Town of Andover, Vermont: Local Hazard Mitigation Plan

Adopted August 27,2018

Prepared by the Town of Andover and the Southern Windsor County Regional Planning Commission

2018-2023

CERTIFICATE OF ADOPTION

Town of Andover, VT
Selectboard

A Resolution Adopting the
Town of Andover 2018-2023 Local Hazard Mitigation Plan

WHEREAS, the Town of Andover has worked with the Southern Windsor County Regional Planning Commission to prepare an updated hazard mitigation plan for the town, to identify natural hazards, analyze past and potential future damages due to natural and man-made caused disasters, and identify strategies for mitigating future damages; and

WHEREAS, duly-noticed public meetings were held by the Andover Selectboard on June 26, 2017 to present and receive public comment on the draft Plan; and

WHEREAS, the updated 2018-2023 Andover Local Hazard Mitigation Plan was submitted to the Division of Emergency Management and Homeland Security and the Federal Emergency Management Agency for review on 10/2/17 & 7/10/18 and

WHEREAS, the updated 2018-2023 Andover Local Hazard Mitigation Plan demonstrates the community's commitment to implementing the mitigation strategy and authorizes responsible agencies to execute their actions; and

NOW, THEREFORE BE IT RESOLVED that the Town of Andover Selectboard hereby adopts the 2018-2023 Andover Local Hazard Mitigation Plan for municipal use and implementation.

Duly adopted this 27TH day of August, 2018.

Andover Selectboard:

Harold J Moore
Chair, Andover Selectboard

Member

Member

Member

Member

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INTRODUCTION

The goal of this stand-alone Local Hazard Mitigation Plan is to help the community identify risks and provide local mitigation strategies it can take to make Andover more disaster resilient.

What is Hazard Mitigation?

Hazard mitigation is an action taken to reduce or eliminate the long-term risk to human life and property from both natural and man-made hazards. The work done to minimize the impact of hazard events to life and property is called Hazard Mitigation Planning.

1. PURPOSE

The Federal Emergency Management Agency (FEMA), Vermont Emergency Management (VEM), and local towns have come to recognize that it is less expensive to prevent disasters than to repeatedly repair damage after a disaster has struck. Hazards cannot be eliminated, but it is possible to determine what the hazards are, where the hazards are most severe, what is most likely to occur and identify what local actions can be taken to reduce the severity of the hazard and reduce their impacts on the community.

Hazard mitigation planning and strategies include the following benefits:

- structural or land improvements
- increased public education and awareness of hazards
- altering the hazard area to remove the hazard occurrence
- reducing the hazard frequency through structure or land treatment
- increased community support for specific actions to reduce future losses
- reduction in financial and physical losses caused by hazard events
- eligibility for hazard mitigation grants and aid
- strengthened partnerships

The Town of Andover Local Hazard Mitigation Plan is a stand-alone plan to assist the town in identifying hazards within the town and identify strategies to reduce or eliminate these hazard risks.

Previously, the Town of Andover Hazard Mitigation Plan was an annex to the Southern Windsor County Regional Planning Commission Multi-Jurisdictional All Hazard Mitigation Plan. The updated plan is intended to serve as a 'stand-alone' plan for the Town of Andover and will focus on the hazards and mitigation programs best suited for the town.

It is the intent of the town, once this plan is formally approved by FEMA, to incorporate and address recommended mitigation strategies in the town's future comprehensive, emergency operations and disaster response planning, the town plan and in the update of town bylaws and ordinances. The town also intends to continue the cross-board communication in development and implementation of updates to these plans. Andover encourages hazard mitigation planning

to be incorporated into other community planning projects, such as the Town Plan, capital budget planning, and Local Emergency Operations Plan.

2. TOWN PROFILE

The Town of Andover is located within Windsor County in southeastern Vermont, bordered by the Towns of Chester, Ludlow, Weston, Windham, and Londonderry. VT Route 11 connects with large population areas outside of Andover. Andover has a land area of approximately 18,560 acres while the majority of land cover in town is forested. Agricultural land is located in the valleys and plateaus where the best soils and slope conditions are found.

Andover had a peak population of 1000 people in 1820 and, according to the U.S. Census, a population of 467 persons in 2010. Andover is a rural town with no urban centers. Another important trend that should be recognized is the steadily increasing number of seasonal homes in Andover. In 1980 there were 99 seasonal housing units. At the last count, in 2010, 174 were reported (2010 U.S. Census).[1] A 2-acre minimum lot size prevails over Andover. Development is limited to on-site septic systems and private water wells. Andover adopted flood hazard regulations, requiring review by the Planning Commission, over any development proposal within 100 year floodplain or Zone A of the FEMA Flood Hazard Boundary Map. A significant portion of town lies on slopes greater than twenty-five percent, and have soils not suitable for dense development.

The ongoing growth and expansion of the Okemo Mountain Resort in Ludlow and other nearby ski areas may put some residential development pressure on the Town of Andover. The town consists of single family residential homes and seasonal homes (due in part to Andover's proximity to the Okemo ski area) with very little commercial development. There are a few businesses that operate in town, but most people work in surrounding towns. Development in the Town of Andover has been significantly influenced by its topography and road access. Generally, commercial development has occurred along Andover Road and Route 11 with the exception being the Tater Hill recreational area which is located in the Towns of Windham and Andover. Current land use patterns are influenced by some limitations (steep slopes, shallow soils), but important factors such as technological advances and availability of capital are providing opportunities for development in areas that were once considered severely limited. The Town is served by private wells and on-site septic systems.

As in all of Vermont, the climate is generally temperate with moderately cool summers and cold winters. Average annual precipitation is around 40 inches, and snowfall generally ranges from a minimum of 70 inches to as much as 200 inches in the mountains. The weather can be unpredictable at times, with large variations in temperature, precipitation, and other conditions occurring both within and between seasons. The highest elevation in town is 2,882 feet on

[1] Andover Town Plan 2013

Terrible Mountain. Major transportation routes include VT Routes 11 and 100 as well as Weston-Andover Road.

3. PLANNING PROCESS

The local planning process used to develop this hazard mitigation plan follows guidance by the Federal Emergency Management Agency (FEMA) and Vermont Emergency Management (VEM). Beginning in the spring of 2014, the Southern Windsor County Regional Planning Commission (SWCRPC) staff reviewed the 2012 Andover All Hazard Mitigation Plan, which at the time was an annex to the Southern Windsor County Regional Planning Commission Multi-Jurisdictional All Hazard Mitigation Plan to identify key areas for updates. In 2013, the State of Vermont adopted an updated Hazard Mitigation Plan in November (Vermont HMP 2013), which was consulted during this update.

4.1 Public Process

The Town of Andover in partnership with the Southern Windsor County Regional Planning Commission established a plan of completion for the Andover Local Hazard Mitigation Plan which included public meetings to discuss and complete the following:

- Complete hazard analysis and hazard extent
- Review hazard history and identify additional data to be included
- Review plan and identify mitigation strategies to address each high hazard
- Review past completed or on-going mitigation projects and actions
- Identify new mitigation projects and actions

4.2 Plan Update Process

In April of 2014, June 2016, December 2016 and again in May 2017, SWCRPC staff met with the Andover Hazard Mitigation Committee to complete the hazard analysis and perform a hazard extent mapping exercise.[2] Participants also discussed the purpose and timeline for updating the plan along with groups/individuals that should be invited to meetings and made aware of the plan update.

The current plan is an extensive update to the previous annex plan. A partial list of revisions that have been made include:

- General updates
- Reorganization/restructuring of the plan
- Revaluation of hazards and edits as necessary
- Update of data and statistics

[2] See Appendix for sign-in sheets

- Status and update of mitigation strategies
- Identification of new mitigation strategies
- Maps

In the winter of 2016/2017, SWCRPC staff reviewed and edited the previous version of the Hazard Mitigation Plan to continue the rewriting process. This revision includes updating population statistics in the town profile section, incorporating hazard events that occurred since the last plan, updating the hazard analysis, data additions and updates, and reviewing the progress of past mitigation actions. Following the draft edits completed by the SWCRPC, a publicly noticed meeting was held at Andover Town Hall in May and June 2017[3]. SWCRPC met with the Andover Selectboard and reviewed the draft plan at their publicly noticed June 26, 2017 meeting. No comments were received at that meeting. Simultaneously, the revised draft plan was put out for public comment. This was done by posting an electronic copy on the SWCRPC website and having a hard copy of the plan advertised and made available at the town office for public review and comment. Instructions included contacting Allison Hopkins at SWCRPC by phone or email, email address was provided. No comments were received from the public at the meeting or from the website postings. On June 28, 2017 the Andover LHMP was distributed to adjacent towns for comment via email (Chester, Weston, Ludlow, Londonderry, and Windham). Specifically, Andover's Hazard Mitigation Committee, via SWCRPC, sent the plan to each of the neighboring Town Clerk's with a request to provide a copy to the Planning Commission and Selectboards. The adjoining towns were asked to provide comments and/or feedback via email to SWCRPC and the Hazard Mitigation Committee within 15 days. As of July 14, 2017 no feedback was received.

Attendees of these meetings consisted of members of the Andover Planning Commission, Selectboard, Town Manager, town personnel, members of the public and SWCRPC staff.

- Barry Williams – Selectboard Member
- Kevin Baker – Andover Public Works Director
- Charles Golden – Andover Public Works and Planning Commission Member
- Jeanette Haight – Andover Town Clerk
- Allison Hopkins – SWCRPC Senior Planner
- Ken Hathaway – Andover EMD
- Members of LEPC 3 also assisted at various LEPC 3 meetings when the plan was discussed

The meeting agendas included a section by section review of the previous plan with an emphasis on identifying the highest hazards facing the town and mitigation actions specific to the town. The previous version of the Andover Hazard Mitigation Plan, Andover Town Plan and the recently updated SWCRPC Regional Plan were provided as examples to facilitate the discussion of highest

[3] See Sign-in sheet

hazards facing the town. Attendees of the meeting collaborated in creating the hazard analysis seen in the Hazard Identification and Analysis section of this Plan (Table 1).

At a subsequent meeting attendees discussed areas of town most likely to be affected by these hazards as well as future goals and mitigation strategies that may be undertaken to reduce the risk of future harm and cost to the town. These mitigation strategies were incorporated into the implementation schedule at the end of this document. Changes in priorities, development, and local mitigation efforts were also considered both at these meetings and during the entire revision process. Mitigation Strategies included developing goals, objectives and strategies aimed at mitigating future disaster losses that are cost-effective, technically feasible, and environmentally sound. Following the meetings, SWCRPC staff made the revisions and drafted a new, updated plan which is available for review at the Andover Town Office and posted on the SWCRPC website (www.swcrpc.org). The final adopted Andover Local Hazard Mitigation Plan will also be posted on the SWCRPC website and available at the Town Offices. All meetings of the Andover Hazard Mitigation Committee were posted at the Andover Town Office and the SWCRPC website. No public comments or feedback were received.

This plan has also been updated to reflect progress in local mitigation planning efforts. The table below (Table 1) incorporates status updates for actions from the previous plan. The majority of the not-completed actions have been revaluated and incorporated into the new Projects and Actions table near the end of this document as the towns priorities have largely remained the same from last plan. However, several of the not-completed actions were not chosen to be on the updated list due to a change in priority – mostly related to funding and high costs as a deterrent. The priority for the installation of dry hydrants into private water sources has remained the same since the last plan and is still "medium". The priority to map ponds as emergency water sources has remained the same since the last plan and is still "high". The priorities to assess the vulnerability of critical facilities to earthquake, high winds, and snow load capacity; and to provide 'firewise' practice materials to home and property owners have been removed since the last plan due to staff capacity. The Town of Andover and the Hazard Mitigation Committee decided that other actions had higher priority and feasibility of completion. Again, the following not completed actions were not carried forward: assess the vulnerability of critical facilities to earthquake, high winds, and snow load capacity (because town does not have the resources to complete nor concerned of the vulnerability), provide 'firewise' practice materials to home and property owners (because Chester provides fire services to the town and has not provided this service). Completed efforts were also not carried forward unless they are of an on-going nature (because they have been completed as shown in status column in **Table 1**).

Table 1: Status on Past Plan Mitigation and Preparedness Projects and Actions

MITIGATION ACTION	TYPE OF ACTION	HAZARD ADDRESSED	RESPONSBILE PARTY	TIME FRAME	FUNDING SOURCE	STATUS

Upsize and replace culverts as needed	Mitigation	Flooding, Transportation Disruption	Road Foreman, Selectboard	Annually	Town budget	Completed; Checked a minimum of 2 times per year
Purchase generator for town hall	Preparedness	Severe Winter Weather, Flooding	Selectboard, Emergency Management Director	2012-2015	VEM Generator Grant	Completed; Have 2 portable.
Install dry hydrants into private water sources	Mitigation	Fire	Emergency Management Director, Selectboard	2013-2015	Town Budget, HMGP	Not completed. Moved to current prioritization schedule.
Locate and map ponds as emergency water source	Preparedness	Fire	Emergency Management Director, SWCRPC	2012-2013	No cost to town	Partially completed. Data collected.
Develop Continuity of Government Plan	Mitigation, Preparedness	Severe Winter Weather	SWCRPC, Selectboard	2013-2015	No cost to town	Completed.
Review 2011 Commodity Flow Study to assess hazardous materials transportation routes	Mitigation	Hazardous Materials, Transportation Disruption	Emergency Management Director, Road Foreman, Selectboard	2012-2014	No cost to town	Completed. Presented to town for review.
Make NFIP educational material available in town	Mitigation	Flooding	Zoning Administrator, SWCRPC	2012-2014	HMGP, SWCRPC EMPG funds	Completed.
Coordinate with power companies in developing strategies to	Mitigation	High Wind, Severe Winter Weather	Selectboard, Power Company, Tree Warden	2013-2016	No cost to town	Partially completed. Recently completed Green Mountain Power survey.

limit loss of power						
Assess the vulnerability of critical facilities to earthquake, high winds, and snow load capacity	Mitigation	Earthquake, High Winds, Severe Winter Weather	Selectboard, Zoning Administrator	2014-2019	HMGP, Town Budget	Not completed. Removed no longer a concern.
Conduct town education and outreach programs	Mitigation	Earthquake, Severe Winter Weather	Selectboard	2012-2014	No cost to town, SWCRPC	Partially completed. Winter weather driving brochure completed to address severe winter weather hazard.
Provide 'firewise' practice materials to home and property owners	Mitigation	Structure Fire, Wildfire	Selectboard, Emergency Management Director	2012-2014	No cost to town	Not completed. Removed from prioritization as Chester provides aid.
Encourage the tie-down of propane tanks	Mitigation	Hazardous Materials, Flooding	Emergency Management Director, Planning Commission	2013-2015	No cost to town	Completed. Campground educated and tanks now bolted down.

The list below offers a sample of the mitigation actions that have occurred in Andover over the last 5 years:

- 1053 Simonsville Road HMGP buyout program currently in process

- Culvert replacements:

road	local_id	year_built	comment1	comment4
SIMMONS RD	Simmons Rd - 2	2011	Plugged	replaced after TS Irene 2011
LITTLE POND RD	Little Pond Rd - 1	2011		replaced after TS Irene 2011
LOVEJOY BROOK RD	Lovejoy Brook Rd - 6	2011		replaced after TS Irene 2011
MIDDLETOWN RD	Middletown Rd - 21	2011		replaced after TS Irene 2011
MIDDLETOWN RD	Middletown Rd - 5	2011		replaced after TS Irene 2011
MARSH HILL RD	Marsh Hill Rd - 6	2011	Black plastic	replaced after TS Irene 2011
OLD GULF RD S	Old Gulf Rd - 3	2011		new after TS Irene 2011
SIMMONS RD	Simmons Rd - 1	0		repaired after TS Irene 2011
MIDDLETOWN RD	Middletown Rd - 12	2011		replaced after TS Irene 2011
SCHMIDT RD	Schmidt Rd - 4	2011		replaced after TS Irene 2011
SCHMIDT RD	Schmidt Rd - 3	2011		replaced after TS Irene 2011
SCHMIDT RD	Schmidt Rd - 2	2011	Black plastic	replaced after TS Irene 2011
MARSH HILL RD	Marsh Hill Rd - 18	2012	Replaced 2012 but needs more depth	
HOWARD HILL RD	Howard Hill Rd - 4	2014	Destroyed in July 2014 storm and replaced. Shallow cover due to ledge. Remedied erosion issues when replaced.	Jul-14
MIDDLETOWN RD	Middletown Rd - 18	2011		replaced after TS Irene 2011
HOWARD HILL RD	Howard Hill Rd - 1	2011		replaced after TS Irene 2011
E HILL RD	East Hill Rd - 34	2013	replaced 2013. Previously a 30 inch culvert.	
HOWARD HILL RD	Howard Hill Rd - 3	2011	Black plastic	replaced after TS Irene 2011
GATES RD	Gates Rd - 3	2011		replaced after TS Irene 2011
STIGERS RD	Stigers Rd - 10	2011	Replaced in 2011 prior to Irene	
HOWARD HILL RD	Howard Hill Rd - 11	2011		replaced after TS Irene 2011
MIDDLETOWN RD	Middletown Rd - 19	2011		replaced after TS Irene 2011
STIGERS RD	Stigers Rd - 8	2014		Replaced after July 2014 storm
STIGERS RD	Stigers Rd - 7	2011	Need to change alignment so output into trees not field	Replaced after TS Irene 2011
SCHMIDT RD	Schmidt Rd - 1	2011		replaced after TS Irene 2011
HOWARD HILL RD	Howard Hill Rd - 10	2014	Replaced after July 2014 storm	Jul-14
MIDDLETOWN RD	Middletown Rd - 7	2011		replaced after TS Irene 2011
N HILL RD	North Hill Rd - 5	2011	State bridge B10	replaced after TS Irene 2011
SIMMONS RD	Simmons Rd - 6	2014	Pre-2014 was 15x15x40	cleaned after TS Irene 2011
STIGERS RD	Stigers Rd - 11	2011		Replaced after TS Irene 2011
STIGERS RD	Stigers Rd - 12	2014	Was plastic 18 inch prior to 2014	Replaced after July 2014 storm

There has been some very small scale development in the last five years, and no major development is anticipated in the next five years. According to town records only 3 permits were issued for new residential structures and 3 permits for residential additions in 2016. This small amount of development has not impacted the Town's vulnerability.

The following plans, studies, reports, and technical information was consulted during the preparation of this plan:

- Southern Windsor County Regional Planning Commission Multi-Jurisdictional All-Hazard Mitigation Plan with Andover, VT Annex. Adopted October 12, 2012.
- Williams River Corridor Plan September 29, 2016 – SGA study which helps to delineate fluvial erosion hazard areas. The town does not have any studies of landslides or earthquakes.
- Andover Town Plan. Adopted April 8, 2013
- Andover Local Emergency Operations Plan (LEOP). Adopted April 11, 2016
- Flood Insurance Study for Windsor County, Vermont (dated 09/28/2007)
  Southern Windsor County Regional Planning Commission. 2014 Regional Plan. Volumes 1 and 2. Adopted November 18, 2014

4.3 Plan Maintenance Process

The future method for monitoring and evaluating the Andover Local Hazard Mitigation Plan includes annual meetings of the identified Hazard Mitigation Review Committee in partnership with the SWCRPC. The purpose of these meetings will be to continue to identify hazards which may threaten structures and property within the town and to review the mitigation strategies included within this plan. The mitigation strategies will be reviewed annually to ensure that appropriate actions are being followed and budgeted for as necessary. The annual evaluation will include assessment of whether the goals of the plan are being achieved. If prioritizations have changed during the past year reasons why will be noted and used during the next update. These efforts will be coordinated by the Town Clerk and Selectboard. An effort will be made to involve representatives from the Chester Volunteer Fire Department, Chester Police Department, Andover EMD, Andover Planning Commission, Andover Zoning Administrator and Andover Highway Department along with local volunteer boards and interested members of the public, including local business owners. In addition, neighboring communities will be pointed to where draft versions can be found for review and comment. An opportunity to provide public input will also be scheduled for a Selectboard meeting once each year.

Additional outreach will continue to garner input from community members and businesses which have not been included in previous hazard mitigation planning efforts. The Town of Andover and SWCRPC recognize the importance of public participation in hazard mitigation planning and will continue to provide opportunities for public comment and review during future plan revisions and updates. In addition, the town realizes the importance of improving communication and integration among diverse committees, plans and regulations while meeting state requirements for hazard mitigation and flood resilience. This plan encourages hazard mitigation planning to be incorporated into other community planning projects, such as the Town Plan, budget planning, and the Local Emergency Operation Plan.

The Hazard Mitigation Committee will be responsible for monitoring this plan to ensure that specific mitigation actions are implemented as resources or opportunities become available. This includes the identification and application for additional funding opportunities. The hazard mitigation committee will also be responsible for reviewing the plan to ensure proposed mitigation actions remain in line with current town goals, strategies, and policies.

Just under four years into the five year plan revision process, the SWCRPC and Local Emergency Planning Committee (LEPC) 3 will assist the Andover Hazard Mitigation Committee in revising and updating this plan to incorporate issues which have been identified during the ongoing mitigation meetings. The Andover Local Hazard Mitigation Plan update process will begin in January 2021 assuming an October 2017 plan adoption, with the first public meeting of the Hazard Mitigation Committee. All public meetings will be warned following town protocols.

Following the meeting, a draft plan will be made available for public comment. The plan will be available on the SWCRPC website www.swcrpc.org, and paper copies will be available at the town office. A second publicly warned meeting will be held no later than June 2021 in which any substantial revisions gathered during the public input period will be discussed. The SWCRPC will make all necessary edits to the plan and provide the Hazard Mitigation Committee with a revised version for final review. Subsequently, the plan will be sent to the Vermont State Hazard Mitigation Officer for referral to FEMA for Approval Pending Adoption (APA). Following APA, the town may then adopt the Andover Local Hazard Mitigation Plan and forward a copy of the adoption resolution for FEMA to complete the plan approval and adoption process.

5. RISK AND VULNERABILITY ASSESSMENT

The following assessment addresses the Town of Andover's vulnerability to all of the hazards identified by the Hazard Mitigation Committee during the hazard analysis. The likelihood of occurrence and impact to the town were used to assess the town's vulnerability to each hazard.

5.1 Hazard Identification and Analysis

A hazard vulnerability assessment for the town began with an inventory of all possible hazards, both natural and man-made, the anticipated amount of warning time and an assessment of the risk each poses. The ranking methodology used for the analysis ranked the frequency of occurrence, warning time, and potential impact and provided an overall hazard score. For this plan, the hazards which ranked around a seven were considered for inclusion and additional information. Hazards not considered as a "high hazard" may still occur.

Table 2: Hazard Analysis

Hazard	Frequency of Occurrence	Warning Time	Potential Impact	Hazard Score
Flash Flood/Flood/Fluvial Erosion	4	2	3	9
Severe Weather (Thunderstorm, Lightning, High Wind, Tornado, and Hail) *Note: We have defined 'Severe Weather' to include two or more of the above hazards.	4	1	1	6
Landslides/Mudslides/Rockslides	1	4	1	6
Hurricanes/Tropical Storms	2	1	4	7
Wildfire	1	1	2	4
Extreme Cold/Snow/Ice Storm	4	1	2	7
Structural Fire	3	4	1	8
Dam Failure	1	3	2	6
Ice Jams	2	2	1	5
Drought	1	1	2	4
Earthquake	1	4	1	6
Hazardous Material Spill	1	4	1	6
Extreme Heat	1	1	1	3
Invasive Species/Infestation	4	1	1	6

- Frequency of Occurrence
  - 1 = Unlikely. <1% probability of occurrence in the next 100 years (less than 1 occurrence in 100 years)
  - 2 = Occasionally. 1-10% probability of occurrence per year, or at least 1 chance in the next 100 years (1 to 10 occurrences in 100 years)
  - 3 = Likely. >10% but <100% probability per year (at least 1 chance in the next 10 years)
  - 4 = Highly Likely. 100% probable in a year (annual occurrence)

- Warning Time
  - 1 = More than 12 hours
  - 2 = 6 – 12 hours
  - 3 = 3 – 6 hours
  - 4 = None / Minimal

- Potential Impact
  - 1 = Negligible. Isolated occurrences of minor property damage, minor disruption of critical facilities and infrastructure, and potential for minor injuries
  - 2 = Minor. Isolated occurrences of moderate to severe property damage, brief disruption of critical facilities and infrastructure, and potential for injuries
  - 3 = Moderate. Severe property damage on a neighborhood scale, temporary shutdown of critical facilities, and/or injuries or fatalities
  - 4 = Severe. Severe property damage on a town-wide or regional scale, shutdown of critical facilities, and/or multiple injuries or fatalities

5.2 Detailed Hazard Analysis

While the town may be affected by many hazards, the detailed hazard analysis and potential loss estimates listed in this plan have been identified as having a 'high' likelihood of occurrence within Andover. The types of hazards having the greatest impact can be gleaned from **Table 3**, a listing of **FEMA Disaster Declarations for Windsor County** since 1990.

Less significant hazards did not have occurrence frequencies or levels of impact that would necessitate a more detailed level of analysis. Human losses are also not calculated in this plan, but may be expected to occur depending on the type and severity of the hazard.

The following hazards have been identified as having a relatively 'high' total impact score based on the methodology above*:

SCORE	HAZARD
9	**Flash Flood / Inundation Flood / Fluvial Erosion**
8	**Structural Fire**
7	**Extreme Cold/Snow/Ice Storm**
7	**Hurricanes/Tropical Storms****

**For hazards that did not rank "7" or higher, and are not profiled in this plan, the reader is directed to the Vermont State Hazard Mitigation Plan. Hazards that ranked low in the above table are not detailed as they are not likely to occur in Andover or are a way of life in Vermont and handled well by the Town.*

*** Included because of the widespread devastation that occurred during Tropical Storm Irene across the State and not considered a "way of life" in Andover.*

When possible, previous occurrence data specific to Andover has been provided, however, for all high hazards this was not possible and the best available information has been provided. Much of the available hazard data was found to be on a county, regional or state level. Throughout the life span of this Andover Local Hazard Mitigation Plan, both the town and the SWCRPC will strive to continually gather local hazard information.

Table 3: Federal Disaster Declarations for Windsor County VT

Federal Disaster Declarations: Windsor County 1990 – 2017 (1/27/17)		
FEMA Disaster Number	**Date of Declaration**	**Description**
4207	February 3, 2015	Severe Winter Storm
4140	August 2, 2013	Severe Storms and Flooding
4120	June 13, 2013	Severe Storms and Flooding
4066	June 22, 2012	Severe Storm, Tornado, and Flooding
4043	November 8, 2011	Severe Storms And Flooding
4022	September 1, 2011	Tropical Storm Irene
4001	July 8, 2011	Severe Storms And Flooding

1995	June 15, 2011	Severe Storms And Flooding
1951	December 22, 2010	Severe Storm
1790	September 12, 2008	Severe Storms and Flooding
1784	August 15, 2008	Severe Storms, Tornado, and Flooding
1778	July 15, 2008	Severe Storms and Flooding
1715	August 3, 2007	Severe Storms and Flooding
1698	May 4, 2007	Severe Storms and Flooding
1559	September 23, 2004	Severe Storms and Flooding
1488	September 12, 2003	Severe Storms and Flooding
1428	July 12, 2002	Severe Storms and Flooding
1358	January 18, 2001	Severe Winter Storm
1336	July 27, 2000	Severe Storms And Flooding
1307	November 10, 1999	Tropical Storm Floyd
1228	June 30, 1998	Severe Storms and Flooding
1184	July 25, 1997	Excessive Rainfall, High Winds, Flooding
1124	June 27, 1996	Flooding
1101	February 13, 1996	Storms and Flooding
1063	August 16, 1995	Heavy Rain, Flooding
990	May 12, 1993	Flooding, Heavy Rain, Snowmelt
938	March 18, 1992	Flooding, Heavy Rain, Ice Jams
875	July 25, 1990	Flooding, Severe Storm

a) Flash Flood/Inundation Flood/Fluvial Erosion

Flash floods and Fluvial Erosion are significant natural hazard events in the Town of Andover, and Windsor County, including inundation flooding events, ice jams, and potential dam failures. The town is susceptible to both flash flooding, frequently caused by summer thunderstorms and spring snow runoff, and the fluvial erosion which often accompanies these events. Flash flooding is further aggravated by fluvial erosion from previous damaging flood events. The damage from spring flooding events can vary greatly depending upon the amounts of precipitation, snow cover, spring melt, soil saturation, existing erosion and topography.

The Federal Emergency Management Agency (FEMA) has designated small floodplain areas within Andover along the Williams River and its tributaries. The town is currently a participatory, non-sanctioned member of the National Flood Insurance Program and regulates development in the floodplain through the enforcement of the Town of Andover Flood Hazard Area Regulations. Vermont Agency of Natural Resources has

recently mapped river corridors for these stream segments along with special flood hazard areas which can be found on-line.[4] **See water resources map**.

A significant flood event in designated floodplain areas could potentially disrupt evacuation routes and may impact residential structures, hazardous materials storage, and "at risk" populations. Damage from a **100-year flood** event would be influenced by the following factors unique to the Town of Andover:

- Estimated number of residential structures in 100-year flood zone: 4 in A zone as mapped by FEMA.
- Estimated number of bridges and culverts within Andover from the Vermont Online Bridge and Culvert Inventory Tool is 413 (16 bridges, 397 culverts), last inventoried in 2013. Approximately 74 of the culverts are in fair or worse condition.
- The 2016 equalized municipal property values of all residential and commercial property was $2,728,608.00
- There are 11 small private property dams, including beaver dams locally known as: Dorman, Simmons, Spruce, Mansion, Lovejoy, Willeys, Little Pond, Moosewalk, Weston Andover Road (2), and Blanchard Road.

Flash flooding typically occurs during summer when a large thunderstorm or a series of rain storms result in high volumes of rain over a short period of time. Infrastructure and structures along higher elevation streams and drainage areas are often the most vulnerable to damage from flash flooding. The National Weather Service describes a flash flood as:

"A flood caused by heavy or excessive rainfall in a short period of time, generally less than 6 hours. Flash floods are usually characterized by raging torrents after heavy rains that rip through river beds, urban streets, or mountain canyons sweeping everything before them. They can occur within minutes or a few hours of excessive rainfall. They can also occur even if no rain has fallen, for instance after a levee or dam has failed, or after a sudden release of water by a debris or ice jam[5]".

Table 3 above shows FEMA Disaster Declarations for Windsor County from 1990-2015. The table shows that, of the 28 disaster declarations for Windsor County, 25 were related

[4] The ANR FLOOD READY link below shows river corridors overlays comparable to FEH zones
http://maps.vermont.gov/ANR/Html5Viewer/Index.html?configBase=http://maps.vermont.gov/Geocortex/Essentials/ANR/REST/sites/Focus_on_Floods/viewers/FocusOnFloodsHTML/virtualdirectory/Resources/Config/Default

[5] National Weather Service http://www.srh.noaa.gov/mrx/hydro/flooddef.php

to flooding. Not all of these events had an impact on Andover and some less severely than on other towns.

Infrastructure and structures along higher elevation streams and drainage areas are most susceptible to damage from flash flooding. Due to the nature of flash flood events, it is difficult to accurately predict potential losses to public infrastructure. Although these events are uncommon, hazards posed can be significant challenges as seen in the Tropical Storm Irene event in the summer of 2011. (See **Map 1: Road Network Damage from Tropical Storm Irene**). Reparations continue.

Picture: A defunct concrete stream crossing to be removed as part of the Andover flood resilience project.

The SWCRPC was recently awarded, in the winter of 2017, $26,520 through the Department of Environmental Conservation's Ecosystem Restoration Program to conduct a series of small flood resiliency projects along the confluence of Andover Branch and Trout Brook in Andover. This effort is intended to reestablish floodplain access and stabilize stream banks to reduce sedimentation in the stream. The SWCRPC is partnering with the Windham County Natural Resources Conservation District and the Southeastern Vermont Watershed Alliance on this effort.

No source of historical flood and precipitation data could be identified for the town of Andover, but the Town of Cavendish, Vermont located a few miles to the northeast has historical data for the last 100 years. Given the close proximity of the towns, precipitation and flood data for the Town of Cavendish can be used to gain an understanding of the potential impacts these hazards pose to the Town of Andover.

Notable and recent flood events that have occurred in Andover are:

- Flash flooding (6/1960)
- Ice jams on Williams River, Middle Branch Williams River, So. Branch Williams River (2/1976)
- Ice jam on Williams River (1/1990)
- Ice jam on Williams River (1/1996)
- Ice jam on Williams River (1/1999)
- Ice jams (2) on Williams River (12/2000)
- Ice jams on Williams River (2007)
- Flash flooding following Tropical Storm Irene (2011)
- Flash flooding (July 2014)

Fluvial Erosion is erosion caused by rivers and streams, and can range from gradual bank erosion to catastrophic changes in river channel location and dimension during high flow

conditions. While some flood losses are caused by inundation (i.e. waters rise, fill, and damage low-lying structures), most flood losses in Vermont are caused by "fluvial erosion". Reasons are Vermont's geography, extreme climate, deep snows, destructive ice jams and intense rainstorms. Centers of commerce in villages and towns became concentrated along river banks, forests were cleared, and many rivers moved or channelized to accommodate this development rendering them unstable and prone to fluvial erosion. [6]

Fluvial erosion is often associated with flash flooding and can result in catastrophic damage to property and infrastructure when a rapid adjustment of a stream channel occurs. Severe damage from fluvial erosion caused by Tropical Storm Irene have widened river beds and stripped river banks bare of natural vegetation making them more susceptible to additional erosion and landslides.

Andover, like many other towns within Southern Windsor County, is at risk for fluvial erosion hazard flooding events. Extent data in the form of acres/feet from the most severe historical flooding event is unavailable. Erosion is exacerbated by failure of infrastructure including roads, culverts, bridges and dams. This secondary hazard as a result of flooding can be costed by the capital required to repair and replace these structures, however, these reparation costs from past fluvial erosion events are not specifically identified as separate from the flooding event that caused it.

Stream geomorphic assessments for the Williams River and its major tributaries have been completed and Fluvial Erosion Hazard (FEH) Zones have been mapped and are available online. [7] The Williams River is one of the five large basins draining to the Connecticut River in southeastern Vermont. The watershed is bordered by the Black River watershed to the north, the West River watershed to the west, and the Saxtons River watershed to the south. The Middle Branch of the Williams River and the Andover Branch flow through the Towns of Andover. SWCRPC is in the process of providing information on river corridor bylaws, to further limit development and minimize risks, to local zoning officials and municipalities.
Some options listed below for mitigating fluvial erosion hazards are addressed in this plan:

- Environmentally-friendly river restoration techniques
- Natural channel design
- Remove or relocate threatened structures
- Erosion and landslide hazard maps
- Limiting new investments in river corridors

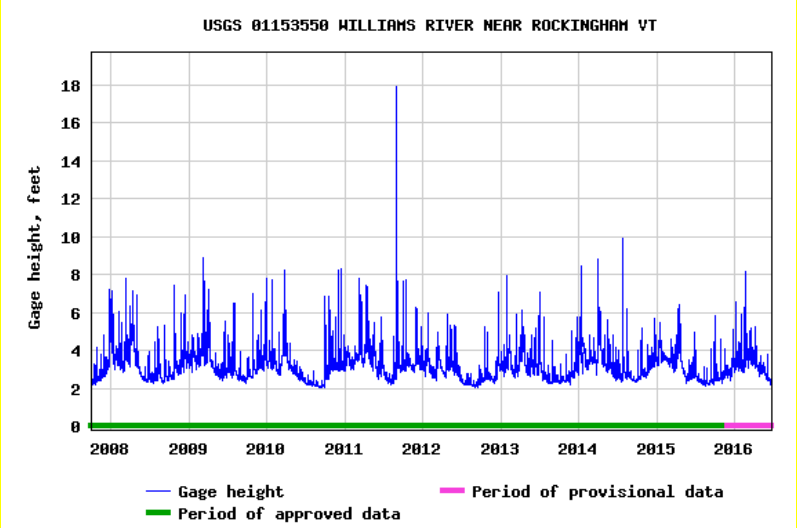
[6] Municipal Guide to Fluvial Erosion Hazard Mitigation, Vermont Agency of Natural Resources

[7] The ANR FLOOD READY link below shows river corridors overlays comparable to FEH zones
http://maps.vermont.gov/ANR/Html5Viewer/Index.html?configBase=http://maps.vermont.gov/Geocortex/Essentials/ANR/REST/sites/Focus_on_Floods/viewers/FocusOnFloodsHTML/virtualdirectory/Resources/Config/Default

- Meet with State Geologist to inspect landslide activity and receive structural appraisal of landslide damaged embankments
- Fluvial erosion/river corridor bylaws

One of the worst widespread flood disasters recorded in the State of Vermont that occurred in November, 1927, dropped nearly 10 inches of rain on frozen ground causing extensive damage statewide. Relatively recent widespread flooding occurred in June, 1973, when up to 6 inches of rain fell resulting in $64 million in damage. However, over the past several years, flooding has occurred in limited areas from intense, scattered storm events and ground saturation from persistent and excessive rainfall. This characterized the pattern of flooding in 2011 in Vermont during which there were four regional disaster declarations issued in Vermont in 2011 due to flooding and fluvial erosion. The fourth was Tropical Storm Irene in late August when up to 11 inches of rain fell in some areas of the State and up to 8 inches in the Andover area. Tropical Storm Irene is also covered under the "Tropical Storms/Hurricanes" hazard section with additional discussion on the variation in rainfall amounts throughout the State with this storm. According to the *2013 State of Vermont Hazard Mitigation Plan*, studies show that areas of the State can expect a greater frequency of flooding with an increase in extreme rainfall amounts.[8]

The National Weather Service maintains a river gauge on the Williams River in the Town of Rockingham, which is located to the southeast of Andover. Between Rockingham and Andover there are no flow interruptions such as dams or other impoundments, therefore, river gauge data on the Williams River in Rockingham may be used to determine extent within Andover.



According to the National Weather Service:

[8] 2013 State of Vermont Hazard Mitigation Plan, p 4-9

Flood Categories (in feet)

Major Flood Stage:	15
Moderate Flood Stage:	12
Flood Stage:	8
Action Stage:	6

Also according to the National Weather Service, the record crest prior to Tropical Storm Irene was 9.98 feet in 1993.

WITHOUT FLOODPLAIN ACCESS, WHICH SERVES THE ESSENTIAL PURPOSES OF SLOWING FLOODWATERS AND STORING SEDIMENT, STREAM BANKS ARE SUBJECTED TO THE FULL POWER OF FLOOD FLOWS, LEADING TO EXTENSIVE FLUVIAL EROSION

Municipal Guide to Fluvial Erosion Hazard Mitigation - ANR

Recent Crests	**Historic Crests**
(1) 9.87 ft on 07/28/2014	(1) 17.94 ft on 08/28/2011
(2) 8.45 ft on 01/12/2014	(2) 9.98 ft on 03/29/1993
(3) 17.94 ft on 08/28/2011	(3) 9.87 ft on 07/28/2014
(4) 8.36 ft on 03/23/2010	(4) 9.69 ft on 04/03/2005
(5) 8.10 ft on 04/17/2007	(5) 9.54 ft on 05/14/2006
(6) 8.99 ft on 03/15/2007	(6) 9.41 ft on 01/19/1996
(7) 9.54 ft on 05/14/2006	(7) 9.05 ft on 01/27/1996
(8) 9.69 ft on 04/03/2005	(8) 8.99 ft on 03/15/2007
(9) 8.77 ft on 10/29/2003	(9) 8.77 ft on 10/29/2003
(10) 7.82 ft on 06/12/2001	(10) 8.71 ft on 04/16/1996

Andover, like many other towns within Southern Windsor County, is at risk for fluvial erosion hazard flooding events. Stream geomorphic assessments completed for neighboring towns indicate that the area is prone to erosion hazards and additional assessments are necessary. If a stream cannot spill out of its banks, the power of the trapped water increases and the channel either digs down or cuts further into the sides. Where there are nearby roads and buildings these adjustments to the channel's shape

can become dramatic and costly. Without floodplain access, which serves the essential purposes of slowing floodwaters and storing sediment, stream banks are subjected to the full power of flood flows, leading to extensive fluvial erosion.[9] SWCRPC is in the process of providing information on fluvial erosion hazard and river corridor bylaws, to further limit development and minimize risks, to local zoning officials and municipalities. By allowing a river the room it needs to slow the flow, over time it can function as a responsive system and avoid repeated losses to public infrastructure and investments. There is a need for responsive systems with room to adjust and intact floodplains to moderate the impact of high water events. The State recently embarked on mapping river corridors that are particularly susceptible to fluvial erosion. The maps have since been completed and are available online[10].

The Chester Fire Department, which responds to Andover calls, began revamping their technical rescue abilities in 2015. They now offer 10 Cold Water Rescue Technicians, 10 Swift and Flood Water Technicians and a 14 foot Rescue boat and motor will be ordered in early 2016. Chester's new Technical Rescue Team trains once a month and 4 weekends a year. Once the department has their final training with the boat they will be applying for Chester to be recognized as Water Rescue Resource within the state.

b) Hurricanes/Tropical Storms

Hurricanes are an infrequent event in Andover. More often, Vermont experiences localized micro-bursts and wind shears that tend to knock down trees and blow the roofs off barns and other structures. Hurricanes (storms with sustained winds greater than 74 mph) rarely reach as far inland as Vermont; more often they have weakened to tropical storms. The most infamous example a hurricane in Vermont was in 1938. According to the National Weather Service, the Hurricane of 1938 was the most powerful and destructive storm to hit New England during the 20th century. By evening on September 21st, the hurricane had roared from Long Island to Vermont. The center blew through Marlboro and followed a track from Weston/Andover to Rutland, Brandon, Middlebury, and Vergennes. Buildings were lost, power lines downed, and forests suffered severely. Tropical Storm Floyd in September 1999 caused flooding, caused a fatality, knocked out power to thousands, and resulted in a federal disaster declaration.

The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating based on a hurricane's sustained wind speed. The scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage.

[9] Municipal Guide to Fluvial Erosion Hazard Mitigation - ANR

[10] http://maps.vermont.gov/ANR/Html5Viewer/Index.html?configBase=http://maps.vermont.gov/Geocortex/Essentials/ANR/REST/sites/Focus_on_Floods/viewers/FocusOnFloodsHTML/virtualdirectory/Resources/Config/Default

Tropical Storm Irene, in late August, 2011 brought much devastation; record flooding was reported across the state and was responsible for several deaths. Irene dumped as much as 11 inches of rain on parts of Vermont, and caused $733 million in damage. In all, it checked in at $15.8 billion, the seventh-costliest hurricane in American history[11].

The most recent tropical storm to impact the Town of Andover was Tropical Storm Irene. Below is a listing of major, non-road projects in Andover directly affected by Tropical Storm Irene.

Road	Damage
East Hill Road	Road washed out beside culvert. Culvert removed and replaced.
Gates Road	50 foot washout (two on Gates road altogether). One 18" by 40 foot culvert replaced on Gates Road as well.
Howard Hill Road	200 and 300 foot shoulder washout. 4 culverts damaged on entire road and bridge was closed before Irene but may have been damaged
Little Pond Road	150 foot washout
Lovejoy Brook Road	900 feet of road completely gone and roadside washouts for remainder. Culverts affected.
Marsh Hill Road	1180 foot washed out in one section, additional small washes. Culverts impacted
Middletown Road	1100 feet of roadbed washed away. Another 830 foot section of roadside also damaged as well as multiple culverts including a 13 foot culvert
Newton Road	250 foot washout
North Hill Road	420 feet of shoulder and road washed out. Approach to 6 foot culvert washed out
Old Gulf Road South	200 foot road bed washed out. 50 foot road bed, culvert, bridge approaches gone. Guardrails damaged.
Pettingill Road	50 foot washout on north side of culvert. Concrete blocks used to divert water and realign streambed.
Schmidt Road	1050 feet of road washed away. 500 foot section needs 3 feet of topping to repair. 5 culverts affected. 2 replaced.
Simmons Road	Washouts on both side of road. Washout of entire road for 480 foot lower section. Culvert plugged and replaced
Stigers Road	1038 foot washout. 3 culverts damaged on entire road
Trombley Road	81 foot approach to north side of bridge washed away. Guardrail washed away as well. Bridge scoured on south abutment and needed rip rap.
Weston-Andover Road	Shoulder washed away into paved area of road. Culvert repaired on one spot along the Weston-Andover road

c) Structure Fire

[11] The 30 Costliest U.S. Hurricanes Weather Underground

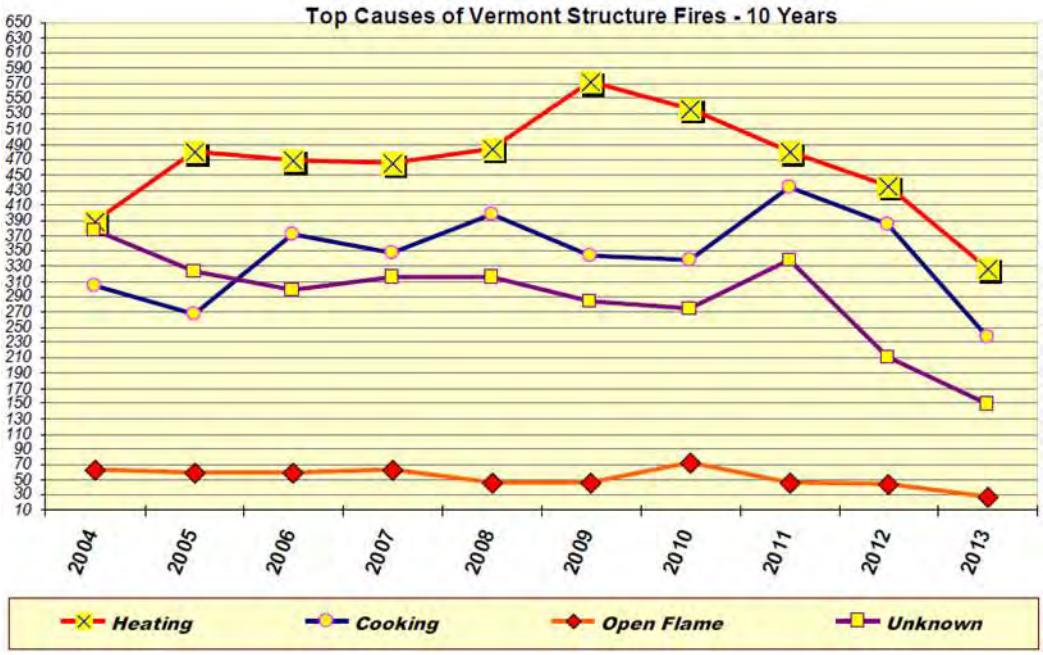
Fires, including both structure and brush, were identified during the hazard analysis and vulnerability assessment as high hazard to the Town of Andover. Structural fires were specifically identified as having a high possible risk to the town, with a Score of 8, due to their high probability of occurrence, short warning time and potential for catastrophic loss. Structure fires are common throughout Vermont especially during the winter months as Andover residents heat their homes with wood or wood pellet burning stoves. With little or no warning, these fires can affect a single residential structure or spread to other homes, businesses or apartment complexes and can result in loss of property and life. Fires can be caused by improperly disposing of ashes with live coals from wood stoves or by faulty electrical wiring. The leading cause of structure fires in Vermont are the result of heating incidents (39%), followed closely by cooking incidents (28%). The most significant common factor in fire fatalities in Vermont continues to be the absence of a functioning smoke detector in the sleeping area of residential structures. National Fire Protection Association (NFPA) estimates show, while residential structure fires account for only 25 percent of fires nationwide, they account for a disproportionate share of losses: 83 percent of fire deaths, 77 percent of fire injuries, and 64 percent of direct dollar losses.[12]

According to the 2015 Vermont Annual Fire Marshal Report, although the fire death rate in Vermont has improved significantly over the past few years, historically, it has been disproportionately high based on population compared to the national average. This is due, in part, to the large percentage of residents that live in small rural communities where emergency response time is delayed. Other characteristics of Vermont that lend toward greater loss from fire compared to other states are-

- Age of Housing Structures - About 44% of year-round, owner-occupied homes and 33% of all homes including rentals, were built before 1950.
- Extreme Winter Temperatures – Vermont is the 7th coldest state.
- Higher Risk Population -2nd oldest median age where elderly are at higher risk. Over the last 4 years, **68%** of Vermont's fire deaths have been seniors over the age of 60.
- Home Heating Methods - 1st for per capita use of wood for heating.

The chart below depicts the top causes of Vermont Structure Fires over a 10 year period, which clearly shows Vermont heating is the number one cause of structure fires followed by cooking.

[12] 2013 Vermont Fire Marshal Annual Report



2013 Annual Vermont Fire Marshal Report

The Chester Fire Department provides fire services to the Town of Andover and records the number and type of fires to which the department responds.

Extent of Fire Hazard

Structure fires are reported in the annual *Vermont State Fire Marshal Report* which provides yearly fire statistics from reporting departments and by county. In the 2015 State Report, there were 45,763 emergency incidents statewide of which fire departments responded to 21,967. Windsor County reported a total of 328 related fires in 2015 - 239 structure fires, (3rd highest County in Vermont), and 89 wildland fires (2nd highest County in Vermont). A total of 7 civilian fatalities were reported due to structure fire, all residential.[13] According to the 2015 data compiled by the National Fire Incident Reporting System (NFIRS) for Vermont, fire departments reported a total of 2,198 incidences relating to structure fires with an estimated dollar loss of $25,112,224, or $11,425 per incident. Over the past five years the highest average annual dollar loss per structure fire in Vermont was $14,400.

[13] 2015 Vermont Fire Marshal Annual Report

2015 Annual Fire Marshal Report- total state data

Year	Fire Departments Reporting	Structure Fires Reported	Estimated Dollar Loss by Fire Departments	Insurance Companies Reporting/ Total	Fire Claims Reported	Reported Dollar Loss by Insurance Companies
2011	191	2,366	$ 21,266,173	566	1127	87,575,447
2012	194	2,233	$ 17,840,192	860	839	44,510,095
2013	194	2,116	$ 26,485,951	615	878	50,911,724
2014	228	2,114	$ 30,412,139	**615**	**1,130**	**50,589,356**
2015	230	2,198	$ 25,112,224	Data not currently available		

2015 Annual Fire Marshal Report – NFIRS data for Vermont

Table 6 shows historical trends for Windsor County Fire Response Statistics.

TABLE 6: 'Annual Report of the State Fire Marshal' for Windsor County[14]

YEAR	Structure Fire Responses
2009	177
2010	181
2011	181
2012	201
2013	229
2014	N/A
2015	239

TABLE 7: 'Chester Fire Department Annual Responses and Fire Incidents to Andover[15]

[14] Vermont Annual Report of the State Fire Marshal
[15] Chester Fire Department

YEAR	Chester FIRE DEPARTMENT RESPONSES to Andover		
	Structure	Other	Total
2014	14	6	20
2015	8	1	9
2016	1	4	5

Data to support the extent of fire hazards for Andover is not available, but can be estimated. Applying the NFIRS highest 5-year average annual dollar loss per structure fire in Vermont of $14,400 to Andover fire reporting, the extent of loss for the town is estimated to be, approximately, $14,000 for structure fires.

d) Extreme Cold/Snow/Ice Storm

Winter storms with snow, ice, and freezing temperatures in varying combinations are fairly commonplace in Andover and occur town wide. Heavy wet snows of early fall and late spring, as well as ice storms, often result in loss of electric power, leaving people without adequate heating capability. Power loss is often the result of downed trees, which can also disrupt traffic and emergency response by making roads and driveways impassable. While snow removal from the transportation system is standard fare, extreme snow or ice can close road systems, further jeopardizing any stranded persons that are in danger of freezing or needing medical attention.

A winter storm is considered severe when there is a possibility of:

- Six or more inches of snow fall at a given location within 48 hours,
- There is property damage, injuries or deaths, or
- An ice/glaze storm which causes property damage, injuries or death.

A nor'easter is a large weather system traveling from South to North, passing along, or near the Atlantic seacoast. As the storm approaches New England and its intensity becomes increasingly apparent, the resulting counterclockwise cyclonic winds impact the coast and inland areas form a northeasterly direction. The sustained winds may meet or exceed hurricane force. The Dolan-Davis Nor'easter Classification Scale is utilized to determine the severity of Nor'easters:

CLASS	% OF STORMS	AVERAGE RETURN INTERVAL	AVERAGE PEAK WAVE IN FEET	AVERAGE DURATION IN HOURS
1 WEAK	49.7	3 DAYS	6.6	8
2 MODERATE	25.2	1 MONTH	8.2	18
3 SIGNIFICANT	22.1	9 MONTHS	10.8	34
4 SEVERE	2.4	11 YEARS	16.4	63
5 EXTREME	0.1	100 YEARS	23.0	96

[16]

Blizzards are defined by the National Weather Service as "the following conditions are expected to prevail for a period of 3 hours or longer:

- Sustained wind or frequent gusts to 35 miles an hour or greater; and
- Considerable falling and/or blowing snow (i.e., reducing visibility frequently to less than ¼ mile)"[17]

Damage from blizzards can vary depending upon wind speeds, snow accumulation, storm duration, and structural conditions (such as heavy snow and ice accumulation on large, flat roofed structures). The assessed value of all residential and commercial property in Andover is $2,728,608.00[18]. Assuming a range of town-wide damage of 1% to 5%, a heavy snow or ice storm could result in $27,286 to $136,430.40 of total damage. 1 Presidential Disaster Declarations in Windsor County for a snow event, since 1953, was declared in 2001.

Ice Storms are defined by the National Weather Service as "occasions when damaging accumulations of ice are expected during freezing rain situations. Significant accumulations of ice pull down trees and utility lines resulting in loss of power and

[16] The Dolan-Davis Nor'easter Classification Scale
[17] National Weather Service Glossary
[18] Andover 2016-2017 Grand List

communication. These accumulations of ice make walking and driving extremely dangerous. Significant ice accumulations are usually accumulations of ¼" or greater."[19]

Ice storms have a significant impact on Northern New England, with high elevation locations being the most severely impacted. Multiple sources state that a ¼ inch of ice accumulation from an ice storm can add 500 pounds of weight on the lines between two power lines.

Depending on the event, particularly with heavy, wet snow or ice, electricity may be knocked out for a few hours or days. Green Mountain Power, the utility company that currently serves Andover, follows a regular tree-trimming schedule. Andover town officials believe this to be satisfactory to mitigate damages and power outages caused by down trees and tree limbs during events. In the event of an extended power outage, the Town would work to open an emergency shelter. The town has 2 portable generators which currently operate the Town Office and Highway garage. A need like an emergency shelter would require a 3rd portable generator or a solution to power all three critical buildings. This is the reason that generators have been included in Table 10.

The December 2008 and winter 2018 ice storms were major weather events that caused extended power loss. Some areas were out of power for 10 days.

Extreme Cold temperatures are part of Vermont's climate tendency to stray above or below expected temperature values. While long range forecast models are projecting a general temperature increase of 4°F by 2100, with warmer winters, the Andover area has experienced recent extreme cold temperatures during winter months. This presents a greater concern given the heating methods and age and condition of housing structures in rural Vermont. In recent history for the neighboring Town of Cavendish during the month of January in 2009, there were 13 days of below 0 F temperatures; -18°F for three consecutive days[20]. Extreme heat is not addressed in this plan as there are relatively few days of excessive temperatures in Andover.

6. MITIGATION PROGRAM

The following sections detail the mitigation goals, objectives, and potential mitigation actions identified by the Town and compiled and organized by the Hazard Mitigation Committee to reduce the impact of the hazards assessed in this plan. The implementation schedule that follows in **Table 8** is a comprehensive list of actions that the town has targeted for implementation during the five year cycle of this plan.

[19] National Weather Service Glossary
[20] www.usclimatedata.com

6.1 Goals and Objectives

The following sections detail the mitigation goals, objectives, and potential mitigation actions which the town has identified to aid in the reduction of threats posed by the hazards detailed in this plan. The implementation schedule that follows is a table of actions that the town has targeted for implementation during the five year cycle of this plan.

The 2013 Andover Town Plan identifies the following recommendations which support hazard mitigation. In general, there needs to be better integration of hazard mitigation planning in the Town Planning process.

- Review the town plan, zoning bylaws, subdivision regulations and other bylaws and ordinances to determine whether changes need to be made to address community-wide issues.
- Review the Town road ordinance for consistency with newest Vermont codes and standards and subdivision road standards.
- The Board of Selectmen will review the condition of town facilities and equipment on an annual basis.
- Develop a Capital Program and Budget Plan to guide town expenditures on future capital projects.
- Review and amend zoning regulations to protect rivers and streams, ponds and wetlands not already protected under state law.
- Include high elevation streams and buffer areas in a plan for open space conservation.

Following the Hazard Analysis and the public involvement process for this update, the Hazard Mitigation Committee then reviewed the prior AHMP goals and strategies **(Table 1),** Existing Resources below **(Table 9)**, and the Town Plan recommendations (above). The intent was to get a better overall sense of whether, and to what extent, hazard mitigation had been incorporated into current Town plan goals and programs. The Hazard Committee then formulated the following overarching goals below.

The following general goals and objectives were identified by the Hazard Mitigation Committee to reduce or avoid long term vulnerabilities to identified hazards:

<u>Hazard Mitigation Goals and Associated Objectives</u>

1. Provide protection to Andover community from impact of hazardous events.
    a. Reduce potential for loss of life, injuries and property damage from hazard events.
    b. Maintain and enhance Local Emergencies Operation Plan.

2. Improve efforts to raise municipal awareness of the Local Hazard Mitigation Plan and incorporate Plan goals, objectives and actions into other Town planning processes and related projects.
    a. Ensure implementation through improved monitoring of 2018-2023 Hazard Mitigation Plan.
    b. Recognize and incorporate hazard mitigation in the Andover Town Plan, Flood Hazard Area Regulations, Permits, Road Standards and Maintenance Programs.
3. Increase community resiliency to hazardous events.
    a. Increase community awareness of local hazards and the Hazard Mitigation Plan.
    b. Improve efforts to help minimize and address financial losses due to hazard events incurred by residents and business owners.
4. Reduce future economic impact and disruption caused by hazard events on public and historic infrastructure, and municipal programs.

6.2 Existing Programs

The following programs, policies, and regulations are currently being implemented throughout the Town of Andover and help to reduce the towns' long-term susceptibility to hazards. These programs reduce the effects of hazards to existing, new, and future buildings, infrastructure, and critical facilities by preventing their location in identified and known hazard areas and by ensuring that the infrastructure and buildings are designed to minimize damage from hazard events.

The town currently participates in the NFIP program and will continue to regulate floodplain use through the Andover Flood Hazard Regulations last updated and adopted on September 10, 2007; these regulations refer to the FEMA flood insurance rate maps last revised by FEMA in 2007 and adopted on September 28th, 2007. The town will continue to enforce these regulations to maintain future NFIP compliance. As outlined in the regulations, the Zoning Administrator is charged with implementing and advising residents on floodplain development, as well as regulating construction within Special Flood Hazard Areas and NFIP compliance.

There have been no NFIP insurance claims filed since 1978, totaling $0 dollars in payouts. There are no repetitive loss properties in the Town of Andover.

The following authorities, policies, programs, and resources related to hazard mitigation are currently in place and/or being implemented in the Town of Andover, in addition to the NFIP. These programs reduce the effects of hazards to existing, new, and future buildings, infrastructure, and critical facilities by preventing their location in identified hazard areas and ensuring that infrastructure and buildings are designed to minimize damage from hazard events. The Committee analyzed these programs for their effectiveness and noted any improvements that may be needed.

Table 9: Existing Resources for Mitigating Hazards: Authorities, Policies and Programs

Resource	Description	Effectiveness in implementing HM Goals	Opportunities for Improving Effectiveness
Town Plan	Plan for coordinated town-wide planning for land use, municipal facilities, etc.	Effectively addresses issues with floodplains, transportation, safety, municipal and critical facilities; revised and adopted in 2013	Plan is updated on a five year cycle, the next revision may be strengthened by addressing flood resiliency and incorporating the AHMP goals and strategies
Local Emergency Operations Plan	Basic municipal procedures for emergency response	Outlines procedures for call-outs, evacuations, etc.; last updated in 2016	Plan is reviewed and updated yearly following town meeting; statewide template can restrict additional functionality
LEPC All Hazards Resource Guide	Outline resources available to town in emergency situations	Effective in providing data and resources to town first responders	Revisions occurred in 2015
Mutual Aid – Emergency Services	Agreement for regional coordinated emergency services	Effective in providing additional emergency support during atypical events	All mutual aid agreements are formalized
Road Standards	Design and construction standards for roads and drainage systems	Effective through continued use and implementation	Continued implementation of road standards is critical to effectiveness
Subdivision Regulations	Regulates the division of land, standards for site access and utilities	Effective through their continued implementation	Continued updates and enforcement are important for continued effectiveness
Flood Hazard Area Regulations	Regulates development in FEMA flood hazard areas	Effective at limiting development in known hazard areas	Continued updates and enforcement are critical to greater effectiveness
Site Plan Review	Reviews plans for development	Effective in addressing drainage and impervious surface area	Continued use of this mechanism will help prevent additional hazards
National Flood Insurance Program (NFIP)	Provides ability for residents to acquire flood insurance	Effective, Andover is compliant with the NFIP program	Flood maps should be updated, town may pursue CRS rating
Maintenance Programs	Bridge & Culvert Inventory	Effective at tracking and planning infrastructure upgrades	Inventories should be kept current when possible
Access Permits	Regulates driveway access along town-maintained roads	Effective in limiting the number of road cuts, thereby reducing the potential for transportation issues	Continued enforcement of permit regulations will maintain effectiveness

Resource	Description	Effectiveness in implementing HM Goals	Opportunities for Improving Effectiveness
Entertainment Permits	Addresses fire safety and public occupancy issues	Effective cooperation with VT Labor and Industry	Continued enforcement will maintain effectiveness
Local Emergency Planning Committee 3	Volunteer organization involved in regional hazard mitigation efforts	Effective and important contributor in hazard mitigation planning	Greater town participation at the regional meetings would be beneficial
Southern Windsor County Regional Planning Commission	Regional organization working to further emergency management and hazard mitigation goals	Effective in assisting towns in the adoption of new/updated regulations and the revision of planning tools	The RPC should focus on improving the planning process and investigate additional sources of historical and statistical data for identified hazards and communicate available funding opportunities for hazard mitigation and emergency preparedness

6.3 2018-2023 Mitigation and Preparedness Actions and Projects

The Andover Hazard Mitigation Committee discussed each mitigation strategy and found that many projects are still ongoing and/or are still relevant. In most cases, the past identified strategies have been left in place because of their ongoing and cyclic nature, for example, the incorporation of strategies into the town capital budget and planning documents. They identified the following **Mitigation and Preparedness Actions and Projects** for implementation during the 2018-2023 planning period. These mitigation actions have been chosen by the town as the most cost/effective and feasible actions to be taken during this plan period to lessen the impacts of both known and potential hazards identified in **Section 5**.

The instructions were to choose which should be included in the five year plan, based on cost (including considering the feasibility to complete or initiate in that time) versus benefit (or need). The Andover Hazard Mitigation Committee kept in mind the following benefits while creating **Table 10**:

- structural or land improvements
- increased public education and awareness of hazards
- altering the hazard area to remove the hazard occurrence
- reducing the hazard frequency through structure or land treatment
- increased community support for specific actions to reduce future losses
- reduction in financial and physical losses caused by hazard events
- eligibility for hazard mitigation grants and aid
- strengthened partnerships

Prioritization was primarily based upon the economic impact of the action, the feasibility of the action, the action's cost, and the availability of potential funding. In evaluating potential benefit and or likelihood of successful implementation the committee ranked each criteria as to being highly effective or feasible, neutral, or ineffective or not feasible. The Team considered each prioritization in the scope of the other projects, LHMP priorities and overall community priorities. Strategies given a "High" prioritization indicate they are either critical or potential funding is readily available, and should have a timeframe of implementation of less than two years. A "Medium" prioritization indicates that a strategy is less critical or the potential funding is not readily available, and has a timeframe for implementation of more than two years but less than four. A "Low" prioritization indicates that the timeframe for implementation of the action, given the action's cost, availability of funding, and the community's need to address the issue, is more than four years.

The Town of Andover was awarded one FEMA property buyout grant as a result of Tropical Storm Irene.

The following identified programs, projects and activities are future mitigation strategies for the Town of Andover. Proposed Mitigation Actions are prioritized on an ad-hoc basis by considering all of the following:

- Severity of need in terms of safety and previous hazard event experience
- Projects with the greatest potential impact in terms of number of community members that would benefit.
- Availability of Town funding and Town personnel and/or availability of needed assistance from other groups.
- Availability of grant funding, and application assistance.
- Favorable cost/benefit based on logic or FEMA methodology. Higher priority projects would be those requiring low capital but have high community outreach potential for a high scored hazard, projects more likely to be eligible for grant funding, and projects where the estimated cost of repairs following a potential disaster (the benefit) is apparent, or likely higher than the cost of mitigation based on past experience. For example, the dollar benefit over the cost of proactively prioritizing and implementing culvert upgrades would include the cost of otherwise having to replace a washed out road.

The mitigation measures performed in the last several years have been a result of major events such as Tropical Storm Irene. The committee did spend some time discussing river corridor standards, but felt it needed more time to send to Planning Commission and hold public meetings. Therefore, this action limiting future development from being at risk was considered and not found to be feasible at this time, but will be reviewed by the town. It can be expected that an unforeseen disaster would most likely change these priorities. When considering maintenance and replacement of highway infrastructure each year, Andover refers primarily to its bridge and culvert inventory as well as its Road Surface Management Plan. Andover also takes into consideration grant funding that may be available to assist in these projects.

Table 10: Proposed Hazard Mitigation Programs, Projects and Activities

ACTION	TYPE OF ACTION	HAZARD ADDRESSED	RESPONSIBLE PARTY	TIME FRAME/ PRIORITY	FUNDING SOURCE, COST TO TOWN
Consider VTculvert.org data, VT Road & Bridge Standards, Geomorphic Assessments, and Resident Input to Prioritize Culvert Replacement	Mitigation	Flooding, Erosion, Transportation Disruption	Road Foreman, Selectboard	2018 - 2019 HIGH	Utilizing Existing Town Resources
Replace and Upgrade Known Undersized Culverts based on above	Mitigation	Flooding, Transportation Disruption	Public Works Director	Yearly HIGH	Town Budget, Better Back Roads Grant Cost to Town: High
Keep culvert/bridge inventory updated	Mitigation	Flooding, Erosion, Transportation Disruption	Public Works Director, SWCRPC	Twice per year (fall & spring) HIGH	No cost to town
Purchase additional emergency generator, or 1 fixed unit to power all 3 buildings, for critical facilities	Preparedness	High Winds, Severe Winter Weather	Selectboard, Public Works, EMD	Review costs beginnin g in 2020 MEDIUM	HMGP, Town Budget Cost to Town: High
Review location needs for additional dry hydrants and as funding becomes available	Mitigation	Fire	EMD, Fire, Selectboard	Review area needs and costs 2019 MEDIUM	Town budget, HMGP
Map ponds as emergency water source	Preparedness	Fire	EMD, Fire, SWCRPC	2018 HIGH	No cost to town
Update EOP	Mitigation, Preparedness	All Hazards	Selectboard, Town Clerk, SWCRPC	Annually, no later than May	SWCRPC EMPG funding

				1st after Town Meeting Day HIGH	Cost to Town: low
East Hill Road new box culvert (Ludlow side of 4219 East Hill) *priority	Mitigation	Flooding	Public Works, Selectboard, VTrans, SWCRPC	2020 MEDIUM	VTrans Cost to Town: High
Attend training on floodplain management and flood regulation administration	Mitigation	Flooding	Zoning Administrator, Town Staff, Selectboard, ANR, SWCRPC	2018 HIGH	Town funds Cost to Town: low
High bridge replacement *priority	Mitigation	Flooding, Fluvial Erosion	Selectboard, Public Works, VTrans, FEMA, SWCRPC,	Scoping late 2017 Construction 2020-2021 MEDIUM	VTrans Cost to Town: High
Lovejoy double culvert replacement (upsize needed)	Mitigation	Flooding, Erosion	Selectboard, Public Works (Ludlow to install if Andover supplies culverts), VTrans	2021 MEDIUM	VTrans Cost to Town: Medium
Stone Culvert Little Pond box culvert	Mitigation	Flooding, Erosion	Selectboard, Public Works, VTrans	2022 LOW	VTrans Cost to Town: Medium
Outlet Lily Pond on Little Pond new box culvert	Mitigation	Flooding, Erosion	Selectboard, Public Works, VTrans	2021 LOW	VTrans Cost to Town: Medium
30” Lovejoy by beaver pond to new box culvert	Mitigation	Flooding, Erosion	Selectboard, Public Works, VTrans	2022 LOW	VTrans Cost to Town: Medium
Dorman Road double culvert replacement to new box culvert (near end by Sarley property)	Mitigation	Flooding, Erosion	Selectboard, Public Works, VTrans	2022 LOW	VTrans Cost to Town: Medium

Mitigation Actions In-Progress

1. The SWCRPC was recently awarded $26,520 through the Department of Environmental Conservation's Ecosystem Restoration Program (ERP) to conduct a series of small flood resiliency projects along the confluence of Andover Branch and Trout Brook in Andover. This effort is intended to reestablish floodplain access and stabilize stream banks to reduce sedimentation in the stream. The SWCRPC is partnering with the Windham County Natural Resources Conservation District and the Southeastern Vermont Watershed Alliance on this effort.
    a. Horseshoe Acres Campground – berm removal and channel restoration.
2. Four culverts replaced in 2016 by Wes-Ameden Construction using VTrans Highway Disaster Assistance Funds (all culverts damaged by 2014 storm). Total cost for all 4 culverts: $600-700k
    a. Weston Andover Rd – 33
    b. Weston Andover Rd – 36
    c. Plumb Rd – 1
    d. Simmons Rd - 3
3. Additional culvert replacements:

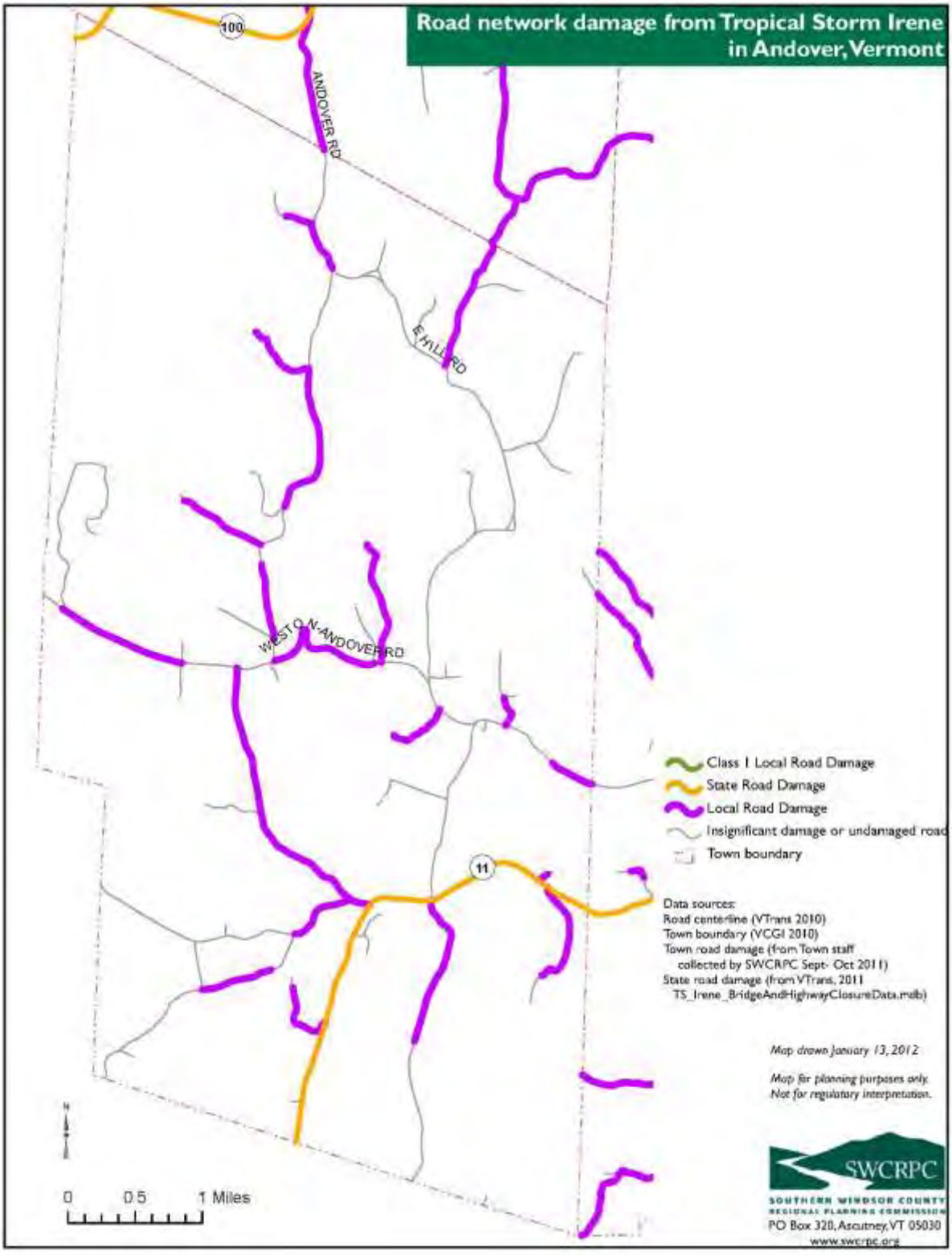
road	local_id	year_built	comment1	comment4
SIMMONS RD	Simmons Rd - 2	2011	Plugged	replaced after TS Irene 2011
LITTLE POND RD	Little Pond Rd - 1	2011		replaced after TS Irene 2011
LOVEJOY BROOK RD	Lovejoy Brook Rd - 6	2011		replaced after TS Irene 2011
MIDDLETOWN RD	Middletown Rd - 21	2011		replaced after TS Irene 2011
MIDDLETOWN RD	Middletown Rd - 5	2011		replaced after TS Irene 2011
MARSH HILL RD	Marsh Hill Rd - 6	2011	Black plastic	replaced after TS Irene 2011
OLD GULF RD S	Old Gulf Rd - 3	2011		new after TS Irene 2011
SIMMONS RD	Simmons Rd - 1	0		repaired after TS Irene 2011
MIDDLETOWN RD	Middletown Rd - 12	2011		replaced after TS Irene 2011
SCHMIDT RD	Schmidt Rd - 4	2011		replaced after TS Irene 2011
SCHMIDT RD	Schmidt Rd - 3	2011		replaced after TS Irene 2011
SCHMIDT RD	Schmidt Rd - 2	2011	Black plastic	replaced after TS Irene 2011
MARSH HILL RD	Marsh Hill Rd - 18	2012	Replaced 2012 but needs more depth	
HOWARD HILL RD	Howard Hill Rd - 4	2014	Destroyed in July 2014 storm and replaced. Shallow cover due to ledge. Remedied erosion issues when replaced.	Jul-14
MIDDLETOWN RD	Middletown Rd - 18	2011		replaced after TS Irene 2011
HOWARD HILL RD	Howard Hill Rd - 1	2011		replaced after TS Irene 2011
E HILL RD	East Hill Rd - 34	2013	replaced 2013. Previously a 30 inch culvert.	
HOWARD HILL RD	Howard Hill Rd - 3	2011	Black plastic	replaced after TS Irene 2011
GATES RD	Gates Rd - 3	2011		replaced after TS Irene 2011
STIGERS RD	Stigers Rd - 10	2011	Replaced in 2011 prior to Irene	
HOWARD HILL RD	Howard Hill Rd - 11	2011		replaced after TS Irene 2011
MIDDLETOWN RD	Middletown Rd - 19	2011		replaced after TS Irene 2011
STIGERS RD	Stigers Rd - 8	2014		Replaced after July 2014 storm
STIGERS RD	Stigers Rd - 7	2011	Need to change alignment so output into trees not field	Replaced after TS Irene 2011
SCHMIDT RD	Schmidt Rd - 1	2011		replaced after TS Irene 2011
HOWARD HILL RD	Howard Hill Rd - 10	2014	Replaced after July 2014 storm	Jul-14
MIDDLETOWN RD	Middletown Rd - 7	2011		replaced after TS Irene 2011
N HILL RD	North Hill Rd - 5	2011	State bridge B10	replaced after TS Irene 2011
SIMMONS RD	Simmons Rd - 6	2014	Pre-2014 was 15x15x40	cleaned after TS Irene 2011
STIGERS RD	Stigers Rd - 11	2011		Replaced after TS Irene 2011
STIGERS RD	Stigers Rd - 12	2014	Was plastic 18 inch prior to 2014	Replaced after July 2014 storm

4. Smithville Road property buyout

6.4 Integration

Andover uses all of the tools listed throughout the plan for current and future activities with the town. For example: the Local Emergency Operation Plan has a contact list that is used for response purposes in the case of a hazard event, and is updated every year after Town Meeting

The list includes updates to vulnerable geographic locations, as well as locations of vulnerable populations. Town Road and Bridge Standards are followed by the town and Andover just competed updating their culvert inventory in 2015. The mitigation action and goals identified in this plan will be reviewed annually by the Selectboard at a meeting prior to Town Meeting Day. Additionally, the SWCRPC will work with the Andover Planning Commission to incorporate ideas into the next Town Plan rewrite. The goals of this hazard mitigation plan will be incorporated in the rewrite to ensure that emergency preparedness and mitigation planning efforts are included in the Town Plan, with particular attention to include the projects in the Mitigation Actions Table. As each referenced plans and regulations are updated, they will better incorporate hazard mitigation. This will assist with ensuring that this plan is utilized and project follow-through occurs.


Road network damage from Tropical Storm Irene in Andover, Vermont
100
ANDOVER RD
E HALL RD
WESTON-ANDOVER RD
11
Class 1 Local Road Damage
State Road Damage
Local Road Damage
Insignificant damage or undamaged road
Town boundary
Data sources:
Road centerline (VTrans 2010)
Town boundary (VCGI 2010)
Town road damage (from Town staff collected by SWCRPC Sept- Oct 2011)
State road damage (from VTrans, 2011 TS_Irene_BridgeAndHighwayClosureData.mdb)
Map drawn January 13, 2012
Map for planning purposes only. Not for regulatory interpretation.
0 0.5 1 Miles
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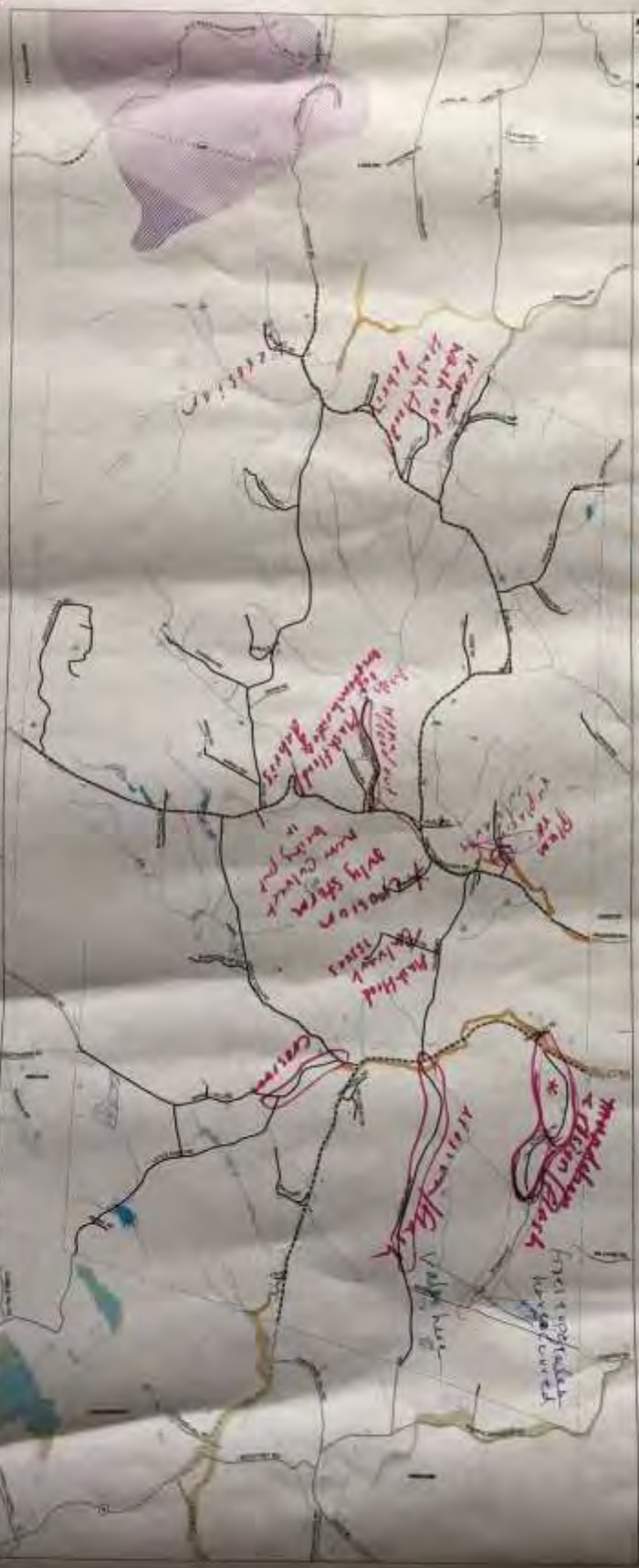
www.swcrpc.org



Water Resources Map
from working meetings
Town Plan Update 2013
Town of Andover, VT
Adopted 04/08/2013

- VT State Highway
- Class 2 Town Highway
- Class 3 Town Highway
- Class 4 Town Highway
- Legal Trail (in Andover only)
- Private Road (in Andover only)
- River or Stream
- Lake or Pond
- Floodway
- Floodplain
- Surface water Protection Area
- Groundwater Protection Area
- VT Significant Wetlands
- VT Significant Wetlands (Class 3)
- Town Boundary

Data Sources:
Roads (VTrans 2012), Rivers and Lakes (VHD 2008), Floodway and Floodplain (FEMA 2008), Surface Water Protection Area (ANR 2010), Groundwater Protection Area (ANR 2011), Vermont Significant Wetlands (ANR 2010), Town Boundary (VCGI 2012).

0 0.25 0.5 0.75 1
Miles

N

VT State Plane, Meters, NAD 83
All data from VCGI, except privately conserved lands. Data depicted on this map are for planning purposes only and are based on best available information from VCGI. Some of the data - for example, town boundaries and parcels - do not line up.

SWCRPC
SOUTHERN WINDSOR COUNTY REGIONAL PLANNING COMMISSION

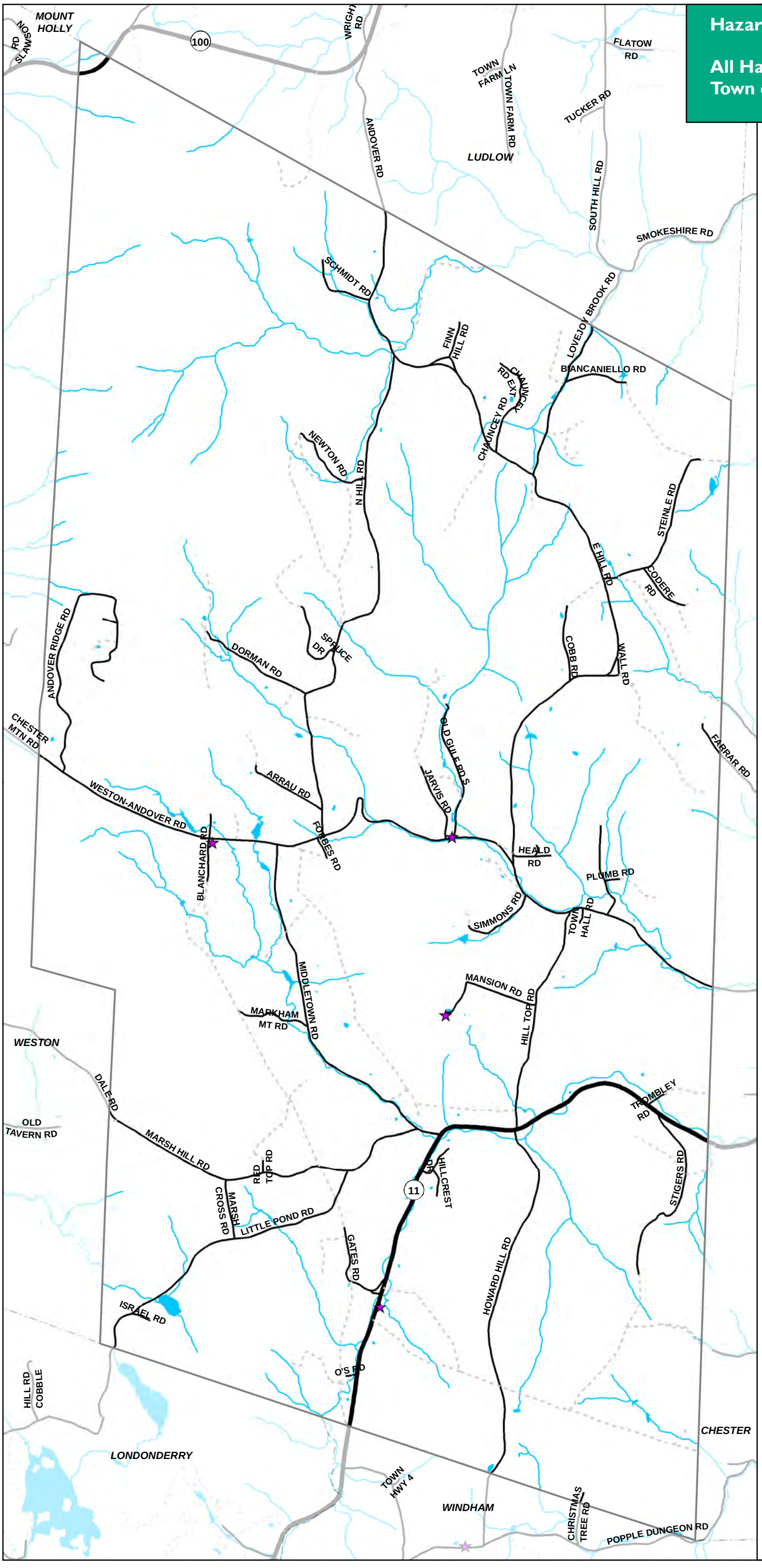
P.O. Box 320, Ascutney, VT 05030
802-674-9201 www.swcrpc.org

For planning purposes only
Not for regulatory interpretation
Drawn August 9, 2012

* indicates damage from irene/or July storms * or both!

Hazardous Waste Sites Map

All Hazard Mitigation Plan 2017
Town of Andover, VT



- Hazardous Waste Site

Hazardous Waste Facility Status

- Fully Regulated Generator
- Conditionally Exempt Generator
- Out of Business
- Unknown Status

- VT State Highway
- Town Highway
- Private Roads and other Rights of Way
- River or Stream
- Lake or Pond
- Town Boundary

Data Sources:
Hazardous Waste Facilities (VT Dept of Environmental Conservation 2006), Hazardous Waste Sites (VT Dept of Environmental Conservation 2012), Roads (VTrans 2015), Waterbodies (VHD 2008), Town Boundary (VCGI 2012).

N

VT State Plane, Meters, NAD 83
Data depicted on this map are for planning purposes only and are based on best available information. Some of the data may not line up.

0 0.5 1 Miles

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For planning purposes only
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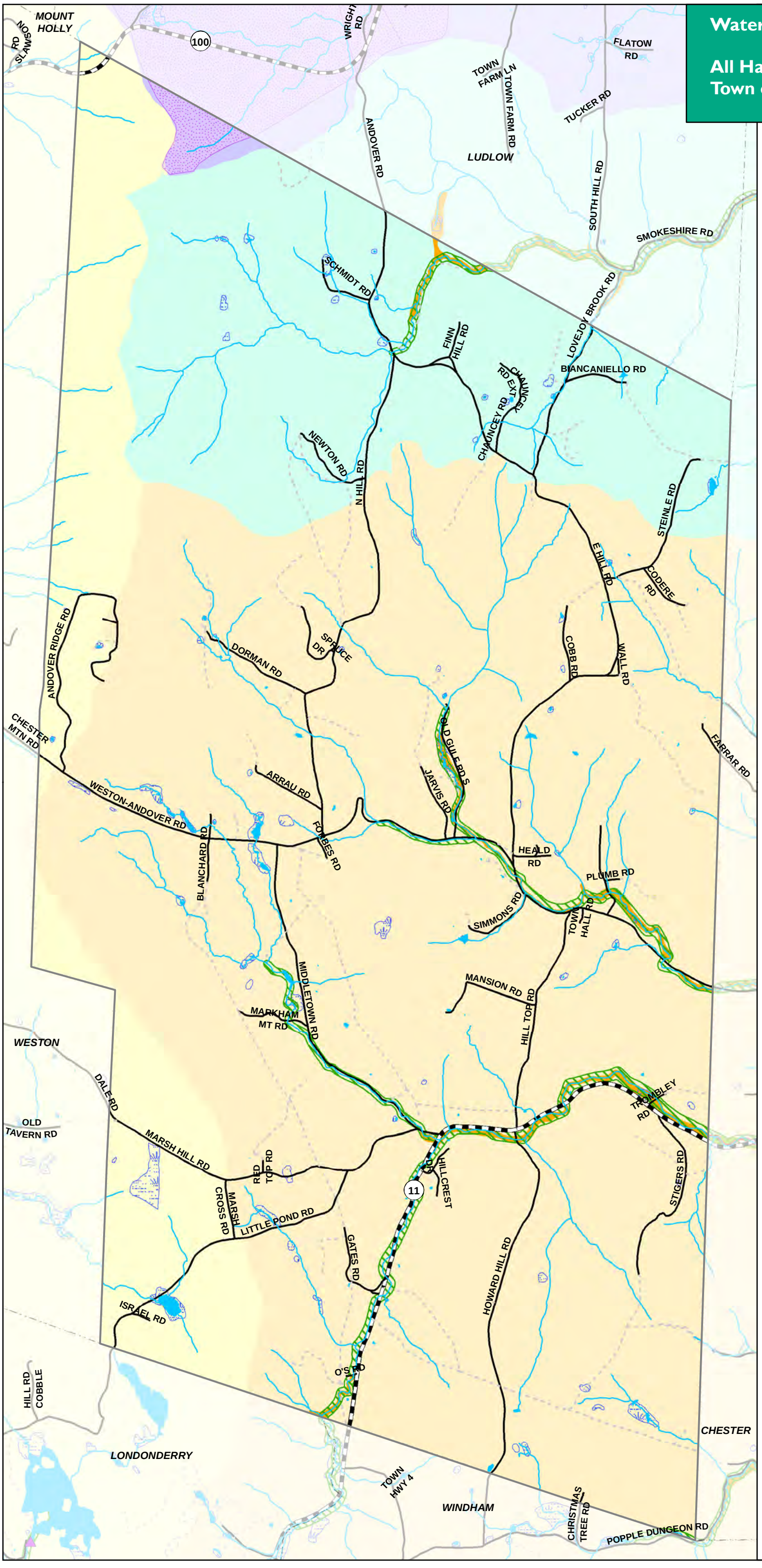
Drawn September 6, 2016
Adopted date: DRAFT

Water Resources Map

All Hazard Mitigation Plan 2017
Town of Andover, VT



- Dam
- River Corridor
- Wetland
- Surface Water Protection Area
- Groundwater Protection Area
- Floodway (Zone AE)
- Floodplain (Zone A)
- Floodplain (Zone AE)

Major Watersheds

- West River
- Middle Branch Williams River
- North Branch Williams River
- Black River

- VT State Highway
- Town Highway
- Private Roads and other Rights of Way
- River or Stream
- Lake or Pond
- Town Boundary

There are no surface water protection areas within the Town of Andover.

Data Sources:
Dams (ANR 2008), Floodplain and Floodway (Special Flood Hazard Areas) (FEMA 2008), River Corridor (ANR January 2, 2015), Wetlands (VT Significant Wetlands Inventory) (ANR 2010), Groundwater Protection Area (also known as Wellhead Protection Areas) (ANR 2011), Surface Water Protection Area (ANR 2010), Roads (VTrans 2015), Waterbodies (VHD 2008), Town Boundary (VCGI 2012).

N

VT State Plane, Meters, NAD 83
Data depicted on this map are for planning purposes only and are based on best available information. Some of the data may not line up.

0 0.5 1 Miles

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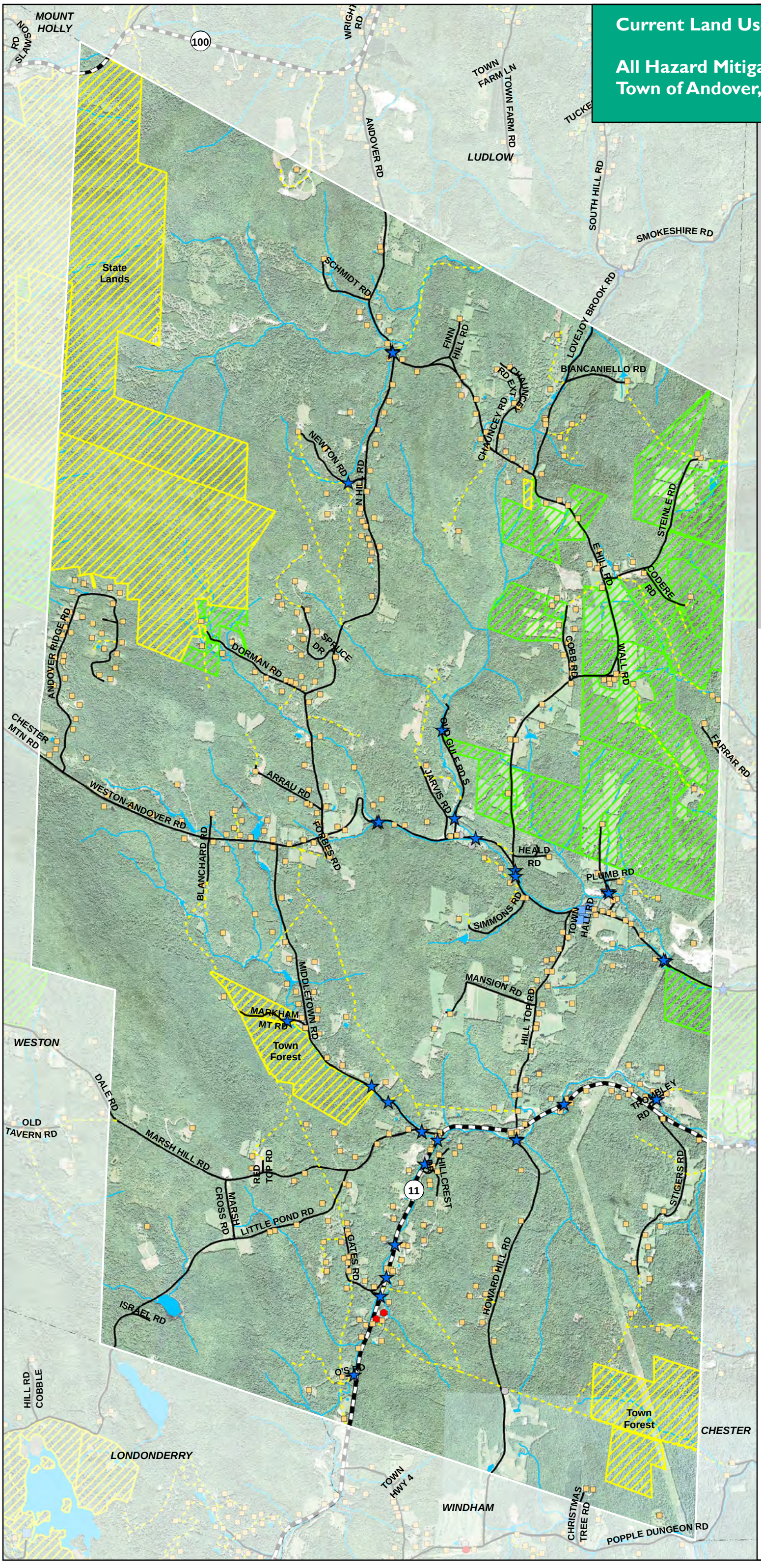
802-674-9201 www.swcrpc.org

For planning purposes only
Not for regulatory interpretation
Drawn September 6, 2016
Adopted date: DRAFT

Current Land Use and Transportation Map

All Hazard Mitigation Plan 2017
Town of Andover, VT



- Bridge or very long culvert

Land Use

- Government or Civic
- Commercial or Industrial
- Residential
- Farm
- Education
- Cemetery
- Other

- VT State Highway
- Town Highway
- Private Roads and other Rights of Way

- River or Stream
- Lake or Pond

- Conserved Public Lands
- Conserved Private Lands

- Town Boundary

Within the town there are no airports, transit routes or railroads. There are also no schools, hospitals, libraries, public water or sewer lines.

Data Sources:
Roads (VTrans 2015), Building (VT E911 Building 2016), Conserved Public Lands (UVM 2010), Conserved Private Lands (UVM 2009), Waterbodies (VHD 2008), Aerials (NAIP 2014), Town Boundary (VCGI 2012).

N

VT State Plane, Meters, NAD 83
Data depicted on this map are for planning purposes only and are based on best available information. Some of the data may not line up.

0 0.5 1 Miles

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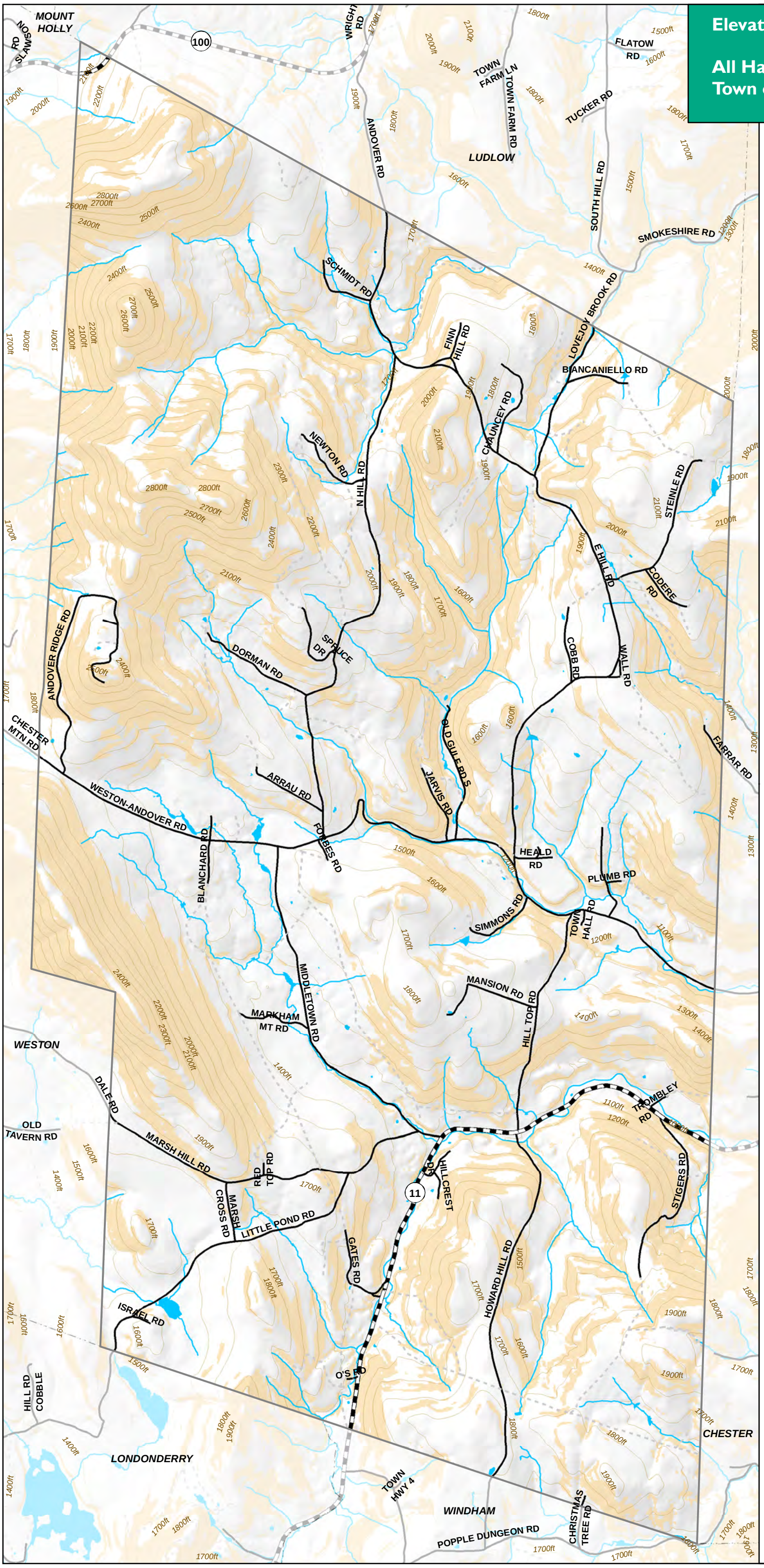
802-674-9201 www.swcrpc.org

For planning purposes only
Not for regulatory interpretation
Drawn September 6, 2016
Adopted date: DRAFT

Elevation and Slopes Map

All Hazard Mitigation Plan 2017
Town of Andover, VT



- 100ft Contour
- Steep slopes
- VT State Highway
- Town Highway
- Private Roads and other Rights of Way
- River or Stream
- Lake or Pond
- Town Boundary

Data Sources:
Contours, steep slopes and hillshade (derived from 10m Digital Elevation Model, US Geological Survey/ VT Center for Geographic Information 2012), Roads (VTrans 2015), Waterbodies (VHD 2008), Town Boundary (VCGI 2012).

N

VT State Plane, Meters, NAD 83
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0 0.5 1 Miles

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For planning purposes only
Not for regulatory interpretation
Drawn September 6, 2016
Adopted date: DRAFT

Town of Andover Floodplain, Floodway and Fluvial Erosion Hazard Area

- Dam
- Government and major destination
- Commercial, Farms and Lodging
- Educational
- Industrial
- Residential
- State Highway
- Town Highway
- Other Roadway (eg Private)
- Railroad
- FEMA Floodway
- FEMA Floodplain (Zone A)
- FEMA Floodplain (Zone AE)
- Fluvial Erosion Hazard (FEH) Area
- Rivers and Streams
- Lakes and Ponds
- Town Boundary

0 0.5 1 Miles

N

There is currently no Fluvial Erosion Hazard (FEH) area delineated within Andover.

Data Sources: Roads (Vermont Agency of Transportation 2013), Railroad (Vermont Agency of Transportation 2003) Floodplain and Floodway (FEMA 2008), Fluvial Erosion Hazard Area (Black River Watershed) (Vermont Agency of Natural Resources, Last modified 9/18/2012), Rivers and waterbodies (Vermont Hydrographic Dataset 2008), Town and Village Boundaries (Vermont Center for Geographic Information 2012), Dams (Vermont Agency of Natural Resources 2009), Buildings (Vermont E-911, April 2013)

VT State Plane Meters, NAD 83

Map for planning purposes only.
Not for regulatory interpretation.

Map drawn April 3, 2014

SWCRPC
SOUTHERN WINDSOR COUNTY REGIONAL PLANNING COMMISSION
PO Box 320, Ascutney, VT 05030
www.swcrpc.org

VOLUNTEER FORM TO DOCUMENT IN-KIND SERVICES - MATCH INFORMATION

PROGRAM: HMGP
DATE OF MEETING: June 22, 2016
MEETING LOCATION: Town Office- Andover
TOPIC: LHMP
MEETING TIME: 9:30 AM – 11 AM

VOLUNTEER ATTENDEES - CLAIMED

No.	NAME	AFFILIATION	MILEAGE ROUND TRIP	MEETING HOURS	TOTAL MILEAGE	TOTAL TIME
					0.54	~~$20.00~~ 22.79
1	Barry Williams	Town Andover		1.5	-	-
2	Charlie Golden	"		"	-	-
3	Kevin Baker	"		"	-	-
4	Jeanette Haight	"		"	-	-
5					-	-
6					-	-
7					-	-
8					-	-
9					-	-
10					-	-
11					-	-
12					-	-
13					-	-
14					-	-
15					-	-
16					-	-
17					-	-
18					-	-
		Sub Total	0.00	0.00	$0.00	$0.00

FEDERALLY SUPPORTED PERSONNEL - CAN NOT CLAIM

No.	NAME	AFFILIATION				
					0	$0.00
1	Allison Hopkins	SWCRPC		1.5	-	-
2					-	-
3					-	-
4					-	-
5					-	-
6					-	-
7					-	-
		Sub Total	0.00	0.00	$0.00	$0.00

2nd

VOLUNTEER FORM TO DOCUMENT IN-KIND SERVICES - MATCH INFORMATION

PROGRAM: HMGP
DATE OF MEETING: December 8, 2016
MEETING LOCATION: Town Office- Andover
TOPIC: LHMP
MEETING TIME: 9:30 AM – 11:30 AM

(*) public mtg notices provided + posted

VOLUNTEER ATTENDEES - CLAIMED

No.	NAME	AFFILIATION	MILEAGE ROUND TRIP	MEETING HOURS	TOTAL MILEAGE	TOTAL TIME
					0.54	~~$20.00~~ 22.79
1	Charles Golden	Town Andover			-	-
2	Jeannete Haight	"			-	-
3	KEVIN BAKER	"			-	-
4					-	-
5					-	-
6					-	-
7					-	-
8					-	-
9					-	-
10					-	-
11					-	-
12					-	-
13					-	-
14					-	-
15					-	-
16					-	-
17					-	-
18					-	-
		Sub Total	0.00	0.00	$0.00	$0.00

FEDERALLY SUPPORTED PERSONNEL - CAN NOT CLAIM

No.	NAME	AFFILIATION				
					0	$0.00
1	Allison Hopkins	SWCRPC			-	-
2					-	-
3					-	-
4					-	-
5					-	-
6					-	-
7					-	-
		Sub Total	0.00	0.00	$0.00	$0.00

VOLUNTEER FORM TO DOCUMENT IN-KIND SERVICES - MATCH INFORMATION

PROGRAM: HMGP
DATE OF MEETING: May 19, 2018
MEETING LOCATION: Town Office- Andover
TOPIC: LHMP
MEETING TIME: 9:30:00 AM - 11:30 AM

VOLUNTEER ATTENDEES - CLAIMED

No.	NAME	AFFILIATION	MILEAGE ROUND TRIP	MEETING HOURS	TOTAL MILEAGE	TOTAL TIME
					0.54	$22.79
1	Josh Vincent	Town of Anover			-	-
2	Charles Golden	"			-	-
3	Jeanette Haight	"			-	-
4	Kevin Baker	"			-	-
5					-	-
6					-	-
7					-	-
8					-	-
9					-	-
10					-	-
11					-	-
12					-	-
13					-	-
14					-	-
15					-	-
16					-	-
17					-	-
18					-	-
		Sub Total	0.00	0.00	$0.00	$0.00

FEDERALLY SUPPORTED PERSONNEL - CAN NOT CLAIM

No.	NAME	AFFILIATION				
					0	$0.00
1	Allison Hopkins	SWCRPC		2	-	-
2					-	-
3					-	-
4					-	-
5					-	-
6					-	-
7					-	-
		Sub Total	0.00	0.00	$0.00	$0.00

VOLUNTEER FORM TO DOCUMENT IN-KIND SERVICES - MATCH INFORMATION

PROGRAM: HMGP
DATE OF MEETING: June 26, 2017
MEETING LOCATION: Town Office- Andover
TOPIC: LHMP Selectboard Public Meeting
MEETING TIME: 6:30 - 8:30 PM

VOLUNTEER ATTENDEES - CLAIMED

No.	NAME	AFFILIATION	MILEAGE ROUND TRIP	MEETING HOURS	TOTAL MILEAGE	TOTAL TIME
					0.54	$20.00
1		Town Andover			-	-
2	Harold Johnson				-	-
3					-	-
4					-	-
5					-	-
6					-	-
7					-	-
8					-	-
9					-	-
10					-	-
11					-	-
12					-	-
13					-	-
14					-	-
15					-	-
16					-	-
17					-	-
18					-	-
		Sub Total	0.00	0.00	$0.00	$0.00

FEDERALLY SUPPORTED PERSONNEL - CAN NOT CLAIM

No.	NAME	AFFILIATION				
					0	$0.00
1	Allison Hopkins	SWCRPC			-	-
2					-	-
3					-	-
4					-	-
5					-	-
6					-	-
7					-	-
		Sub Total	0.00	0.00	$0.00	$0.00