollution, etc.) that cause more frequent if less dramatic damages. It is these more mundane damages of erosion along road beds, damaged small culverts and the ongoing struggle to maintain and improve water quality (which cost the municipality and its taxpayers both time and money) that deserve the most attention rather than hazards that could hypothetically cause damage but which are rare and wherein the benefit-to-cost ratio for potential mitigation actions is weak (e.g. Major Transportation Incident, Hazardous Material Incident, Terrorism). No new discrete action is recommended with regards to Education & Awareness as the Town does not have adequate funds or staff to undertake such an effort nor is such an effort warranted given the identified vulnerabilities. **Lastly, it is also worthwhile to note that in comparison to the 2011 Plan the priorities for this 2017 Plan have not changed. The hazards and vulnerabilities remain the same as well. Indeed, the only real change is that there is a more heightened awareness due to the severity of recent disasters starting in 2011 to the present.**

5.4.2 Specific Mitigation Actions

The Town plans to conduct the following mitigation actions during the 5 year period this Plan is in effect.

CATEGORY A: Upgrade Stormwater Systems

Hazards Addressed: Severe Rainstorm, Water Pollution

Vulnerabilities Addressed: Damage to new/existing public infrastructure and buildings;
Temporary road and bridge closure and Budgetary impacts;

Status: Ongoing

Primary Responsible Entity: Town Public Works Department and Town Planning Department

Timeframe: Month 2017 through March 5, 2022 (update start after FEMA issues Final Approval)

Funding Requirements and Sources: FEMA or other hazard mitigation grants; FHWA grants; VTrans grants; Municipal Operating and Capital budgets only if sufficient

Progress since 2011: Not applicable. New strategy.

Specific Identified Actions

Action A-1: Catch Basin cleaning & Street Sweeping

Catch basin cleaning & street sweeping removes materials and pollutants which would otherwise cause damages to the ecosystem, to municipal infrastructure and result in the municipality not achieving compliance with its MS-4 permit which in turn would force the municipality to spend more money on personnel, equipment and projects to meet compliance. This is an effective, if low-profile, mitigation action.

Action A-2: Land development proposal review & regulation

Review of such proposals by municipal staff and the municipality's Development Review Board which issues permits assures that land development is sited appropriately and that adequate stormwater controls are required to reduce the amount of runoff from private residential and

commercial properties into the municipal road and stormwater infrastructure and in to local streams and Lake Champlain. While broad zoning measures set limits on such measures as units per acre, lot coverage, etc, the attention to detail given at the permit review and application phase is key to mitigating against the vulnerabilities from Severe Rainstorms and Water Pollution which can be exacerbated by poorly sited land development.

Action A-3: Develop Phosphorus Control Plan

Develop and begin to implement plans to reduce overall loading of phosphorus from within municipal boundaries that is eventually discharged into Lake Champlain. The exact nature and scope of these plans are not known at this time but MS4 permitted municipalities will be required to develop these plans as part of forthcoming requirements in an amended MS4 permit to meet the phosphorus targets in the Lake Champlain Total Maximum Daily Loads (LCTMDLs).

Rationale / Cost-Benefit Review: These improvements to the municipality’s stormwater management programs will assure that they remain in compliance with its MS4 permit and that various programs and projects will be implanted to better detain, infiltrate and treat runoff during severe rainstorm events. This will act to reduce overall water levels and velocity. The actions will also reduce pollutant and phosphorus loads into local streams and Lake Champlain.

CATEGORY B: Upgrade transportation infrastructure

Hazards Addressed: Severe Rainstorm, Fluvial Erosion and Water Pollution

Vulnerabilities Addressed: Damage to new/existing public infrastructure and buildings; Temporary road and bridge closure and Budgetary impacts;

Status: Ongoing

Primary Responsible Entity: Town Public Works Department

Timeframe: Month 2017 through March 5, 2022 (update start after FEMA issues Final Approval)

Funding Requirements and Sources: FEMA or other hazard mitigation grants; FHWA grants; VTrans grants; Municipal Operating and Capital budgets only if sufficient

Action B-1: Complete 5 to 15 culvert upgrade projects each year from 2017-2021.

Specific, known project locations, at this time, include:

North Road;

Everest Road; and

other Class II Town roads

Action B-2: Complete drainage improvement projects

Known locations at this time include:

Beebe Hill Road: consistent problem with spring “mud season”. In 2017 and 2018 the Town will be blasting adjacent rock faces and installing ditching along 1600 feet to address problems with heaving and eroding shoulders.

Quarry Lane (2017): improve drainage

Eagle Mountain Harbor Road: Two State Geologists visited the site in late May 2015. Based upon their recommendations, the Town will be improving drainage in fall 2017 and spring 2018.

Action B-3: Seek funding to upgrade Town Bridge #6, Mallets Creek

Bridge #6 is the priority for the Town and the Town will continue to seek to obtain grant funds to replace this bridge with a larger one. In addition to seeking grant funding, the Town will consider including funding for elements of this project in long-term municipal capital plans. This action will lower the risk of a catastrophic failure of the bridge.

Rationale / Cost-Benefit Review:

These locations are known to suffer low-level but repeated damages that require both municipal staff time and dollars to address. Implementation of the projects identified above will reduce the likelihood of future damages.

5.4.3 Prioritization of Mitigation Strategies

The above mitigation actions were listed in order of priority. Descriptions of specific projects, where available, are listed in Section 5.4.2 and in *Table 5-3* below. Because of the difficulties in quantifying benefits and costs, it was necessary to utilize a simple “Action Evaluation and Prioritization Matrix” in order to effect a simple prioritization of the mitigation actions identified by the jurisdiction. 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, as many projects are not fully scoped out at this time. The highest possible score is 45.

It is anticipated that, as municipalities begin 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, all proposed FEMA mitigation projects will undergo a benefit-cost analysis using a FEMA BCA template and approved methodology.

Other than the reclassification of some strategies as non-mitigation strategies and the consolidation of actions into categories, there have not been significant changes in the prioritization of strategies between 2011 and now, with one notable exception. Strategies related to landslide assessment have been removed from the plan. CCRPC and Town staff have concluded that landslides are not a discrete threat in Milton and are adequately captured in the plan’s discussion of fluvial erosion. Additionally, further work on the development of a Vermont-specific landslide risk estimation protocol has not progressed making landslide-specific strategies inappropriate at this time for inclusion in the County plan and its annexes.

Note that these priorities are within categories as this is more appropriate rather than ranking project that address different hazards.

Table 5-7 Town of Milton mitigation action evaluation and prioritization matrix

Mitigation Category & Actions	Responds to significant (likely or high risk) hazards	Likelihood of funding	Protect threatened infrastructure	Implemented quickly	Socially / Politically acceptable	Technically Feasible	Administratively Realistic	Reasonable cost to benefit	Environmentally sound	TOTAL SCORE
A: Upgrade Stormwater Systems										
A-1: Catch basin cleaning & street sweeping	5	5	5	5	5	5	5	5	5	45
A-2: Land development proposal review and regulation	4	5	5	4	4	5	5	5	5	42
A-3: Develop phosphorus control plan	4	4	5	3	4	4	4	5	5	38
B: Replace and improve infrastructure										
B-1: Complete 5-15 culvert upgrade projects per year	5	5	5	5	5	5	5	5	5	45
B-2: Complete drainage improvement projects	5	4	5	4	5	5	5	4	5	42
B-3: Seek funds to Upgrade Bridge #6	5	3	5	3	5	5	4	3	5	38

5 = Excellent; 4=Good; 3=Average; 2=Below Average or Unknown; 1=Poor

5.5 Implementation and Monitoring of Mitigation Strategies

The following *Table* is intended to aid municipal officials in implementing their mitigation actions for Milton and to facilitate the annual monitoring & evaluation of the plan as outlined in Section 1.7.4 above.

Table 5-8 Town of Milton Mitigation Actions: Implementation Monitoring Worksheet

<p>CATEGORY A: Upgrade Stormwater Management Systems to mitigate against Severe Rainstorm and Water Pollution and their associated vulnerabilities of:</p> <ul style="list-style-type: none"> • Damage to new/existing public infrastructure and buildings • Temporary road and bridge closure • Budgetary impacts 	
<p>Action</p> <p>Primary Responsible Entity</p> <p><u>Action A-1: Catch Basin cleaning & Street Sweeping</u> Public Works Dept. Director</p> <p><u>Action A-2: Land development proposal review & regulation</u> Planning Dept. Director</p> <p><u>Action A-3: Develop Phosphorus Control Plan</u> Public Works Dept. Director</p>	<p>Report on Progress since Plan adoption</p> <p>-annual # basins cleaned</p> <p>-annual # street miles swept</p> <p>-approximate annual # of site plans reviewed</p> <p>-approximate annual # of subdivision plans reviewed</p> <p>-progress on development of plan and filing to State</p>
<p>CATEGORY B: Upgrade Transportation Infrastructure to mitigate against Severe Rainstorms, Fluvial Erosion and Water Pollution and their associated vulnerabilities of:</p> <ul style="list-style-type: none"> • Damage to new/existing public infrastructure and buildings • Temporary road and bridge closure • Budgetary impacts 	
<p>Action</p> <p>Primary Responsible Entity</p> <p><u>Action B-1: Complete 5 to 15 culvert upgrade projects each year from 2017-2021</u> Public Works Dept. Director</p> <p><u>Action B-2: Complete drainage improvement projects</u> Public Works Dept. Director</p> <p><u>Action B-3: Seek funds to Upgrade Town Bridge #6</u> Public Works Dept. Director Town Manager</p>	<p>Progress since Plan adoption</p> <p><i>See Section 5.4 for details on locations identified during Plan development.</i></p> <p>-note annual # of culvert upgrades & on which roads</p> <p>--note year and road location of drainage improvements such as ditching, rock lining, etc.</p> <p>-note progress on grants/funding sources investigated, applied for and obtained</p>