Town of Starksboro, Vermont

Single Jurisdiction All-Hazards Mitigation Plan

Final Plan Adoption Date: 10/30/2018 *FEMA Approval Date: 11/2/2018*

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1. Planning Process

1.1. Current Plan Development Process

In response to a November 2013 query by the Addison County Regional Planning Commission (ACRPC), the Starksboro selectboard requested assistance in writing an All-Hazards Mitigation Plan. At the confirmation of funding availability by ACRPC, the Town further showed their support of the plan by gathering the following residents of Starksboro and having the selectboard appoint them to a mitigation planning committee:

Tony Porter -	Starksboro Selectboard
Tom Estey -	Starksboro Road Foreman and Fire Chief
Cheryl Estey -	Starksboro Town Clerk
Charlene Phelps -	Starksboro Emergency Manager
Dennis Casey -	Starksboro Planning Commission Chair
Jeff Keeney -	Starksboro Planning Commission
David Wetmore -	Starksboro Zoning Administrator

The committee met on 9/17/2016 to complete a hazards inventory and risk assessment matrix and to flesh out locations where hazards are known to the community. The committee met again on 11/17/2016 to identify hazard locations on maps and identify potential mitigation projects associated with those locations. On 1/12/2017 the committee met again, this time to identify potential projects which would help mitigate some of the identified hazards. The committee met once again on 2/23/2017 to brainstorm and further evaluate projects. At that meeting an updated copy of the draft hazard mitigation plan was provided for the town office along with a comment sheet so residents visiting the office could review and make comments

Input on the draft plan was requested from town residents during open meetings of the Town Planning Commission and the Town Selectboard where copies of the draft plan were available for review. The town also made the plan available on its website www.starksborovt.org to reach a broader distribution.

Based on comments from the public process, the draft plan was further edited and forwarded to Vermont's State Hazard Mitigation Officer on 6/21/2017 for comments and preliminary approval. After a series of edits were made, the draft was circulated through the selectboard and Planning Commission prior to a final resubmission to the SHMO. The final draft of the plan received selectboard approval on 3/26/2018 before being sent to FEMA reviewers on 3/29/2018.

Comments were received back from FEMA reviewers and changes were made to the draft plan based on FEMA recommendations. With edits made, the plan was returned to FEMA for Approval Pending Adoption (APA) status. Upon receipt of the FEMA APA, the resulting document was adopted by the Starksboro selectboard on 10/30/2018. The final adopted plan was then forwarded to FEMA Region I for approval which was received on 11/2/2018.

1.2. Opportunities for Public Comment

Multiple opportunities for public comment were made available during the planning process:

- A planning committee was appointed from volunteers and town officers at an open meeting of the Town Selectboard.
- The plan was made available on the Town website www.starksborovt.org for public comment while in draft form. (No comments received)
- A copy of the draft plan was made available for public comment at the Town Office on 2/23/2017 with a comment sheet. (No comments received)
- Meetings of both the Town Selectboard and the Town Planning Commission were open for public comment throughout the planning and draft phases of this plan and the public was encouraged to contact Tim Bouton at ACRPC. (No comments received)
- Copies were distributed to the Town Clerks of neighboring communities requesting redistribution to their boards and the public. Comments were to be directed to Tim Bouton at ACRPC. (1 comment received)

1.3. Opportunities for Additional Comment

Additional opportunities for regional and state-level comments in the draft stage were provided throughout the planning process.

- A copy of the draft plan was posted on the ACRPC website www.acrpc.org for regional review on 2/14/2017. Comments were directed to Tim Bouton at ACRPC. No comments received.
- The draft plan was posted at ACRPC offices at 14 Seminary St., Middlebury, VT on 2/14/2017 with a comment sheet requesting public input. Comments were directed to Tim Bouton at ACRPC. No comments received.
- The Town Clerks of bordering towns of Monkton, Hinesburg, Huntington, Buell's Gore, Lincoln, and Bristol were all sent a draft of the plan for distribution. They were requested to direct comments to Tim Bouton at ACRPC tbouton@acrpc.org One comment received.
- A final copy of the draft plan was provided to the State Hazard Mitigation Office for comments which were received on 1/23/2018.
- Comments were returned and edits were made between 3/29/18 and 8/28/18.
- An edited draft was sent to VEM and was submitted to FEMA Region 1 on 9/11/18.
- The draft was returned from FEMA for required revisions on 10/5/2018 and resubmitted on 10/15/2018.

1.4. Extent of Review

Throughout the plan update process all sections of the plan were reviewed for accuracy. Recently completed studies and newly developed data were included in the document. Information from the following documents and sources were incorporated into this plan either as data or to inform the committee's prioritization process:

- 2017 Basic Emergency Operations Plan (previously identified high hazard and vulnerable sites)
- 2012 Starksboro Town Plan (support for the committee's prioritization process and section 2 narrative)
- 2016 Addison County Regional Plan (transportation section used to identify high accident locations)
- 2013 State of VT Hazard Mitigation Plan (provided a listing of statewide hazard concerns)
- 2015 Report of the State Fire Marshall (provided data to inform structure and wild fire risks)
- Federal Emergency Management Agency, www.fema.gov (provided official data on declared disasters)
- The Vermont Weather Book by David Ludlum (provided historic accounts of disasters for Section 4.3
- National Climatic Data Center website (provided information for Section 4.3)
- FEMA Snow Load Safety Guide (informed Section 4.3)
- FEMA FIRMS dated 12/4/1985 (incorporated into maps and section 4.3)
- VT Center for Geographic Information data layers (incorporated into map products)
- LEPC #8 Tier II reports (reviewed for Section 4.3)
- Town of Starksboro Grand List for 2016 (utilized to determine value of identified properties)
- Vermont Department of Health, www.healthvermont.gov (incorporated transmissible disease information into section 4.3)
- State of Vermont dam inventory database (incorporated into section 4.3)
- Starksboro Annual Town Reports 1980-2015 (informed FEMA reimbursements in table #1)
- Phase 2 Stream Geomorphic Assessment High Knob Brook Watershed Town of Starksboro, VT February 2009 (Identified degraded stream segments)
- Lewis Creek Watershed: River Corridor Conservation & Management Plan by South Mountain Research and Consulting, March 2010 (identified projects for Flood Mitigation)
- Findings and Recommendations High Knob Brook Culverts by Milone and Mc Broom 3/29/2010 (identified projects for flood mitigation)

2. Local Background/Maps

2.1. Community Background

"Starksboro, Vermont is a town of 45 square miles and around 1,800 residents located in the northeastern corner of Addison County. It adjoins the towns of Bristol, Lincoln and Monkton in Addison County, as well as Hinesburg and Huntington in Chittenden County. Starksboro is located in the western foothills of the Green Mountains and is characterized by its terrain, which ranges from 372 to 2,500 feet above sea level. Hogback Mountain, a north-south ridge that defines the town's western border, slopes sharply into the Lewis Creek Valley. The valley is recognized for its high quality agricultural soils and the scenic views of the surrounding hills and ridges visible beyond the fields and pastures. From the valley eastward, the land rises by a series of gradually ascending hills to another significant ridgeline, East Mountain. That north-south ridgeline extends in a broken, irregular manner through nearly the whole length of the town, sloping steeply on the east towards the Huntington River, which flows for a short distance in Starksboro. Most of the town drains to the Lewis Creek, which has its source in the Hillsboro Mountain and Ireland Road area and flows north through the western parts of Starksboro ultimately emptying into Lake Champlain. Numerous small streams, tributaries of Lewis Creek, flow out of Starksboro's hillsides.

Those streams and the rugged terrain have shaped the town's settlement pattern and transportation system. Starksboro Village, the traditional town center, is located in the Lewis Creek Valley, along the town's main north-south highway, now Vermont Route 116. High up above the valley in the southeastern part of town, known as South Starksboro, the historic hamlet of Jerusalem developed along one of the few east-west crossings over the Green Mountains, now Vermont Route 17. A number of town roads wind their way eastward from the valley up into the town's higher elevations following the narrow stream valleys. The hill farms that were once scattered along these roads have largely disappeared, to be replaced in recent decades by rural residences. Large areas of the town's uplands remain inaccessible, creating large tracts of undisturbed forestland." (Starksboro Town Plan 10/18/2011)

Starksboro currently belongs to the Addison Northeast Supervisory Union and elementary school children attend the Robinson Elementary School. Under a recently approved proposal, all schools within the current union will operate under a single governance structure as a cost savings measure. The elementary school will continue to operate for at least 4 years at which point, the possibility of school closings will likely come up. The elementary school is located strategically central in town and serves more than 140 elementary students up to the 6th grade. Beginning in 7th grade, students attend the Mount Abraham Union Middle and High Schools in nearby Bristol. Starksboro has seen a steady increase in population from a low in 1960 of about 502 to its current (2010) level of 1,777 residents.

In Starksboro, most homes are single-family wood structures with an average value in 2016 of $230,000. Of the 826 housing units in Starksboro, approximately 75% are owner occupied single family homes 10% renter occupied and 12% seasonal camps. Of the single-family homes, nearly 17% are mobile homes, generally more susceptible to disaster than permanent structures. Most of the town is still a mix of wetland, forest and active farmland and several large properties have been set aside in permanent conservation easements. The majority of the undeveloped land in town is enrolled in the Current Use program in which owners pay property taxes commensurate with the value of products generated from the land. The program exchanges this tax relief for a temporary easement which helps keep much of the land in Starksboro undeveloped.

Electrical power is provided in most of Starksboro by Green Mountain Power. However, The Vermont Electric Cooperative has a distribution network which covers the northeastern corner of town accessed by Big Hollow Rd. The Vermont Electric Power Company (VELCO), a private corporation owned by the power companies in the state, owns most of the bulk power transmission system in Vermont.

Most town residents rely on drilled wells for their drinking water. Some groundwater wells produce water containing nuisance substances such as iron, manganese, hardness minerals, hydrogen sulfide gas and sulfate reducing or iron fixing bacteria. Well yields vary from plentiful to extremely low and highly problematic.

Other residents rely on a mix of groundwater and surface water in wells that are relatively shallow dug wells or springs. Such wells are susceptible to natural contamination and pollutants such as leaking petroleum or industrial tanks, road salt, failing septic systems and agricultural chemicals.

A limited number of residents within the village are served by the Starksboro Aqueduct Company.

The Addison County Sheriff's Department provides Civil Process for the entire county. In addition, the Town of Starksboro contracts with the county Sheriff to provide traffic enforcement. The Vermont State Police provide service for motor vehicle regulation and criminal law enforcement. Starksboro is also served by an elected constable who is available to assist law enforcement officials when requested.

There is a dedicated group of volunteers in the Starksboro Volunteer Fire Department with equipment housed in the Firehouse at the town gravel pit off Rte. 116 in the Rockville section of town. The FY 16-17 appropriation in support of the fire department was $20,000 with an additional $43,000 set aside in a fire equipment reserve fund. In 2017 they responded to 44 calls, most of which were categorized as "False Alarm" or "Hazardous Condition".

Starksboro First Response is an all-volunteer agency made up of town residents and provides initial emergency medical services in town. The first response agency is provided $9,500 annually to support its mission. Records from 2015 show that they responded to 95 calls. The Bristol Rescue Squad, with headquarters in Bristol, responds to calls for patient transport in Starksboro. BRS bills for its services, receives additional funding from towns serviced, and accepts donations. In 2015 BRS transported 43 patients from Starksboro and was allocated $6,000 by the town.

There are no medical facilities in Starksboro, but many doctors, nurses and dentists are available a short distance north or south of town. Addison County Home Health and Hospice can make home visits, and the Community Health Services of Addison County has an Open Door Clinic in Middlebury.

The Town has identified an Emergency Manager and uses a Local Emergency Operations Plan (LEOP) last adopted in 2016 to coordinate response to larger incidents. The LEOP identifies the Town office at 2849 VT Rte. 116, the Old Fire Station at 3011 VT Rte. 116 and the Fire Station at 3902 VT Rte. #116 as emergency operations centers. The Robinson Elementary School, the Starksboro Town Hall and the fire station as community shelters. The LEOP also identifies high hazard areas and vulnerable sites primarily based on Flooding, HAZMAT and likely transportation incidents.

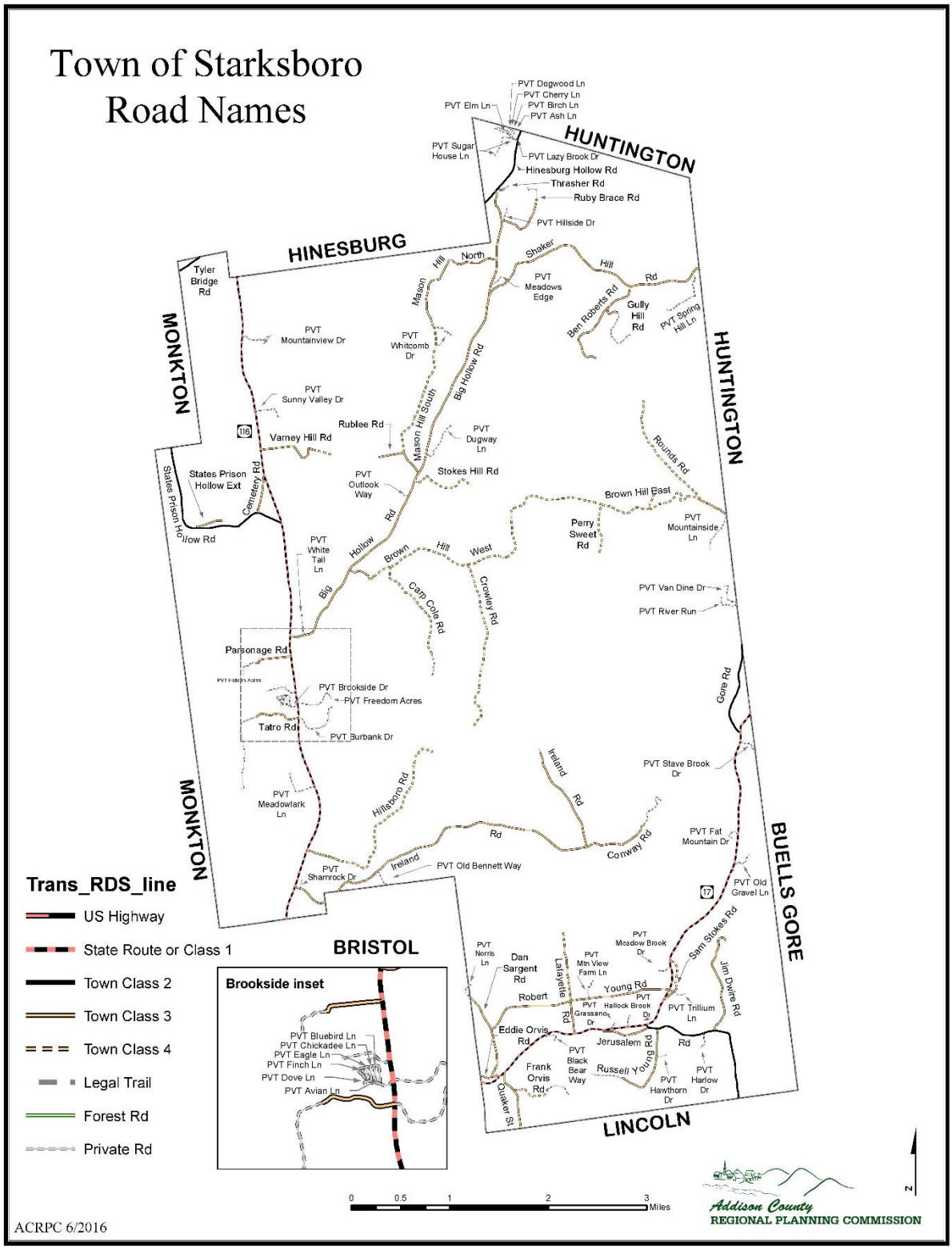
Starksboro has its own Highway Department headquartered at the former Colton gravel pit with a full-time Road Foreman and two additional employees. The department is responsible for summer maintenance, winter snow removal and maintenance, and reconstruction of town highway infrastructure on 47.3 miles of town-owned roads. Starksboro has a town garage and various pieces of road maintenance and construction equipment which are factored into a capital equipment replacement fund. Highway expenditures are the largest item within the town (non-school) budget. The budget hovers at approximately $750,000, about half of which pays for winter maintenance with additional portions going toward bridge and highway construction. In 2013, Starksboro adopted the VTrans recommended road and bridge standards which include maintenance and replacement standards, and confirms that adoption annually.

The Town has been a member of the National Flood Insurance Program since 1985 and as such has adopted zoning by-laws designating Flood Hazard Areas including associated regulations for administering those areas. The administration of these regulations is the duty of the Town Zoning Administrator. All applications for development are viewed through the standard zoning regulations and reviewed for any proximity to the floodplain as identified in the Town of Starksboro Flood Insurance Rate Maps (FIRM) dated 12/4/1985. If the proposed development appears to be located in the 1% floodplain, the application is referred to the Development Review Board for review prior to any issuance of permit or conditional permit.

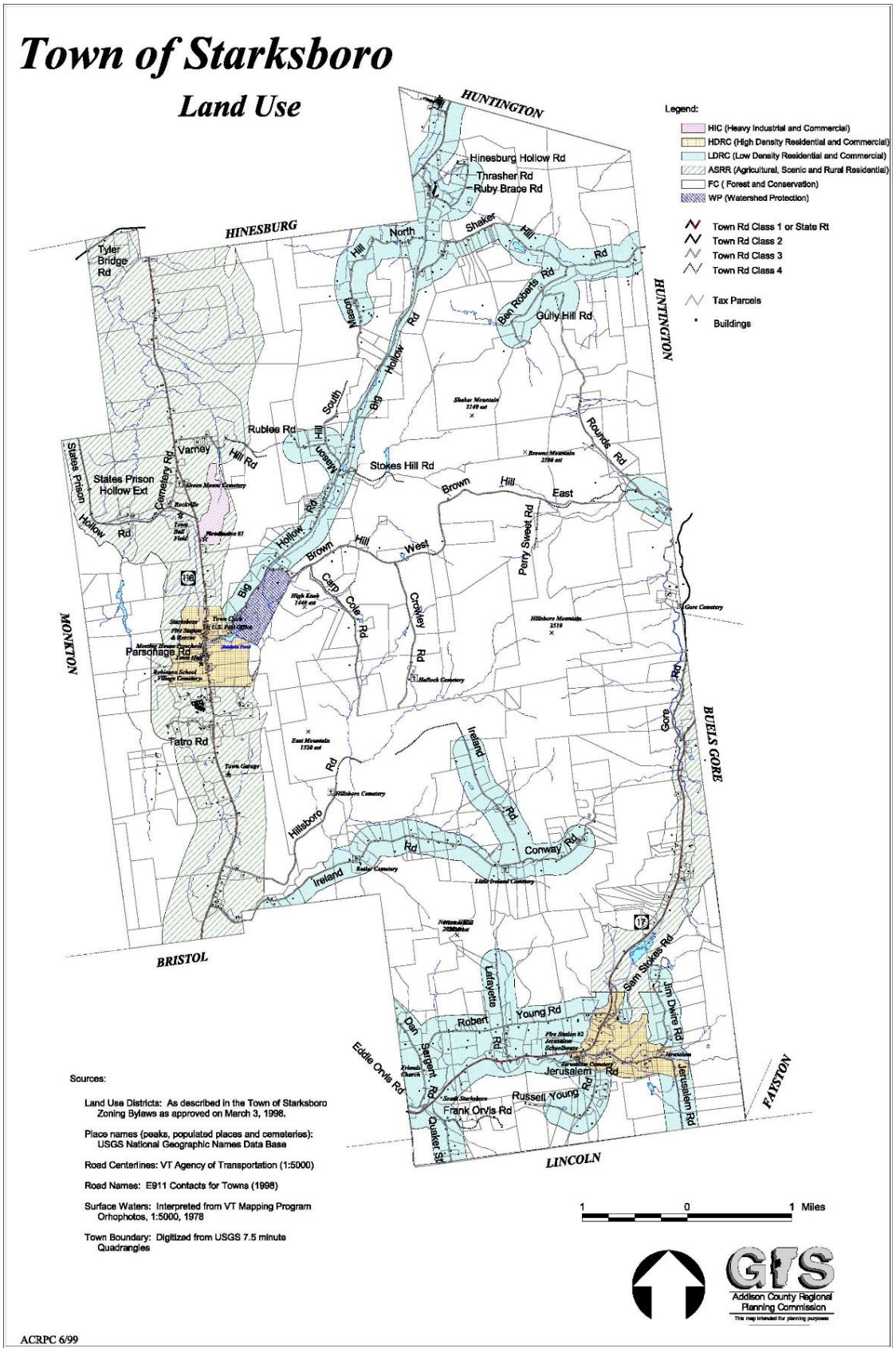
Fortunately, much of the mapped floodplain floods regularly and therefore is not particularly attractive for new development. The availability of alternate sites has thus far discouraged development along these areas due to difficulties in disposing of septage and the costs of complying with floodplain regulations. A comparison of e-911 locations in Starksboro and the current flood maps show a total of 17 structures located in the floodplain. State records utilizing a similar methodology indicate a total of 18 buildings in the floodplain. The discrepancy between the two can be attributed to the lack of digitized flood maps. None of these buildings are covered by flood insurance policies with the NFIP. There are no repetitive-loss structures located in Starksboro.

2.2. Community Maps

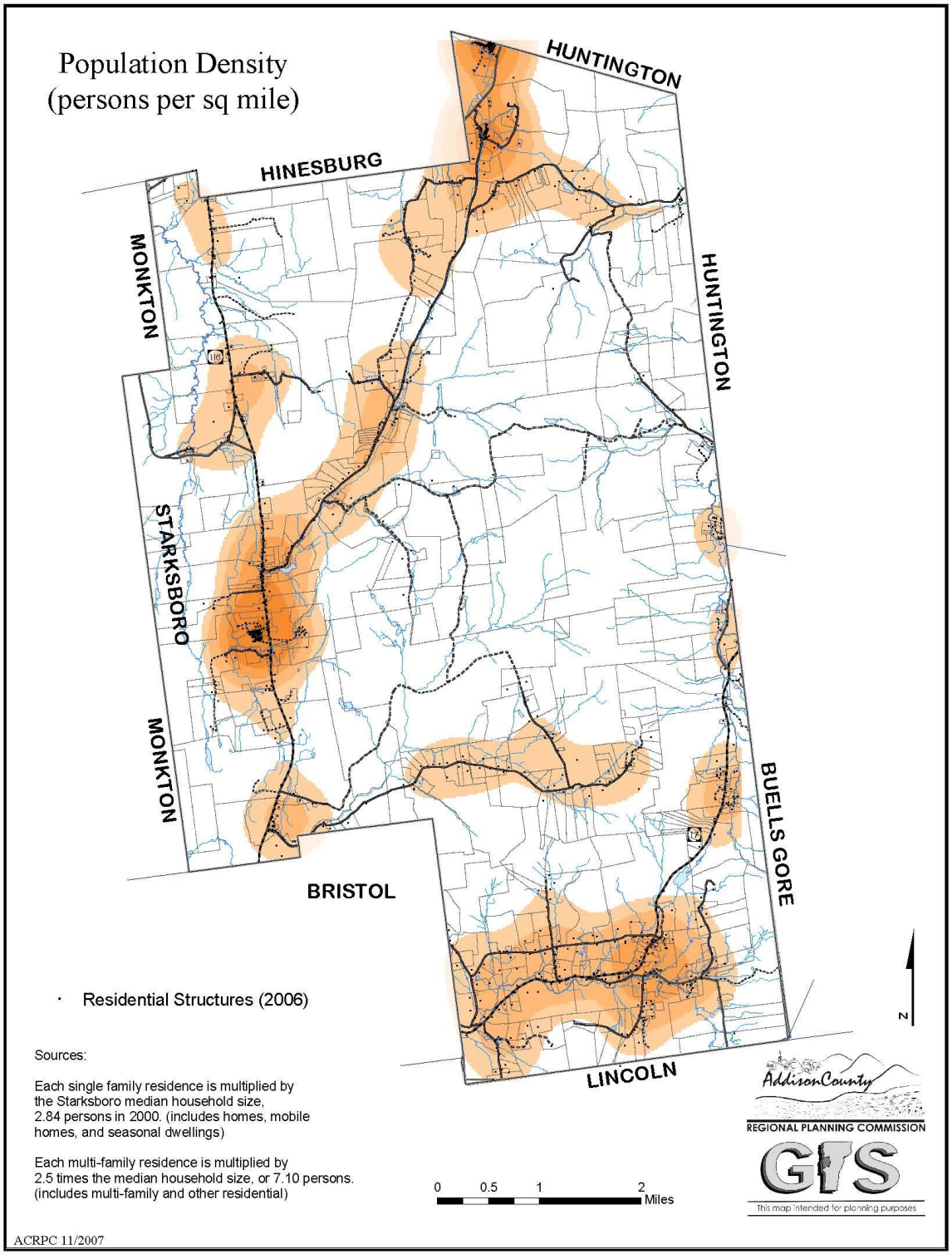
2.2.1. Road Names



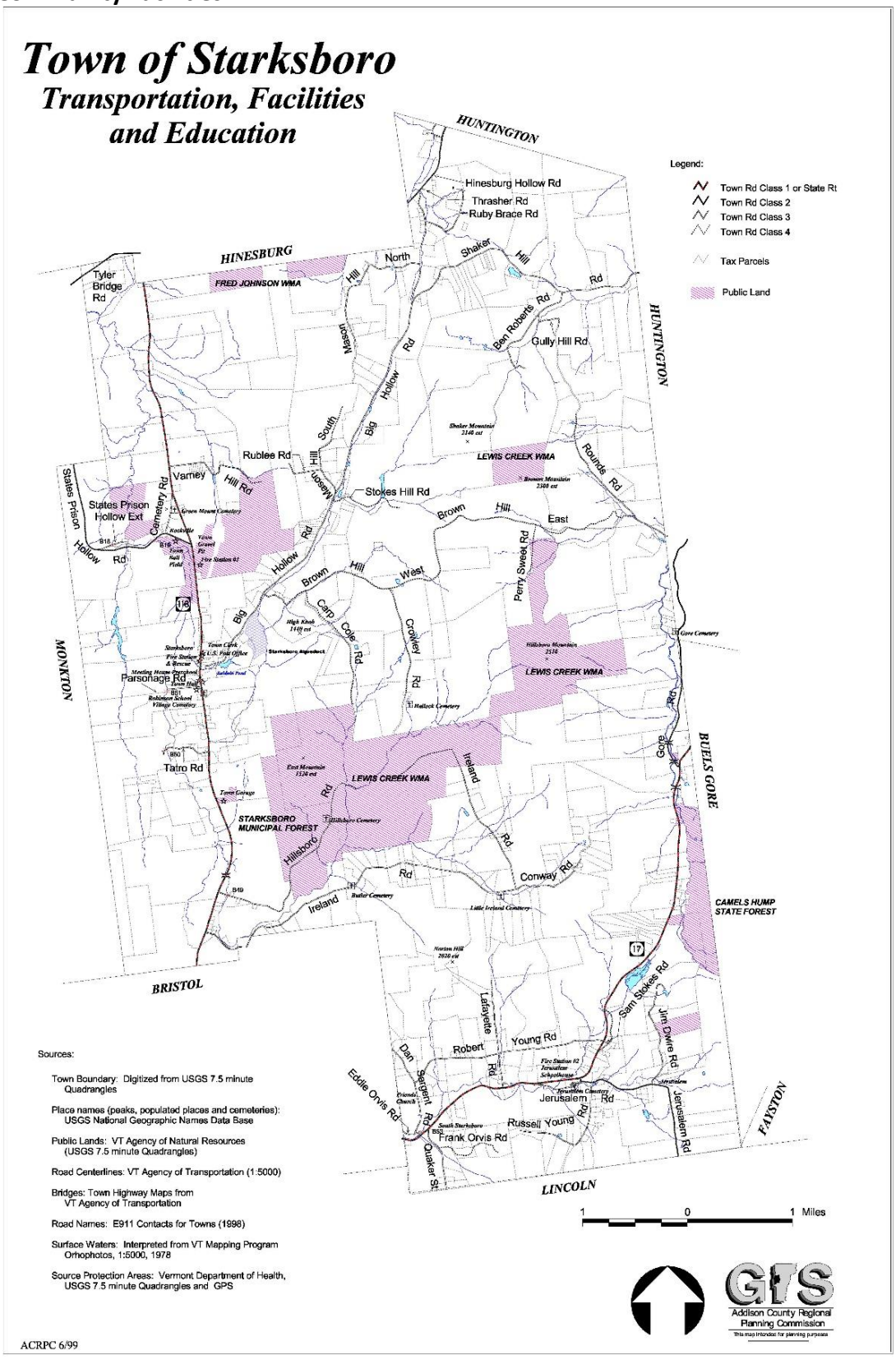
2.2.2. Future Land Use



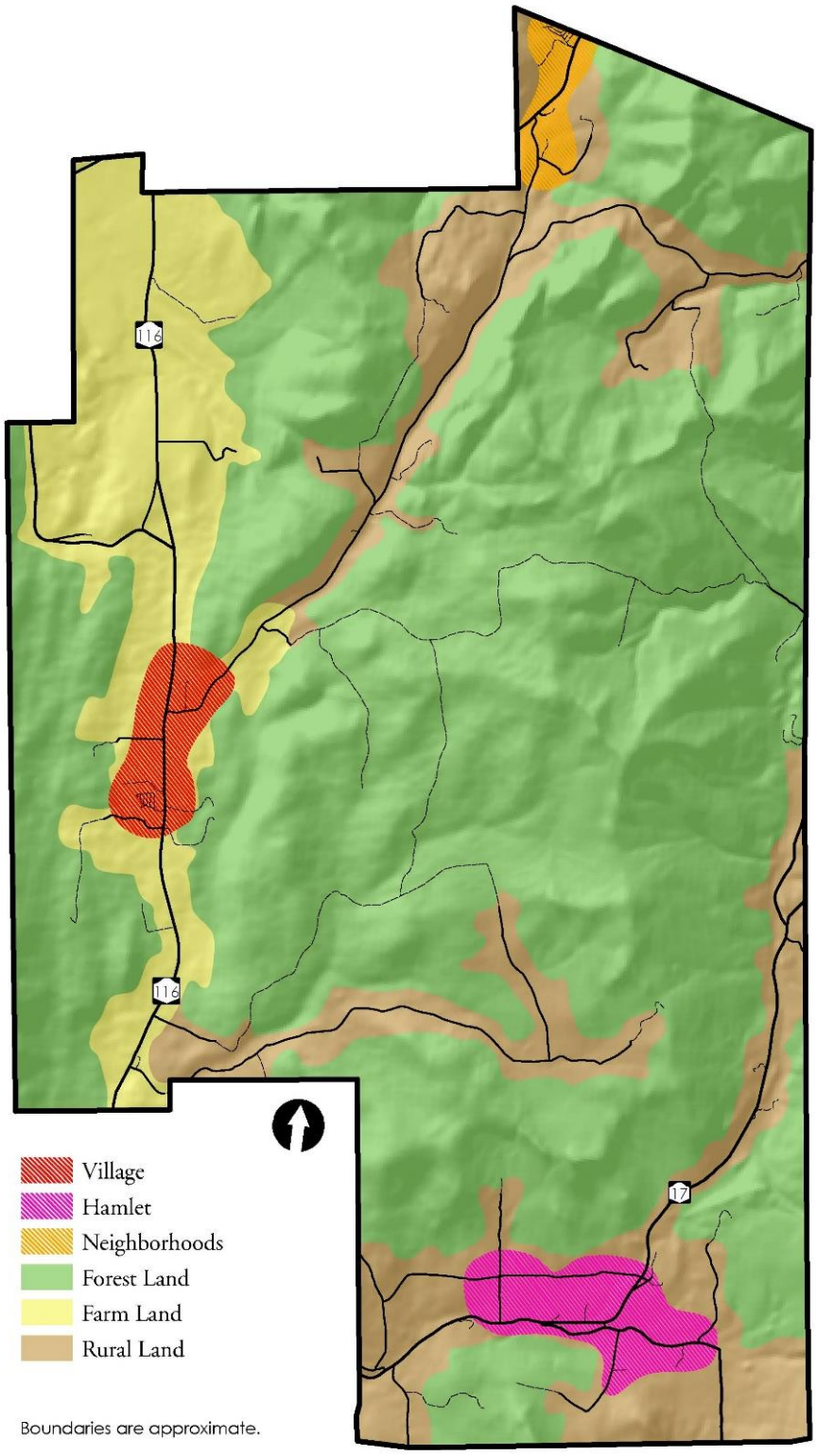
2.2.3. Population Density



2.2.4. Community Facilities



2.2.5. Land Use Planning Areas



3. Existing Adopted Plans Which Support Hazard Mitigation

The following plans pre-date this plan and are used to illustrate how the community, the Addison region and the State of Vermont have incorporated mitigation into standard planning mechanisms. As the Starksboro Selectboard, Planning Commission and Emergency Manager continue to work on annual or 8-year updates of these plans, the Town of Starksboro All Hazards Mitigation Plan will provide needed information to be incorporated into the plans.

3.1. 2016 Town Emergency Operations Plan (High Hazard Sites Identified)

- *Flooding – States Prison Hollow Road Extension*
- *Flooding – Big Hollow Road*
- *Hazardous Materials Storage – Foam Laminates of VT, Varney Hill Road*
- *Pesticide Storage – Cobble Creek Nursery, Tyler Bridge Road*

3.2. 2011 Starksboro Town Plan – Objectives and Policies which support Hazard Mitigation

- *Improve the quality of housing in mobile home parks by addressing common housing issues, …*
- *When reviewing applications for new or expanding businesses, special consideration should be given to public safety, potential danger to community health, pollution…*
- *Maintain groundwater quality to provide a supply of safe and clean drinking water throughout town…*
- *Encourage utilities and property owners to take the actions needed to increase the reliability of Starksboro's electric and communications infrastructure.*
- *Recognize the services provided by the town's volunteer emergency responders as critical to the town and continue to support their efforts to provide high quality fire and rescue services in Starksboro.*
- *Maintain the firehouse and rescue squad station within Starksboro village and the fire department substation in South Starksboro and explore the feasibility of other actions that could minimize response times, especially in the town's more densely populated areas.*
- *Regulate land use within identified source protection areas in order to limit the potential for pollution and to safeguard the purity of drinking water supplies.*
- *Consider the town's ability to provide emergency services, especially during winter months and mud season, when determining the appropriate types and densities of land use that will be allowed in outlying areas.*
- *Support a system of dry hydrants, fire ponds, cisterns, etc. o facilitate firefighting efforts, and consider the needs of emergency responders when reviewing development proposals.*
- *Minimize the number of new curb cuts onto public roads and promote construction of shared driveways whenever feasible in order to protect public safety…*
- *Seek opportunities to improve traffic and pedestrian safety especially within Starksboro's population centers.*

- *The town should develop and adopt construction standards for private roads and drives to ensure reasonable access by emergency vehicles…*
- *Restrict development along and in the headwaters of major streams, including Lewis Creek and Baldwin Creek.*
- *Protect or provide for long-term stewardship of wetlands that support significant functions and values…*
- *The town's land use regulations should be revised to guide development away from steep slopes…*
- *Delineate fluvial erosion hazard areas for the major tributaries of the Lewis Creek watershed…and press for updated FEMA Flood Insurance Rate Maps upon which to base regulations intended to limit property damage and loss of life from natural hazards.*
- *Remove invasive species when possible…*
- *…Protections could be increased by changing all or a portion of the setback to a buffer requirement. A simple no-build setback still permits removal of native vegetation along the riverbanks, which can lead to bank destabilization and accelerated erosion.*
- *Starksboro should develop a comprehensive storm-water management plan…*

3.3. 2016 Addison County Regional Plan - Goals that support Hazard Mitigation

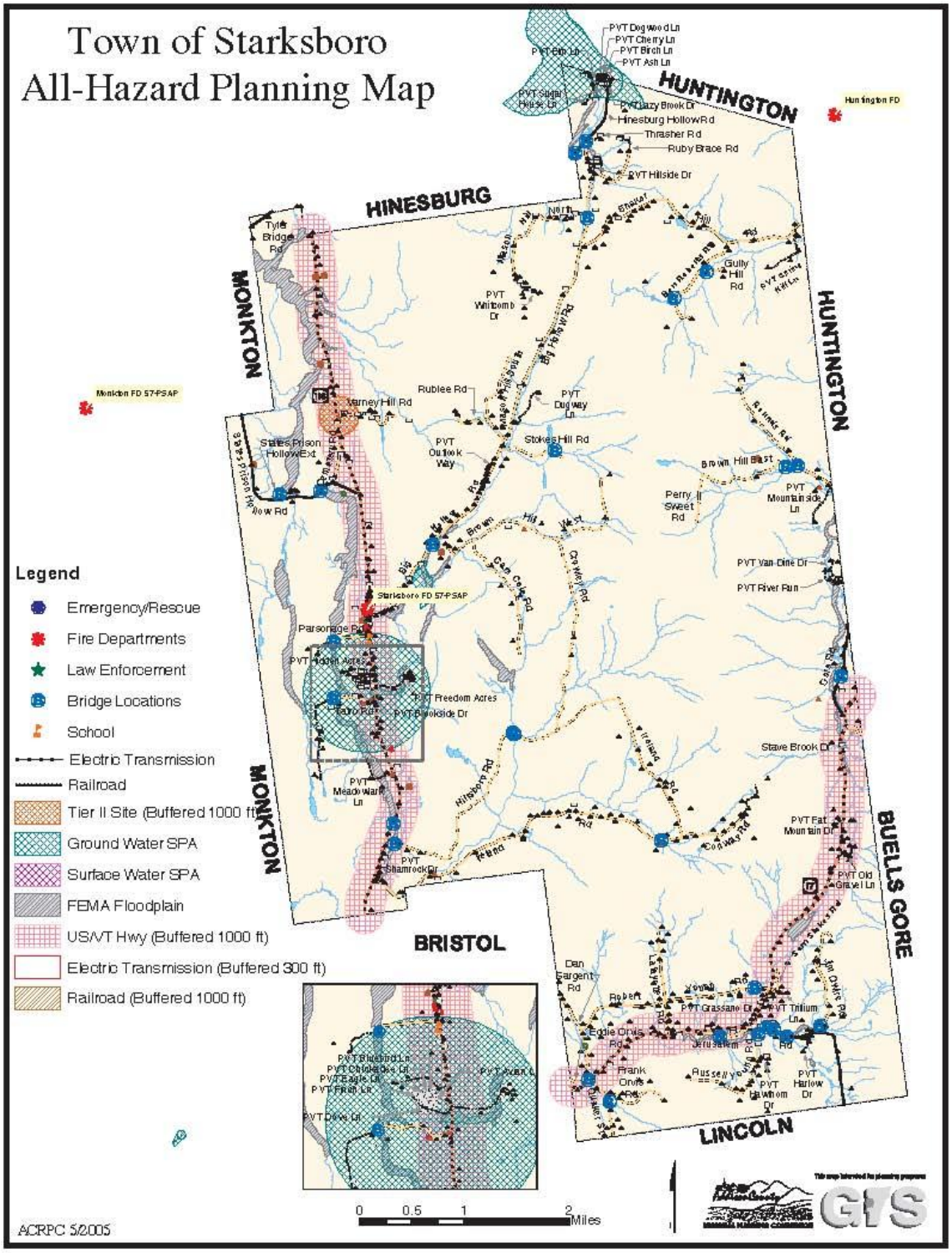
- *Work to restore and maintain stream equilibrium by developing and implementing river corridor plans.*
- *Reduce flooding and related damages through appropriate mitigation techniques.*
- *Encourage watershed-based cooperation and educate towns and the general public about water quality and stream dynamics*
- *Provide communities the support they need to be proactive in reducing flood and erosion hazards by adopting appropriate zoning regulations to limit development in hazardous areas.*
- *Encourage proper maintenance and sizing of bridges, culverts and other structures to accommodate flow from storm events and to mitigate flood hazards.*
- *Reduce the loss of life and injury resulting from all hazards.*
- *Mitigate financial losses incurred by municipal, residential, industrial, agricultural and commercial establishments due to disasters.*
- *Reduce the damage to public infrastructure resulting from all hazards.*
- *Recognize the connections between land use, storm-water, road design/ maintenance and the effects from disasters.*
- *Ensure that mitigation measures are sympathetic to the natural features of the region's rivers, streams and other surface waters; historic resources; character of neighborhoods; and the capacity of the community to implement them.*
- *Encourage hazard mitigation planning as a part of the Municipal Planning Process.*
- *Encourage municipalities and landowners to consider VT Agency of Natural Resources riparian guidelines for habitat and flood protection.*

3.4. 2013 State of Vermont Hazard Mitigation Plan - Hazard Mitigation Goals

- *Ensure that current and proposed legislation and regulatory policies require effective hazard mitigation practices throughout the State.*
- *Ensure that grant-related funding processes allow for expedient and effective mitigation actions to take place at the municipal and State level.*
- *Provide timely and accurate technical assistance that supports hazard mitigation activities to regional and local jurisdictions as well as private sector partners.*
- *Identify state-level risks and vulnerabilities and protect or harden state infrastructure against hazards.*
- *Conduct hazard assessments, mapping and data collection projects to increase knowledge about both the hazards facing Vermont and the most effective mitigation actions for minimizing public exposure to hazards.*

4. Community Risk Assessment

Local All-Hazards Planning Map (2007)



4.1. Risk Prioritization Process/Results

The Town of Starksboro's Hazard Mitigation Planning Committee reviewed 23 hazards in its Hazard Inventory/Risk Assessment. In reviewing these hazards, the committee identified 10 hazards which they would consider High Priority based on the completed Risk Assessment. These high priority risk/vulnerabilities are: Flash Flood, Invasive Species, Structure Fire, Severe Snow, Ice Storm, Insect-borne Illness, Highway Accident, Severe Mud, High Winds and HazMat Spill. The remaining 13 hazards scored at a lower level 2 vulnerability rating either due to the unlikelihood of their occurrence or the limited damages that would be expected from them. In reviewing these hazards, Hurricane and Tropical Storm which are identified in the state mitigation plan were not reviewed as their primary effects were profiled under high wind and flooding.

Hazard Inventory/Risk Assessment Parameters

Probability: Frequency of Occurrence

1= Unlikely	<1% in a given year
2= Occasionally	1%-10% probability in a given year
3= Likely	>10% but <100% in any given year
4= Highly Likely	100% probability in a given year

Warning: Time available to give notice to the majority of the population

1= More than 12 hours
2= 6-12 Hours
3= 3-6 hours
4= <3 hours (minimal)

Geographic Impacts: How much of the population is expected to be impacted

1= Isolated Locations/neighborhood	<20% of population impacted
2= Moderate impact	>20% and <75% of population impacted
3= Community-wide	>75% of population impacted within community
4= Region-wide	Level 2 & 3 impacts in surrounding communities

Property Damage: Severity of damages and disruption

1= Negligible	Isolated property damage, minimal disruption to infrastructure
2= Minor infrastructure	Isolated moderate to severe property damage, brief disruption to
3= Moderate infrastructure	Severe damages at neighborhood level, temporary closure of
4= Major infrastructure	Severe damages town-wide, temporary to long-term closure of

Level of Committee Concern

1= Low level of Concern	Not worth spending a lot of time with
2= Moderate Level of concern	Could happen, but mitigation costs are high and benefits are low
3= High Level of Concern	Worth exploring more, developing mitigation projects for
4= Extreme Concerns assistance.	Town is generally mitigating as much as they can, really need

Vulnerability: Total score of Probability, Warning, Geographic Impact, and Property Damage

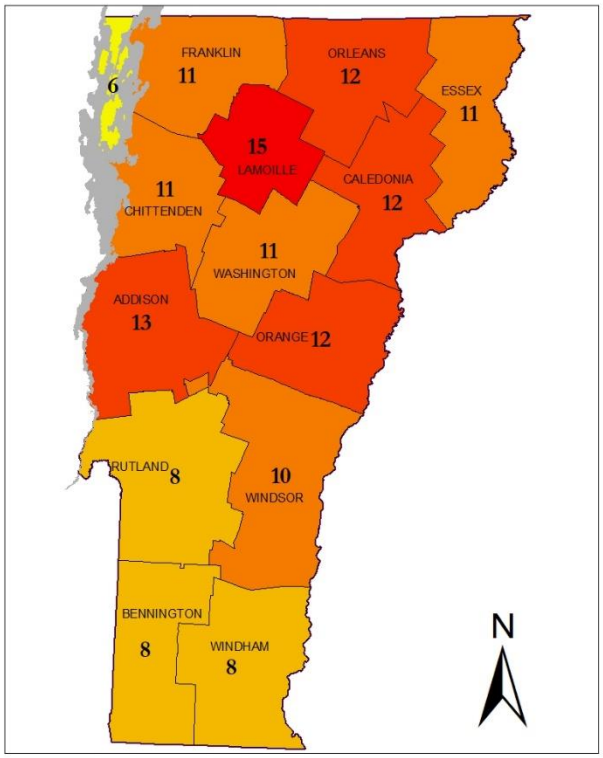
1= Low Priority	≤ 8 total score, low cost –no cost mitigation projects only
2= Medium Priority	>8 and ≤10 total score
3= High Priority	>10 and ≤12 total score
4= Regional/State-wide Priority	>12 total score

Town of Starksboro Risk Assessment 11/17/2016

Hazard	Damage Type	Probability	Warning	Geographic Impacts	Property Damage	Committee Concern	Total Score (Vulnerability)
Flash Flood	Water or Erosion	3	4	1	3	2	13 (4)
Inundation Flooding	Water Damage	2	2	1	1	1	7 (1)
Dam Failure	Water or Erosion	1	1	1	2	2	7 (1)
Ice Jam	Water Damage	2	4	1	1	1	9 (2)
Severe Snow	Closed Roads	3	1	4	2	2	12 (3)
Ice Storm	Power Outage or Fire	2	3	2	3	2	12 (3)
High Winds	Power Outage	4	3	1	2	1	11 (3)
Lightning Strike	Fire	2	2	1	1	1	7 (1)
Hail	Crop or property damage	1	4	1	1	1	8 (1)
Tornado	Power outage or structural damage	1	4	1	1	1	8 (1)
Drought	No drinking water/crop loss	2	1	1	3	2	9 (2)
Wildfire	Structure fire	2	4	1	1	1	9 (2)
Earthquake	Property damage	2	4	1	1	1	10 (2)
Infectious Disease	Health risk	1	1	4	1	1	8 (1)
Insect-borne Illness	Health risk	3	1	4	1	3	12 (3)
Invasive Species	Ecological damage	4	1	4	2	2	13 (4)
Extreme Temperature	Health risk/ structure damage	2	1	4	1	1	9 (2)
HazMat Spill	Health risk/ contamination	3	4	1	2	1	12 (3)
Highway Accident	Human injury	4	4	1	1	2	12 (3)
Structure Fire	Property damage injury	4	4	1	1	3	13 (4)
Landslide/ Rockslide	Property or Infrastructure	2	4	1	1	1	9 (2)
Severe Mud	Access/ isolation	4	1	2	2	3	12 (3)

Table #1: Federally declared disasters affecting Addison County

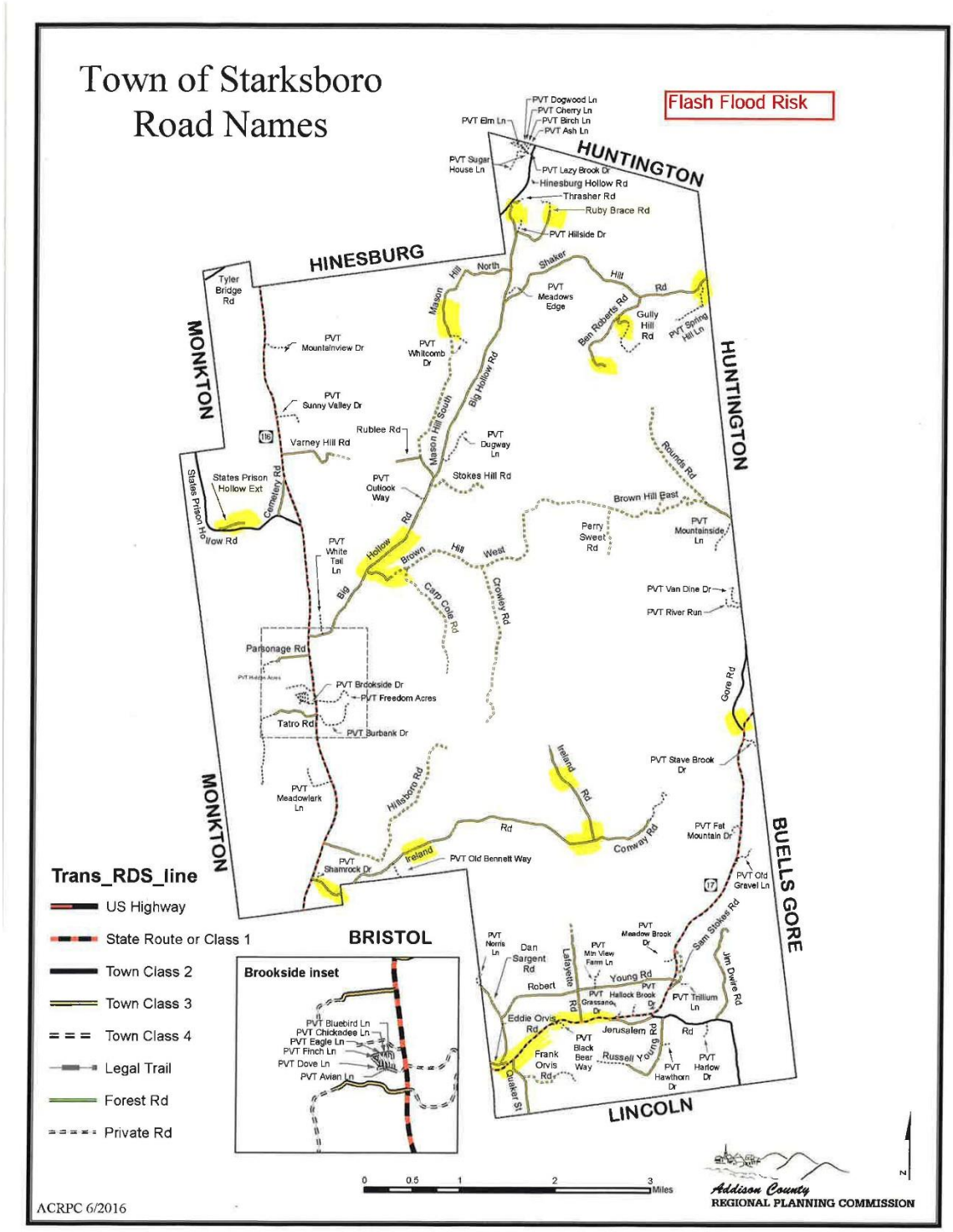
Year	Date	Description	Dec. #	County est.	Starksboro
1973	7/6/1973	Severe Storms, Flooding, Landslides	DR397	$ Unavailable	$ Unavailable
1976	8/5/1976	Severe Storms, High Winds, Flooding	DR518	$ Unavailable	$ Unavailable
1977	9/6/1977	Drought	EM3053	$ Unavailable	$ Unavailable
1989	8/4-5/1989	Severe Storms, Flooding	DR840	$ 31,033.00	$ Unavailable
1993	4/24-5/26/1993	Flooding, Heavy Rain, Snowfall	DR990	$ 17,639.00	$ Unavailable
1996	1/19-2/2/1996	Storms, Flooding	DR1101	$ 130,529.00	$ Unavailable
1998	1/6-16/1998	Ice Storms	DR1201	$ 662,388.00	$ 52,613.00
1998	7/17-8/17/1998	Severe Storms and Flooding	DR1228	$ 2,146,484.00	$ Unavailable
2000	7/14-18/2000	Severe Storms and Flooding	DR1336	$ 738,127.27	$ 0.00
2001	3/5-7/2001	Snowstorm	EM3167	$ 138,333.08	$ 5,251.66
2004	8/12-9/12/2004	Severe Storms and Flooding	DR1559	$ 430,551.00	$ 0.00
2008	6/14-17/2008	Severe Storms and Flooding	DR1778	$ 1,114,515.70	$ 0.00
2008	7/21-8/12/2008	Severe Storms and Flooding	DR1790	$ 2,273,481.42	$ 0.00
2011	4/23-5/9/2011	Severe Storms and Flooding	DR1995	$ 384,416.53	$ 95,525.63
2011	8/26-9/2/2011	Hurricane Irene	EM3338	$ Unavailable	
2011	8/27-9/2/2011	Tropical Storm Irene	DR4022	$ 1,175,911.20	$ 16,616.92
2012	5/29/2012	Severe Storm, Tornado and Flooding	DR4066	$ 172,847.70	$ 0.00
2014	12/9-12/13/2014	Severe Winter Storm	DR4207	$ 184,715.05	$ 72,817.68
2015	6/9/2015	Severe Storm and Flooding	DR4232	$ 893,310.63	$ 439,914.57
2017	7/1/2017	Severe Storms and Flooding	DR4330	$ Unavailable	$ Unavailable
		Total Since 2000:		$ 7,506,209.58	$ 630,126.46



Declared Disasters by County, January 2000 - July 2018

4.1. Hazard Type, Location, Extent and Vulnerability

4.1.1. **Flash Flood** (Risk Score – 13, Vulnerability Rating – 4)



Starksboro Flash Flood Risk Identified by HM Committee

Location: Starksboro's moderate to steep terrain, when combined with heavy rainfall are conditions conducive to flash flooding throughout town. The only area of town where inundation flooding may be more common than flash flooding is along the north-south valley of Lewis Creek through the center of town. The river valleys, as in much of Vermont, were the easiest to travel along for early settlers and therefore contain much of the town's road infrastructure and dispersed settlement.

Extent: Based on National Weather Service's precipitation records for nearby Burlington, VT, the summer months of June July and August receive the greatest amount of rain. The Flash Flood Risk map indicates where the committee knows flash flooding risk is highest. Generally, any rains in excess of 2.5" in a 24-hour period are likely to result in some flash flooding. Rains in excess of 3-4" can cause floods in multiple locations with considerable damage to town roads. Single 24-hour storm totals exceeded 6" in both 1927 and 2011, the two "watershed" events which resulted in statewide devastation.

Previous Occurrences: The committee identified several storms in Starksboro where damage was great enough to warrant federal assistance. In late June of 1998, Starksboro was the recipient of a chain of successive rainstorms. Once the ground was saturated, the remainder flowed into streams in torrents. The nearby Town of Lincoln was entirely cut off from the rest of the state and Starksboro also had major damages. The damage resulted in disaster declaration DR1228 which caused over $2 million in damages in Addison County alone. 2011 saw another banner year for flooding/flash flooding in Starksboro. Spring rains which eventually caused record water levels on Lake Champlain DR-1995 and Tropical Storm Irene DR-4022 both contributed to damages of over $100,000.

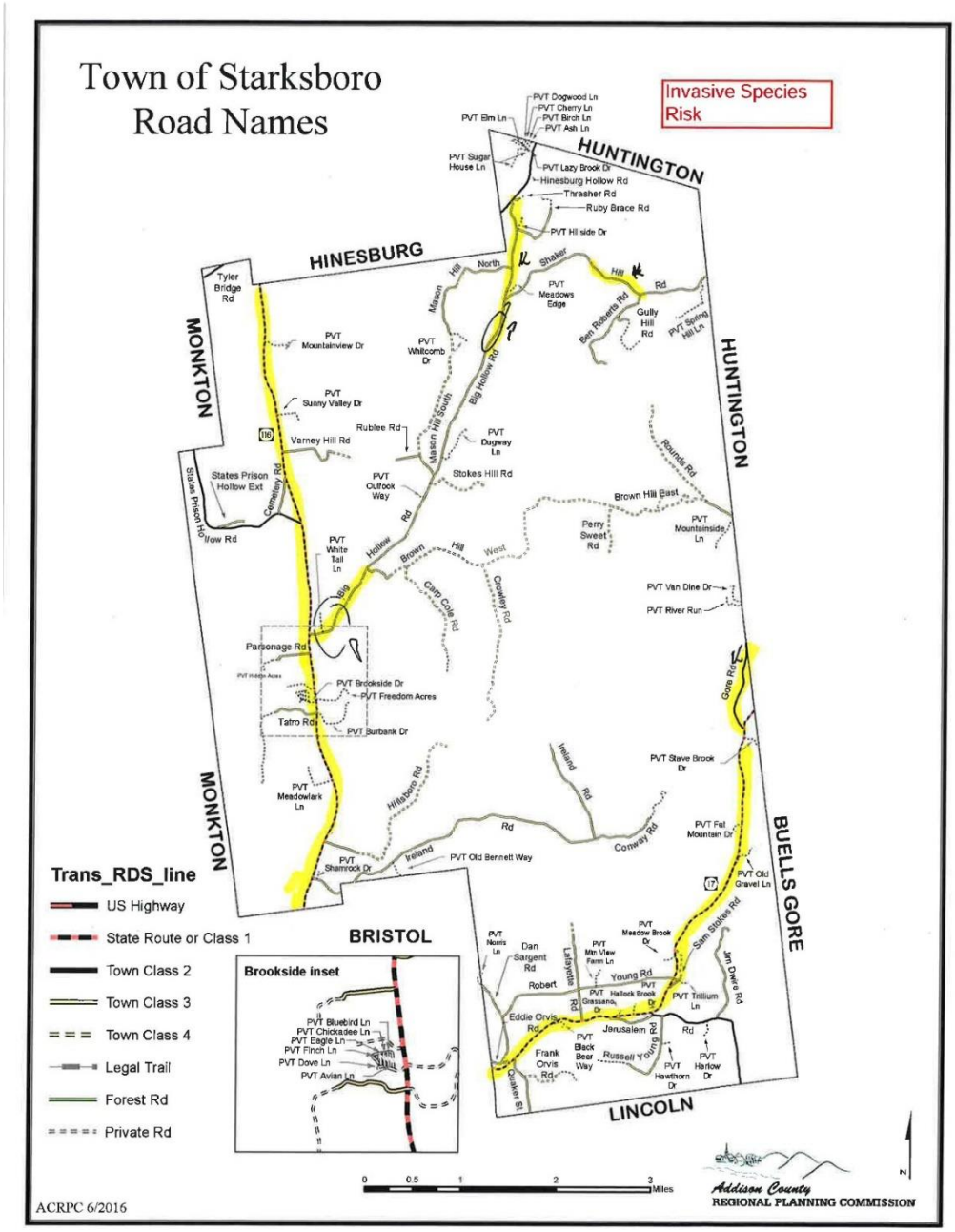
1976 saw remnants of another tropical storm which also left its mark of Starksboro's highway system. DR 518 resulted in washouts throughout southern Starksboro. Prior to the committee's collective memories, Starksboro was also the recipient of major flash flooding in 1927, 1938, and 1952.

Future Probability: Whether the current climate change trend is the direct result of human activity or due to other circumstances, it is impossible to not see it happening. While FEMA has only existed for the past half century, the increase in disaster declarations in Vermont has been noticeable. As one committee member identified, we had five, 700yr storms in a 10yr period. Observing and predicting a rising trend in larger and more severe storms is not a stretch. Following an extended period of calmer/drier weather from the 1950s through the 1980s, this current trend is even more obvious and it is likely to continue on into the future.

Vulnerability Summary: The Town of Starksboro's topography and location along the western slopes of the Green Mountains practically guarantees the likelihood of flash flooding events. Areas identified as most vulnerable to flash flooding were mostly distant from the village center, primarily in places with a low number of residences where creeks ran alongside or across roads (including Lewis Creek along Ireland Road and States Prison

Hollow Road, Carpenter Brook along Ben Roberts Rd and Shaker Hill Rd, and the headwaters of Hollow Brook). However, some areas like Baldwin Creek along Rte. 17 in South Starksboro, the Huntington River headwaters at Rte. 17 and Gore Rd, and a small creek parallel to Big Hollow Rd may threaten critical transportation routes through town. The most damages to date have occurred to the town highway infrastructure in the form of washouts and culvert failures. Fortunately, a progressive road crew monitors trends and proactively installs culverts and repairs ditching in anticipation of ever worsening rainfall/flooding events. The Starksboro hazard mitigation committee identified flash flooding as the highest vulnerability to the community. Scoring a risk rating of 13, the vulnerability to flash flooding would be considered a regional concern which shows as a similar vulnerability in much of the rest of Vermont. Fortunately, the community understands this vulnerability and supports the road crew's efforts to prepare against future risk.

4.1.2. **Invasive Species** (Risk Score – 13, Vulnerability Rating - 4)



Locations of Invasives Identified by Starksboro HM Committee

Location: Invasive species are becoming a widespread problem throughout Starksboro and the rest of Vermont. Damages range from skin blistering and scarring in the case of poison parsnip, to the devastating effect the Asian Longhorn Beetle could have on Vermont's famous maple sugar industry.

The Starksboro hazard mitigation committee pointed out that much of the spread of unwanted invasive plants is along roadsides and has entered the town via state highways. (see map) Flying insect invasives will be far more widespread due to the mobility of these

pests and could strike anywhere in the community where their hosts live (Ash for Emerald Ash Borer and Maple for Asian Longhorned Beetle). From small woodlots to large-tract forests, all treed land is susceptible.

Extent: Widespread establishment of Wild or Poison Parsnip (*Pastinaca sativa*) along roadsides and/or open fields can effectively remove those areas for recreational purposes through much of the summer months. Once contracted many are quite hesitant to venture far from cleared paths and given the non-developed nature of much of Vermont's attraction for tourists, could heavily impact future visits.

Ash trees are the source for hardwood that can bend and withstand considerable stress. Historically, ash has been the source for axe handles, hockey sticks and baseball bats. It is a component of timber harvesting in Vermont and provides that industry with a moneymaking product. Spread of the Emerald Ash Borer (*Agrilus planipennis*) (EAB) into Vermont's forests would have a significant impact on timber values.

A third invasive of immediate concern to Vermont is the Asian Longhorned Beetle (*Anoplophora glabripennis*) (ALB) which attacks and kills maple trees. Vermont is famous for its maple syrup and is the largest producer of maple products in the United States. Widespread loss of maple trees could result in the collapse of this iconic industry and a severe impact to the state's economy.

Other invasives include Purple Loosestrife, Japanese Knotweed, Rock Snot and many others which all have a detrimental impact on the state's native populations and the state's ecological balance.

Previous Occurrences: The most noticeable impact of invasives in Vermont began when a load of elm lumber was imported from Europe in the early 1900s. Embedded in this load were spores of what we now call Dutch elm disease. At the time, elm was the most popular street tree in the US due to its hardiness in many types of conditions. The loss of these trees which were liberally planted as shade trees in many village greens and along roadsides had an extreme impact both aesthetically and due to the loss of shade, in the overall use of electricity in summer months. Now, elm is uncommon in most of the north east and the disease continues to spread westward.

Other examples include the importation of gypsy moth to attempt to create locally grown silk, the spread of zebra mussels which threaten water intakes on infested water bodies and the unintentional importation of the Norway Rat in ships holds with early colonists. Each of these has had its own impacts on the economy and ecological stability of the US and Vermont.

Future Probability: With an increasing global economy, new and unknown invasives are sure to be imported from other countries in the future. In recognition of the inevitable spread of EAB and ALB into Vermont, trapping is being conducted by foresters and

biologists along the border areas of Vermont. Both EAB and ALB are expected in Vermont within the next few years and damage caused by their spread is already anticipated by the Vermont Agency of Natural Resources.

Vulnerability Summary: Starksboro is extremely vulnerable to the economic impacts of invasives and is limited in its ability to combat their spread. The community does what it can but is highly dependent on State and Federal agencies to slow down the spread of invasives. With a number of local businesses focused on the forests and forest products, the community economy is vulnerable, and sections of roads through predominantly forested areas like Rte. 17, Big Hollow Road, and Ireland Road may be threatened by dead and weakened trees. The hazard mitigation committee scored Invasives as its second highest risk with a score of 13 and a vulnerability rating of 4 reflecting the regional nature of the hazard and its importance.

4.1.3. **Structure Fire** (Risk Score – 13, Vulnerability Rating - 4)

Location: There are wood frame buildings susceptible to structure fire scattered throughout the Town of Starksboro. The highest concentration of public buildings in town is located around the traditional village center along Rte. 116. This area would pose the highest risk of damage to public infrastructure. Most of these buildings were built before modern fire-resistant construction materials and methods were developed. The risk of personal property damage due to structure fire is highest at farms and former farmsteads with buildings often built close by each other and susceptible to fire passing from one structure to another. The three mobile home parks in town also pose considerable risk for multiple structure fires.

Extent: The community's greatest risk for structure fire would be in the village area where a cluster of historic buildings (Town offices, old Fire Station and the Robinson school) effectively defines Starksboro. A fire destroying any of these buildings would have a large effect on residents' ability to connect with the community.

Starksboro Volunteer Fire Department Responses vs. new Building

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg.
# of Responses	45	33	34	38	38	46	44	27	55	44	40.4
# of New building permits	9	2	7	1	1	4	5	7	5	2	4.3

Past Occurrences: Responses by the Starksboro Volunteer Fire Department for all calls over the past 10 years have remained relatively stable with an average of 40.4 per year. Roughly 6% of these calls are for structure fires.

Future Probability: The Town of Starksboro has issued an average of 4.3 building permits per year over the past 10 years for the construction of new residences. These are generally built on new lots created by subdivision but the overall number of new homes in town seems to be relatively stable. Those homes which are being built are generally built to more fire-resistant standards than the older homes and over time, the risk to structure fire will be lessened. Fire alarms are now required by statute whenever properties change hands which should also result in fewer destructive fires and loss of life.

Vulnerability summary: A well-trained and equipped fire department, coupled with state-mandated fire alarm installations continue to keep Starksboro's overall fire risk at a minimum. Unfortunately, risks to firefighters continue to escalate as some newer construction materials can produce a dangerous combination of gasses when burned. The area most vulnerable to a catastrophic fire and highest risk of damage to public infrastructure is concentrated around the traditional village center along Rte. 116. Additional residences with poorly constructed driveways can impact the fire department's ability to respond. While a landowner may have saved money in constructing these driveways, a much higher cost is associated with a structure fire at a location with limited access as well as an additional risk to volunteer firefighters who respond.

The community vulnerability score for Structure Fire is 4 and is considered a STATEWIDE PRIORITY evidenced by a separate fire safety division within Vermont's Department of Public Safety.

4.1.4. Severe Snow (Risk Score – 12, Vulnerability Rating - 3)

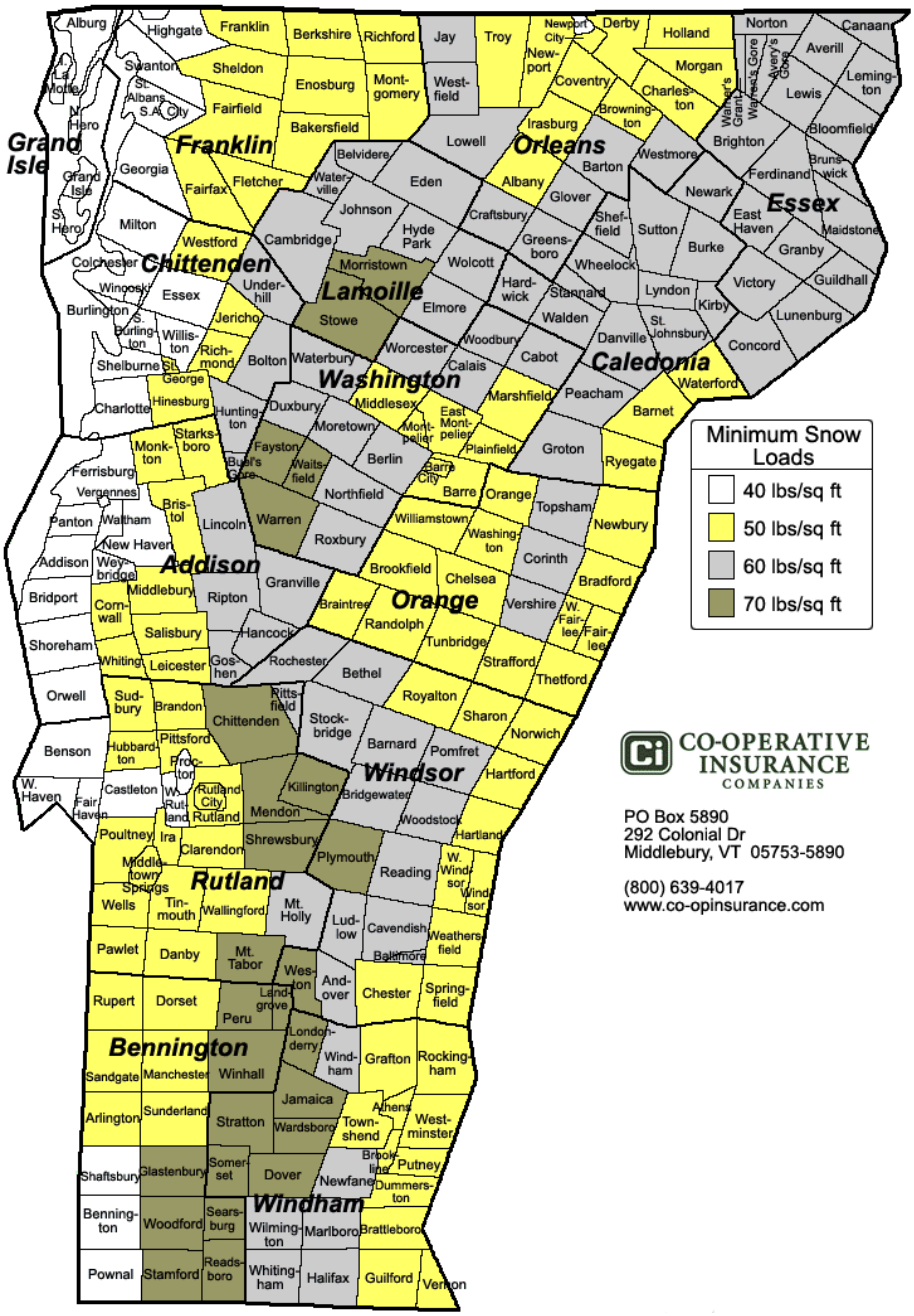
Location: Severe winter storms with heavy accumulations of snow can occur geographically in any part of Starksboro. The upper elevations of town, South Starksboro and Jerusalem are particularly susceptible to snows both early (October) and late (April). North and South prevailing winds tend to build up drifts along east/west roads and deep valleys often retard spring snow melt well into May.

Extent: When conditions are predicted, the National Weather Service issues warnings ranging from a Winter Storm Warning (heavy snowstorm predicted within 24 hours) to Blizzard Warning (sustained wind and snow with gusts up to 35 mph for at least 3 hours) to Heavy Snow Warning (accumulations of over 6 inches in a 24-hour period).

Construction standards for snow load (see map) indicate that structures in the Town of Starksboro should be built to withstand loads of 50 - 60 pounds per square foot. This would indicate an average depth of snow of 40-45 inches on a square foot of roof surface. At that point, design standards would be exceeded and the structure runs the risk of collapse. Given this standard, a snowstorm which dumped 40-45 inches of snow would likely result in a few collapsed roofs, especially on structures which are not built to these standards. Given the normally higher rate of snowfall in eastern Starksboro, a higher rate of collapse would be expected.

Previous Occurrences: The National Climatic Data Center (NCDC) records indicate that the Addison Region experienced 123 winter storm events over the past 25 years. The worst storms resulted in $100,000 in damages in both 2005 and 2010. During that period an estimated $1,743,000 in cumulative property damages and $10,000 in crop damages were incurred.

Minimum Snow Loads for Estimating Construction Design (Starksboro=50lb/sq. ft)



A March 1993 snowstorm left a record 51.4 inches in nearby Lincoln. In March of 2001, the so-called "Town Meeting Day" snow event (Emergency Declaration #EM3167) caused reduced ability for residents to travel to the voting booth due to hazardous conditions. In some Addison County communities, additional efforts to keep polling places open were reimbursed with federal funds but Starksboro managed without any additional assistance.

As recently as February 2007, a significant snowstorm coupled with high wind nearly crippled much of Vermont including the Addison County region which suffered a reported $237,000 in damages. This "Valentines' Day Blizzard" stressed the resources of most local communities, including the Town of Starksboro, to capacity but did not ultimately result in a federal declaration.

Future Probability: The number and severity of winter storms have been increasing since the 1980's. The misnomer of "global warming" has reduced the concerns of many citizens. Unfortunately, "global climate change" more effectively describes the issue and has led to more numerous and more severe storms of all types in the past 30 years. If the current trend continues, it is likely there will be a continued increase in severe winter storms that will impact the Town of Starksboro in the future.

Vulnerability Summary With a regular occurrence of a significant snow or ice storm, the town feels the impact of a winter storm most on the transportation infrastructure of the community. The town is able to keep the roads open and treated for most storms and rarely has lost the ability to keep up with a winter storm due to the Town's high preparedness level and ongoing mitigation actions. Fortunately, the regular occurrence of winter storms also causes most residents to maintain a high level of preparedness for winter storms.

As population growth and housing expand along remote road corridors, especially upper Ireland and Conway Roads and Shaker Hill Road, increasing dependency on local infrastructure by the new homeowners requires changes in winter maintenance. The town has, thus far, been able to keep up with those increased demands on its services through its combination of town employee utilization and equipment.

Without the existing preparedness level and with a community vulnerability rating of 3, Winter Storm/Ice Storm would be considered HIGH PRIORITY based on the highly likely occurrence and the high portion of the community impacted.

4.1.5. Ice Storm (Risk Score – 12, Vulnerability Rating - 3)

Location: Severe ice storms are common throughout Vermont and can occur geographically in any part of Starksboro. Located on the edge of the Champlain Valley, Starksboro is at greater risk for more widespread Ice. Generally, ice storms strike within a particular elevation band depending on temperatures with higher elevations experiencing snow and lower elevations experiencing rain. As a town with a topography ranging from relatively flat lowlands to the higher elevations of the Green Mountains, portions of Starksboro can easily fall into just such a band.

Extent: Because Ice storms are extremely temperature and elevation dependent, they are notoriously difficult to predict. When conditions conducive to ice build-up are predicted, the National Weather Service issues a Winter Storm Warning with emphasis on ice accumulation. The Starksboro hazard mitigation committee identified the ice storm of 1998 as the worst they had seen with accumulations of up to ¾ inch and loss of power for up to 2.5 weeks.

The Sperry-Piltz Ice Accumulation Index, or "SPIA Index" – Copyright, February, 2009

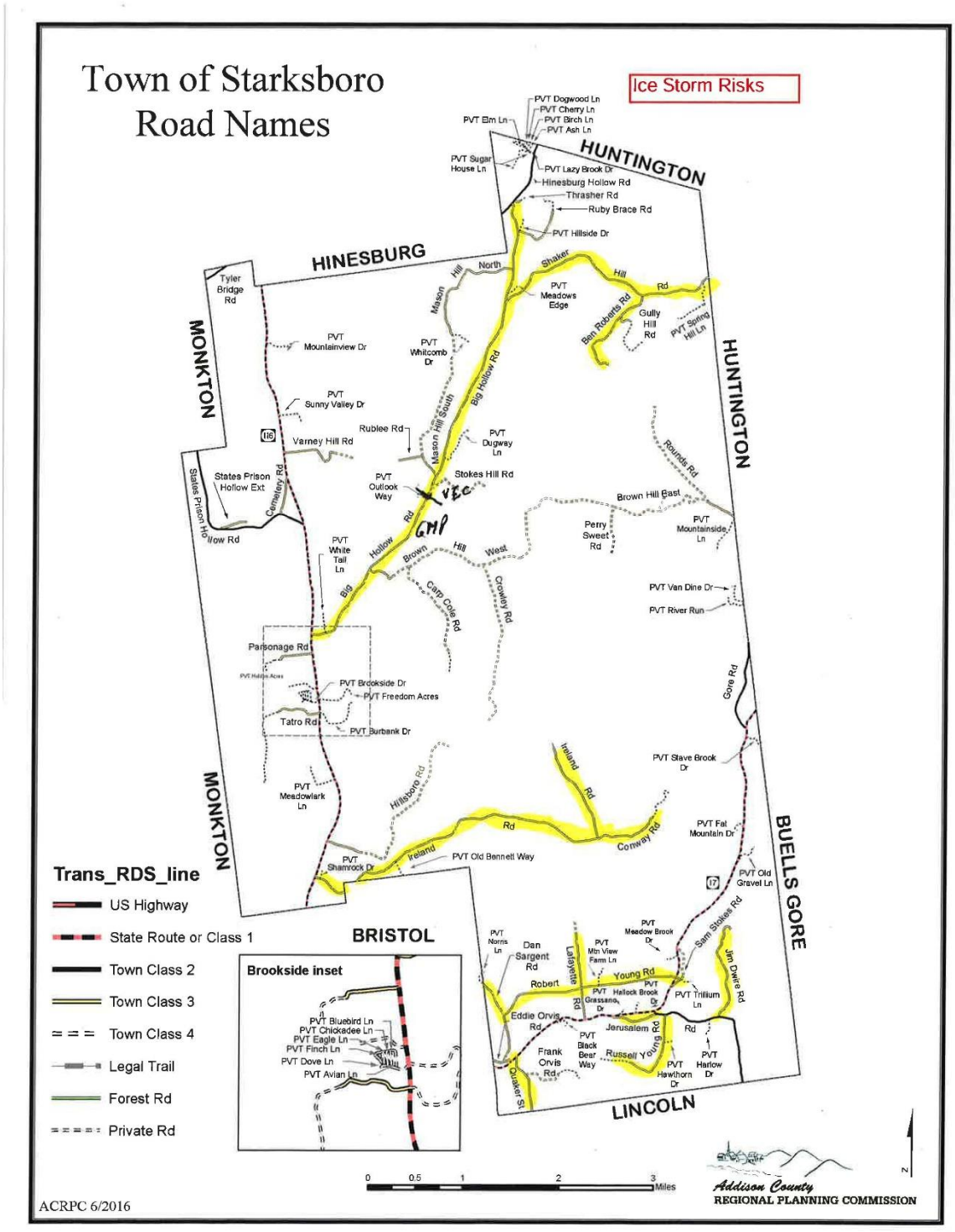
ICE DAMAGE INDEX	* AVERAGE NWS ICE AMOUNT (in inches) *Revised-October, 2011	WIND (mph)	DAMAGE AND IMPACT DESCRIPTIONS
0	< 0.25	< 15	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	0.10 – 0.25	15 - 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
	0.25 – 0.50	> 15	
2	0.10 – 0.25	25 - 35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
	0.25 – 0.50	15 - 25	
	0.50 – 0.75	< 15	
3	0.10 – 0.25	> = 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
	0.25 – 0.50	25 - 35	
	0.50 – 0.75	15 - 25	
	0.75 – 1.00	< 15	
4	0.25 – 0.50	> = 35	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
	0.50 – 0.75	25 - 35	
	0.75 – 1.00	15 - 25	
	1.00 – 1.50	< 15	
5	0.50 – 0.75	> = 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75 – 1.00	> = 25	
	1.00 – 1.50	> = 15	
	> 1.50	Any	

The Sperry-Piltz Ice Accumulation Index rates ice storms from 0 to 5 depending on amount of ice buildup and accompanying wind speeds. Storms of ¼ inch and less with winds under 15mph rate a "0" and are termed "Nuisance" storms with ice buildup on windshields and an occasional downed tree branch. A "5" rating, on the other hand, can be the result of as little as ½ inch of ice with 35 mph winds or any accumulations over 1.5 inches. A category 5 ice storm would be labeled "Catastrophic" and would likely result in massive failures of both distribution and transmission lines. Indices at the scale of 1-3 range from scattered outages lasting hours to widespread outages lasting 1-5 days.

Previous Occurrences: The National Climatic Data Center reports that the Addison Region has experienced 2 major Ice Storm events over the past 25 years. The highest recorded damages were incurred during the 1998 Ice Storm which impacted most of the northeastern US and

resulted in $750,000 in damages to Addison County properties. During the same 25-year period an estimated $850,000 in total property damages were recorded. The major impacts within the Town of Starksboro are generally limited to residents impacted by loss of power and the occasional downed tree or branches in the road.

Ice Storm Problem Areas Identified by the Starksboro Hazard Mitigation Committee



Future Probability: Warmer temperatures such as might be anticipated with climate change could result in less snow and a higher likelihood of ice in winter. Other predictions indicate that climate change will bring colder winters that might increase ice storms in early spring and late fall. In both cases, storms are predicted to increase in severity which would make category 0-1 storms less frequent and 2-5 storms a higher possibility.

Vulnerability Summary: The Town of Starksboro is a rural community with a strong summer tourist economy. The tree-lined rural roads so popular with tourists add additional risk of ice laden trees falling on power lines and resulting in widespread power failures. Power company policy is to repair the simplest fixes which impact the highest populations as the highest priority. Many residences off Ireland, Conway, and Shaker Hill Roads may not be restored for lengthy periods of time. The combination of these two circumstances points to a high risk of extended power failures due to ice storm throughout the Town of Starksboro.

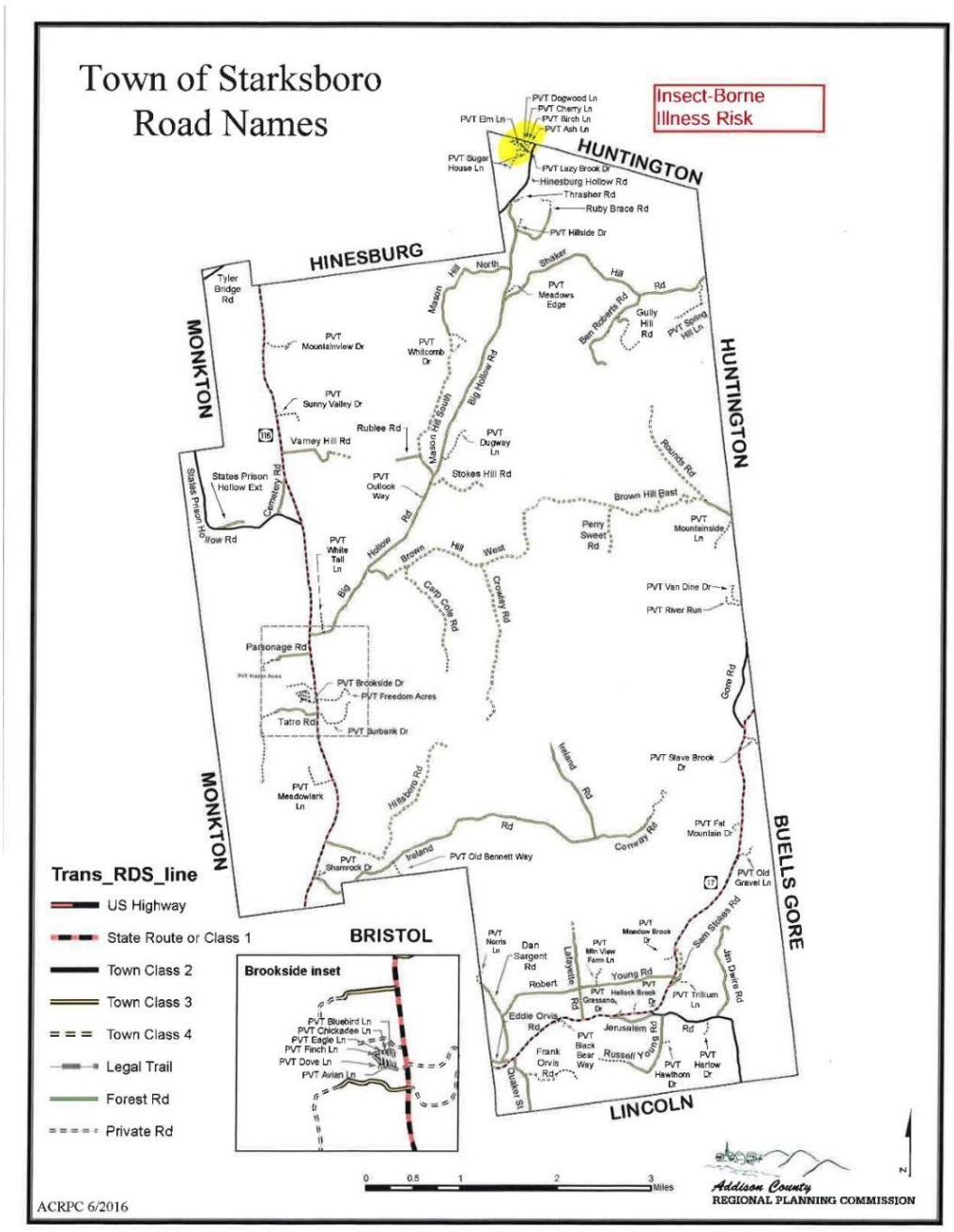
The community vulnerability rating for Ice Storm and accompanying widespread power outage is 3 and would be considered HIGH PRIORITY. Widespread power outages have been extensively mitigated by service providers in the past few years following the disastrous Ice Storm of 1998 effectively reducing the community's vulnerability. Many of these mitigation measures are now over 15 years old and may not provide the same protections as when they were instituted.

4.1.6. Insect-Borne Illness (Risk Score – 12, Vulnerability Rating - 3)

Location: Health risks associated with Insect-Borne Illness are on the increase in Vermont and Starksboro. Much of the risk is equally spread out within the town, broadly present in forest and field alike. West Nile Virus, Eastern Equine Encephalitis (EEE), and Lyme Disease are illnesses which were basically nonexistent in Vermont 25-30 years ago, yet are now toward the front of many residents' minds. Insects associated with these diseases breed in wetlands, forestlands and fields. The Starksboro hazard mitigation committee specifically identified the area around the Lazy Brook mobile home neighborhood as an area of greater risk than others due to the higher concentrations of residents and the proximity to low lying wetlands.

Extent: A major outbreak of any of these diseases could result in a high mortality among those who contract the disease. Numbers exceeding 50% mortality is common for Eastern Equine Encephalitis (EEE) and was seen in cases involving EEE in the southern Champlain Valley communities of Salisbury, Leicester, Whiting, Sudbury, and Brandon in 2012. Victims of Lyme disease, can experience debilitating pain in joints for years following contracting the disease via the bite from an infected Black Legged Tick. Any delay in treatment via antibiotics can result in a victim being unable to perform tasks and possibly their jobs for the rest of their lives and this loss of manpower/labor can have a widespread impact on the local economy. In 2015, the CDC reported that the State of Vermont had ten times the rate of infection due to Lyme Disease of any other state in the nation. In 2015, a random sample of Black Legged Ticks in Vermont found that the ticks are now present throughout Vermont and that roughly 50% carry the disease.

Insect-borne Disease risk areas Identified by the Starksboro HM Committee



West Nile has been confirmed in every county in Vermont according to the VT Department of Health. Though incidents are currently rare (8 Since 2011), the presence of a disease pool throughout Vermont is of great concern. In mild cases, the disease manifests as fever, and aches and can last for a few days. Of far more concern is a strain of the virus which attacks a victim's neurological system and can result in paralysis or even coma. Again, should this disease become more widespread, the impacts to the local economy both through loss of labor force and from loss of tourist dollars could have lasting effects.

Previous Occurrences: Each of the three diseases mentioned by the mitigation committee have come to the forefront in Vermont in the past 5-10 years. The number of confirmed cases of Lyme Disease skyrocketed from 11 in 2002 to 674 in 2013. This rapid increase resulted in a bill passing the legislature and being signed into law which addresses the treatment of Lyme disease and its status for insurance purposes.

2012 saw the first cases of EEE in Vermont and the first fatalities as well. The cases resulted in efforts by the Department of Health to eradicate the mosquito hosts through an aerial spray program. West Nile Virus was first reported in Vermont shortly after its discovery in New York in 1999. It is of a great enough concern to public health officials that there has been an ongoing mosquito trapping and bird carcass collection program since 2002.

Future Probability: The preponderance of the insects carrying these diseases is being credited to a reduction in harsh winters which formerly would have wiped out most population gains each year. Forecasts for the current trends in warmer winters due to global climate change would indicate that the insects carrying these diseases will continue to move northward. Many insect-borne illnesses formerly confined to warmer climates (Zika, Malaria, Yellow Fever and others) could become much more common in areas like Vermont in the next 25 years.

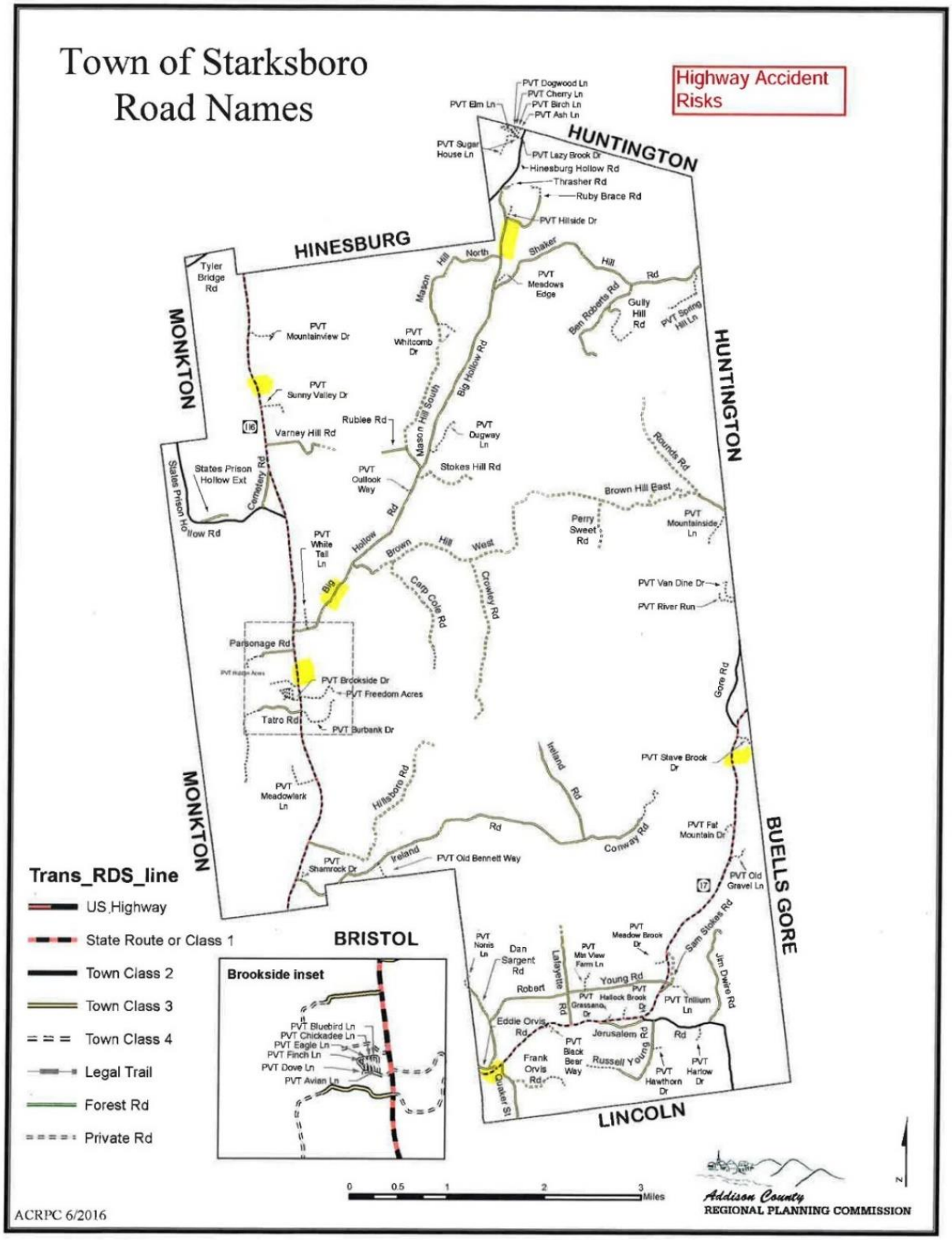
Vulnerability Summary: Current wisdom attempting to address ecological imbalances indicates that pesticides should be used sparingly. Chemical treatments theoretically reduce risk to these diseases due to lowering the insect populations. Reductions in spray programs and the restoration of wetlands over the past 50 years have begun to create ecological balance in much of Starksboro. Unfortunately for the residents, the town's vulnerability to insect-borne illnesses has increased during the same period. Improved and ecologically safe treatment regimens have not yet been developed which would lessen the vulnerability.

4.1.7. Highway Accident (Risk Score 12, Vulnerability Rating - 3)

Location: In most communities, intersections along town and state highways would have the highest volume of accidents. In Starksboro, due to the often steep and curvy nature of roads, most locations identified by the Starksboro Hazard Mitigation Committee are located along road segments characterized by terrain issues. The fire department responds more often for highway accidents along these stretches of road than other locations in town (see Highway Accident Map).

Extent: Town highway accidents contribute to the highest volume of calls for the Starksboro Volunteer Fire Department and nearby rescue squads. Multiple locations on every road in town are potential accident sites which could result in property damage, injury, or death. Fire department members have multiple tales of serious accidents occurring along town roads. When accidents involve vehicles carrying hazardous substances, the risks for injury to the nearby residents is magnified and is a consideration for every accident calling out the fire department.

Common Highway Accident Locations Identified by Starksboro HM Committee



Previous Occurrences: Records compiled by the Vermont Department of Transportation between 2003 -2010 concur with two of the locations identified by the committee. Rte. 17 near the Buell's Gore line and Rte. 116 just south of the village collectively accounted for 12 reported crashes during that period. Data for the past 5 years, from 2011-2016 show a total of 44 accidents reported by police within the town boundaries. Crashes are evenly distributed between the state and town highways (20 vs 24). The majority of the reported accidents (approximately 64%) are for accidents which are limited to property damage whether to vehicles alone or as a result of a vehicle leaving the highway and colliding with non-highway property. Unfortunately, 23% have resulted in personal injury and one death.

Future Probability: Committee members indicated that the majority of accidents are caused by excessive speed on clear roads. As traffic continues to increase along town roads, and especially where the local road constitutes a "shortcut", such as along Big Hollow Road, accidents are also likely to increase. One unintended consequence of a higher quality of road maintenance is higher speeds which also contribute to highway accidents. Higher traffic volumes combined with higher speeds would be expected to result in a higher number of accidents in the future.

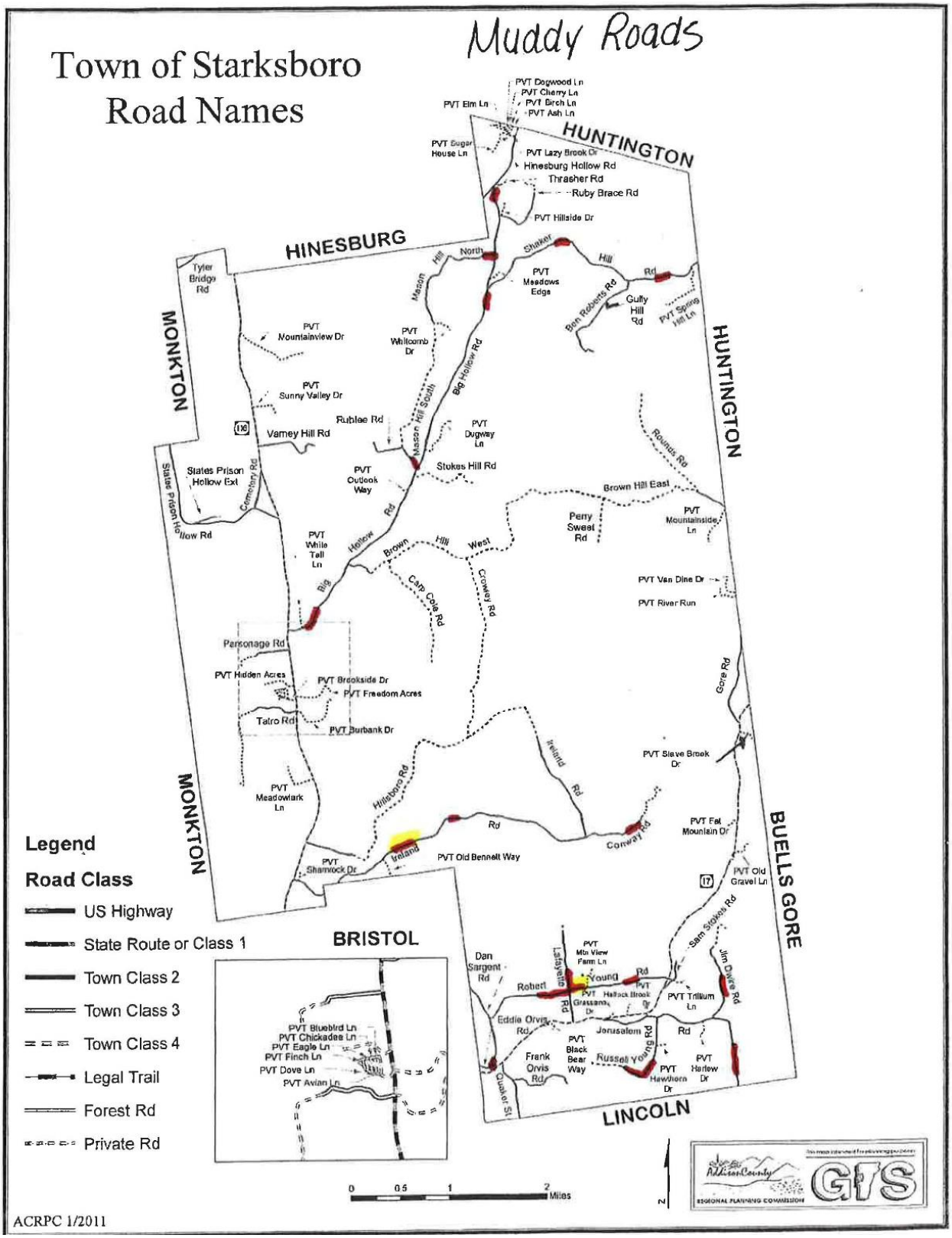
Vulnerability Summary: The Town of Starksboro has several known high crash locations as identified by the hazard mitigation committee. These are targeted by the State and local road crews when driving conditions are predicted to deteriorate but crashes with good road condition continue to be a problem. Committee members repeatedly indicated that "people just need to slow down". Starksboro continues to rely on signage and enforcement of speed limits to keep the numbers of accidents in check. With an overall vulnerability rating of 3, Highway accidents must be considered a HIGH priority. Due to the risk to life and property represented by this hazard the Town expends considerable resources attempting to make its roads as safe as possible within a restricted budget.

4.1.8. Severe Mud (Risk Score – 12, Vulnerability Rating - 3)

Location: Muddy roads are common throughout the gravel roads in Starksboro. Winter frost, particularly in shaded areas, extends deep into the road base by the time spring thaws begin. Once these areas begin to thaw the repeated freeze/thaw cycle results in alternating muddy and frozen ruts. With the entire system of class 3 roads in town consisting of either improved gravel or graded dirt, nearly all town roads are susceptible to severe mud issues. Issues with mud are especially apparent at the intersection of Robert Young Rd. and Lafayette Rd in South Starksboro. Other segments of highway are also affected (see Map) and at certain times in the spring, a few are totally impassable.

Extent: Low snow winters are usually the worst in generating a bad "mud season" occasionally making back roads impassable to vehicles. During this period, which can last for weeks, emergency vehicles can be challenged to provide service to some areas of town. Highway crews are aware of this issue but are sometimes challenged to keep up with deteriorating road conditions. Mud can result in delayed response times for first responders putting life and property at risk.

Common Muddy Road Locations Identified by Starksboro HM Committee



Previous Occurrences: While "mud season" is a normal spring occurrence on the back roads of Vermont, they occasionally become severe. In the spring of 2012, mud conditions on town roads were notable as even tractors had difficulty negotiating the ruts.

South Starksboro 2012 Credit WCAX TV

Future Probability: As the climate continues to warm, freeze/thaw cycles which create mud will likely occur throughout the winter. While these cycles have historically occurred mostly in spring, mud seasons which could stretch from December through March are a possibility.

Vulnerability Summary: With 42 miles of rural unpaved roads, Starksboro is particularly susceptible to severe mud on its roads. Complete rebuilding of a road from the base up starting with geo-fabrics could possibly reduce mud conditions. However, the costs of that treatment and the time out of service of the road being rebuilt make this process all but impossible for a small community like Starksboro.

4.1.9. **High Winds** (Risk Score 11, Vulnerability Rating 3)

Location: High winds can be experienced almost anywhere in the Town of Starksboro and are generally seen in any corridor running north/south along the ridges of town. Especially noted by the committee are areas between Rte. 116 through the village and Rte. 17 along its eastern border. (See committee map). An evaluation of the entire State of Vermont identifies a string of locations along the mountain ridges which would be outstanding for generation of wind power in the Town of Starksboro (see Vermont 50m wind power map).

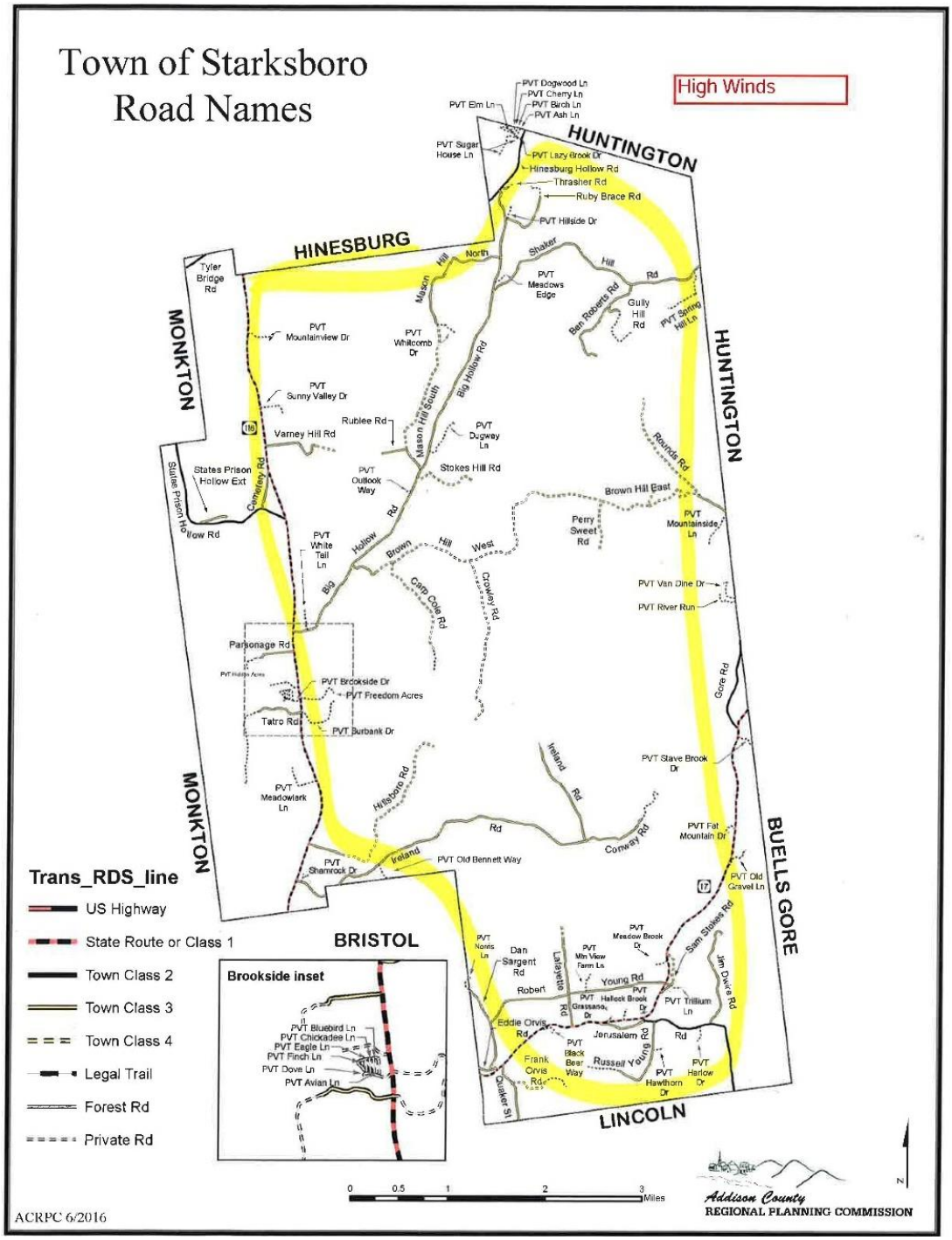
Extent: Extreme high winds can wreak havoc resulting in downed trees, power outages, roof failures and overturned trailers/trucks. These, in turn can result in electrical fires, failed communications towers and substandard housing for those impacted. Elsewhere in the region, roofs have collapsed, trees have been uprooted and outdoor furniture has been lost.

High winds in excess of 50mph cause noticeable damage but those which exceed 60mph are most noticeable resulting in structural damage to buildings. Fortunately, much of the Town of Starksboro is sheltered by hills which break up major wind events felt in more open areas. Unfortunately, areas not sheltered by hills receive the brunt of high winds.

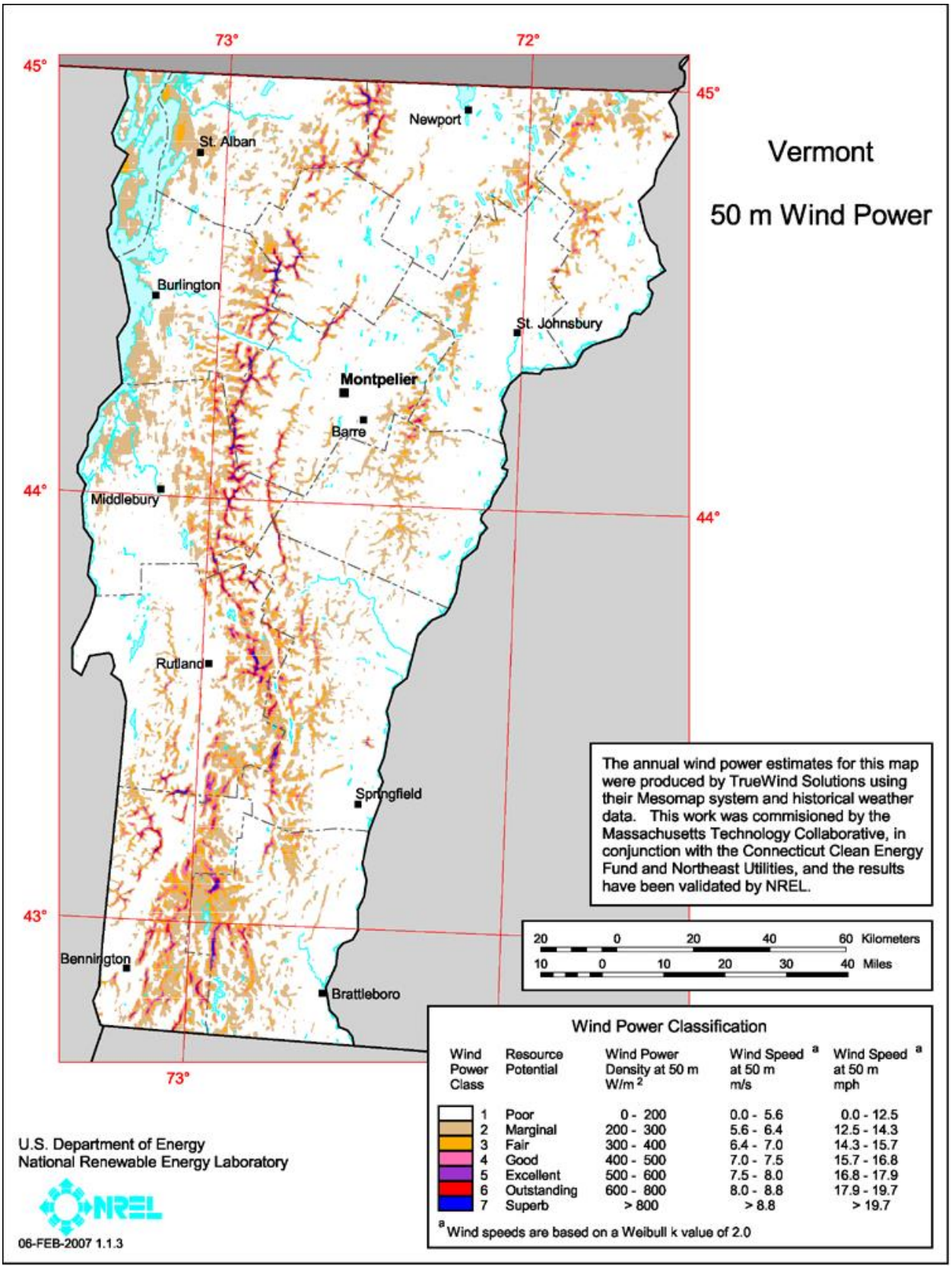
Previous Occurrences:

NCDC records indicate The Addison Region has experienced 34 High Wind events and 35 Strong Wind events over the past 25 years resulting in $1,451,000 in cumulative property damage and $25,000 in crop damages. The Addison Independent archives record the damages associated with the “Great Windstorm of November 1950”. That storm saw the remnants of a late season hurricane, blow through the Addison region between the Town of Pittsford in Rutland County and the City of Vergennes west of Starksboro. “Hundreds of trees were uprooted, miles of fences ruined, seven out of every ten houses suffered roof damage…Barns were blown down, 1,000 head of cattle are dead, families are temporarily homeless.” This storm resulted in over $1million in damages in 1950 dollars, an amount equal to over $10 million in 2016 dollars.

High Wind Locations Identified by Starksboro HM Committee



Locally, the Starksboro hazard mitigation committee recalled several times when severe winds caused damage in town. In 2002, Kelly's hay shed at the corner of Robert Young and Lafayette Roads was damaged when winds broke the posts of this pole barn. In both 2012 and 2016, the Clifford farm withstood damaged roofs when overly severe gusts were experienced. The Starksboro Fire Dept experienced damages during a chimney fire in a wind storm when one of the doors blew off a truck.


Vermont
50 m Wind Power
73°
72°
45°
44°
43°
Newport
St. Alban
Burlington
St. Johnsbury
Montpelier
Barre
Middlebury
Rutland
Springfield
Bennington
Brattleboro
The annual wind power estimates for this map were produced by TrueWind Solutions using their Mesomap system and historical weather data. This work was commisioned by the Massachusetts Technology Collaborative, in conjunction with the Connecticut Clean Energy Fund and Northeast Utilities, and the results have been validated by NREL.
20 0 20 40 60 Kilometers
10 0 10 20 30 40 Miles
Wind Power Classification
Wind Power Class
Resource Potential
Wind Power Density at 50 m W/m 2
Wind Speed a at 50 m m/s
Wind Speed a at 50 m mph
1 Poor 0 - 200 0.0 - 5.6 0.0 - 12.5
2 Marginal 200 - 300 5.6 - 6.4 12.5 - 14.3
3 Fair 300 - 400 6.4 - 7.0 14.3 - 15.7
4 Good 400 - 500 7.0 - 7.5 15.7 - 16.8
5 Excellent 500 - 600 7.5 - 8.0 16.8 - 17.9
6 Outstanding 600 - 800 8.0 - 8.8 17.9 - 19.7
7 Superb > 800 > 8.8 > 19.7
a Wind speeds are based on a Weibull k value of 2.0
U.S. Department of Energy
National Renewable Energy Laboratory
NREL
06-FEB-2007 1.1.3

Beaufort Wind Scale

0-1	0	Calm	Calm; Smoke rises straight up
1-3	1	Light Air	Wind motion causes smoke to drift slowly
4-7	2	Slight Breeze	Leaves rustle, wind is felt on exposed skin
8-12	3	Gentle Breeze	Leaves and small twigs in constant motion
13-18	4	Moderate Breeze	Small branches move; dust and loose paper raised
19-24	5	Fresh Breeze	Small trees sway;
25-31	6	Strong Breeze	Large branches sway; overhead wires “whistle”
32-38	7	Near Gale	Whole trees in motion; walking into wind takes effort
39-46	8	Gale	Twigs break off trees; cars veer on the road
47-54	9	Severe Gale	Branches break; Light structural damages
55-63	10	Whole Gale	Trees blown over; considerable structural damage
64-73	11	Storm	Widespread structural damages
74+	12	Hurricane	Considerable and widespread damage to structures

Future Probability:

Over the past 15-20 years there has been an observable increase in the severity and frequency of storms in Addison County. The Starksboro Hazard Mitigation Committee collectively commented that there has been an observable increase in storms with sustained winds recently. Extremes in warming and cooling which we have seen in recent years lead to high winds as convective forces meet cooling forces. It is probable that in the future, we will not see a lessening in winds or wind producing storms. Certainly, if climatologists’ predictions are true, this trend is expected to continue into the future. Since, by nature, severe storms are accompanied by high winds, damages due to wind are expected to increase as well.

Vulnerability Summary:

Residents of the Town of Starksboro are expected to see an increase in so-called “Freak” storms which are often accompanied by high winds. Because these storms were formerly unusual occurrences, most people in town are unprepared for high winds. Exceptionally high winds found in cyclonic storms would likely result in damage to roofs in town and result in the collapse of some structures. Fortunately, the hills and deep valleys make much of Starksboro basically safe from cyclonic storms (tornados).

With a community vulnerability score of 3, high winds would be considered a HIGH PRIORITY based on a moderate overall impact to the community with a relatively common period of occurrence.

4.1.10. Haz Mat Spill (Risk Score 11, Vulnerability Rating 3)

Fixed Locations:
There are only two sites in town which have sufficient types and/or quantities of hazardous materials to require Tier II reporting.

- Verizon Wireless maintains a tower on Varney Hill Rd. including back-up batteries containing reportable quantities of Sulfuric Acid. These batteries could fail and/or otherwise explode in the event of a fire on site spreading the acid and causing risk to unprotected responders.
- Foam Laminates of Vermont also located on Varney Hill Rd. has reported quantities of chemicals used in its manufacturing process in the past.

Transportation Accidents:
The presence of VT Rte. 116 running through Starksboro Village increases the probability that at some time a transportation accident will occur. The village is the most likely location where trucks carrying product south from the Chittenden County area would have the greatest impacts. Trucks which mistakenly try to travel across Rte. 17 travel through several tight corners which are prone to accident as well. In addition, all town highways experience an ongoing risk of a spill as fuels are transported to individual homes on an almost daily basis.

Extent:
Based on the recommended Public Safety evacuation distance from the 2016 Emergency Response Guidebook, a 1000-foot circle has been drawn around those sites. Structures inside the circle are those that may need to be evacuated if an incident were to occur. Utilizing a 1000ft buffer distance around the reporting locations and roads, essentially every building in the community is within an evacuation zone should a spill occur on a road. There are approximately 325 (E911 locations) in Starksboro. Of these, there are 11 public locations including 2 fire stations, a rescue headquarters, 3 town buildings, a post office and four public gathering places including churches that might be impacted based on the 1000-foot hazard buffer.

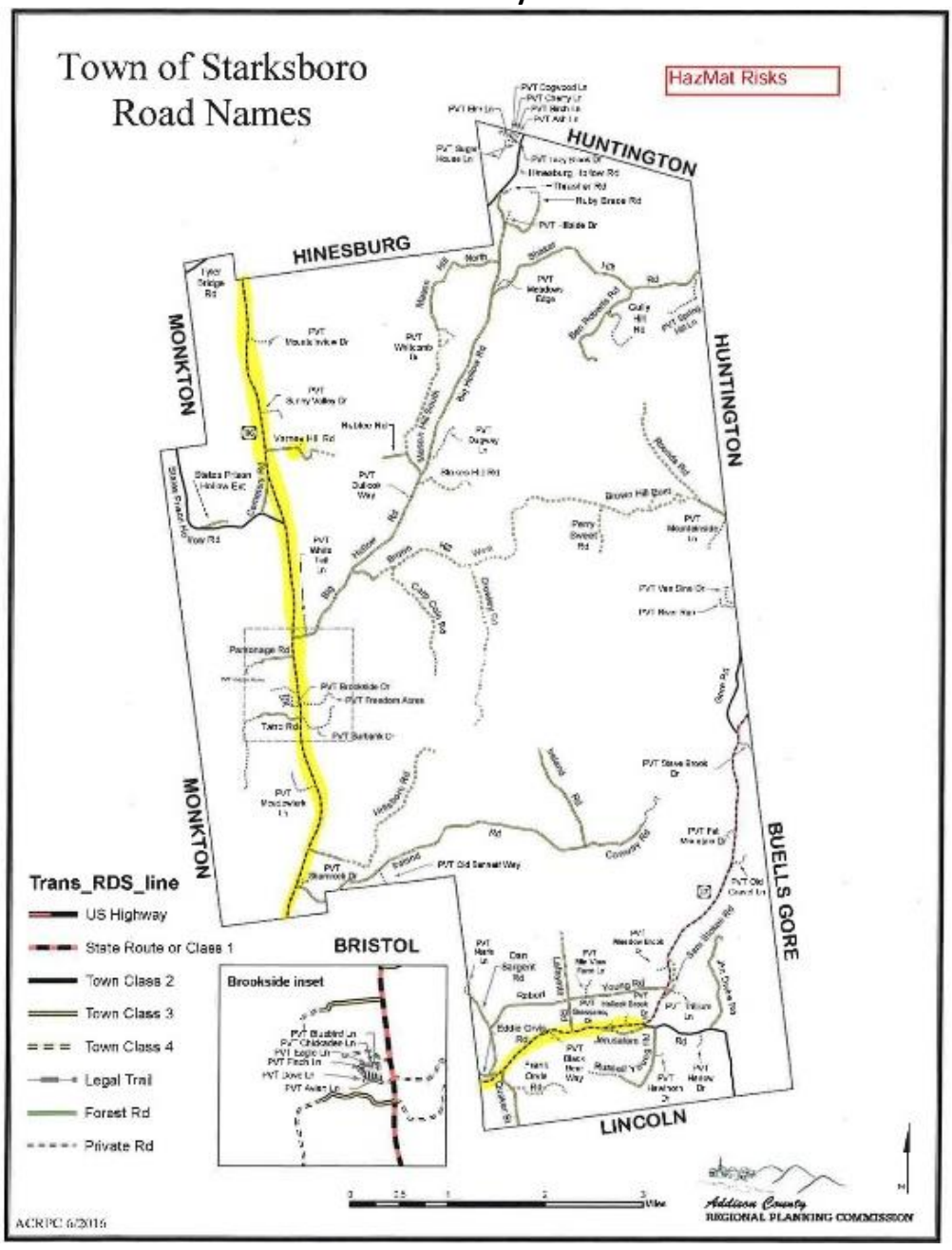
Previous Occurrences:
No recent hazardous materials spills have been reported at any of the facilities. Highway accidents responded to by the Starksboro Volunteer Fire Department routinely include spills of gasoline or oil from the vehicles involved. No reports of chemical cargo spillage were recorded.

Future Probability:
Increased demand for products whether they be hazardous or non-hazardous, shows up as increased freight traffic, mostly on Route #116. An increase in traffic is generally followed by an increase in accidents, leading to an increasing probability that some type of large hazardous material spill will occur within the Town of Starksboro in the future.

Vulnerability Summary:

Route #116 is a commonly used north/south bypass route for trucks traveling from Chittenden County to US Rte. #7 south of Middlebury. Trucks carry a mix of hazardous materials through Starksboro along this highway. The numbers of public buildings and critical infrastructure within easy exposure to spillage along this route shows a high vulnerability should a spill occur. With a committee evaluated vulnerability score of 3 for a hazardous materials incident, this hazard would be considered HIGH PRIORITY based on the high probability of an incident and its potential for critical impact to town infrastructure in the village area.

Hazardous Materials Risks Identified by the Starksboro HM Committee



5. Mitigation Strategies

5.1. Hazard Mitigation Goals by Hazard Type

Each hazard type profiled in Section 4.3 "Community Risk Assessment" can be mitigated dependent on the willingness to do so at the local, state or federal level. For example, the mitigation of flood damage is basically a simple fix- don't allow anything in the floodplain that can't afford to be lost and when it is lost, don't replace it. This would include all forms of infrastructure whether it be homes, highways, dams or croplands. Unfortunately, political will can rarely stand up to the simplicity of this mitigation concept.

The Town of Starksboro has identified that its goals for hazard mitigation are to reduce and/or avoid all long and short-term vulnerabilities to the hazards identified in section 4.3. In doing so, it also recognizes that political will and lack of funding stand in the way of many mitigation projects. The town particularly supports local residents' efforts to mitigate their personal risks. The Town also supports projects that lead to a positive benefit vs. cost evaluation and which the voters can afford.

Identified Hazard	Primary Mitigation Goal
Flash Flood	Ensure that essential services can function during disaster and reduce overall vulnerability to this hazard.
Invasive Species	Reduce impacts from a variety of expected invasives.
Structure Fire	Reduce hazards to residents and property.
Severe Snow	Ensure that essential services can function during disaster and reduce overall vulnerability to this hazard.
Ice Storm	Ensure that essential services can function during disaster and reduce overall vulnerability to this hazard.
Insect-Borne Illness	Ensure that conditions conducive to the hazard are limited and that residents have understanding and the ability to protect themselves.
Highway Accident	Ensure that highway improvements result in safer conditions.
High Winds	Ensure that essential services can function during disaster and reduce hazards to residents and property.
Severe Mud	Ensure that essential services can continue to function in an extended Mud Season.
HazMat Spill	Reduce hazards to residents and property.

5.2 Authorities, Policies, Programs, Resources (and the ability to expand upon these) 44CFR 201.6(c)(3)

Authorities of Town Officials:

Selectboard: The Town Selectboard is responsible for the basic administration of the town. They take care of roads, make appointments to other boards and commissions, and authorize expenditures of voted budgets. The selectboard may enact ordinances and rules in many areas including traffic regulation, regulating nuisances, managing solid waste, dogs and recreation, and establishing bike paths.

Planning Commission: The Planning Commission is responsible for long range planning in a town particularly as it relates to future land uses, transportation, energy and resilience. They prepare a municipal plan and zoning bylaws which are adopted by the Selectboard. Planning Commission members are elected for staggered 3-year terms.

Zoning Administrator: The Zoning Administrator (ZA) is appointed by the town's Selectboard with consideration given to the recommendation of the planning commission. Their responsibilities include administration and enforcement of a town's zoning bylaws, and usually also serve as the administrator of town floodplain regulations.

Tree Warden: The Town Tree Warden is responsible for the shade and ornamental trees within the town rights-of-way. They oversee tree health and removal when necessary. The tree warden is appointed by the Selectboard.

Fire Warden: The Town Forest Fire Warden has the responsibility for suppression of wildland fires, regulating open burning in the town by issuing burn permits, and wildfire education/prevention. The Town Fire Warden is appointed by the state Commissioner of Forests, Parks and Recreation with approval by the town's Selectboard.

Health Officer: The Town Health Officer is the executive officer of the local Board of Health. A local Board of Health may make and enforce rules and regulations…relating to the prevention, removal, or destruction of public health hazards and the mitigation of public health risks. The Town Health Officer is appointed by the Commissioner of Health with approval by the local Selectboard. They take direction from the Vermont Department of Health in investigation and enforcement of public health issues.

Town Service Officer: The Town Service Officer's responsibilities are to coordinate aid for residents needing assistance during hours when State offices are closed. In many towns, this office has become redundant as State agencies have developed 24/7 emergency assistance programs.

Emergency Manager or Coordinator: By default, a towns Selectboard chair is the town's emergency management director (EMD) unless one is appointed. Many communities retain the authorities of an EMD within the Selectboard and appoint an emergency coordinator instead. The emergency manager is responsible for the organization, administration and operation of the local emergency management organization. Emergency managers prepare local emergency operations plans, coordinate a local emergency management group and perform emergency management functions at the local level.

5.3 Current policies, programs, resources and the ability to expand on these for identified hazards:

Flash Flood

Starksboro is active in mitigating the hazards associated with flash flooding. Culvert upgrades and ditch treatments are implemented as part of normal maintenance activities along town roads.

The Town of Starksboro adopted the 2013 version of road and bridge standards as recommended by VT AOT on 2/5/2013. These standards address road and bridge construction, are designed to mitigate local traffic issues and are particularly designed to mitigate potential damages due to flooding and flash flooding. The standards address culvert sizing, ditch treatments and driveway access to reduce flood-caused erosion. The adopted standards are attached as Annex F of this mitigation plan.

In addition to these mitigation measures, the town also sets aside any road budget surplus to an emergency fund to help soften the financial blow should the unexpected happen. This fund is capped at 20% of the most recently voted budget.

The Lewis Creek Association has funded several geomorphic assessments of the Lewis Creek and its tributaries which have identified multiple undersized culverts on private roads/driveways along High Knob Brook and Hollow Brook. Changes to driveway standards could be adopted to prevent future situations where failure of undersized driveway culverts end up washing out town-owned structures.

Invasive Species

Damage from invasives is inevitable but actions can be taken to lessen their impacts. Starksboro has already adopted policies which partially address the spread of poison parsnip. By carefully monitoring the plant's life cycle, they conduct their roadside mowing in a manner that limits the spread of plants.

The State of Vermont, with the help of a network of volunteer spotters monitors the presence of Emerald Ask Borer and Asian Longhorned Beetle. Upon discovery of either invasive insect, the State is prepared to activate its protection plan. Volunteers from the Starksboro conservation commission are active in this monitoring process.

Structure Fire

Installation of dry hydrants at water supply locations can increase the availability of and speed in which water can be accessed for firefighting purposes. The Town of Starksboro supports installation of these hydrants as funding permits and suitable locations can be identified.

As housing continues to expand into rural areas, the potential lack of a dependable water supply for fighting fire is becoming an issue. As a mitigation measure, future development may need to be required to provide fire ponds as part of an impact assessment.

The ability to increase fire resistance in new construction is technically feasible at this time. The wholesale lack of building codes in residential construction has a long history in Vermont as only a few communities have adopted any codes. It is within the ability of the town planning commission and Selectboard to adopt national codes but the political will to do so is nonexistent in the local populace.

Severe Snow

The Town of Starksboro has a comprehensive mitigation program in place to address severe snow hazards. Approximately 10% of the town's annual road budget is for the purchase of sand and salt, focused on dealing with snow hazards.

In addition, purchases of road equipment are always made with its use for snow removal a major consideration.

Ice Storm

Many private residences have back-up power sources and essential Town facilities like the Town Office and Town Garage either have been retrofitted in recent years or are scheduled to be fitted with back-up power.

As population growth and housing expands along remote road corridors, increasing reliance on dependable power by the new homeowners requires changes in line maintenance. Green Mountain Power (GMP), and VT Electric Cooperative the utilities servicing the Town of Starksboro, have ongoing programs of line clearing and relocation to ensure outages are kept to a minimum.

The Town of Starksboro supports continued development of a robust and redundant local electric generation and transmission system for its residents. This support is limited to that which can prove that the benefit to local residents outweighs the societal costs associated with industrial generation and transmission degradation of the local landscape.

The ability to expand on the town's activities is generally related to the availability of funds.

Insect-Borne Illness

The Town of Starksboro currently has a limited active mitigation program directed at limiting insect-borne illnesses. Current mitigation actions are limited to making information available through handouts at the town office and school instruction by the VT Department of Health.

Should conditions worsen, especially at mobile home parks near standing water, the town could contract with a spray applicator to reduce mosquito populations or conduct an educational project directed at removing standing water near homes and recreation areas.

Highway Accident

A representative from the town sits on the local Transportation Advisory Committee (TAC), a regional group whose purpose is to prioritize potential transportation related projects within the region. The TAC rates high crash locations highly in prioritizing projects to mitigate the risks associated with these locations by changing alignments, adding signage and reducing speeds.

Severe Mud

The town road crew currently addresses perennial mud "holes" through addition of gravel and/or stone base where possible. During any road rebuild project, care is taken to divert water away from the roadbed to dry up identified mud areas. In the case of large projects, the existing road base is excavated out and replaced with a new base of large stone and finished with gravel.

If conditions worsen due to a changing climate, the town could introduce a program of capital road improvements with the intent of addressing the mud hazard.

High Winds

Ongoing brush and dead tree removal along town highways helps to address power loss due to downed power lines. Both GMP and VECO, with the permission of the Starksboro selectboard, routinely inspect and remove hazardous trees. In addition, the town road crew addresses many of the most hazardous trees in the performance of their regular duties.

In particularly vulnerable locations with a history of power outages due to high wind, burial of power limes could be an effective mitigation measure. Burial as a requirement for new construction in these areas should be considered.

Hazardous Materials Spill

The most effective mitigation for hazardous materials spills are well-trained first responders. The Starksboro Volunteer Fire Department requires that all of its members are trained in HazMat response to the operations level which includes training in such mitigation measures as dikes, dams, diversions and absorption of products.

Ensuring safe access for deliveries of fuels is another way in which spills of product can be avoided. Mitigating overly steep roads, blind curves and general improvements to the transportation system can produce favorable results in reduces accidents and spills.

5.4 Project Prioritization Process

Projects and actions included in Section 5.2 are conducted by the Town of Starksboro or regional and State agencies where noted. The Town encourages its residents to adopt mitigation actions which could protect their personal property by making educational materials available to residents. Many of these potential actions are contained in Annex C as mitigation measures for individuals. Mitigation actions identified in Section 5.4, however, are considered the jurisdiction's priority mitigation actions.

The Town has established the following priorities for choosing mitigation projects: Life safety and the safety of its residents, keeping local roads and bridges open to ensure access for emergency vehicles, and protecting critical infrastructure facilities in the town. These actions/projects are constantly evaluated for benefit to the community, estimated project cost and political will to implement and will be implemented as those factors indicate. The actions identified in Section 5.4 under each hazard have passed a preliminary evaluation utilizing those general concepts by the hazard mitigation committee, and are listed in their order of priority. Before undertaking these projects, they will additionally be prioritized based on their feasibility and a benefit vs. cost review. A minimum C/B result of 1.0 will be required prior to any request for federal mitigation funds. Annex D identifies only some of the available programs which can help to fund some of these actions/projects. All projects in section 5.4 will be reviewed for progress following any local disaster declaration and will be considered annually as part of overall town budgeting.

5.5 Proposed Mitigation Actions by Hazard Type

Flash Flood/Flooding

Flash flooding has been a major cause of disaster declaration in Starksboro. The following generalized road projects have been identified which will help mitigate the effects of flash flooding in the road network system. These projects will be implemented as funding allows. All identified culvert and bridge replacements will be subject to the State of Vermont's stream alteration permit and the codes and standards adopted by the Town of Starksboro.

- Stone-line ditches according to the town's road and bridge standards when work is being completed on any road.
  Estimated cost: Varies dependent on project
  Source of funds: Town highway budget.
  Responsibility: Joint Town Highway Dept. and Selectboard
  Timeframe: 2019

  In addition to the above-mentioned standard road work, the following projects were identified specifically by the town's hazard mitigation committee and by river studies conducted by the Lewis Creek Association:

- Replacement of the existing undersized culvert on Hinesburg Hollow Road with a 12 ft. "Squashed Culvert" of bank-full width to reduce vulnerability of adjoining communities.
  Estimated cost: $200,000
  Source of funds: Town highway budget, HMGP, State bridge and culvert program.
  Responsibility: Joint Town Highway Dept. and Selectboard
  Timeframe: 2019 - Q3, 2022

- Replacement of existing undersized culvert on Brown Hill Road off Big Hollow Road.
  Estimated cost: $50,000
  Source of funds: Town highway budget.
  Responsibility: Joint Town Highway Dept. and Selectboard
  Timeframe: 2019-2021

- Replacement of existing undersized culvert on Stokes Hill Road off Big Hollow Road.
  Estimated cost: $50,000
  Source of funds: Town highway budget.
  Responsibility: Joint Town Highway Dept. and Selectboard
  Timeframe: 2019-2021

- Replacement of existing undersized culvert on Big Hollow Rd just downstream of Dugway Rd.
  Estimated cost: $50,000
  Source of funds: Town highway budget.
  Responsibility: Joint Town Highway Dept. and Selectboard
  Timeframe: 2019-2021

- Replacement of existing undersized culvert at corner of Big Hollow Rd and Dugway Ln.
  Estimated cost: $50,000
  Source of funds: Town highway budget.
  Responsibility: Joint Town Highway Dept. and Selectboard
  Timeframe: 2019-2021

- Replacement of undersized culverts on Rte. 116 South of the village
  Estimated cost: $400,000
  Source of funds: VTrans/State highway budget
  Responsibility: VTrans with encouragement by Selectboard
  Timeframe: 2019-2021

- Replacement of existing undersized culverts on private roads in Freedom Acres, 1127 Big Hollow Rd, Path behind home and barn off Big Hollow Rd, Driveway at 3382 Big Hollow Rd.
  Estimated cost: $20,000 each
  Source of funds: Homeowners
  Responsibility: homeowners with encouragement by town road crew and selectboard
  Timeframe: 2019-2021

- Evaluation and engineering for replacement of existing undersized private culverts generally along High Knob Brook and Hollow Brook.
  Estimated cost: under $5,000 each
  Source of funds: Homeowners
  Responsibility: homeowners with encouragement by town road crew and selectboard
  Timeframe: 2019-2021

Invasive Species

Awareness of invasives and their hazards are beginning to rise in priority among town residents. Actions the town can take to mitigate the spread of invasives, however, are limited.

- Continue to actively support the road crew's mowing standards that reduce the spread of roadside weeds.
  Estimated cost: limited to diligence by the road crew in timing mowings
  Source of funds: Town highway budget.
  Responsibility: Joint Town Highway Dept. and Selectboard
  Timeframe: Q4, 2018 – indefinitely
  Benefits: reduced spread of noxious weeds

- Support efforts by town residents as advanced "spotters" in identifying invasives through educational programs.
  Estimated cost: Space availability, trainers
  Source of funds: State ANR invasives program
  Responsibility: Selectboard, Conservation Commission, Road crew
  Timeframe: Q4, 2018 – indefinitely
  Benefits: capacity for early response

- Provide educational literature on invasives identification and treatments for residents at town offices.
  Estimated cost: none, space only
  Source of funds: N/A
  Responsibility: Joint Town Clerk, ACRPC
  Timeframe: Q4, 2018 – indefinitely
  Benefits: capacity for early response

Structure Fire

Starksboro supports the following as mitigation actions for structure fires:

- Establish minimum water supply standards as a requirement for subdivisions.
  Estimated cost: As part of next subdivision regulation rewrite
  Source of funds: Municipal Grant Program, volunteer efforts.
  Responsibility: Planning Commission with recommendations from fire dept.
  Timeframe: Q1, 2019 – Q4, 2020
  Benefits: adequate water supply for firefighting

- Support fire department fire safety program in schools.
  Estimated cost: Volunteer time
  Source of funds: Fire Dept annual budget
  Responsibility: Selectboard, Fire Dept.
  Timeframe: Q3, 2018 – annually
  Benefits: early safety awareness for children and parents

- Encourage smoke detector installation and battery check publicity
  Estimated cost: none, space only
  Source of funds: N/A
  Responsibility: Joint Town Clerk, Fire chief
  Timeframe: Q3, 2018 – indefinitely
  Benefits: early detection and evacuation saves lives

Severe Snow

Starksboro supports the following as mitigation actions for severe snow events:

Install transfer switch at the Town Office to facilitate installation of a generator/back-up power.

- ***Estimated cost to Town: $3,000- $5,000***
  Source of funds: Town general fund, HMGP
  Responsibility: Town Selectboard
  Timeframe: Q3, 2020 – Q4, 2020
  Benefits: Allows operation of Town office during snow storm caused outage

Conduct test installations of snow fence at drift-prone locations throughout town.

- ***Estimated cost to Town: $3,000- $5,000***
  Source of funds: Town highway fund
  Responsibility: Town Selectboard, highway crew
  Timeframe: Q4, 2018 – Q2, 2019
  Benefits: Potential to limit closure of roads during severe storms

Ice Storm

Install transfer switch at the Town Office to facilitate installation of a generator/back-up power.

- ***Estimated cost to Town: $3,000- $5,000***
  Source of funds: Town general fund, HMGP
  Responsibility: Town Selectboard
  Timeframe: Q3, 2020 – Q4, 2020
  Benefits: Allows operation of Town office during an outage.

Change zoning to encourage burial of power line to new homes

- ***Estimated cost to Town: none as part of an overall zoning rewrite***
  Source of funds: Town general fund, Municipal planning grants
  Responsibility: Town Planning Commission
  Timeframe: Q3, 2018 – Q4, 2018
  Benefits: Reduces the likelihood of power loss due to power line failure between the distribution network and the home.

Manage vegetation in the ROW to allow space for ice storm events.

- ***Estimated cost to Town: $3,000 annual cost***
  Source of funds: Town general fund
  Responsibility: Town Selectboard, road crew
  Timeframe: Q1, 2019 and ongoing
  Benefits: reduces likelihood of trees falling on power lines

Insect-Borne Illness

Conduct public educational outreach via newsletter and publications at town office

- ***Estimated cost to Town: $0.00 (space in newsletter and office)***
  Source of funds: VT Dept Health
  Responsibility: Town EMD
  Timeframe: Q3, 2018 – Q4, 2020
  Benefits: Allows residents to make knowledgeable decisions to protect themselves from insects.

Evaluate importation of natural predators into breeding areas of high concentration of pests. (mosquito larval predators, wild turkeys, etc.)

- ***Estimated cost to Town: $0.00***
  Source of funds: State F&W funds, VDH grants
  Responsibility: Town Selectboard, EMD
  Timeframe: Q3, 2019 – Q4, 2021
  Benefits: reduced populations of carrier pests

Highway Accident

Request Evaluation of hazardous road locations through the Systemic Local Road Safety Program (SLRS)

- ***Estimated cost to Town: $500.00 (road commissioner's salary expenses)***
- ***Source of funds: Town highway budget***
- ***Responsibility: Joint Road Commissioner and Selectboard***
- ***Timeframe: Q2, 2019 – Q3, 2020***
- ***Benefits: Reduced hazards on sections of town roads***

Installation of speed reduction signage and reflective arrows where needed to reduce accidents.

- ***Estimated cost to Town: $1,000- $2,000***
- ***Source of funds: Town highway funds***
- ***Responsibility: Town Selectboard, road crew***
- ***Timeframe: Q3, 2018 – Q3, 2019***
- ***Benefits: reduced speeds along town roads***

High Winds

Manage vegetation in the ROW to allow space for ice storm events. (same as for Ice Storm)

- ***Estimated cost to Town: $3,000 annual cost***
- ***Source of funds: Town general fund***
- ***Responsibility: Town Selectboard, road crew***
- ***Timeframe: Q3, 2018 and ongoing***
- ***Benefits: reduces likelihood of trees falling on power lines***

Explore feasibility of requiring installation of "hurricane clips" on all new mobile home installations.

- ***Estimated cost to Town: $0 annual cost***
- ***Source of funds: Town general funds or Municipal Planning Grants***
- ***Responsibility: Town Selectboard, Planning Commission***
- ***Timeframe: 2019-2020 (at next zoning rewrite)***
- ***Benefits: reduces likelihood of trees falling on power lines***

Severe Mud

Rebuild sections of town roads where mud is a perennial problem:

- Big Hollow Rd. (3 segments)
- Shaker Hill Rd. (2 segments)
- Mason Hill Rd. (north and south intersections with Big Hollow Rd.
- Ireland Rd. (2 segments)
- Various segments around South Starksboro roads.

- ***Estimated cost to Town: $3,000- $5,000 per segment***
- ***Source of funds: Town highway fund, FEMA grant funding***
- ***Responsibility: Town Selectboard, road crew***
- ***Timeframe: Q3, 2019 – Q3, 2022***
- ***Benefits: reduce frequency of mud holes in these locations***

Rebuild the intersection of Lafayette Rd and Robert Young Rd.

- ***Estimated cost to Town: $15,000 - $20,000 estimate***
- ***Source of funds: Town highway fund***
- ***Responsibility: Town Selectboard, road crew***
- ***Timeframe: Q2, 2019 – Q3, 2019***
- ***Benefits: reduce frequency of mud holes in these locations***

Hazardous Materials Spill

Encouraging conversion to alternate heating sources to reduce overall transport of fuels

- ***Estimated cost to Town: Minimal as part of a Town Plan Energy Section***
- ***Source of funds: Town General Fund, Municipal Planning Grants***
- ***Responsibility: Town Selectboard & Planning Commission***
- ***Timeframe: Q3, 2018 – Q4, 2019 (During rewrite of town energy plan)***
- ***Benefits: Increased energy efficiency of current housing stock and reduced transport of Hazardous Materials (Fuels) over town highways.***

6 Plan Maintenance Procedures

Any Hazard Mitigation Plan is dynamic and should not be fixed. To ensure that the plan remains current and relevant, it is important that it be updated periodically. The plan will be updated at a minimum every five years in accordance with the following procedure:

6.1 Plan Review/Update Process (5-year cycle) 44CFR 201.6 (c)(4)(i) and 44CFR 201.6 (c)(4)(iii)

1. The Starksboro Selectboard assembles a Review/Update Committee to include government officials and interested public.

2. The Committee will discuss the process to determine if any modifications or additions are needed due to changing conditions since the last update occurred. Data needs will be reviewed, data sources identified and responsibility for collecting/updating information will be assigned to members.

3. Other Town plans (Emergency Operations Plan, Town Plan, Road Plan, etc.) will be reviewed to ensure a common mitigation thread still exists throughout.

4. A draft update will be prepared based on these evaluation criteria:
   - Changes in community and government processes, which are hazard-related and have occurred since the last review.
   - Progress in implementation of plan initiatives and projects.
   - Effectiveness of previously implemented initiatives and projects.
   - Evaluation of unanticipated challenges or opportunities that may have occurred between the date of adoption and the date of the report.
   - Evaluation of hazard-related public policies, initiatives and projects.
   - Review and discussion of the effectiveness of public and private sector coordination and cooperation.

5. The public will be invited to review and give input on drafts as they are produced.

6. Selectboard members will have an opportunity to review the draft update. Consensus will be reached on any changes to the draft.

7. The Selectboard will notify and schedule a public meeting to ensure adequate public input.

8. The Selectboard will recommend incorporation of community comments into the draft update.

6.2 Programs, Initiatives and Projects Review

Although the plan will be reviewed and updated in its entirety at least every five years as described above, the Town will monitor and evaluate its goals, strategies and actions/projects annually as the town budget is created. A town budget is created by the Selectboard of a town in publicly noticed meetings utilizing budget requests from town committees and the citizenry. This will ensure that progress will be reviewed and actions/projects either added or removed from the towns work plan based on changing local needs and priorities. In creation of the municipal plan by the planning commission, concepts, goals and strategies from this plan will be used to inform the development of that plan and will be incorporated into that plan when appropriate.

6.3 Post-Disaster Review Procedures

Should a declared disaster occur, a special evaluation process will occur in accordance with the following procedures:

1. Within six (6) months of a declared emergency event, the Town will initiate a post disaster review and assessment of actions.

2. This post disaster review and assessment will document the facts of the event and assess whether the existing Hazard Mitigation Plan effectively addressed the hazard.

3. A report of the review and assessment will be created by a Review/Update Committee.

4. The committee will make a determination whether the plan needs to be amended. If the committee determines that NO modification of the plan is needed, then the report is distributed.

5. If the committee determines that modification of the plan IS needed, then the committee drafts an amended plan based on its recommendations and forwards to the Selectboard for their input.

6. Following completion of a public input process, further amendments may be made and a final plan delivered to the Selectboard for adoption.

7. The Selectboard adopts the amended plan.

7 Plan Adoption Resolution

TOWN OF STARKSBORO, VERMONT SELECTBOARD ADOPTION RESOLUTION

WHEREAS, the Town of Starksboro has occasionally experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the **Town of Starksboro, Vermont Single Jurisdiction All-Hazards Mitigation Plan (Plan),** which can result in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Starksboro has developed the **Plan** and received conditional approval from the Federal Emergency Management Agency (FEMA); and

WHEREAS, the **Plan** identifies specific hazard mitigation strategies, and plan maintenance procedures applicable to the Town of Starksboro; and

WHEREAS, the **Plan** identifies actions and/or projects intended to provide mitigation for specific natural hazards that impact the Town of Starksboro; and

WHEREAS, adoption of this **Plan** will make the Town of Starksboro eligible for additional funding to help alleviate the impacts of future hazards;

Now, therefore, be it RESOLVED by Town of Starksboro Selectboard:

1. The **Town of Starksboro, Vermont Single Jurisdiction All-Hazards Mitigation Plan** is hereby adopted as an official plan of the Town of Starksboro, Vermont;
2. The respective Town officers identified in the action plan are hereby directed to pursue implementation of the recommended actions assigned to them.
3. Support agencies within the Town of Starksboro are also requested to implement actions assigned to them within this plan;
4. Plan maintenance procedures described in Section 6 of this plan are also adopted as part of this resolution

IN WITNESS WHEREOF, the undersigned have affixed their signatures for the Town of Starksboro, this 30 day of OCT 2018.

Selectboard Chair

Selectboard Member

Selectboard Member

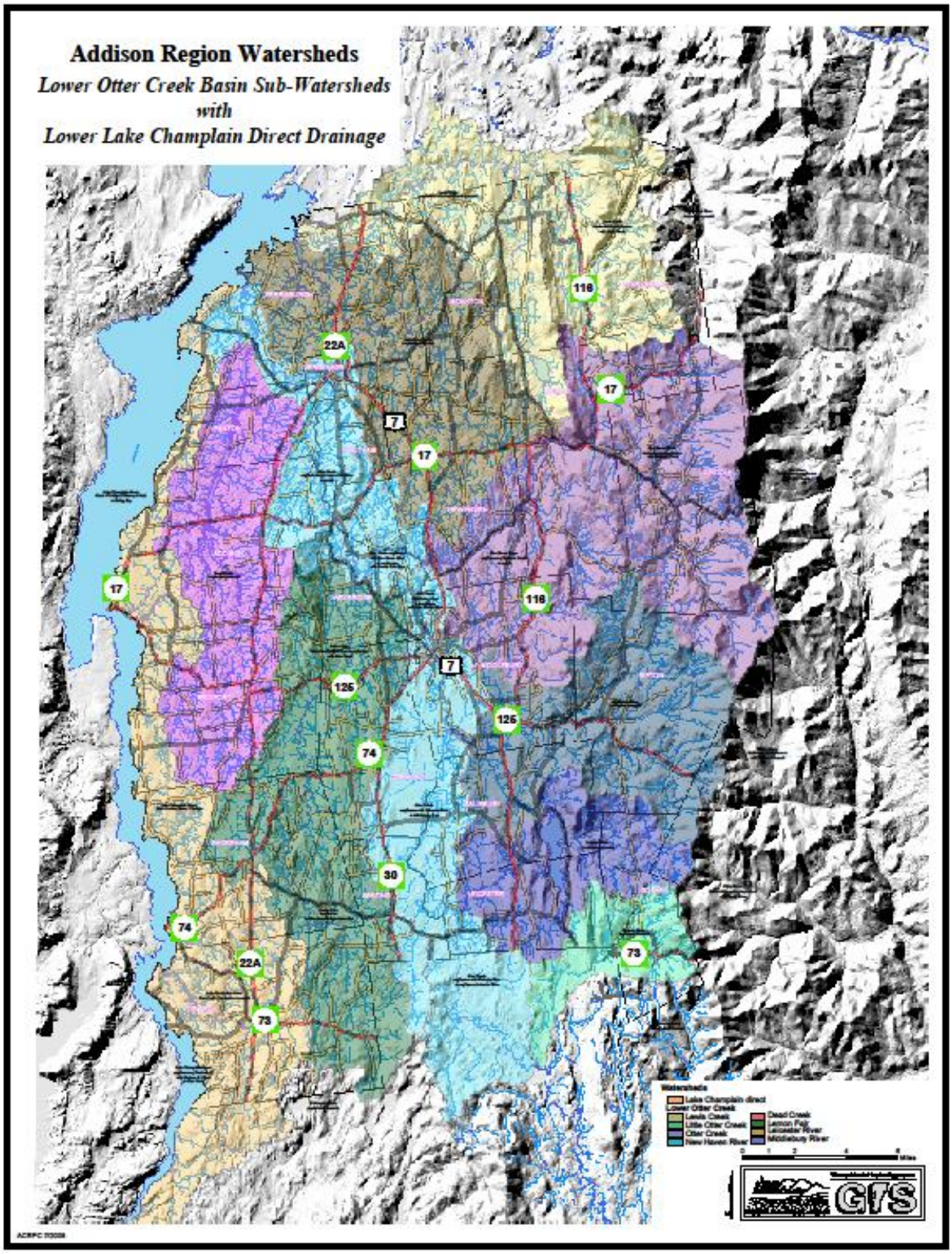
Selectboard Member

Selectboard Member

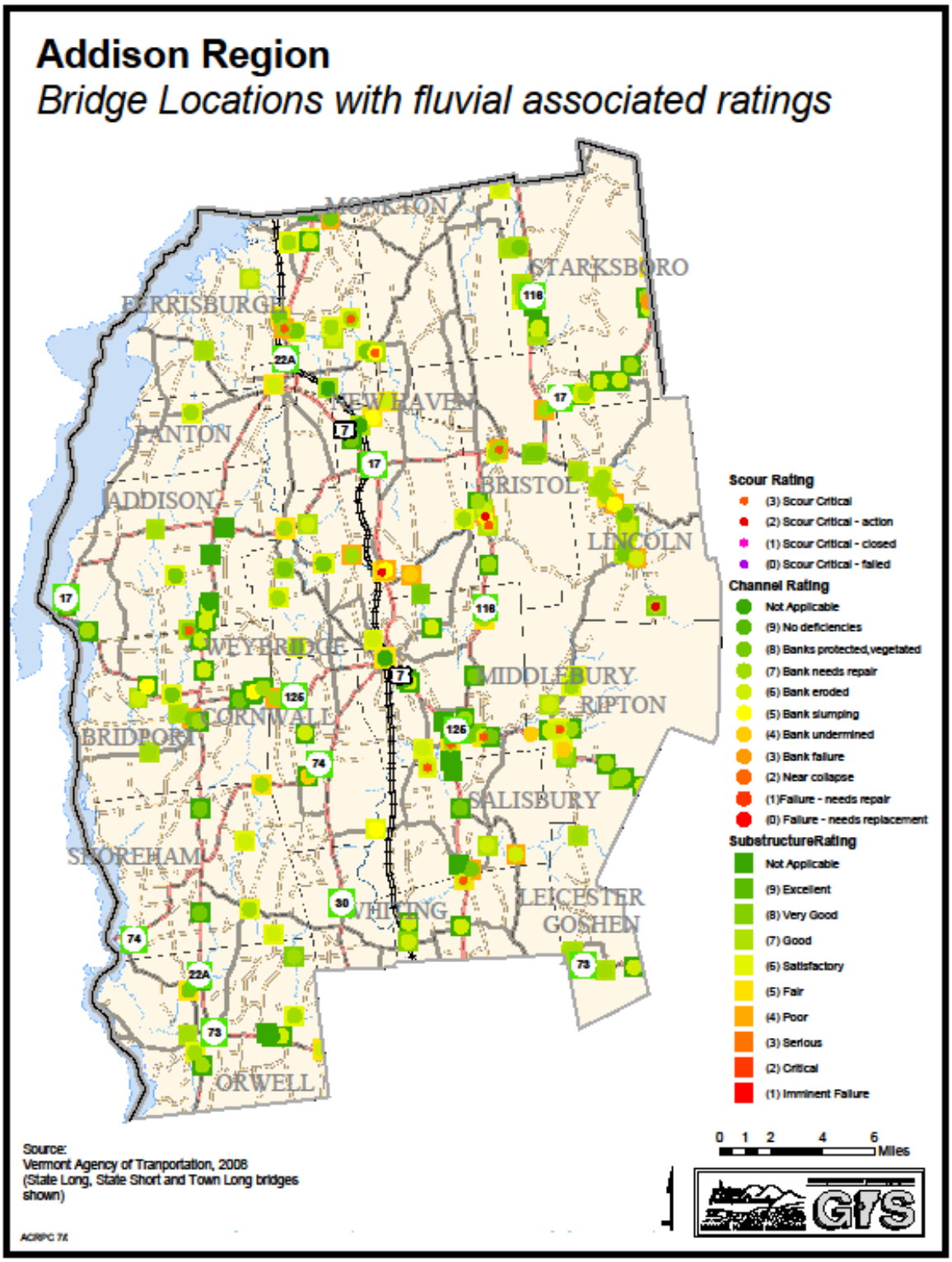
ATTEST:
Rebecca Elder
Selectboard
Assistant

8. Annex A - Regional Maps

8.1 Addison Region Watersheds



8.2 Addison Region



9. Annex B – Local Documents

Town of Starksboro, VT

Hazard Mitigation Planning Committee Meeting

November 17, 2016 3:00-4:30pm

Starksboro Town Office

Minutes:

1. Convene Meeting: 3:05

2. Discuss Hazard Mitigation Planning Process – Tim introduced the concept of hazard mitigation planning and explained the process. The committee was told they should be able to expect a total of 3-4 meetings like this one and should have a completed first draft plan by May of 2017. He let them know that he will periodically send out early drafts for corrections as he cannot know the town as well as its citizens.

3. Complete Town of Starksboro Risk Assessment – Tim lead the process of having the committee evaluate the major hazards in Starksboro and develop an understanding of the town's vulnerability to those hazards. The committee collectively filled out the risk assessment worksheet containing 21 hazards that Starksboro could be impacted by and added a 22nd hazard, extreme mud.

4. Schedule next meeting - The committee decided that due to the upcoming holidays, they would next meet on January 12th of 2017 at 3pm at the Starksboro town office.

5. Adjourn: 4:38

Thank you for participating in our ongoing efforts to help Addison County communities prepare for natural and/or man-made emergencies. Because available funding sources often require non-federal matches to the dollars our region is receiving, we need to document your time and expenses in lieu of hard dollars. We appreciate the time and effort you are volunteering. Thanks for your assistance.

1. Incident Name (Meeting/Course)	2. Operational period Date: Time:	3. Check-In (Meeting/Course)Location	Check-In List ICS 211-P
Starksboro Hazard Mitigation	1/12/17 3pm	Starksboro Town office	

4. Name	5. Town or Agency	6. Position?	7. Volunteer? (Y/N)	8. Mileage? (to & from)	9. Hrs. contributed (include travel)
David Wetmore		ZA			
Cheryl Estey	Starksboro	Town Clerk			
Charlene Phelps	Starksboro	management Emagency			
Tony porter	Starksboro	S-B			
Tim Boudon	ACRPC	sr. Planner	N		
Jeff Koenef	Starksboro	P.C.			
Tom Estey					

Page _____ of _____ | 10. Prepared by: | Date/Time

Town of Starksboro, VT

Hazard Mitigation Planning Committee Meeting

January 12, 2017 3:00-4:30pm

Starksboro Town Office

Minutes:

1. Convene Meeting: 3:05

2. Tim lead a discussion on each of the primary hazards identified in the 11/17 risk assessment. Committee members were encouraged to remember a time when each hazard had been an issue in Starksboro. Flood events and high wind events were most often recalled and members related roof losses due to wind, culvert losses due to flood events, and previous work to mitigate rock slides.

3. The committee identified past disaster declarations as:

    a. The ice storm of 1998 when downed trees and power lines caused problems in some sections of town
    b. The floods of 1998 that stranded nearby Lincoln and caused damage on the southern end of Starksboro.
    c. Spring flooding of 2011 which caused multiple washouts on town roads.
    d. Tropical storm Irene in 2011 which caused damage throughout Vermont
    e. December 2014 winter storm that dropped heavy snow on trees and power lines
    f. June 2015 storm that caused a culvert on Big Hollow to fail at a cost of $400,000

4. The committee also identified possible mitigation actions:
    a. Mowing patterns to reduce the spread of invasives
    b. Import turkeys to consume insects and thereby reduce risks.
    c. Convince VT ANR to let equipment into rivers to fix them
    d. Getting drivers to slow down to reduce traffic accidents
    e. Replace culvert at Hinesburg Hollow to reduce flooding
    f. Reclassify Rounds Rd to a trail

5. Schedule next meeting - The committee decided to meet next on February 8th of 2017 at 3pm at the Starksboro town office.

6. Adjourn: 4:38

Thank you for participating in our ongoing efforts to help Addison County communities prepare for natural and/or man-made emergencies. Because available funding sources often require non-federal matches to the dollars our region is receiving, we need to document your time and expenses in lieu of hard dollars. We appreciate the time and effort you are volunteering. Thanks for your assistance.

1. Incident Name (Meeting/Course)	2. Operational period Date: Time:	3. Check-In (Meeting/Course)Location	Check-In List ICS 211-P
Starksboro Hazard Mitigation	1/12/17 3PM	Starksboro Town office	

4. Name	5. Town or Agency	6. Position?	7. Volunteer? (Y/N)	8. Mileage? (to & from)	9. Hrs. contributed (include travel)
David Wetmore		ZA			
Cheryl Estey	Starksboro	Town Clerk			
Charlene Phelps	Starksboro	management Emergency			
Tony porter	Starksboro	S-B			
Tim Boutin	ACRPC	sr. Planner	N		
Jeff Koenef	Starksboro	PC			
Tom Estey					

Page _____ of _____ | 10. Prepared by: | Date/Time

January 23, 2013

TOWN ROAD AND BRIDGE STANDARDS
TOWN OF Starksboro, VERMONT

The Town of Starksboro hereby adopts the following Town Road and Bridge Standards which shall apply to the construction, repair, and maintenance of all town roads and bridges.

The standards listed here are considered minimum and apply to construction projects and repair and maintenance activities. The standards include management practices and are designed to: ensure the safety of the traveling public, minimize damage to road infrastructure during flood events, and enhance water quality protections by minimizing sediment delivery to surface waters and/or wetlands.

The select board reserves the right to modify the standards for a particular project or repair or maintenance activities where, because of unique physical circumstances or conditions, there is no possibility that the project or activities can be completed in strict conformance with these provisions. Any modifications to the standards must be done in a manner that serves the underlying intent of the management practice, be it public safety, flood hazard avoidance, or water quality protection. Fiscal reasons are not a basis for modification of the standards. Questions about modifications to the standards should be directed to the VTrans District Office.

Municipalities must comply with all applicable state and federal approvals, permits and duly adopted standards when undertaking road and bridge activities and projects.

Any new road regulated by and/or to be conveyed to the municipality shall be constructed according to the minimums of these standards. If any federal and/or state funding is involved in a project, the VTrans district office must be notified prior to any field changes taking place that would alter the original scope of work.

Roadways

- All new or substantially reconstructed gravel roads shall have at least a 12-inches thick processed gravel sub-base, with an additional 3 inches (minimum) top course of crushed gravel.
- All new or substantially reconstructed paved roads shall have at least a15 inches thick processed gravel sub-base.
- All roadways shall be graded so water does not remain on the road surface. For roadways that are not super-elevated, this generally means a 2-4% ($^1/_4$" - $^1/_2$" per ft) crown for gravel roads and a 1-2% ($^1/_8$" - $^1/_4$" per ft) crown for paved roads to promote sheeting of water.
- Proper grading techniques for gravel roadways must be used to avoid creating a ridge or berm between the crown and the ditch.
- Any berm along the roadway shoulder that prevents the proper sheeting of water must be removed.

Ditches and Slopes

Soil exposed during ditch and slope construction, repair or maintenance must be treated immediately following the operation and temporary erosion prevention and sediment control practices must be installed and maintained during construction activities and until the ditch or slope is permanently stabilized.

The following are minimum erosion control measures. Careful attention must be given to areas vulnerable to erosion and immediately adjacent or discharging to surface waters and/or roadway drainage facilities:

- Seed and mulch all ditches with grades less than 5% when undertaking projects or repairs or maintenance activities that result in exposed soil. Vegetation must be established and monitored. If vegetation is not established within 10 days of placement, install biodegradable non-welded matting with seed.
- Stone line all new or reconstructed ditches or whenever soils are disturbed by maintenance activities with grades equal to and greater than 5%; alternatively, install stone check dams. The check dams must meet criteria outlined in the *"Standards and Specifications for Check Dams,"* from the *Vermont Standards and Specifications for Erosion Prevention and Sediment Control*. Specifically, dams must be placed so that the crest of the downstream check dam is at the same elevation as the base of the upstream dam.
- Create parabolic (wide "U" shaped) ditches when constructing new or substantially reconstructing ditches, rather than narrow "V" shaped ditches wherever lateral space allows. Ditches with gradual side slopes (maximum of 1:2, vertical to horizontal ratio) and a wide bottom (at least 2 feet) are preferred. Use biodegradable, non-welded matting to stabilize side-slopes where slopes are greater than 1:2 and less than 1:1 ½; apply seed and mulch to any raw or exposed side-slope if slopes are less than 1:2.
- All ditches must be turned out to avoid direct outlet into surface waters. There must be adequate outlet protection at the end of the turnout, either a structural (rock) or vegetative filtering area.
- If in the best professional engineering judgment of the VTrans Operations Division, there is a cost effective ditch treatment that will meet the intent of the management practices described above, but represents a departure from these standards, the municipality may implement the more cost effective ditch treatment alternative with the professional recommendation submitted in written form by VTrans prior to the municipality executing the work.
- When constructing new or substantially reconstructing side slopes, use appropriately sized stone armament on slopes that are 1:1½ or greater. If perennial streams are affected by the toe of slope the project must conform to the statewide Stream Alteration standards.

Culverts and Bridges

- Replacement of existing culverts and any new culvert must have a minimum culvert diameter of 18 inches.
- Replacement of existing bridges and culverts and any new bridges and culverts must be designed in accordance with the VTrans Hydraulics Manual, and, in the case of perennial streams, conform to the statewide Stream Alteration standards.
- All new driveway culverts must have a minimum diameter of 15 inches.
- When installing or replacing culverts, use appropriate techniques such as headwalls and wingwalls, where there is erosion or undermining or where it is expected to occur.
- Install a splash pad or plunge pool at the outlet of new or repaired drainage culverts where there is erosion or where erosion may occur. Splash pads and plunge pools are not appropriate for use in streams supporting aquatic life.

Guardrails

When roadway, culvert, bridge, or retaining wall construction or reconstruction projects result in hazards such as foreslopes, drop offs, or fixed obstacles within the designated clear-zone, a roadside barrier such as guardrail must be installed. The most current version of the AASHTO Roadside Design Guide will govern the analysis of the hazard and the subsequent treatment of that hazard.

Access Management
The town must have a process in place, formal or informal, to review all new drive accesses and development roads where they intersect Town roads, as authorized under 19 V.S.A. Section 1111. Towns may reference VTrans A-76 Standards for Town & Development Roads and B-71 Standards for Residential and Commercial Drives; and the VTrans Access Management Program Guidelines for other design standards and specifications.

Training
Town highway maintenance crews must collectively attend a minimum total of 6 hours of training per year on best road management practices. The town must keep documentation of their attendance for a period of three years.

Passed and adopted by the Selectboard of the Town of Starksboro **, State of Vermont on** Feb 5 **, 20** 13.

Select Board: _____ _____

Peter Marsh _____ _____

_____ _____

A TRUE COPY
ATTEST: _____

3

Huntington Comments:

Tim Bouton

From: Barbara Elliott <townhunt@gmavt.net>
Sent: Monday, January 29, 2018 3:55 PM
To: 'Tim Bouton'
Cc: Barbara Elliott - Town Administrator
Subject: RE: Draft Starksboro Hazard Mitigation plan for input

Hi Tim –

Thanks for forwarding this. While I don't have recommendations for your report, I do want to say that I found it very 'user friendly' and that it contains info that is easy to find and therefore more likely to be referenced.

I'd like to adopt some of the strategies that I found in your plan that are not in Huntington's current plan – or that are not included in such a readable manner. The list I made that I hope we will incorporate in our next review includes:

1. Have the Selectboard (SB) appoint a Mitigation Planning Committee
2. A more complete listing of federally declared disasters that includes year, date, description, Declaration # (in addition to the names of roads impacted & their $ amount)
3. Chart on SHMP pg 46: Goals by Hazard Type (identified hazard| primary mitigation goal)
4. Authorities pg 47 that outlines roles and responsibilities
5. Current programs pg 48
6. Proposed actions that includes cost estimates pgs 51 – 57
7. Specific outline of review process pgs 59-60
8. Inclusion of info on how to protect your property/community, plan, etc on pgs 71-82
9. Funding Opportunities section pgs 83-90

Regards,
Barbara

****
Barbara JM Elliott, Town Administrator
4930 Main Road, Huntington, VT 05462
802.434.4779 | townhunt@gmavt.net

From: Tim Bouton [mailto:tbouton@acrpc.org]
Sent: Friday, January 26, 2018 1:52 PM
To: townhunt@gmavt.net
Subject: Draft Starksboro Hazard Mitigation plan for input

Barbara,
Attached, please find a draft copy of a hazard mitigation plan for the Town of Starksboro. As a bordering community FEMA requests that we reach out and ask for input. If you have a chance, please review and send any suggested edits to tbouton@acrpc.org. If there are others in Huntington that may be interested, feel free to pass along.
Thank you for your input.
Tim

Tim Bouton
Sr Planner ACRPC
388-3141/989-9006
tbouton@acrpc.org

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10. Annex C – Common Mitigation Hazards by Hazard Type

Mitigation measures for "all-hazards" have been adapted from a flood mitigation approach developed by French Wetmore, of Wetmore and Associates in Park Forest, Illinois, into six categories:

- Prevention – measures intended to keep a hazard risk problem from becoming worse. They ensure that future development does not increase hazard losses. Examples would include: Planning and Zoning, Open space preservation, Land Development regulations, Storm water management.
- Property Protection – measures used to modify buildings, or their surroundings, subject to hazard risk rather than prevent the hazard from occurring. Examples are: Acquisition of vulnerable properties, Relocation from hazard prone areas, Rebuild or modify structures to reduce damage by future hazard events, Flood-proofing of flood-prone buildings.
- Natural Resource Protection – measures intended to reduce the intensity of hazard effects as well as improve the quality of the environment and wildlife habitats. Erosion and sediment control and Wetlands protection are examples.
- Emergency Services – measures that protect people before and after a hazard event. That would include: Warning, Response, Critical facilities protection, Health and safety maintenance.
- Structural Projects – measures that involve construction of man-made structures to control hazards. Some examples would include: dams, reservoirs, debris basins, channel modifications, storm sewers, elevated roadways.
- Public Information – activities intended to inform and remind people about hazardous areas and the measures to avoid potential damage and injury. Examples are: Outreach projects, Real estate disclosure, Technical assistance, Community education programs.

The following suggested Mitigation Measures were taken from the website of the Northeast States Emergency Consortium (NSEC).

10.1.1.1.1.1 ALL HAZARDS

- Map vulnerable areas and distribute information about the hazard mitigation strategy and projects.
- Provide information to contractors and homeowners on the risks of building in hazard-prone areas.
- Develop a list of techniques for homeowner self-inspection and implementation of mitigation activities.

- Organize and conduct professional training opportunities regarding natural hazards and hazard mitigation.
- Distribute NOAA weather radios.
- Develop sound land use planning based on known hazards.
- Enforce effective building codes and local ordinances.
- Increase public awareness of community hazards.
- Provide sites that are as free as possible from risk to natural hazards for commercial and industrial activities.
- Consider conservation of open space by acquisition of repetitive loss structures.
- Consider conservation of open space by acquisition of areas identified as “vulnerable or at risk”
- Ensure a balance between residential growth, conservation of environmental resources through a detailed analysis of the risks and vulnerability to natural hazards.
- Conduct joint planning and sharing of resources across regions, communities, and states.
- Establish a hazard mitigation council.
- For future proposed development design guidelines, incorporate hazard mitigation provisions, including improved maps.
- Consider adding a "safe room" requirement for all new buildings.
- Establish incentives to encourage business owners and homeowners to retrofit buildings with hazard resistant features.
- Teach disaster and hazard awareness in schools.

10.1.1.1.1.2 FLOOD

Flood Hazard Mitigation Measures for Communities:

- Developing and enforcing all-hazards building codes,
- Adopting incentives to encourage mitigation
- Developing administrative structures to support the implementation of mitigation programs
- Mitigation should be incorporated into future land use plans through riparian corridor protection, limiting flood hazard area development, and other measures.
- Developing and conducting public information campaigns on hazard mitigation should be a priority.
- Participate in the National Flood Insurance Program (NFIP).
- Conduct watershed geomorphic assessments.
- Encourage riparian corridor protection.

Flood Hazard Mitigation Measures for Individuals:

How to Protect Your Property:

- Keep insurance policies, documents, and other valuables in a safe-deposit box. You may need quick, easy access to these documents. Keep them in a safe place less likely to be damaged during a flood.
- Avoid building in a floodplain. Some communities do not permit building in known floodplains. If there are no restrictions, and you are building in a floodplain, take precautions, making it less likely your home will be damaged during a flood.
- Raise your furnace, water heater, and electric panel to higher floors or the attic if they are in areas of your home that may be flooded. Raising this equipment will prevent damage. An undamaged water heater may be your best source of fresh water after a flood.
- Install check valves in building sewer traps to prevent flood water from backing up into the drains of your home. As a last resort, when floods threaten, use large corks or stoppers to plug showers, tubs, or basins.
- Seal walls in basements with waterproofing compounds to avoid seepage through cracks.
- Consult with a construction professional for further information if these and other damage reduction measures can be taken. Check local building codes and ordinances for safety requirements.
- Contact your local emergency management office for more information on mitigation options to further reduce potential flood damage. Your local emergency management office may be able to provide additional resources and information on ways to reduce potential damage.

HAZARDOUS MATERIALS

Hazardous Material Hazard Mitigation Measures for Communities:

FEMA's National Mitigation Action Plan suggests that state and local mitigation plans include the following:

- Developing and enforcing all-hazards building codes,
- Adopting incentives to encourage mitigation
- Developing administrative structures to support the implementation of mitigation programs
- Mitigation should be incorporated into land use management plans.
- Developing and conducting public information campaigns on hazard mitigation should be a priority.

Natural hazard events have often triggered technological hazards such as ruptured pipelines and building fires, clearly linking the natural and technological risks. Accordingly, the National

Mitigation Strategy, as an all-hazards strategy, will build upon existing programs that mitigate technological hazards, and focus on the critical importance of coordination among efforts to mitigate hazards, regardless of the source of the risk.

- Recognize the dangers posed by hazardous materials.
- Identify places where hazardous materials are likely to be encountered.
- Understand when a hazard may exist.
- Contact the appropriate persons or agencies to give or receive specific hazardous materials information.
- Identify procedures to minimize personal and community exposure to hazardous materials.

Hazardous materials events can and do occur as independent events. Natural hazard events, however, have often triggered technological hazards such as ruptured pipelines and building fires, clearly linking the natural and technological risks. Accordingly, the National Mitigation Strategy, as an all-hazards strategy, will build upon existing programs that mitigate technological hazards, and focus on the critical importance of coordination among efforts to mitigate hazards, regardless of the source of the risk.

Communities can and should:

- Recognize and identify the dangers posed by hazardous materials in the community.
- Identify industries and other locations places where hazardous materials are stored and used.
- Develop a community hazardous materials emergency plan.
- Develop an early warning and notification system.
- Work with local businesses and industry to identify procedures to minimize personal and community exposure to hazardous materials.

Hazardous Materials Hazard Mitigation Measures for Individuals: Individual and families should develop a personal plan of what to do in case of a hazardous materials accident.

How to Plan for a Hazardous Materials Incident:

- Learn to detect the presence of a hazardous material.
- Many hazardous materials do not have a taste or an odor. Some materials can be detected because they cause physical reactions such as watering eyes or nausea. Some hazardous materials exist beneath the surface of the ground and can be recognized by an oil or foam-like appearance.
- Contact your Local Emergency Planning Committee (LEPC) or local emergency management office for information about hazardous materials and community response plans.
- Find out evacuation plans for your workplace and your children's schools.
- Be ready to evacuate. Plan several evacuation routes out of the area.

- Ask about industry and community warning systems.
- Have disaster supplies on hand.
- Flashlight and extra batteries
- Portable, battery-operated radio and extra batteries
- First aid kit and manual
- Emergency food and water
- Non-electric can opener
- Essential medicines
- Cash and credit cards
- Sturdy shoes
- Develop an emergency communication plan. In case family members are separated from one another during a hazardous materials accident (this is a real possibility during the day when adults are at work and children are at school), develop a plan for reuniting after the disaster. Ask an out-of-state relative or friend to serve as the "family contact." After a disaster, it's often easier to call long distance. Make sure everyone knows the name, address and phone number of the contact person.

STRUCTURE FIRE

Fire Hazard Mitigation Measures for Communities:

FEMA's National Mitigation Action Plan suggests that state and local mitigation plans include the following:

- Developing and enforcing all-hazards building codes,
- Adopting driveway and water supply standards for new development.
- Adopting incentives to encourage mitigation
- Developing administrative structures to support the implementation of mitigation programs
- Mitigation should be incorporated into land use management plans.
- Developing and conducting public information campaigns on hazard mitigation should be a priority.

The United States Fire Administration (USFA) serves as the national focus on reducing fire deaths, injuries, and property losses. In 1974, Congress passed the Federal Fire Prevention and Control Act which established the USFA and the fire research program at the National Institute of Standards and Technology (NIST). The USFA works to involve the public and private sector to reduce losses through public education, arson detection and control, technology and research, fire data collection and analysis and fire service training and education. NIST performs and supports research on all aspects of fire with the aim of providing scientific and technical knowledge applicable to the prevention and control of fires.

Fire Hazard Mitigation Measures for Individuals:

How to Protect Your Property:

- Keep lawns trimmed, leaves raked, and the roof and rain-gutters free from debris such as dead limbs and leaves.
- Stack firewood at least 30 feet away from your home.
- Store flammable materials, liquids and solvents in metal containers outside the home at least 30 feet away from structures and wooden fences.
- Create defensible space by thinning trees and brush within 30 feet around your home.
- Landscape your property with fire resistant plants and vegetation to prevent fire from spreading quickly.
- Post home address signs that are clearly visible from the road.
- Provide emergency vehicle access with properly constructed driveways and roadways, at least 12 feet wide with adequate turnaround space.
- Make sure water sources, such as hydrants and ponds, are accessible to the fire department.
- Burning yard waste is a fire hazard. Check with your local fire agency on a non-emergency number for fire permit requirements and restricted burning times.
- Use fire resistant, protective roofing and materials like stone, brick and metal to protect your home. Avoid using wood materials that offer the least fire protection.
- Cover all exterior vents, attics and eaves with metal mesh screens no larger than 6 millimeters.
- Install multipane windows, tempered safety glass or fireproof shutters to protect large windows from radiant heat.
- Use fire-resistant draperies for added window protection.
- Have chimneys, wood stoves and all home heating systems inspected and cleaned annually by a certified specialist.
- Fire Alarm Safety requires checking on or installing fire alarms in your home.
- Residential sprinklers have become more cost effective for homes. Currently, they protect few homes.

How to Prepare for a Fire Emergency:

- Know how to contact fire emergency services in your area.
- Plan ahead. Make sure you and your family are prepared for a fire emergency.
- Develop and practice escape and evacuation plans with your family.
- Install smoke alarms on every level of your home. Test them monthly and change the batteries at least once a year. Consider installing the new long-life smoke alarms.

WINTER STORM

Winter Storm Hazard Mitigation Measures for Communities:

FEMA's National Mitigation Action Plan suggests that state and local mitigation plans include the following:

- Developing and enforcing all-hazards building codes,
- Adopting incentives to encourage mitigation
- Developing administrative structures to support the implementation of mitigation programs
- Mitigation should be incorporated into land use management plans.
- Developing and conducting public information campaigns on hazard mitigation should be a priority.

In addition, FEMA recommends the following actions to further protect communities from the effects of Winter Storms:

- Building code development and enforcement of snow loads
- Develop a storm water management plan for snowmelt
- Assuring adequate supplies of sand and salt
- Maintaining snow removal equipment so that it is ready to be deployed
- Retrofitting public buildings to withstand snow loads and prevent roof collapse
- Clearing roofs of excessive snow accumulations
- Develop a winter storm pan or annex to the local emergency management plan
- Develop a capability to monitor weather forecasts, conditions and warnings issued by the National Weather Service
- Identify appropriate shelters for people who may need to evacuate due to loss of electricity, heat or coastal flooding due to storm surge
- Assure that critical facilities such as police and fire stations and schools are accessible and equipped
- Clearing streets and roads of snow to assure the passage of public safety vehicles and general traffic.

Winter Storm Hazard Mitigation Measures for Individuals:

How to Protect Your Property:

- Make sure your home is properly insulated. If necessary, insulate walls and attic. This will help you to conserve electricity and reduce your home's power demands for heat. Caulk and weather-strip doors and windowsills to keep cold air out, allowing the inside temperature to stay warmer longer.

- Install storm windows or cover windows with plastic from the inside. This will provide an extra layer of insulation, keeping more cold air out.
- To keep pipes from freezing:
- Wrap pipes in insulation or layers of old newspapers.
- Cover the newspapers with plastic to keep out moisture.
- Let faucets drip a little to avoid freezing.
- Know how to shut off water valves.
- If the pipes freeze, remove any insulation or layers of newspapers and wrap pipes in rags. Completely open all faucets and pour hot water over the pipes, starting where they were most exposed to the cold (or where the cold was most likely to penetrate). A hand-held hair dryer, used with caution to prevent overheating, also works well.
- Consider storing sufficient heating fuel. Regular fuel sources may be cut off. Be cautious of fire hazards when storing any type of fuel.
- Before winter, be sure you install and check smoke alarms.
- Consider keeping safe emergency heating equipment:
- Fireplace with ample supply of wood.
- Small, well-vented wood, coal, or camp stove with fuel.
- Portable space heater or kerosene heater. Check with your local fire department on the legality of using kerosene heaters in your community. Use only the correct fuel for your unit and follow the manufacturer's instructions. Refuel outdoors only, and only when cool. Keep your kerosene heater at least three feet away from furniture and other flammable objects.
- When using alternative heat from a fireplace, wood stove, space heater, etc., use fire safeguards and ventilate properly. Fire hazard is greatly increased in the winter because alternate heating sources are used without following proper safety precautions.
- Install snow fences in rural areas to reduce drifting in roads and paths, which could block access to homes, barns, and animals' feed and water.
- If you live in a flood-prone area, consider purchasing flood insurance to cover possible flood damage that may occur during the spring thaw. Homeowners' policies do not cover damage from floods. Ask your insurance agent about the National Flood Insurance Program if you are at risk.

How to Plan for a Winter Storm:

- Understand the hazards of wind chill, which combines the cooling effect of wind and cold temperatures on exposed skin. As the wind increases, heat is carried away from a person's body at an accelerated rate, driving down the body temperature. "Wind chill" is a calculation of how cold it feels when the effects of wind speed and temperature are combined. A strong wind combined with a temperature of just below freezing can have the same effect as a still air temperature about 35 degrees colder.
- Service snow removal equipment before winter storm season. Equipment should be available for use if needed. Maintain it in good working order.
- Keep your car's gas tank full for emergency use and to keep the fuel line from freezing.

- Get training. Take an American Red Cross first aid course to learn how to treat exposure to the cold, frostbite, and hypothermia.
- Discuss with your family what to do if a winter storm WATCH or WARNING is issued. Designate one household member as the winter storm preparedness leader. Have him or her discuss what to do if a winter storm watch or warning is issued. Have another household member state what he or she would do if caught outside or in a vehicle during a winter storm. Everyone should know what to do in case all family members are not together. Discussing winter storms ahead of time helps reduce fear and lets everyone know how to respond during a winter storm.

HIGH WINDS

High Wind Hazard Mitigation Measures for Communities:

FEMA's National Mitigation Action Plan suggests that state and local mitigation plans include the following:

- Developing and enforcing all-hazards building codes,
- Adopting incentives to encourage mitigation
- Developing administrative structures to support the implementation of mitigation programs
- Mitigation should be incorporated into land use management plans.
- Developing and conducting public information campaigns on hazard mitigation should be a priority.

FEMA also suggests that communities further reduce their vulnerability to hurricanes through the adoption and enforcement of wind- and flood-resistant building codes. Sound land-use planning can also ensure that structures are not built in the highest hazard areas.

High Wind Hazard Mitigation Measures for Individuals:

- Make a list of items to bring inside in the event of a storm. A list will help you remember anything that can be broken or picked up by strong winds. High winds, often in excess of 40 miles per hour, can turn unanchored items into missiles, causing damage or injury when they hit.
- Keep trees and shrubbery trimmed. Make trees more wind resistant by removing diseased or damaged limbs, then strategically remove branches so that wind can blow through. High winds frequently break weak limbs and hurl them at great speed, causing

damage when they hit property. Debris collection services may not be operating just before a storm, so it is best to do this well in advance of approaching storms.

- Remove any debris or loose items in your yard. High winds can pick up anything unsecured, creating damage to property when the debris hits.
- Install protection to the outside areas of sliding glass doors. Glass doors are as vulnerable as windows to breakage by wind-driven objects.
- If you live in a flood plain or are prone to flooding, also follow flood preparedness precautions. Nor'easters and severe thunderstorms can bring great amounts of rain and frequently cause floods.

EARTHQUAKE

Earthquake Hazard Mitigation Measures for Communities:

FEMA's National Mitigation Action Plan suggests that state and local mitigation plans include the following:

- Developing and enforcing all-hazards building codes,
- Adopting incentives to encourage mitigation
- Developing administrative structures to support the implementation of mitigation programs
- Mitigation should be incorporated into land use management plans.
- Developing and conducting public information campaigns on hazard mitigation should be a priority.

FEMA's Earthquake Program has four basic goals directly related to the mitigation of hazards caused by earthquakes. They are to:

- Promote Understanding of Earthquakes and Their Effects.
- Work to Better Identify Earthquake Risk.
- Improve Earthquake-Resistant Design and Construction Techniques.
- Encourage the use of Earthquake-Safe Policies and Planning Practices.

Earthquake Hazard Mitigation Measures for Individuals

How to Protect Your Property:

- Bolt bookcases, china cabinets, and other tall furniture to wall studs. Brace or anchor high or top-heavy objects. During an earthquake, these items can fall over, causing damage or injury.

- Secure items that might fall (televisions, books, computers, etc.). Falling items can cause damage or injury.
- Install strong latches or bolts on cabinets. The contents of cabinets can shift during the shaking of an earthquake. Latches will prevent cabinets from flying open and contents from falling out.
- Move large or heavy objects and fragile items (glass or china) to lower shelves. There will be less damage and less chance of injury if these items are on lower shelves.
- Store breakable items such as bottled foods, glass, and china in low, closed cabinets with latches. Latches will help keep contents of cabinets inside.
- Store weed killers, pesticides, and flammable products securely in closed cabinets with latches, on bottom shelves. Chemical products will be less likely to create hazardous situations from lower, confined locations.
- Hang heavy items, such as pictures and mirrors, away from beds, couches, and anywhere people sit. Earthquakes can knock things off walls, causing damage or injury.
- Brace overhead light fixtures. During earthquakes, overhead light fixtures are the most common items to fall, causing damage or injury.
- Strap the water heater to wall studs. The water heater may be your best source of drinkable water following an earthquake. Protect it from damage and leaks.
- Bolt down any gas appliances. After an earthquake, broken gas lines frequently create fire hazards.
- Install flexible pipe fittings to avoid gas or water leaks. Flexible fittings will be less likely to break.
- Repair any deep cracks in ceilings or foundations. Get expert advice if there are signs of structural defects. Earthquakes can turn cracks into ruptures and make smaller problems bigger.
- Check to see if your house is bolted to its foundation. Homes bolted to their foundations are less likely to be severely damaged during earthquakes. Homes that are not bolted have been known to slide off their foundations, and many have been destroyed because they are uninhabitable.
- Consider having your building evaluated by a professional structural design engineer. Ask about home repair and strengthening tips for exterior features, such as porches, front and back decks, sliding glass doors, canopies, carports, and garage doors. Learn about additional ways you can protect your home. A professional can give you advice on how to reduce potential damage.
- Follow local seismic building standards and safe land use codes that regulate land use along fault lines. Some municipalities, counties, and states have enacted codes and standards to protect property and occupants. Learn about your area's codes before construction.

How to Plan for an Earthquake:

- Pick "safe places" in each room of your home. A safe place could be under a sturdy table or desk or against an interior wall away from windows, bookcases, or tall furniture that could fall on you. The shorter the distance to move to safety, the less likely you will be

injured. Injury statistics show that persons moving more than 10 feet during an earthquake's shaking are most likely to experience injury.

- Practice drop, cover, and hold-on in each safe place. Drop under a sturdy desk or table, hold on, and protect your eyes by pressing your face against your arm. Practicing will make these actions an automatic response. When an earthquake or other disaster occurs, many people hesitate, trying to remember what they are supposed to do. Responding quickly and automatically may help protect you from injury.
- Practice drop, cover, and hold-on at least twice a year. Frequent practice will help reinforce safe behavior.
- Talk with your insurance agent. Different areas have different requirements for earthquake protection. Study locations of active faults, and if you are at risk, consider purchasing earthquake insurance.
- Inform guests, babysitters, and caregivers of your plan. Everyone in your home should know what to do if an earthquake occurs. Assure yourself that others will respond properly even if you are not at home during the earthquake.
- Get training. Take a first aid class from your local Red Cross chapter. Get training on how to use a fire extinguisher from your local fire department. Keep your training current. Training will help you to keep calm and know what to do when an earthquake occurs.
- Discuss earthquakes with your family. Everyone should know what to do in case all family members are not together. Discussing earthquakes ahead of time helps reduce fear and anxiety and lets everyone know how to respond.

11. Annex D – External Mitigation Project Funding Opportunities

Federal

FEMA

- **Pre-Disaster Mitigation Program.** FEMA's Pre-Disaster Mitigation Competitive (PDM-C) Grant Program provides funds to states, territories, and federally recognized tribes for pre-disaster mitigation activities. The grant program is administered by FEMA for pre-disaster mitigation planning and projects primarily addressing natural hazards. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations.

- **Hazard Mitigation Grant Program.** The Hazard Mitigation Grant Program (Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act) is activated during Presidential Disaster Declarations to assist in identifying mitigation projects, and funding these projects on a 75% Federal/25% non-Federal cost share basis. Mitigation program funding is based on 15% of the federal funds expended for the Infrastructure and Individual Assistance Programs. The HMGP supports other program activities, i.e. participation the NFIP and a current Hazard Mitigation Plan are required for recipients of HMGP funds.

- **Section 406 Hazard Mitigation.** Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act provides funding to mitigate certain projects as they are being repaired as part of overall disaster assistance to a community. Under Section 406, if it can be shown to be cost effective to mitigate a Public Assistance eligible project as part of the repair, FEMA may fund the mitigation as part of the overall project cost.

- **National Flood Insurance Program (NFIP).** The National Flood Insurance Program (NFIP) makes federally subsidized flood insurance available to property owners in locations agreeing to participate in the NFIP. If communities enter the NFIP, they are required to adopt floodplain ordinances meeting criteria established by FEMA. These criteria include: requiring permits for development within designated floodplains; review development plans and subdivision proposals to determine whether proposed sites will be reasonably safe from flooding; require protection of water supply and sewage systems to minimize infiltration of floodwater; obtain, review, and utilize all base flood elevation data; and assure the maintenance of flood carrying capacities within all watercourses.

- **The Community Rating System.** An element of the NFIP, is designed to promote the availability of flood insurance, reduce future flood damages, and ensure the accurate rating of flood insurance policies. Participating communities may receive credit for proven mitigation measures, thus reducing the cost of flood insurance within their jurisdictions.

- **The Infrastructure Program (Section 406 of the Stafford Act).** Authorizes funding for the repair, restoration, or replacement of damaged facilities belonging to public and private non-profit entities, and for other associated expenses, including emergency protective measures and debris removal. The Infrastructure Program also authorizes funding for appropriate cost-effective hazard mitigation related to damaged public facilities.

- **The National Inventory of Dams (US Army Corps of Engineers project).** Identifies high-hazard dams and encourages the development of warning systems and emergency plans for many of these facilities.

- **Hazardous Materials Program.** FEMA's mission under this program is to provide technical and financial assistance to States and local jurisdictions and to coordinate with public and private sector entities to develop, implement, and evaluate HAZMAT emergency preparedness programs. FEMA supports State and local agencies in the design, implementation, and evaluation of HAZMAT- related training and planning exercises, and cooperates with the U.S. Department of Transportation in the maintenance of electronic bulletin boards to provide the latest information on HAZMAT planning, training, exercises, and conferences.

- **US Fire Administration (USFA).** Through the USFA, FEMA administers a nationwide program to enhance fire prevention and control activities and to reduce significantly the loss of life and property caused by fires. Programs are carried out by: National Fire Academy; Office of Fire Prevention and Arson Control; Office of Firefighter Health and Safety; Office of Fire Data and Analysis; Office of Federal Fire Policy and Coordination; Office of National Emergency Training Center Operations and Support, and Office of Educational Technology.

- **Flood Mitigation Assistance (FMA).** The Flood Mitigation Assistance (FMA) program provides funds for projects to reduce or eliminate risk of flood damage to buildings that are insured under the (NFIP) on an annual basis.

  There are three types of FMA grants available to Applicants:
  - Planning Grants - *to prepare flood mitigation plans*
  - Project Grants - *to implement measures to reduce flood losses, such as elevation, acquisition or relocation of NFIP-insured structures*
  - Management Cost Grants - *for the grantee to help administer the FMA program and activities*

The Emergency Planning and Community Right-to-Know Act of 1986 imposed upon state and local governments planning and preparedness requirements for emergencies involving the release of hazardous materials. The role of the federal government in response to an emergency involving the release of hazardous materials is to support local and state emergency operations. Activation of the federal Regional Response Team (RRT) provides access to federal resources not available at the state and local levels. An on-scene coordinator is designated to manage federal resources and support. The national warning and communications center for emergencies

involving the release of hazardous materials is manned 24 hours a day, and is located at the U.S. Coast Guard headquarters in Washington, D.C.

The National Weather Service provides meteorological and hydrologic services that include weather and hydrologic warnings, forecasts, and related information. The primary mission of the NWS is to save lives and reduce property damage through timely issuances of tornado and flood warnings and river stage forecasts. To cope with dangerous weather, the NWS interacts with emergency services personnel throughout the state by: issuance of tornado and flash flood watches or warnings for those areas in which a threat is posed; issuance of flood watches and warnings for major streams and rivers within the state. Addison County is within the coverage area of the NWS office in Burlington but also may receive information from the Albany, NY office.

The U.S. Army Corps of Engineers undertake a broad range of civil works projects to develop, manage, and conserve the nation's water resources. No work may be undertaken without authorization and funding from Congress, either from specific legislation or continuing authorities. Projects are planned to serve as many purposes as are feasible and to protect or improve the environment as much as possible. The Corps is involved in developing and implementing plans for flood control, navigation, hydropower, recreation, and water supply. The Corps has authority for emergency operations, bank protection, permit administration, and technical assistance. Corps of Engineers assistance includes:

- Studies and Projects
- Discretionary Authority to implement certain types of water resources projects without specific Congressional approval. These projects are typically limited in cost and duration, and include:

    - Section 14 - Emergency Stream bank Protection of Public Facilities, limitation of $500,000 per project.
    - Section 107 - Small Navigation Projects, usually for port facilities and navigation channels. Work on channels usually improves stream flow and aids flood control efforts.
    - Section 205 - Small Flood Control Projects, not to exceed $5 million. Funds may be used for projects such as upgrading flood protection structures and channelization of streams.
    - Floodplain Technical Assistance, to include:
        - Conducting floodplain mapping surveys to provide either first-time mapping of an area or to correct older floodplain maps;
        - Conducting flood studies in cooperation with FEMA to determine actual flood levels for settlement of flood insurance claims;
        - Providing technical advice regarding proposed floodplain ordinances and building codes.
- Emergency operations to respond to flood emergencies, to include flood fighting, constructing advance temporary measures in anticipation of imminent flood, and the repair of damaged flood control works after the flood event.
- Permit authority, the Corps has the authority to issue Permits to cover construction excavation and other related work in or over navigable waterways;

and Permits covering the discharge of fill material in all waters of the United States and adjacent wetlands.

Department of Housing and Urban Development

- Community Development Block Grant Program. Funds are provided as grants to units of local government. Local governments can use the funds to: construct flood and drainage facilities; finance rehabilitation projects that include flood proofing, elevation, purchase of flood insurance, etc.; finance acquisition and relocation of homes to remove them from the floodplains.
- Rental Rehabilitation Program. Funds to rehabilitate rental properties can be used for flood proofing and repair to flood damage.
- Section 312 Loan Program. Provides funds to rehabilitate both residential and non-residential properties, including flood repair and flood proofing.

Department of Agriculture Natural Resource Conservation Service (NRCS) can provide technical assistance in the conservation, development, and productive use of water resources. In addition, the NRCS monitors use of prime farmland.

- Watershed Protection and Flood Prevention. Technical and financial assistance to local entities to plan and install works of improvement for watershed protection, flood prevention, agricultural water management, and other approved purposes.
- Resource Conservation and Development. Technical and financial assistance to local entities to plan and install works of improvement for watershed protection, flood prevention, agricultural water management, and other approved purposes.
- Emergency Watershed Protection. Provides assistance to reduce hazards to life and property in watersheds damaged by severe natural events. NRCS can provide 100% of the cost of exigency situations, and 80% of the cost for non-exigency situations, if funds are available.
- Conservation Technical Assistance. Provided to land users to control erosion, sediment, and to reduce upstream flooding.
- River Basin Surveys and Investigations. Includes Conservation River Basin Studies to assist in solving existing problems or meeting existing or projected needs, and Floodplain Management Studies to provide information and assistance for reducing future flood damages. Financial assistance is provided by sponsors.

U.S. Geological Survey (USGS) provides certain hazard studies and recommendations. A portion of the mission of the USGS is to collect and analyze data on the quantity of surface water through a network of gauging stations. The data is used in preparing flood frequency reports to evaluate the severity of floods. This data is useful in flood hazard mitigation studies, establishing flood prone areas, and potential flood heights near hydraulic structures.

Economic Development Administration was established to generate new jobs, to help protect existing jobs, and to stimulate commercial and industrial growth in economically distressed areas of the United States.

Small Business Administration (SBA) Disaster Assistance Programs provide loans to businesses and individuals affected by presidential and SBA disaster declarations. The program provides direct loans to businesses to repair or replace uninsured disaster damage to property owned by the business, including real estate, machinery, and equipment, inventory and supplies. Businesses of any size are eligible. Non-profit organizations are also eligible. Assistance to individuals comes in the form of low-interest loans for repair or replacing damaged real and personal property. The SBA administers the Disaster Assistance Programs.

State

Agency of Administration

- **Emergency Relief and Assistance Fund (ERAF)** The ERAF was created following disastrous flooding in 1998 and was created so that the State of Vermont would have funding to assist municipalities in covering the 25% local share following a federally declared disaster. Communities who are active in mitigation efforts (including current hazard mitigation plans, adopted codes and standards, membership in the NFIP and others) are rewarded with a higher level of state funded reimbursement.

VTrans

- **Town Highway Grants Program**. State aid grants for highways are made annually to the governing body based on the number of Class 1,2 or 3 miles in the Municipality. The General Assembly appropriates a lump sum annually for this purpose (19 V.S.A. Section 306(a)). Distribution is made quarterly, with no application required. There is no requirement that State funds be matched with local funds, other than a requirement that municipalities expend no less than $300 per mile of local tax revenues of their highways (19 V.S.A. Section 307).

- **Town Highway Bridge Program**. State assistance for major rehabilitation or reconstruction of bridges with a span of six feet or more on class 1, 2 or 3 town highways is made available by the Secretary of Transportation from annual appropriations for that purpose (19 V.S.A. Section 306(b)). State assistance amounts are not limited for any one project. The State assistance requires 10 percent participation or match of total project cost with town funds for replacement projects and 5% for rehabilitation projects. The local match is capped at the amount raised by a municipal tax rate of $0.50 on the Grand List (19 V.S.A. Section 309(a)).

- **Town Highway Structures Program.** State grants for bridges, culverts and retaining walls that are part of the municipalities highway (Class 1, 2 or 3) infrastructure are made by the Secretary of Transportation from annual appropriations for the purpose. State grant amounts are limited to $150,000 for any one project. State funds are required to be matched, as follows:
    - By at least 20% of the total project cost, or
    - By at least 10% of the total project cost providing that town has adopted Town Highway codes and standards and the town has conducted a highway infrastructure study (not less than three years old), which identifies all town culverts, bridges and identified road problems.

- **Town Highway Class 2 Roadway Program.** State grants to provide for the preservation of any Class 2 highways by providing grants for resurfacing or reconstruction are made by the Secretary of Transportation or his/her designee from annual appropriations for that purpose. State grants are limited to $150,000 for any one project and there are match requirements for the town similar to the Town Highway Structures Program.

- **Town Road & Bridge Standards.** As a result of legislative action relating to the Town Aid programs an incentive program was created providing additional funding to towns meeting two requirements:
    - Adopted codes and standards.
    - Conducted a network infrastructure study.

Agency of Natural Resources

- Ecosystem Restoration Grant Program. As part of a governor's initiative to improve water quality in Lake Champlain, Funds have been allocated to assist in clean-up. Funds from this source have paid for a large portion of recent geomorphic studies in the Addison region as well as supporting the development of Fluvial Erosion Hazard Zones. Additionally, funds have been allocated to purchase development rights in hazardous locations.

Department of Public Safety, Division of Emergency Management

- Local Emergency Management Director Program. A continuing program of training for local emergency management directors to provide a consistent base of knowledge to understand their roles and responsibilities in Emergency Management.

- Generator Grant Program. VEM allocates funds from FEMA EMPG to allow towns to purchase back-up power sources for emergency shelters for continued use in the event of a power failure.

Regional

The Addison County Regional Planning Commission (ACRPC) provides assistance to local governments concerning planning for future land use, business, transportation, emergency management and population.

In addition to the specific programs mentioned below, ACRPC has identified Municipal Development Plans and Capital Improvement Plans as appropriate local planning mechanisms suitable for incorporating many of the provisions of this plan. These plans, by statute, need to be updated on an 8-year rotation. In Addison County, each municipality adopts these new or updated plans according to their own timetable and therefore, each is at a different place in the planning and adoption process. At the time of each rewrite, ACRPC generally assists local planning commissions and will encourage inclusion of appropriate provisions of this plan into any new document.

ACRPC annually sets aside funds from its transportation planning activities to be administered by the Transportation Advisory Committee (TAC). Proposals are entertained each year to fund planning projects for transportation projects. One effective ongoing program is a local culvert survey and upgrade program, which funds

updates of culvert surveys for 2-3 towns annually. TAC grants have funded several mitigation studies in the past including:

- Route 125 relocation study
- Bakers Bridge mitigation study

ACRPC assists community mitigation projects and planning through utilization of:

- FEMA PDM-C planning grants
- FEMA HMGP planning grants
- FEMA HMGP project grants
- Federal Emergency Planning Grants

12. Annex E Local Plan Review Tool Self-Assessment

13. Jurisdiction: 14. Town of Starksboro, VT	**Title of Plan:** Town of Starksboro, Vermont Single Jurisdiction All-Hazards Mitigation Plan	**Date of Plan:** 10/15/18

Single or Multi-jurisdiction plan? SINGLE JURISDICTION	**New Plan or Plan Update?** NEW PLAN
Regional Point of Contact: Andrew L'Roe Planner, Addison County Regional Planning Commission (802) 388-3141 alroe@acrpc.org	**Local Point of Contact:** Cheryl Estey Town Clerk/Treasurer, Town of Starksboro (802) 453-2639 starksboro@madriver.com

State Reviewer: Stephanie A. Smith	**Title:** Hazard Mitigation Planner	**Date:** 1/23/18; 3/29/18; 7/19/18; 9/11/18; 10/16/18

FEMA Reviewer: Gabriella Spitzer Marie-Annette (Nan) Johnson	**Title:** CERC Region I Community Planner	**Date:** 9/28/2018 10/4/2018, 10/22/18
Date Received in FEMA Region I	9/11/2018, Resubmitted 10/16/18	
Plan Not Approved	Returned for Required Revisions – 10/5/2018	
Plan Approvable Pending Adoption	YES – 10/22/18	
Plan Approved		

SECTION 1:

REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan** **(section and/or**	**Met**	**Not Met**
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Sec. 1, pp. 3-5; Sec. 9, pp. 62-69	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Sec. 1, pp. 3-5	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Sec. 1, pp. 3-5	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Sec. 1, pp. 4-5	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Sec. 6, pp. 57-58	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Sec. 6, pp. 57-58	X	
ELEMENT A: REQUIRED REVISIONS			

1. REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Sec. 4, pp. 19-44	X	
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Sec. 4, pp. 19-44	X	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Sec. 4, pp. 19-44	X	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Sec. 2, p. 9	X	
ELEMENT B: REQUIRED REVISIONS			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Sec. 2, pp. 7-9; Sec. 3, pp. 15-17; Sec. 5, pp. 46-49	X	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Sec. 2, pp. 8-9	X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Sec. 5, p. 45	X	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Sec. 5, pp. 50-56; Sec. 10, pp. 70-	X	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Sec. 5, pp. 50-56	X	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Sec. 6, pp. 57-58	X	
ELEMENT C: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Not applicable		
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Not applicable		
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Not applicable		
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Sec. 7, p. 59		
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))			
ELEMENT E: REQUIRED REVISIONS			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			

Acknowledgements:

The creation of this plan is the result of many, many efforts to create hazard mitigation plans for communities in the State of Vermont. We have borrowed liberally from other adopted plans from throughout the state sometimes basic concepts and design, and at other times duplication of wording and illustrations.

ACRPC wants to thank specifically all other Regional Planning Commissions and their collective staff for the collaborative efforts that have resulted in this and many other plans statewide. Additional thanks for many of the same reasons need to go out to all the state agencies that are equally committed to mitigating the risks we face in Vermont.

Special thanks to the State of Vermont's Division of Emergency Management and Homeland Security and especially Lauren Oats the State Hazard Mitigation Officer (SHMO) and Stephanie Smith in the mitigation division.

Lastly, thanks to the volunteers from the Town of Starksboro who have spent countless hours living and working with these hazards.

Thank you for caring enough about your community to spend even more hours to bring that collective experience into this document.

Thank you to:

Tony Porter -	Starksboro Selectboard
Tom Estey -	Starksboro Road Foreman and Fire Chief
Cheryl Estey -	Starksboro Town Clerk
Charlene Phelps -	Starksboro Emergency Manager
Dennis Casey -	Starksboro Planning Commission Chair
Jeff Keeney -	Starksboro Planning Commission
David Wetmore -	Starksboro Zoning Administrator

U.S. Department of Homeland Security
FEMA Region I
99 High Street, Sixth Floor
Boston, MA 02110-2132

FEMA

JAN 07 2019

Lauren Oates
State Hazard Mitigation Officer
Vermont Emergency Management
45 State Drive
Waterbury, Vermont 05671-1300

Dear Ms. Oates:

We would like to acknowledge the Town of Starksboro and the State of Vermont for their dedication and commitment to mitigation planning. The Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) Region I Mitigation Planning Team has completed its review of the Town of Starksboro, Vermont Single Jurisdiction All-Hazards Mitigation Plan and determined it meets the requirements of 44 C.F.R. Pt. 201.

With this plan approval, the Town of Starksboro is eligible to apply to Vermont Emergency Management Agency for mitigation grants administered by FEMA. Requests for mitigation funding will be evaluated individually according to the specific eligibility requirements identified for each of these programs. A specific mitigation activity or project identified in your community's plan may not meet the eligibility requirements for FEMA funding; even eligible mitigation activities or projects are not automatically approved.

Approved mitigation plans are eligible for points under the National Flood Insurance Program's Community Rating System (CRS). Complete information regarding the CRS can be found at http://www.fema.gov/national-flood-insurance-program-community-rating-system, or through your local floodplain administrator.

The Town of Starksboro, Vermont Single Jurisdiction All-Hazards Mitigation Plan must be reviewed, revised as appropriate, and resubmitted to FEMA for approval within **five years of the plan approval date of November 2, 2018** in order to maintain eligibility for mitigation grant funding. We encourage the Town to continually update the plan's assessment of vulnerability, adhere to its maintenance schedule, and implement, when possible, the mitigation actions proposed in the plan.

JAN 0 7 2019

Thank you for your continued dedication to public service demonstrated by preparing and adopting a strategy for reducing future disaster losses. Should you have any questions, please contact Melissa Surette at (617) 956-7559 or Melissa.Surette@fema.dhs.gov.

Sincerely,

Paul F. Ford
Acting Regional Administrator

PFF: ms

cc: Ben Rose, Recovery and Mitigation Section Chief, VEM
Stephanie Smith, Hazard Mitigation Planner, VEM