

HAZARD MITIGATION PLAN

Greenfield, New Hampshire

2007



Prepared by the:

Town of Greenfield Hazard Mitigation Committee

&

Southwest Region Planning Commission

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Executive Summary

The Greenfield Hazard Mitigation Plan serves as a means to reduce future losses from natural or man-made hazard events before they occur. The Plan was developed by the Greenfield Hazard Mitigation Committee and contains statements of policy adopted by the Board of Selectmen.

Hazards are addressed as follows:

- Flooding
- Wind (Downburst, Tornado & Hurricane)
- Wildfire
- Tornadoes
- Severe Winter Weather/Icing
- Subsidence
- Radon (Air/Water)
- Drought
- Extreme Heat
- Earthquakes
- Lightning
- Snow Avalanches
- Severe Wind
- Man-Made (Hazardous Materials/Dam Breach)

The Greenfield Hazard Mitigation Committee identified critical facilities and potential hazard areas as follows:

Critical Facilities

- Emergency Response Facilities and Services
- Non-Emergency Response Facilities
- Facilities/Populations to Protect
- Potential Resources

Potential Hazard Areas

- New Boston Rd
- Dunklee Rd
- Minor Rd
- Holden Rd
- Gulf Rd
- Russell Station Rd
- Lyndeborough Rd

- Cornwall Rd
- Swamp Rd
- Otter Lake Ln
- Crotched Mountain
- Greenfield State Park
- NH 31, 136, other town roads
- Many hazards- townwide

The Greenfield Hazard Mitigation Committee identified existing hazard mitigation programs in various stages of development:

- School Evacuation Plan
- Building Codes
- Local Road and Driveway Design Standards
- Emergency Snow Removal Policy
- Town Master Plan
- Mutual Aid
- Fire Pond/Dry Hydrant Management Plan
- Town Warning System Erosion and Sedimentation Plan
- Shoreland Protection Act
- Wetlands Protection
- Health Officer
- Floodplain Development Ordinance
- Steep Slopes Protection
- Emergency Management Plan
- EMS Week
- Hazard Materials Spill procedure
- Pandemic Plan
- Training for fire fighters
- Fire Prevention Program
- Town Radio System
- Fire Inspector

Prioritized Hazard Mitigation Strategies

Rank

Mitigation Strategy

- | | |
|---|--------------------------------------------------------------------------------------------------------------------------------|
| 1 | Informational pamphlets for severe weather |
| 1 | Wetlands protection regulations- revisit them to see if changes are necessary |
| 1 | Private culvert maintenance education program |
| 1 | Campfire education |
| 1 | Classification sign at the fire station |
| 1 | Have ample supplies and continue operation-level training of fire and police departments |
| 2 | All flooding hazard mitigation strategies (raise road, replace culvert, rip rap, etc at different locations specified in plan) |
| 3 | Develop emergency warning system for Townwide notification |
| 3 | Recommend to the planning board to consider requiring underground utilities for subdivisions or site plans |
| 4 | Beaver population control and monitoring plan |
| 4 | Open roads to sunlight to prevent icing in E/W directions |
| 4 | Slash monitoring to prevent fires |

CHAPTER I: INTRODUCTION

Background

As a result of the Disaster Mitigation Act of 2000, the Federal Emergency Management Agency (FEMA) mandated that all communities within New Hampshire establish local hazard mitigation plans as a means to reduce future losses from natural or man-made hazard events before they occur. In response to this mandate, the NH Bureau of Emergency Management (BEM) contracted the Southwest Region Planning Commission (SWRPC) to develop a program that would achieve this goal. SWRPC prepared a hazard mitigation planning handbook to be used by local communities as a guide in the preparation of hazard mitigation plans. SWRPC then facilitated two hazard mitigation planning processes with selected communities as pilot projects. The resulting plans laid the foundation in an effort to enable all New Hampshire Regional Planning Commissions, through education outreach, the capability to assist their local communities, such as the Town of Greenfield, in the preparation of local hazard mitigation plans.

What is Hazard Mitigation?

| |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>“Hazard Mitigation means any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards” (44 CFR 206.401).</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|

Authority

This Hazard Mitigation Plan was prepared under the authority of the planning requirements of Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000), Public Law 106-390, which amended the Robert T. Stafford Act of 1988.

Funding Source

This Plan was funded by the NH Bureau of Emergency Management, with grants from the Predisaster Mitigation Competitive Grant Program, as well as from funds appropriated by the Town of Greenfield.

Purpose

The Greenfield Hazard Mitigation Plan is a planning tool to be used by the Town of Greenfield, as well as other local, state and federal governments, in their efforts to reduce the effects from natural and man-made hazards. This plan does not constitute any sections of Greenfield’s Master Plan or Town Ordinances.

Scope of the Plan

The scope of this Plan includes the identification of past and potential natural and manmade hazards affecting the Town of Greenfield, the determination of vulnerability of existing and future structures to the identified potential hazards, and the identification and discussion of new strategies aimed at mitigating the likely effects of potential hazards before they occur.

Methodology

Using the Guide to Hazard Mitigation Planning for New Hampshire Communities handbook, written by the Southwest Region Planning Commission, the Greenfield Hazard Mitigation Committee developed the content of the Plan by following the ten step process set forth in the handbook and summarized below.

Step 1: Establish a Hazard Mitigation Planning Committee

The Emergency Management Director (EMD) contacted town officials and residents who might wish to volunteer their time and serve on a committee.

Step 2: Identification Critical Facilities

The Committee identified all of the critical facilities within the Town. These were identified using four categories: Category 1 - Emergency Response Facilities & Services; Category 2 - Non Emergency Response Facilities; Category 3 - Facilities/Populations to Protect; and Category 4 - Potential Resources. The list of Critical Facilities is found in Chapter V, "Critical Facilities."

Step 3: Identification of Past and Potential Hazards

The Committee members identified the following hazards that could or have affected the Town of Greenfield and the locations of these past and/or potential events:

| | | |
|--------------------------|-------------------------------|-----------------------------------|
| Flooding | Tornado | Hazardous Materials Spills |
| Drought | Hurricanes | Snow Avalanche |
| Extreme Heat | Earthquakes | Subsidence |
| Wildfire | Severe Wind/Downburst | Radon |
| Lightning Strikes | Extreme Winter Weather | Dams |

The table in Chapter III contains information about all the past and potential hazards. The Hazard Mitigation Map and the end of the Plan shows the locations of all past and potential hazards and critical facilities.

Step 4: Analyze Land Use and Development Trends

The Committee was asked to determine where future development would most likely take place in town. The information was compared to other documents such as Town Reports and the Town Master Plan. Chapter II, "Community Profile," shares this information. Future development areas are also shown on the map at the end of the plan.

Step 5: Risk Assessment

The Committee members completed a Risk Assessment for all of the types hazards identified in Step 3 in order to assess probability, severity and risk. Potential human impact, property impact and business impact for each hazard type were determined in addition to the likelihood of the hazard occurring within the next 25 years. Severity and risk were then calculated.

Step 6: Identifying What Mitigation Actions are already in Place

The Committee identified plans and policies that are already in place to reduce the effects of hazards. The Committee evaluated the effectiveness of the existing measures to identify where they can be improved. The results are found in Chapter VII, "Existing Mitigation Strategies." The Committee also identified programs in place that would not be categorized as mitigation strategies.

Step 7: Identify the Gaps in Protection

For each general hazard type or specific potential hazard location identified in Step 3, the Committee identified possible mitigation actions not currently in place. Each was identified in one of the following

categories: Preventative (Programs & Policies); Property Protection; Structural; Emergency Services; and/or Public Education & Information.

Step 8: Prioritizing Proposed Mitigation Actions

The Committee ranked the proposed mitigation actions developed in Step 7 using the STAPLEE method which analyzes the Social, Technical, Administrative, Political, Legal, Economic and Environmental aspects of each project.

Step 9: Develop an Implementation Plan

Using the prioritized list of mitigation actions identified in Step 8, the Committee developed a clear strategy that outlines who is responsible for implementing each project, as well as when and how the actions will be implemented.

Step 10: Adopt and Monitor the Plan

The Committee members reviewed and approved each section of the plan as it was completed. After acceptance by the Committee, the Plan was submitted to the New Hampshire Bureau of Emergency Management for initial review, and then forwarded to FEMA, for formal approval. Once approved, the Plan was formally adopted by the Board of Selectmen. It is important to the Town of Greenfield that this plan be monitored and updated annually or after a Presidentially declared disaster. Chapter X addresses this issue.

Committee Meetings

The Committee held monthly meetings, open to the public including area business owners, schools, organizations and communities from April 10, 2007 through July 10, 2007 in order to develop the Plan. On _____ the Greenfield Board of Selectmen held a public hearing and adopted the Plan. The following are dates of Committee meetings.

Public Committee Meetings:

Working committee meetings held at Greenfield Town Offices from 3:30-5:30pm on the following dates: April 10, 2007, May 8, 2007, June 12, 2007, July 10, 2007. A mailing was made to each committee member, prior to each meeting that contained information from the previous meeting, an agenda (Appendix H), and information to be covered.

Public Meetings with the Board of Selectmen:

_____: The Board of Selectmen adopted the Local Hazard Mitigation Plan. Public hearing held at Greenfield Town Offices.

Acknowledgements

The Greenfield Board of Selectmen extends special thanks to the Greenfield Hazard Mitigation Committee:

- Karen Day, Selectwoman
- Peter Hopkins, Emergency Management Director/Code Enforcement Officer
- Dario Carrara, Planning Board
- James Plourde, Fire Chief
- Brian Giammarino, Police Chief
- Wyatt Fox, Road Agent

The Greenfield Board of Selectmen offers thanks to the New Hampshire Bureau of Emergency Management for developing the State of New Hampshire Natural Hazards Mitigation Plan (2000, 2004) which served as a model for this plan. In addition, special thanks are extended to the staff of the Southwest Region Planning Commission for professional services, process facilitation and preparation of this document.

Hazard Mitigation Goals

The Hazard Mitigation Goals of the Town of Greenfield are:

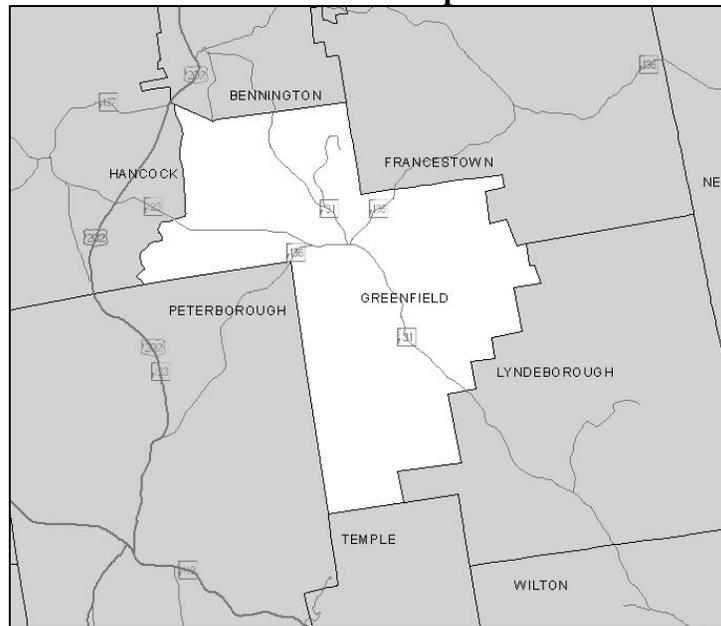
1. To improve upon the protection of the general population, the citizens of the Town of Greenfield and guests, from all natural and man-made hazards.
2. To reduce the potential impact of natural and man-made disasters on the Town of Greenfield's Emergency Response Services.
3. To reduce the potential impact of natural and man-made disasters on the Critical Facilities in the Town of Greenfield.
4. To reduce the potential impact of natural and man-made disasters on the Town of Greenfield's infrastructure.
5. To improve the Town of Greenfield's Emergency Preparedness and Disaster Response and Recovery Capability.
6. To reduce the potential impact of natural and man-made disasters on private property in the Town of Greenfield.
7. To reduce the potential impact of natural and man-made disasters on the Town of Greenfield's economy.
8. To reduce the potential impact of natural and man-made disasters on the Town of Greenfield's natural environment.
9. To reduce the potential impact of natural and man-made disasters on the Town of Greenfield's specific historic treasures.
10. To identify, introduce and implement cost-effective Hazard Mitigation measures so as to accomplish the Town's Goals and Objectives and to raise the awareness of and acceptance of Hazard Mitigation opportunities generally.
11. The Town of Greenfield will work in conjunction and cooperation with the State of New Hampshire's Hazard Mitigation Goals.

CHAPTER II: COMMUNITY PROFILE

Town Overview

The Town of Greenfield is located in southwestern Hillsborough County, in Southwest New Hampshire. Greenfield is bounded on the north side by Francestown and Bennington, easterly by Lyndeborough, southerly by Temple and westerly by Peterborough and Hancock.

Location Map



The Town of Greenfield has a land area of approximately 26.2 square miles, or 16,778 acres. Surface water and aquifers account for approximately 350 of this total area. Greenfield's most significant watercourse is the Contoocook River, which forms the Town's border with Hancock, and therefore shares the river. In addition, there is Otter Brook that runs south and east from Otter Lake into Zephyr Lake. Rand Brook runs east to west between Francestown and East Road, crossing into Lyndeborough. Greenfield has six water bodies: Powder Mill Pond – 435 acres, on the border with Bennington and Hancock; Otter Lake – 61.2 acres, located in the west central part of town, just north of Forest Road; Sunset Lake – 30.9 acres, located to the north of the intersection of Sawmill and Crotched Mountain Roads; Zephyr Lake – 30.9 acres, on the west side of Route 31 south; Hogback Pond – 9.89 acres, situated between Sawmill and Forest Roads, just to the northwest of the Village; and Mud Pond.¹

According to the 2003 Master Plan, there were 5,112 developed acres (30.5% of total land area) and 11,316 undeveloped acres (67.4% of total land area).

The topography of Greenfield is dominated by Crotched Mountain in the north and North Pack Monadnock in the south. Crotched Mountain lies in the three towns of Greenfield, Bennington, and Francestown. The mountain's highest elevation is actually in Francestown (2,020 feet above sea level); in Greenfield the highest elevation is 1,500 feet, in the northeasterly corner of the town, going down to 900 feet at Sunset Lake. North Pack Monadnock has the highest elevation in town, ranging from 1,300 feet at

¹ Data from the Town of Greenfield Master Plan (2003)

Mountain Road up to over 2,200 feet at the highest point just north of the Temple town line. Gould Hill in the south-central part of town and Blanchard Hill on the eastern side of town are two other concentrated areas of high elevation, although they do not exceed 1,200 feet. The western and central parts of town have the lowest elevations, ranging from 700 to 900 feet above sea level.

Disaster Risk

Extreme winter weather carries the greatest risk for Greenfield, followed by severe wind, hazardous materials spills, and wildfires. The high risk is attributed to both the high probability of these events occurring and the extensive amount of possible damage associated with them. Flooding has a high probability of occurring in Greenfield but an overall medium risk due to the low human, property and business impacts of this hazard on the town. More information about risk can be found in Chapter IV.

Development Patterns and Land Use

Examination of the U.S. Census Data for Greenfield indicates that population grew 57% from 1980 to 1990. From 1990-2000, population only grew by 9%. Using NH Office of Energy and Planning 2005 population estimate of 1,774 for the Town, population grew by approximately 7% between 2000 and 2005. This figure reflects the lowest rate of population growth seen in recent decades.

The following land use descriptions are from the Greenfield Master Plan, 2003 update:

Agricultural – Although primarily a suburban town, Greenfield has some 211 acres of land devoted to farming in many of its forms. These are scattered throughout town in several concentrations such as the Blanchard Hill section and areas just outside the center of Town. The number of acres of land devoted for agricultural use has decreased from 600 acres in 1980 as reported in the 1986 Master Plan. In Greenfield, as in most of the towns in the region, there are individual garden plots servicing the needs of local homeowners.

Residential – Residential development in Town is mostly single family detached homes and manufactured housing, with an infrequent occurrence of two family and multi-family housing. Also of significance in terms of concentrated residential development are the areas around Sunset and Zephyr Lakes where residential density is higher than in other parts of Town. In general, residential use occurs along the existing road network and is devoted to Single family homes. Approximately 1,326 acres of Greenfield's land is in residential use, which is a 342% increase since 1980.

Commercial/Industrial – The major concentration of commercial and industrial uses is located in and around the town center. There is a limited amount of commercial development found along NH Route 31 in the southern portion of Town. The number of acres devoted to these uses has increased from 7 acres in 1980 to 36 acres in 2003.

Government/Institutional - Government/institutional uses are generally concentrated in the village center and are represented by the Town Office Building, the Fire Station, the Meeting House, and the Post Office. The schools, cemeteries, and the large tracts used by the Crooked Mountain Rehabilitation Center, Brantwood Camp and Lyris, and by Barbara C. Harris Camp and Conference Center are also included in this land use category. Some of these are considered mixed uses, such as the Camp Union area which operates both as an “educational” facility and a “recreational” area.

Recreational – Greenfield's 2003 tax assessing data does not include recreational uses as a separate land use category. Recreational uses are incorporated in the Exempt categories (municipal, state, and federal). Recreational land in Greenfield includes the fairgrounds, the elementary school playground, a part of

North Pack Monadnock Mountain, the Greenfield State Park, the beaches of Sunset and Zephyr Lakes, and several private camps.

Roads and Highways - Roads and highways, while not typically thought of as a "use" per se, do take up nearly 370 acres of land.

Protected Lands - Approximately 2,880 acres of land in Greenfield are protected as conservation land.

Consideration for Development

Several factors have played, and will continue to play, an important role in the development of Greenfield. These include: the existing development pattern and availability of land for future development; the present road network; physical factors such as steep slopes, soil conditions, wetlands, and aquifers; and, land set aside for conservation. These factors have an impact, both individually and cumulatively, on where and how development occurs.

Development Trends

Overall, changing land use trends in Greenfield are dominated by the growth of single family residential development. There is strong desire amongst residents to remain a traditional, small, rural New England town. In recent years there has been a significant increase in the population of Southern New Hampshire that may have serious impacts on the ability of Greenfield to remain a small, rural community.

The proximity of Greenfield to Manchester, NH, Nashua, NH, Keene, NH, Peterborough, NH, Worcester, MA, and Boston, MA may make it an attractive location to commuters looking to live in a small community outside of the more developed regions.

As shown on the Hazard Mitigation Map, there have been a number of recent subdivisions in Town. These range from a proposed 27-unit development to a number of smaller 2 and 3 lot subdivisions. The town should keep track of the larger parcels in town with adequate frontage and access for subdivision and development.

Development in Hazard Areas

Some hazards identified in this plan are regional risks and, as such, all new development falls into the hazard areas. These include severe winter weather, tornados, lightning, wildfires, and earthquake. There are many areas in town that are prone to flooding as well. The town should monitor proposed development located in identified potential hazard areas.

National Flood Insurance Program (NFIP)

Greenfield is a participating member of the National Flood Insurance Program. Flood Insurance Rate Maps for Greenfield became effective 11/17/1977, and the Town then entered the NFIP. The NFIP biennial report for 2005 notes that there are 2 structures located in FEMA designated Special Flood Hazard Areas (SFHAs). As of 2005, there were 4 flood insurance policies in force totaling \$741,900 in insurance. Flood Insurance Rate Maps, all bearing the effective date of 5/1/1980, are used for flood insurance purposes and are on file with the Greenfield Planning Board. In 2007 it will be necessary for all Towns in Hillsborough County to adopt the updated FEMA Digital Flood Insurance Rate Maps to remain a participating member of NFIP.

CHAPTER III: HAZARD IDENTIFICATION

The following is a list of natural and manmade disasters, and the areas affected by them, that have or could affect the Town of Greenfield. These hazards were identified from the State of New Hampshire Hazard Mitigation Plan (2004), the Federal Emergency Management Administration website, and in a brainstorming session with the Hazard Mitigation Planning Committee. The Hazard Mitigation Map at the end of this Plan reflects the contents of this list. The 2007 Flood Map at the back of the plan and accompanying list shows areas that flooded during the 2007 event. Appendix D also lists the flood areas from 2007.

List of Hazards

Flooding- Disaster Declarations
Flooding- Localized areas
Drought
Extreme Heat
Wildfires
Lightning
Tornadoes
Hurricanes
Earthquakes
Severe Wind/Downbursts
Extreme Winter Weather
Hazardous Materials Incidents
Snow Avalanche
Erosion
Subsidence
Radon
Dams

| Hazard | Date | Location | Description of Areas Impacted |
|-----------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLOODING- DISASTER DECLARATIONS | | | |
| Flood | 1927 | Southern NH | Damage to Road Network. Caused many roads to wash out. |
| Flood | March 11-21, 1936 | NH State | Damage to Road Network. Flooding caused by simultaneous heavy snowfall totals, heavy rains and warm weather. Run-off from melting snow with rain overflowed the rivers |
| Flood/ Severe Storm | August 27, 1986 | Cheshire, Hillsborough Counties, NH | FEMA Disaster # 771-DR (Presidentially Declared Disaster) \$1,005,000 in damage |
| Flood / Severe Storm | April 16, 1987 | Cheshire, Carroll, Grafton, Hillsborough, Merrimack, Rockingham, & Sullivan Counties, NH | FEMA Disaster Declaration # 789- DR (Presidentially Declared Disaster). Flooding of low-lying areas along river caused by snowmelt and intense rain. \$4,888,889 in damage. |
| Flood | August 7-11, 1990 | Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack & Sullivan Counties, NH | FEMA Disaster Declaration # 876. Flooding caused by a series of storm events with moderate to heavy rains. \$2,297,777 in damage. |
| Flood | October 29, 1996 | Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan Counties, NH | FEMA Disaster Declaration # 1144- DR. Flooding caused by heavy rains. \$2,341,273 in damage. |
| Flood | July 2, 1998 | Southern NH | FEMA Disaster Declaration # 1231. Severe storms and flooding |
| Flood | October 26th 2005 | Cheshire, Grafton, Merrimack, Sullivan, and Hillsborough Counties, NH | FEMA Disaster Declaration # 1610. Severe storms and flooding. |
| Flood | October-November 2005 | Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan counties | FEMA Disaster Declaration # DR-1144-NH |
| Flood | May 25th, 2006 | Belknap, Carroll, Hillsborough, Merrimack, Rockingham, and Strafford Counties, NH | FEMA Disaster Declaration # 1643. Severe storms and flooding. |
| Flood | April 16, 2007 | All counties, NH | FEMA Disaster Declaration # 1695. Severe storms and flooding. |
| FLOODING- LOCALIZED- MEDIUM RISK | | | |
| Flooding | Past and potential occurrences | New Boston Road | This area floods when more than 3 inches of rain falls. The last occurrence was in 2005. 1 culvert is at risk at this location. |
| Flooding | Past and potential occurrences | Dunklee Road | This area floods when more than 3 inches of rain falls. The last occurrence was in 2005. 3 residential structures are at risk at this location. |
| Flooding | Past and potential occurrences | Minor Road | This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. 1 culvert washed away in 2004 and was rebuilt. No other structures are at risk at this location. |

| FLOODING- LOCALIZED- MEDIUM RISK (CONT...) | | | |
|---------------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flooding | Past and potential occurrences | Holden Road | This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. No structures are at risk at this location. |
| Flooding | Past and potential occurrences | Gulf Road | This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. Access to 2 residential structures is at risk at this location. |
| Flooding | Past and potential occurrences | Russell Station Road | This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. 1 culvert is at risk at this location. |
| Flooding | Past and potential occurrences | Old Lyndeborough Mountain Road | This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. Access to 7 residential structures are at risk, 4 of which are in the flood zone. |
| Flooding | Past and potential occurrences | Cornwell Road | This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. 2 sets of twin culverts are at risk at this location. |
| Flooding | Past and potential occurrences | Swamp Road | This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. 1 residential structure is at risk. 4 undersized culverts are at risk. |
| Flooding | Potential Occurrences | Otter Lake Lane | 1 residential house is at risk at this location. |
| Flooding | April 16, 2007 | 86 locations had flood damage (see table and associated map in back of plan for a list of these locations) | A number of roads were closed, one bridge washed out, and many roads were washed out with only one lane open. Other than road infrastructure, no other structures were damaged. |
| Flooding | Potential | Structures within the flood zone- Russell Station Rd, Old Lyndeborough Mountain Rd, Beach Rd, Forest Rd, Gibbons Lane, Old Bennington Rd, School House Rd, Holden Rd | There are approximately 14 structures currently located within the flood zone (11 residences and 3 businesses). |
| DROUGHT- LOW RISK | | | |
| Drought | 1929-1936 | Statewide | Regional. Recurrence Interval 10 to > 25 years |
| Drought | 1939-1944 | Statewide | Severe in southeast and moderate elsewhere. Recurrence Interval 10 to > 25 years |
| Drought | 1947-1950 | Statewide | Moderate. Recurrence Interval 10 to > 25 years |
| Drought | 1960-1969 | Statewide | Regional longest recorded continuous spell of less than normal precipitation. Encompassed most of the Northeastern US. Recurrence Interval > 25 years |
| Drought | 2001-2002 | Statewide | Third worst drought on record, exceeded only by the drought of 1956-1966 and 1941-1942. |

| EXTREME HEAT- LOW RISK | | | |
|----------------------------------------------------------------|------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Extreme Heat | July, 1911 | New England | 11-day heat wave in New Hampshire |
| Extreme Heat | Late June to September, 1936 | North America | Temps to mid 90s in the northeast |
| Extreme Heat | Late July, 1999 | Northeast | 13+ days of 90+ degree heat |
| Extreme Heat | Early August, 2001 | New Hampshire | Mid 90s and high humidity |
| Extreme Heat | August 2-4, 2006 | New Hampshire | Regional heat wave and severe storms, Greenfield provided a cooling center at the Ambulance Bay |
| Elderly and special needs populations are at risk. | | | |
| WILDFIRES- MEDIUM-HIGH RISK | | | |
| Wildfire | 1998 | South of School House Road | School house was destroyed, caused by lightning strike. |
| Wildfire | 2003 | South of Zephyr Lake | Caused by lightning strike |
| Wildfire | 2003 | Off of Old Bennington Rd | Set by campers |
| Wildfire | Past and Potential | Crotched Mountain | Mostly caused by lightning strikes |
| Wildfire | Potential | Townwide | The whole town is at risk with many large blocks of forest and problems accessing remote areas |
| Wildfire | Potential | Greenfield State Park | While there have been no known past occurrences of wildfires, there are 253 camp sites at the park. |
| LIGHTNING- LOW-MEDIUM RISK | | | |
| Lightning | Past and Potential | Crotched Mountain | Lightning strikes with frequency and has caused brush fires. |
| TORNADOS (FUJITA SCALE GIVEN IF KNOWN)- LOW-MEDIUM RISK | | | |
| Tornado | July 28, 1748 | Hillsborough County | n/a |
| Tornado | May 21, 1814 | Hillsborough County | n/a |
| Tornado | September 15, 1922 | Hillsborough County | F2 |
| Tornado | July 2, 1961 | Hillsborough County | F2 |
| Tornado | June 9, 1963 | Hillsborough County | F2 |
| Tornado | July 19, 1966 | Hillsborough County | F2 |
| Tornado | July 17, 1968 | Hillsborough County | F2 |
| Tornado | August 20, 1968 | Hillsborough County | F3 |
| Tornado | July 2, 1997 | Hillsborough County | F2 |
| Tornado | 1996 | Greenfield | This tornado started above Otter Lake and traveled east-northeast into Frankestown. 2 commercial buildings has major damage and 2 commercial buildings were destroyed. |
| Tornado | May 23, 1998 | Hillsborough County | F2 |
| River corridors and hill tops susceptible. | | | |

| HURRICANES (CATEGORY GIVEN IF KNOWN) AND TROPICAL STORMS- LOW-MEDIUM RISK | | | |
|----------------------------------------------------------------------------------|-----------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hurricane | August, 1635 | n/a | |
| Hurricane | October 18-19, 1778 | n/a | Winds 40-75 mph |
| Hurricane | October 9, 1804 | n/a | |
| Gale | September 23, 1815 | n/a | Winds > 50mph |
| Hurricane | September 8, 1869 | n/a | |
| Hurricane | September 21, 1938 | Southern New England | Flooding caused damage to road network and structures. 13 deaths, 494 injured throughout NH. Disruption of electric and telephone services for weeks. 2 Billion feet of marketable lumber blown down. Total storm losses of \$12,337,643 (1938 dollars). 186 mph maximum winds. |
| Hurricane (Carol) | August 31, 1954 | Southern New England | Category 3, winds 111-130 mph. Tree and crop damage in NH, localized flooding |
| Hurricane (Edna) | September 11, 1954 | Southern New England | Category 3 in Massachusetts. This Hurricane moved off shore but still cost 21 lives and \$40.5 million in damages throughout New England. Following so close to Carol it made recovery difficult for some areas. Heavy rain in NH |
| Hurricane (Donna) | September 12, 1960 | Southern and Central NH | Category 3 (Category 1 in NH). Heavy flooding in some parts of the State. |
| Tropical Storm (Daisy) | October 7, 1962 | Coastal NH | Heavy swell and flooding along the coast |
| Tropical Storm (Doria) | August 28, 1971 | New Hampshire | Center passed over NH resulting in heavy rain and damaging winds |
| Hurricane (Belle) | August 10, 1976 | Southern New England | Primarily rain with resulting flooding in New Hampshire. Category 1 |
| Hurricane (Gloria) | September, 1985 | Southern New England | Category 2, winds 96-110 mph. Electric structures damaged; tree damages. This Hurricane fell apart upon striking Long Island with heavy rains, localized flooding, and minor wind damage in NH |
| Hurricane (Bob) | August 19, 1991 | Southern New England | Structural and electrical damage in region from fallen trees. 3 persons were killed and \$2.5 million in damages were suffered along coastal New Hampshire. Federal Disaster FEMA-917-DR |
| Hurricane (Edouard) | September 1, 1996 | Southern New England | Winds in NH up to 38 mph and 1 inch of rain along the coast. Roads and electrical lines damaged |
| Tropical Storm (Floyd) | September 16-18, 1999 | Southern New England | FEMA DR-1305-NH. Heavy Rains |
| Tropical Storm (Tammy) | October 5-13, 2005 | East Coast of US | Remnants of Tammy contributed to the October 2005 floods which dropped 20 inches of rain in some places in NH. |

| EARTHQUAKES (MAGNITUDE GIVEN IF KNOWN)- LOW RISK | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Earthquake | 1638 | Central New Hampshire | 6.5-7 |
| Earthquake | October 29, 1727 | Off NH/MA coast | Widespread damage Massachusetts to Maine |
| Earthquake | December 29, 1727 | Off NH/MA coast | Widespread damage Massachusetts to Maine |
| Earthquake | November 18, 1755 | Cape Ann, MA | 6.0, much damage |
| Earthquake | 1800s | Statewide New Hampshire | 83 felt earthquakes in New Hampshire |
| Earthquake | 1900s | Statewide New Hampshire | 200 felt earthquakes in New Hampshire |
| Earthquake | March 18, 1926 | Manchester, NH | Felt in Hillsborough County |
| Earthquake | December 20, 1940 | Ossipee, NH | Both earthquakes of magnitude 5.5, both felt for 400,000 sq miles, structural damage to homes, damage in Boston MA, water main rupture. |
| Earthquake | December 24, 1940 | Ossipee, NH | |
| Earthquake | December 28, 1947 | Dover-Foxcroft, ME | 4.5 |
| Earthquake | June 10, 1951 | Kingston, RI | 4.6 |
| Earthquake | April 26, 1957 | Portland, ME | 4.7 |
| Earthquake | April 10, 1962 | Middlebury, VT | 4.2 |
| Earthquake | June 15, 1973 | Near NH Quebec Border, NH | 4.8 |
| Earthquake | January 19, 1982 | Gaza (west of Laconia), NH | 4.5, walls and chimneys cracked, damage up to 15 miles away in Concord |
| Earthquake | October 20, 1988 | Near Berlin, NH | 4 |
| SEVERE WIND/ DOWNBURST- MEDIUM-HIGH RISK | | | |
| Town at risk from severe localized blasting winds. Structural damage potential; such events cause small blocks of downed timber. High elevations at greatest risk. Old trees along roads at risk of falling and causing damage to structures during wind events. Potential for loss of electricity | | | |
| EXTREME WINTER WEATHER- HIGH RISK | | | |
| Ice Storm | December 17-20, 1929 | New Hampshire | Unprecedented disruption and damage to telephone, telegraph and power system. Comparable to 1998 Ice Storm (see below) |
| Blizzard | February 14-17, 1958 | New Hampshire | 20-30 inches of snow in parts of New Hampshire |
| Snow Storm | March 18-21, 1958 | New Hampshire | Up to 22 inches of snow in south central NH |
| Snow Storm | December 10-13, 1960 | New Hampshire | Up to 17 inches of snow in southern NH |
| Snow Storm | January 18-20, 1961 | New Hampshire | Up to 25 inches of snow in southern NH |
| Snow Storm | February 2-5, 1961 | New Hampshire | Up to 18 inches of snow in southern NH |

| EXTREME WINTER WEATHER- HIGH RISK (CONT...) | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Snow Storm | January 11-16, 1964 | New Hampshire | Up to 12 inches of snow in southern NH |
| Blizzard | January 29-31, 1966 | New Hampshire | Third and most severe storm of 3 that occurred over a 10-day period. Up to 10 inches of snow across central NH |
| Snow Storm | December 26-28, 1969 | New Hampshire | Up to 41 inches of snow in west central NH |
| Snow Storm | February 18-20, 1972 | New Hampshire | Up to 19 inches of snow in southern NH |
| Snow Storm | January 19-21, 1978 | New Hampshire | Up to 16 inches of snow in southern NH |
| Blizzard | February 5-7, 1978 | New Hampshire | New England-wide. Up to 25 inches of snow in central NH |
| Snow Storm | February, 1979 | New Hampshire | President's Day storm |
| Ice Storm | January 8-25, 1979 | New Hampshire | Major disruptions to power and transportation |
| Snow Storm | April 5-7, 1982 | New Hampshire | Up to 18 inches of snow in southern NH |
| Ice Storm | February 14, 1986 | New Hampshire | Fiercest ice storm in 30 yrs in the higher elevations in the Monadnock region. It covered a swath about 10 miles wide from the MA border to New London NH |
| Extreme Cold | November-December, 1988 | New Hampshire | Temperature was below 0 degrees F for a month |
| Ice Storm | March 3-6, 1991 | New Hampshire | Numerous outages from ice-laden power lines in southern NH |
| Snow Storm | 1997 | New Hampshire | Power outages throughout Greenfield due to heavy snowfall |
| Ice Storm | January 15, 1998 | New Hampshire | Federal disaster declaration DR-1199-NH, 20 major road closures, 67,586 without electricity, 2,310 without phone service, \$17+ million in damages to Public Service of NH alone |
| Snow Storm | February 2006 | New Hampshire | Trees down and power outages (for three days) throughout Greenfield due to heavy snowfall. |
| Three types of winter events are heavy snow, ice storms and extreme cold. Occasionally heavy snow will collapse buildings. Ice storms have disrupted power and communication services. Extreme cold affects the elderly. These random events make it difficult to set a cost to repair or replace any of the structures or utilities affected. | | | |
| HAZARDOUS MATERIAL SPILLS- MEDIUM-HIGH RISK | | | |
| HAZMAT | 2001 | Otter Lake | Fuel oil tank dumped fuel into the lake. |
| HAZMAT | Potential | NH 31 and NH 136 and other town rds | Heavy truck travel increases the risk. |
| SNOW AVALANCHE- LOW RISK | | | |
| If a snow avalanche were to occur, it could cause damage to roads, bridges, utilities, houses, and other structures. The Town has no history of snow avalanche events. If information becomes available regarding vulnerable risk locations or avalanche occurrences, the plan will amended accordingly. | | | |

EROSION- LOW RISK

The Town has no history of erosion events. If information becomes available regarding vulnerable risk locations or avalanche occurrences, the plan will amended accordingly.

SUBSIDENCE- LOW RISK

There are no areas that have been or would be affected by subsidence in Greenfield

RADON- LOW-MEDIUM RISK**Summary Table of Short-term Indoor Radon Test Results in NH's Radon Database (5/7/99)**

| County | # Tests | G. Mean | Maximum | % > 4.0 pCi/l | % > 12.0 pCi/l |
|---------------------|--------------|------------|--------------|---------------|----------------|
| Belknap | 744 | 1.3 | 22.3 | 14.4 | 1.3 |
| Carroll | 1042 | 3.5 | 478.9 | 45.4 | 18 |
| Cheshire | 964 | 1.3 | 131.2 | 15.6 | 2.3 |
| Coos | 1072 | 3.2 | 261.5 | 41 | 17 |
| Grafton | 1286 | 2.0 | 174.3 | 23.2 | 5.2 |
| Hillsborough | 2741 | 2.1 | 202.3 | 29.6 | 6.8 |
| Merrimack | 1961 | 2.0 | 152.8 | 25.2 | 6 |
| Rockingham | 3909 | 3.0 | 155.3 | 40 | 9.5 |
| Strafford | 1645 | 3.4 | 122.8 | 44 | 13 |
| Sullivan | 466 | 1.4 | 29.4 | 15.7 | 2.1 |
| STATEWIDE | 15860 | 2.4 | 478.9 | 32.4 | 8.6 |

In Greenfield, there are no known records of illness that can be attributed to radon. However, Greenfield residents should be aware that radon is present. Houses with granite and dirt cellars are at increased risk. The State of NH Hazard Mitigation Plan (October 2000 ed.) identifies communities in Hillsborough County as having a moderate risk for exposure to radon.

DAMS- LOW RISK

The State of New Hampshire classifies dams into the following four categories:

NM – Non-menace S – Significant hazard *Blank- Non-Active*
L – Low hazard H – High Hazard

The table below shows all dams in the Town of Greenfield.

| Dam # | Class | Dam Name | Owner | Status | Type | Height (Ft) | IMPND (Acres) |
|--------|-------|-------------------------------|---------------------------|----------|----------|-------------|---------------|
| 098.04 | | Greenfield Sportsmen Club Dam | Greenfield Sportsmen Club | Breached | Concrete | 12.00 | 2.000 |
| 098.01 | NM | Recreation Pond | Unknown | Active | Earth | 8.00 | 0.330 |
| 098.05 | NM | Hedstrom Pond Dam | Mr. David Hedstrom | Active | Earth | 4.50 | 3.400 |
| 098.03 | NM | Wildlife Pond | Mr. Roger Swain | Active | Earth | 10.00 | 0.030 |
| 098.02 | NM | Beaver Pond | DRED | Active | Concrete | 4.00 | 3.000 |

The McDowell Dam in Peterborough is the only dam that poses a risk to the town of Greenfield. If the dam were to fail, there would be major flooding in town.

Source: Dam information provided by the NH Dam Bureau in 2007 and will be verified by Town officials

CHAPTER IV: ASSESSING PROBABILITY, SEVERITY AND RISK

The Committee members completed a Risk Assessment all of the types hazards identified in Chapter III. The process involved assigning Low, Medium, or High values (numerically 1, 2 or 3) to each hazard type for its possible impact to Human, Property, and Business factors (vulnerability). (A score of zero was given if the hazard was non-applicable). To assess probability, a 1, 2, or 3 value was assigned to each hazard type with respect to the likelihood that the hazard would occur in the next 25 years. The Severity was calculated by determining the average of the Human, Property, and Business impacts. Risk was calculated by multiplying severity by probability. Low-Medium-High (1-2-3) risk was assigned as shown below. Appendix B provides explanations for the risk assessment measures.

0-1.9- Low 2.0-3.9- Low-Med 4-5.9- Med 6-7.9- Med-High 8-9- High

Risk Assessment

| | Human Impact | Property Impact | Business Impact | Probability | Severity | Risk | Risk |
|------------------------|--------------------------------|-----------------------------|-------------------------|----------------------------------------|---------------------------------|------------------------------------------|----------|
| | Probability of death or injury | Physical Losses and damages | Interruption of Service | likelihood this will occur in 25 years | Avg. of Human/Property/Business | Severity x Probability (Relative Threat) | |
| Flooding | 1 | 1 | 1 | 3 | 1.50 | 4.50 | Med |
| Riverine Flooding | 1 | 1 | 0 | 0 | 0.50 | 0.00 | Low |
| Drought | 0 | 0 | 0 | 1 | 0.25 | 0.25 | Low |
| Extreme Heat | 0 | 0 | 0 | 1 | 0.25 | 0.25 | Low |
| Wild Fire | 2 | 2 | 2 | 3 | 2.25 | 6.75 | Med-High |
| Lightning | 2 | 1 | 0 | 2 | 1.25 | 2.50 | Low-Med |
| Tornado | 1 | 2 | 1 | 2 | 1.50 | 3.00 | Low-Med |
| Hurricane | 2 | 2 | 1 | 2 | 1.75 | 3.50 | Low-Med |
| Earthquake | 1 | 1 | 1 | 1 | 1.00 | 1.00 | Low |
| Subsidence | 0 | 0 | 0 | 1 | 0.25 | 0.25 | Low |
| Radon | 0 | 0 | 0 | 3 | 0.75 | 2.25 | Low-Med |
| Severe Wind | 1 | 2 | 3 | 3 | 2.25 | 6.75 | Med-High |
| Extreme Winter Weather | 2 | 3 | 3 | 3 | 2.75 | 8.25 | High |
| Avalanche | 0 | 0 | 0 | 0 | 0.00 | 0.00 | Low |
| HazMat Spills | 2 | 2 | 3 | 3 | 2.50 | 7.50 | Med-High |
| Dam Failure* | 1 | 2 | 2 | 0 | 1.25 | 0.00 | Low |
| Erosion | 0 | 0 | 0 | 0 | 0.00 | 0.00 | Low |

* The only dam failure considered is the McDowell Dam in Peterborough

CHAPTER V: CRITICAL FACILITIES

A Critical Facility is defined as a building, structure, or location which:

- Is vital to the hazard response effort
- Maintains an existing level of protection from hazards for the community
- Would create a secondary disaster if a hazard were to impact it

The Critical Facilities List for the Town of Greenfield has been identified using the following four categories:

Category 1 - Emergency Response Facilities & Services:

The Town has identified the Emergency Response Facilities and Services as the highest priority in regards to protection from natural and man-made hazards

Category 2 - Non Emergency Response Facilities:

The town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Greenfield.

Category 3 - Facilities/Populations to Protect:

The third category contains people and facilities that need to be protected in event of a disaster.

Category 4 - Potential Resources:

Contains facilities that provide potential resources for services or supplies.

| Type of Critical Facility | Name | Address | Comments |
|------------------------------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| CATEGORY 1 - EMERGENCY RESPONSE FACILITIES & SERVICES | | | |
| Emergency Operations Center | Fire Station | 814 Forest Road | |
| Bridges Located on Primary Evacuation Routes | Shown on Hazard Mitigation map | | |
| Town Garage | Highway Department | 29 DPW Drive | |
| Communications | Verizon Switching Station | 764 Forest Road | |
| Hospitals | Monadnock Community Hospital | Peterborough, NH | |
| | St. Joseph's Medical Center | Milford, NH | |
| Helicopter Landing Sites | 18 locations | Barbara C. Harris Camp - ballfield; Sawmill Rd-behind Town Offices; Cavender Rd/Riverbend Dr intersection; East Rd- across from Lehnrs; 971 Forest Rd (Rt. 31) - Oak Park; 171 Forest Rd (Rt. 31) - Yankee Farmer; Francestown Rd (Rt. 136) - Field; Verney Dr.- Crotched Mtn Rehab; Mountain Rd-Brantwood Camp; Mountain Rd- Plowshare Farm; Muzzey Hill Rd- Silley Field; Old Bennington Rd.- Robinson farm field; Old Bennington Rd.- Swamp Rd. intersection; Sawmill Rd.- American Steel parking lot; Sawmill Rd. - DOT parking lot; North of Brantwood Ballfield; East of Whitney Drive | |
| Sewer Department | Town sewer and septic field | South of NH 136 and West of Depot Drive | |

| CATEGORY 1 - EMERGENCY RESPONSE FACILITIES & SERVICES (CONT...) | | | |
|----------------------------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------|------------------------------|
| Town Offices | Town Offices | 7 Sawmill Road | |
| Town Hall | Town Hall | 776 Forest Road | |
| Fire Station | Fire Station | 814 Forest Road | |
| Police Station | Police Station | 7 Sawmill Road | |
| Ambulance Service | Peterborough Ambulance | Peterborough, NH | |
| Emergency Fuel Facilities | Fire Station | 814 Forest Road | |
| | Highway Department | 29 DPW Drive | |
| Emergency Generators | Fire Station | 814 Forest Road | |
| | Crotched Mountain Rehabilitation Center | Crotched Mountain | |
| Emergency Shelters | Crotched Mountain Rehabilitation Center | 106 Verney Drive | |
| | Barbara C. Harris Center | Wally Stone Lane | Camp and Conference Center |
| Dry Hydrants - Fire Ponds - Water Sources | Appendix C lists all water sources in town by street | See Hazard Mitigation Map for hydrant locations | |
| Primary Evacuation Routes | NH 31 (Sawmill Rd); NH 136 (Peterborough Rd) | | |
| CATEGORY 2 - NON EMERGENCY RESPONSE FACILITIES | | | |
| Secondary Evacuation Routes | Forest Road to Hancock; New Boston Road to Francestown | | |
| Bridges on Secondary Evacuation Routes | See Map | | |
| Transfer Station | Transfer Station | 29 DPW Drive | |
| CATEGORY 3 - FACILITIES/POPULATIONS TO PROTECT | | | |
| Special Needs Populations | Crotched Mountain Rehabilitation Center | Crotched Mountain | Treats 2,000 people annually |
| | Lyris Corp Plowshare | 164 Mountain Road | 4 buildings; 24 Apartments |
| | Senior Housing- Greenfield Commons | 826 Forest Road | 24 Units |
| Hazardous Material Storage | American Steel | 328 Sawmill Road | Propane |
| | Rymes | 775 Forest Road | Gasoline; Diesel |
| | Delays | 783 Forest Road | Gasoline |
| | Flagg Junkyard | 1167 Forest Road | Automotive |
| | Kemps Junkyard | 38 Russell Station Road | Automotive |
| Fairgrounds | Oak Park | 971 Forest Road | |
| Library | Library | 761 Forest Road | |
| Schools | Crotched Mountain Rehabilitation Center | Crotched Mountain | |
| | Greenfield Elementary School | 860 Forest Street | Approx. 100 students |
| Day Cares | Crotched Mountain Rehabilitation Center | Crotched Mountain | |
| | Nora's Depot Daycare | 58 Slip Road | |
| Churches | Church | 776 Forest Road | |
| | Greenfield Congregational Covenant Church | 10-12 Depot Drive | |
| Post Office | Post Office | 75 Slip Road | |

| CATEGORY 3 - FACILITIES/POPULATIONS TO PROTECT (CONT...) | | | |
|-----------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------|-------------------------------------|
| Recreation Areas | Camp Winamac | Winamac Lane | |
| | Sunset Lake Beach | Crotched Mountain Road | |
| | Otter Lake Beach (Campers) | Otter Lake Drive | |
| | Otter Lake Beach (Day) | Otter Lake Drive | |
| | Greenfield State Park | Between Forest Road and Sawmill Road by Otter Lake | |
| | Oak Park | 971 Forest Road | |
| | Barbara C. Harris Center | Wally Stone Lane | Camp and Conference Center |
| | Public Boat Landing | Forest Rd by Hancock town boundary | |
| | Wapack Trail | South of Mountain Rd at SW corner of Town | |
| | Wapack National Wildlife Refuge | South of Mountain Road at southwestern corner of Greenfield | |
| | Brantwood Camp | Brantwood Camp Road | |
| | Zephyr Lake Beach | Forest Road at Zephyr Lake | |
| | Crotched Mtn Trailhead Parking | Crotched Mountain Road | |
| Historic Buildings | Town Offices | 7 Sawmill Road | |
| | Church/Meeting House | 776 Forest Road | |
| Employment Centers | Crotched Mountain Rehabilitation Center | Crotched Mountain | Employing approximately 900 |
| | New England Forest Products | 315 Sawmill Road | Approx 10 |
| | American Steel | 328 Sawmill Road | Approx 70 |
| | Mitchell Warehouse | 217 Forest Road | Approx 10 |
| | Monadnock Warehouse | 231 Forest Road | Approx 4 |
| | Barbara C. Harris Center | Wally Stone Lane | Seasonal Camp and Conference Center |
| Apartment Complexes | Rymes | 775 Forest Road | 3 Units |
| | Long Block | 771 Forest Road | 4 units |
| | Industries | 1 Slip Road | 8-9 Units |
| | Gibbons Apartments | 9 Gibbons Lane | 2 Buildings; 8 Units |
| | Todd Lane Apartments | 10 Todd Lane | 2 Buildings; 4 Units |
| | Apartments | 214 Francestown Road | 3 units |
| CATEGORY 4 - POTENTIAL RESOURCES | | | |
| Food/Water | Crotched Mountain Rehabilitation Center | Crotched Mountain | |
| | Greenfield Congregational Covenant Church | 10-12 Depot Drive | |
| | Barbara C. Harris Center | Wally Stone Lane | Camp and Conference Center |
| | Brantwood Camp | Brantwood Camp Road | |
| Medical Supplies | Crotched Mountain Rehabilitation Center | Crotched Mountain | Limited Supplies |
| Gravel Pits | Francestown Sand and Gravel | Between Old Bennington and Muzzy Hill Roads at NW corner of Greenfield | |

| CATEGORY 4 - POTENTIAL RESOURCES (CONT...) | | | |
|-------------------------------------------------|-----------------------------|------------------|---------------------|
| Gas | American Steel | 328 Sawmill Road | Propane |
| | Rymes | 775 Forest Road | Gasoline and Diesel |
| | Delays | 783 Forest Road | Gasoline |
| Building Material and Heavy Equipment Suppliers | New England Forest Products | 315 Sawmill Road | |
| | McGrath Lumber | 328 Sawmill Road | |

Crotched Mountain Rehabilitation Facility

Crotched Mountain Rehabilitation Facility, located at 1 Verney Drive in Greenfield offers inpatient and outpatient services to children and adults with inherited and acquired disabilities and brain injuries. The more than 1,400-acre residential campus includes a school, hospital, outpatient clinic, brain injury center, media center, an athletic complex and New Hampshire's first wheelchair accessible tree house.

The facility employs more than 900 people and provides care to more than 2,000 people annually. Some of the facilities include:

Wonderworks Learning Center: Ages 6 weeks-12 years- Infant program, before and after school program, swimming program, summer programs.

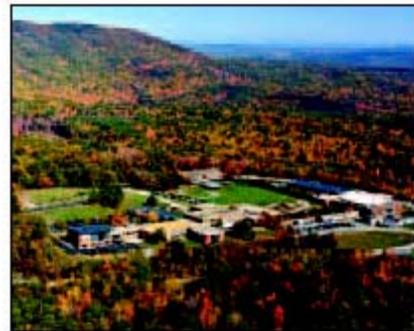
Children's Specialty Hospital: a 30 bed acute and sub-acute rehabilitation services for children and young adults.

Brain Injury Center: 30-bed specialty hospital dedicated to rehab of adults (ages 18-59) who have experienced a brain injury through trauma, stroke, or other causes.

Crotched Mountain School: Serves approximately 128 children and young adults with one or more disabilities in grades K-12 curriculum. There are both residential and day programs for the ages of 6 and 21.

Crotched Mountain Rehabilitation has been identified by the Hazard Mitigation Committee as a critical facility in the following categories: Helicopter landing site, emergency generator, emergency shelter, special needs population, recreation area, school, employment center, food/water supply, and medical supply area.

The town should work closely with the facility in all emergency planning measures. The campus map on the following page shows all the facilities within Crotched Mountain. More information can be found at www.crotchedmountain.org.



CHAPTER VI: ASSESSING VULNERABILITY- IDENTIFYING POTENTIAL HAZARDS AFFECTING STRUCTURES AND ESTIMATING POTENTIAL LOSSES

Existing and future structures have the potential of being affected by some of the hazards identified in this Plan. The table below indicates the number and types of structures would be affected by future hazards. The types of structures considered include residential, commercial, and industrial buildings, infrastructure or other critical facilities identified in Chapter V. Some hazards identified in this plan are regional or town wide risks and, as such, all structures, infrastructure and critical facilities fall into the hazard area.

In order to determine estimated potential losses due to future natural and man made hazards, structures need to be assigned a value. Information was gathered from both the 2005 Greenfield town report and from E-911 driveway location data.² Human losses were not calculated during this exercise, but could be expected to occur depending on the type and severity of the hazard. Also not included is the value of contents within structures.

| | 2005 Valuation (buildings only) | Number of Structures | Average Valuation per Structure |
|--------------------------------------------------------------------|------------------------------------|-------------------------|------------------------------------|
| Residential | \$89,352,300 | 691 | \$129,308 |
| Commercial/Industrial | \$12,492,000 | 34 | \$367,411 |
| Exempt (Church, Fire Dept, Government Buildings, Hospital, School) | \$5,664,800 | 10 | \$566,480 |

Potential losses were estimated for each hazard area by multiplying the type and number of potentially at risk structures by the appropriate calculated average valuation and are shown on the table on the following page.

² While E-911 driveway location data only indicates where driveways to an existing structure are located, it is assumed for the purposes of this plan that the location of the structure itself is in relatively close proximity to the driveway location (in other words, one driveway equals one structure).

Estimating Potential Losses

Structures or Critical Facilities Potentially Affected by Hazard Areas

| Hazard Type | Specific Hazard Area or Location | Critical Facilities, Structures or Infrastructure Affected | | | |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------|
| | | Type and Number of Existing Structures | Estimated Potential Loss of Existing Structures | Type and Number of Future Structures | Estimated Potential Loss of Future Structures |
| Lightning and Wildfires | All critical facilities within Crotched Mountain Facility | Multiple (see Crotched Mountain Map) | unknown | Unknown at this time- will be updated as new information becomes available | n/a |
| Wildfires | Otter Lake Beach (critical facility) | None | n/a | Unknown at this time- will be updated as new information becomes available | n/a |
| Wildfires | Greenfield State Park (critical facility) | None | n/a | Unknown at this time- will be updated as new information becomes available | n/a |
| Lightning and Wildfires | Crotched Mountain trailhead parking (critical facility) | None | n/a | Unknown at this time- will be updated as new information becomes available | n/a |
| Flooding | All structures within FEMA flood zone; Russell Station Rd, Old Lyndeborough Mountain Rd, Beach Rd, Forest Rd, Gibbons Lane, Old Bennington Rd, School House Rd, Holden Rd | There are approximately 14 structures currently located within the flood zone (11 residences and 3 businesses). | \$2,524,621 | Unknown at this time- will be updated as new information becomes available | n/a |
| Flooding | All infrastructure in flood prone locations | Culverts, bridges and other road infrastructure indicated as potential flood locations | Unknown | Unknown at this time- will be updated as new information becomes available | n/a |
| Tornado, hurricane, severe winter weather/ ice, severe wind | Townwide | 735 structures within town | Valuation of \$107,509,100 | Unknown at this time- will be updated as new information becomes available | n/a |

CHAPTER VII: EXISTING MITIGATION STRATEGIES

This step involves identifying existing mitigation strategies and Town programs and evaluate their effectiveness. This section outlines those programs and recommends improvements to ensure the highest quality emergency services possible.

Existing Mitigation Strategies and Proposed Improvements

| Existing Protection | Description/ Area Covered | Responsible Local Agent | Effectiveness | Proposed Improvements/Comments |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <u>School Evacuation Plan-</u> Designated plan to evacuate the schools in the event of an emergency or disaster addressing bussing, transportation routes (primary and alternative), traffic & crowd control, end destination and parental notification. | Greenfield Elementary School | School Board | Unknown | Plan should be shared with town officials |
| <u>Building Codes-</u> The town maintains a code enforcement officer and has adopted provisions of the NH Life Safety Code and the NH State Building Code which includes the International Building Code 2000, International Plumbing Code 2000, International Mechanical Code 2000, International Energy Conservation Code 2000 and National Electric Code 2002. | Townwide | Building inspector/ Code enforcement officer | High | |
| <u>Local Road and Driveway Design Standards-</u> Standards set by the town and the Highway Dept. | Townwide | Planning Board | High | |
| <u>Emergency Snow Removal Policy-</u> procedures for snow removal in town. | Townwide | Highway Dept | High | |
| <u>Town Master Plan-</u> Continuously being updated. A planning document to ensure that overall development in town is sustainable, meeting the needs of the citizens by setting forth steps and guidelines for a sound living environment through well-planned growth. | Townwide | Planning Board | Moderate | |
| <u>Mutual Aid-</u> provides assistance to all aspects of the town's emergency management services. Southwest NH Fire Mutual Aid and the Hillsborough County Sheriff's Dept provide mutual aid. | Townwide | Fire and Police Chiefs | Very High | |
| <u>Fire Pond/Dry Hydrant Management Plan-</u> Designates a maintenance schedule for water sources used by the Fire Dept. | Townwide | Fire Dept. | High | The plan calls for maintaining and flushing the systems two times per year |
| <u>Town Warning System-</u> The town has a town-wide phone tree and an alarm on the fire station. | Townwide | Fire Dept and EMD | Moderate-High | This is an ongoing development process because of changing population and technology. There is some need for upgraded fire alarm equipment. |
| <u>Erosion and Sedimentation Plan-</u> The Town follows the state's best management practices | Townwide | Planning Board | High | |
| <u>Shoreland Protection Act-</u> The Town follows the state's guidelines | Townwide | Planning Board | High | |

| Existing Protection | Description/ Area Covered | Responsible Local Agent | Effectiveness | Proposed Improvements/Comments |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Wetlands Protection - The town requires 25-foot setback from all wetland soils in town. | Townwide | Planning Board | High | |
| Steep Slopes Protection - The town has requirements for the construction of driveways only (no more than 8% grade). | Townwide | Planning Board | Moderate | |
| Floodplain Development Ordinance - The town has an ordinance to control development in the 100-year floodplain as required by FEMA to remain eligible for the National Flood Insurance Program. | Townwide | Planning Board | High | |
| Health Officer - Maintains state health requirements, inspects complaints. | Townwide | Health Officer | High | |
| Emergency Management Plan - This plan was first written in 1994 and establishes protocol for all town departments in the event of an emergency. | Townwide | EMD | High | The Town would like to update its Emergency Management Plan to meet new standards. |
| EMS Week - a public awareness week held each year by the fire department, | Townwide | Fire Department | Unknown | |
| Hazard Materials Spill procedure - the Nashua Hazmat Team responds to Greenfield. Training for fire personnel is provided | Townwide | Fire Department | Moderate | The Town should do a drill. |
| Pandemic Plan - the plan is in the process of being written with 15 neighboring towns. | Regional | EMD and Fire Dept | Unknown | Phase 1 has been completed. Phase 2 will be completed by October 2007. |
| Training for fire fighters - all firefighters required to go through state forestry course to fight wildfires. | Townwide | Fire Department | High | |
| Fire Prevention Program - this program is held annually in the community. | Townwide | Fire Department | unknown | |
| Town Radio System - High band analog radios. There is a disaster frequency that all departments use when there is an emergency. | Townwide | Hwy, Fire and Police Depts | Poor | Highway department needs portable radios to use outside of vehicles; mobile repeaters are necessary to limit dead spots in town. |
| Fire Inspector - inspects any new buildings and any foster homes and assisted living facilities. | Townwide | Fire Inspector | High for new structures, or foster/ assisted facilities | Low to moderate effectiveness for commercial and other existing buildings. Need to do annual inspections of multifamily dwellings. |

CHAPTER VIII: PROPOSED MITIGATION STRATEGIES

New Programs or Activities

In addition to the programs and activities that Greenfield is currently undertaking to protect its residents and property from natural and manmade disasters, a number of additional strategies were identified by the Local Hazard Mitigation Committee for consideration. The process of compiling a comprehensive list of all mitigation strategies currently in place throughout the Town helped the Committee to identify gaps in the existing coverage and improvements which could be made to the existing strategies.

New strategies were identified for each general hazard type using the following categories:

- Prevention (programs and policies)
- Property Protection
- Structural Projects
- Emergency Services
- Public Education and Involvement

Location Specific Programs or Activities

In addition to the mitigation strategies proposed generally for each hazard type as indicated above, the Committee brainstormed actions for specific potential hazard areas identified in Chapter III. In these cases, the Committee felt that the risk to the location was so great, mitigation actions could be geared directly to mitigating hazards at that location.

The table below shows proposed mitigation actions for both general hazard types and specific potential hazard areas.

| Hazard Type or Specific Location | Prevention | Property Protection | Structural Projects | Emergency Services | Public Information |
|-------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------|---------------------|-----------------------------------------|--------------------------------------------------------|
| Flooding | Beaver population control and monitoring plan | Revisit wetlands protection regulations to see if revisions should be made | | | Private culvert maintenance education program |
| Wildfires | Slash monitoring within camp areas | | | Classification sign at the fire station | Campfire education |
| All town-wide weather events | | | | | Informational pamphlets for severe weather preparation |
| Severe winter weather/ Icing | Open roads to sunlight along east/west routes to prevent icing | | | | |

| Hazard Type or Specific Location | Prevention | Property Protection | Structural Projects | Emergency Services | Public Information |
|-----------------------------------------------------------------------------|-----------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|---------------------------|
| All town-wide hazards (tornados, earthquakes, hurricanes, wind, etc) | Continue Emergency Training | | Recommend to the Planning Board to consider requiring underground utilities of new applicants for subdivision or site plan | Develop emergency warning system for Townwide notification | |
| Hazard Materials Spills | Continue Emergency Training | | | Have ample supplies and continue operation-level training | |
| Flooding- Gulf Rd, Holden Rd, Cornwell Rd | | | Raise the Road | | |
| Flooding- Russell Station Rd | | | Replace the Culvert with a larger one | | |
| Flooding- Lyndeborough Mountain Rd, Dunklee Hill Rd, Swamp Rd | | | Rebuilt culvert and raise the road | | |
| Flooding- Francestown Rd Bridge | | | Strengthen Structure | | |
| Flooding- County Rd, Zephyr Lake Rd, Etna Dr | | | “Rip Rap” both sides of road | | |
| Flooding- Swamp Rd Culverts (2 locations), Gulf Rd | | | Replace pipes to one size larger | | |
| Flooding- Gould Hill Rd | | | “Rip Rap” west ditch (partial east) | | |
| Flooding- Etna Dr | | | 4-6” Gradiation | | |
| Flooding- Minor Rd | | | Install storm surge/overflow pipe and raise the road | | |

Prioritization of Proposed Mitigation Strategies

The goal of each strategy identified in the previous table is reduction or prevention of damage from a hazard event. In order to determine their effectiveness in accomplishing this goal, a set of criteria was applied to each strategy. The STAPLEE method analyzes the Social, Technical, Administrative, Political, Legal, Economic and Environmental aspects of a project and is commonly used by public administration officials and planners for making planning decisions. The following questions were asked about the proposed mitigation strategies and discussed in the table below:

- **Social:** Is the proposed strategy socially acceptable to the community? Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- **Technical:** Will the proposed strategy work? Will it create more problems than it solves?
- **Administrative:** Can the community implement the strategy? Is there someone to coordinate and lead the effort?
- **Political:** Is the strategy politically acceptable? Is there public support both to implement and to maintain the project?
- **Legal:** Is the community authorized to implement the proposed strategy? Is there a clear legal basis or precedent for this activity?
- **Economic:** What are the costs and benefits of this strategy? Does the cost seem reasonable for the size of the problem and the likely benefits?
- **Environmental:** How will the strategy impact the environment? Will the strategy need environmental regulatory approvals?

Each mitigation strategy was evaluated and assigned a score (Good = 3, Average = 2, Poor = 1) based on the above criteria. An evaluation chart with total scores for each strategy can be found in the table below. Each strategy was evaluated and prioritized according to the final score. The highest scoring strategies were determined to be of most importance, economically, socially, environmentally, and politically.

An additional factor that is not considered here but should be considered by the Committee on a project-by-project basis is the ability to find funding.

STAPLEE Ranking Matrix

| Proposed Mitigation Strategy | Is it Socially acceptable? | Is it Technically feasible and potentially successful? | Is it Administratively workable? | Is it Politically acceptable? | Is there Legal authority to implement? | Is it Economically beneficial? | Is it Environmentally beneficial? | Total Score |
|------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------|-----------------------------------------|--------------------------------------|-----------------------------------------------|---------------------------------------|------------------------------------------|-------------|
| Informational pamphlets for severe weather | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 21 |
| Wetlands protection regulations- revisit them to see if changes are necessary | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 21 |
| Private culvert maintenance education program | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 21 |
| Campfire education | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 21 |
| Classification sign at the fire station | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 21 |
| Have ample supplies and continue operation-level training of Fire and Police | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 21 |
| All flooding hazard mitigation strategies | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 20 |
| Develop emergency warning system for Townwide notification | 3 | 3 | 3 | 2 | 3 | 1 | 3 | 19 |
| Recommend to the planning board to consider requiring underground utilities for subdivisions or site plans | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 19 |
| Beaver population control and monitoring plan | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 18 |
| Open roads to sunlight to prevent icing in E/W directions | 1 | 3 | 3 | 2 | 3 | 3 | 3 | 18 |
| Slash monitoring to prevent fires | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 18 |

CHAPTER IX: PRIORITIZED IMPLEMENTATION SCHEDULE AND ACTION PLAN

The following questions were asked to develop an implementation schedule for the identified priority mitigation strategies:

WHO? Who will lead the implementation efforts? Who will put together funding requests and applications?

WHEN? When will these actions be implemented, and in what order?

HOW? How will the community fund these projects? How will the community implement these projects? What resources will be needed to implement these projects?

A fourth consideration was the cost/benefit of each proposed action. Comments regarding the cost/benefit of each project are included, along with the “who,” “when,” and “how” in the table on the following page.

As additional information becomes available regarding project leadership, timeline, funding sources, and/or cost estimates, the Plan will be reviewed and amended accordingly.

| Mitigation Action | Who (Leadership) | When (Deadline) | How (Estimated Cost and Funding Source) | Cost/Benefit Comments |
|------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------|----------------------------------------------------------|------------------------------------------------|
| Informational pamphlets for severe weather | EMD and Fire Chief | 1 year | \$1,000 (grant) | Yes, protection of life and property |
| Wetlands protection regulations- revisit them to see if changes are necessary | Conservation Commission | Annually | Minimal (budget) | Yes |
| Private culvert maintenance education program | Highway Dept | Annually | Minimal (budget) | Yes, will prevent road destruction |
| Campfire education | Forest Fire Warden | Annually | Minimal (budget) | Yes |
| Classification sign at the fire station | Forest Fire Warden | 1 year | \$3000 (grant) | Yes- one time fee to help prevent forest fires |
| Have ample supplies and continue operation-level training of Fire and Police | Fire and Police Chiefs | Annually | \$2,000/year (budget) | Yes- to keep up skills |
| All flooding hazard mitigation strategies | Highway Dept | Annually | \$5-10,000/site (some may cost more) (grants and budget) | Yes- will prevent periodic flooding |
| Develop emergency warning system for Townwide notification | EMD | 2 years | Unknown (substantial) | Yes |
| Recommend to the planning board to consider requiring underground utilities for subdivisions or site plans | Hazmit Committee and Planning Board | 6 months | Minimal (budget) | Yes- property protection |
| Beaver population control and monitoring plan | Conservation Commission | 1 year (annually thereafter) | \$1,000/year (grant and budget) | Yes- to prevent flooding |
| Open roads to sunlight to prevent icing in E/W directions | Highway Dept | Annually | \$10,000/year (budget) | Yes- to prevent road icing |
| Slash monitoring to prevent fires | Town Forester | Annually | \$1,000/year (budget) | Yes |

CHAPTER X: ADOPTION, IMPLEMENTATION, MONITORING & UPDATE

Adoption

The Greenfield Board of Selectmen adopted the *Greenfield Hazard Mitigation Plan* on . A copy of the resolution can be found at the end of this chapter. Adopted policy addresses the actions for implementation set forth in the prioritized implementation schedule (action plan) in the previous chapter and in the “Monitoring & Updates” sub-section contained in this Chapter. All other sections of this Plan are supporting documentation for information purposes only and are not included as the statement of policy.

Implementation of the Plan through Existing Programs

In addition to work by the Hazard Mitigation Committee and town departments, several other mechanisms exist which will ensure that the Greenfield Hazard Mitigation Plan receives the attention it requires for satisfactory use.

Master Plan

Implementation of the Master Plan has been ongoing since its most recent adoption in 2003. Recommendations from the Greenfield Hazard Mitigation Plan will be considered for insertion into future updates of the Master Plan. The Planning Board will consider the Plan as an amendment to its Master Plan. The Local Hazard Mitigation Committee will oversee the process to begin working with the Planning Board to ensure that the Greenfield Hazard Mitigation Plan is adopted as a Chapter of the Master Plan.

Zoning Ordinance and Regulations

Some of the implementation strategies proposed involve revisions to the Subdivision Regulations and/or the Site Plan Review Regulations as well as the Zoning Ordinance. The Local Hazard Mitigation Committee will oversee the process to begin working with the Planning Board to develop appropriate language for the recommended modifications.

Continued Public Involvement

On behalf of the Hazard Mitigation Committee, the Emergency Management Director (EMD), under direction of the Board of Selectmen, will be responsible for ensuring that town departments and the public have adequate opportunity to participate in the planning process. Administrative staff may be utilized to assist with the public involvement process. For the yearly update process, techniques that will be utilized for public involvement include:

- Provide personal invitations to Budget Committee members;
- Provide personal invitations to town department heads;
- Post notices of meetings at the Town Office, Library, and local businesses;
- Post flyers of the project at the Town Office, Library, and local businesses; and
- Submit newspaper articles for publication appropriate newspapers.

A number of Implementation Action items which will be undertaken relate to public education and involvement. Additionally, members of the public including area business owners, schools, communities, and organizations will be invited to participate in the yearly process of updating the Greenfield Hazard Mitigation Plan. These outreach activities will be undertaken during the Plan’s annual review and during any Hazard Mitigation Committee meetings the Board of Selectmen calls to order.

Monitoring & Updates

Recognizing that many mitigation projects are ongoing, and that while in the implementation stage communities may suffer budget cuts, experience staff turnover, or projects may fail altogether, a good plan needs to provide for periodic monitoring and evaluation of its successes and failures and allow for updates of the Plan where necessary.

In order to track progress and update the Mitigation Strategies identified in the *Action Plan* (Chapter VII), the Town Hazard Mitigation Team will revisit the Greenfield Hazard Mitigation Plan annually, or after a hazard event. The Emergency Management Director is responsible for initiating this review and needs to consult with the Board of Selectmen and other key local officials. Changes should be made to the Plan to accommodate for projects that have failed or are not considered feasible after a review for their consistency with the timeframe, the community's priorities, and funding resources. Priorities that did not make the implementation list, but identified as potential mitigation strategies, should be reviewed as well during the monitoring and update of this Plan to determine feasibility of future implementation. In keeping with the process of adopting the Greenfield Hazard Mitigation Plan, a public hearing to receive public comment on Plan maintenance and updating will be held during the annual review period and the final product adopted by the Board of Selectmen appropriately.

The Town of Greenfield, NH Hazard Mitigation Plan must be reviewed, revised as appropriate, and resubmitted to FEMA for approval every five years in order to maintain eligibility for Pre-Disaster Mitigation Competitive (PDM-C) and Hazard Mitigation Grant Program project grants.

INSERT ADOPTION FORM

Appendices

Appendix A: Hazard Descriptions

The following list describes hazards that have occurred or have the potential to occur in the Town of Greenfield. The descriptions provided are those used in the State of NH Hazard Mitigation Plan (2000).

Flooding

Floods are defined as a temporary overflow of water onto lands that are not normally covered by water. Flooding results from the overflow of major rivers and tributaries, storm surges, and/or inadequate local drainage. Floods can cause loss of life, property damage, crop/livestock damage, and water supply contamination. Floods can also disrupt travel routes on roads and bridges. Inland floods are most likely to occur in the spring due to the increase in rainfall and melting of snow; however, floods can occur at any time of the year. A sudden thaw in the winter or a major downpour in the summer can cause flooding because there is suddenly a lot of water in one place with nowhere to go.

100-year Floodplain Events

- Floodplains are usually located in lowlands near rivers, and flood on a regular basis. The term 100-year flood does not mean that a flood will occur once every 100 years. Rather, it is a statement of probability that scientists and engineers use to describe how one flood compares to others that are likely to occur. It is more accurate to use the phrase “1% annual chance of flood.” What this means is that there is a 1% chance of a flood of that size happening in a year.

Rapid Snow Pack Melt

- Warm temperatures and heavy rains cause rapid snowmelt. Quickly melting snow coupled with moderate to heavy rains are prime conditions for flooding.

River Ice Jams

- Rising waters in early spring breaks ice into chunks, which float downstream and often pile up, causing flooding. Small rivers and streams pose special flooding risks because they are easily blocked by jams. Ice collecting in river bends and against structures presents significant flooding threats to bridges, roads, and the surrounding lands.

Severe Storms

- Flooding associated with severe storms can inflict heavy damage to property. Heavy rains during severe storms are a common cause of inland flooding.

Beaver Dams and Lodging

- Flooding associated with beaver dams and lodging can cause road flooding or flooding damage to property.

Drought

A drought is defined as a long period of abnormally low precipitation, especially one that adversely affects growing or living conditions. Droughts are rare in New Hampshire. They generally are not as damaging and disruptive as floods and are more difficult to define. The effect of droughts is indicated through measurements of soil moisture, groundwater levels, and stream-flow. However, not all of these indicators will be minimal during a drought. For example, frequent minor rainstorms can replenish the soil moisture without raising ground-water levels or increasing stream-flow. Low stream-flow correlates with low ground-water levels because ground-water discharge to streams and rivers maintains stream-flow during extended dry periods. Low stream-flow and low ground-water levels commonly cause diminished water supply.

Extreme Heat

Extreme heat is characterized by abnormally high temperatures and/or longer than average time periods of high temperatures. These event conditions may impact the health of both humans and livestock.

Wildfire

Wildfire is defined as an uncontrolled and rapidly spreading fire. A forest fire is an uncontrolled fire in a woody area. They often occur during drought and when woody debris on the forest floor is readily available to fuel the fire. Grass fires are uncontrolled fires in grassy areas.

Earthquake

New England is considered a moderate risk earthquake zone. An earthquake is a rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric, water and phone lines, and often cause landslides, flash floods, fires, and avalanches. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks, and end in vibrations of gradually diminishing force called aftershocks. The underground point of origin of an earthquake is called its focus; the point on the surface directly above the focus is the epicenter. The magnitude and intensity of an earthquake is determined by the use of scales such as the Richter scale and Mercalli scale.

Subsidence

The collapse of the Earth's surface elevation due to the removal of subsurface support. Events range from broad regional lowering of the land surface that occurs over long periods of time, to sudden localized collapse.

Radon

Radon is a naturally occurring radioactive gas with carcinogenic properties. The gas is a common problem in many states, including New Hampshire. Data collected by the NH Office of Community and Public Health's Bureau of Radiological Health indicates that one third of the houses in New Hampshire have indoor radon levels that exceed the U.S. Environmental Protection Agency's "action level" of four Pico curies per liter for at least some portion of the year. Radon may also enter homes dissolved in drinking water from drilled wells. A higher level of radon in water from individual drilled wells is a common occurrence in New Hampshire.

Tornado

A tornado is a violent windstorm characterized by a twisting, funnel shaped cloud. They develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. The atmospheric conditions required for the formation of a tornado include great thermal instability, high humidity, and the convergence of warm, moist air at low levels with cooler, drier air aloft. Most tornadoes remain suspended in the atmosphere, but if they touch down they become a force of destruction.

Tornadoes produce the most violent winds on earth, at speeds of 280 mph or more. In addition, tornadoes can travel at a forward speed of up to 70 mph. Damage paths can be in excess of one mile wide and 50 miles long. Violent winds and debris slamming into buildings cause the most structural damage.

The Fujita Scale is the standard scale for rating the severity of a tornado as measured by the damage it causes. A tornado is usually accompanied by thunder, lightning, heavy rain, and a loud "freight train" noise. In comparison to a hurricane, a tornado covers a much smaller area but can be more violent and destructive.

Hurricane

A hurricane is a tropical cyclone in which winds reach speeds of 74 miles per hour or more and blow in a large spiral around a relatively calm center. The eye of the storm is usually 20-30 miles wide

and may extend over 400 miles. High winds and flooding are primary causes of hurricane-inflicted loss of life and property damage.

Severe Wind

Significantly high winds occur especially during tornadoes, hurricanes, winter storms and thunderstorms. Falling objects and downed power lines are dangerous risks associated with high winds. In addition, property damage and downed trees are common during severe wind occurrences.

A downburst is a severe, localized wind blasting down from a thunderstorm. These “straight line” winds are distinguishable from tornadic activity by the pattern of destruction and debris. Downbursts fall into two categories:

- Microburst, which covers an area less than 2.5 miles in diameter, and
- Macroburst, which covers an area at least 2.5 miles in diameter.

Lightning

Lightning is a giant spark of electricity that occurs within the atmosphere or between the atmosphere and the ground. As lightning passes through the air, it heats the air to a temperature of about 50,000 degrees Fahrenheit, considerably hotter than the surface of the sun. Fires are a likely result of lightning strikes, and lightning strikes can cause death, injury, and property damage.

Extreme Winter Weather

Ice and snow events typically occur during the winter months and can cause loss of life, property damage and tree damage.

Heavy Snow Storms

- A winter storm can range from moderate snow to blizzard conditions. Blizzard conditions are considered blinding, wind-driven snow over 35 mph that lasts several days. A severe winter storm deposits four or more inches of snow during a 12-hour period or six inches of snow during a 24-hour period.

Ice Storms

- An ice storm involves rain, which freezes on impact. Ice coating at least one-fourth inch of thickness is heavy enough to damage trees, overhead wires and similar objects. Ice storms often produce widespread power outages.

Nor'easter

- A Nor'easter is a large weather system traveling from South to North passing along or near the seacoast. As the storm approaches New England and its intensity becomes increasingly apparent, the resulting counterclockwise cyclonic winds impact the coast and inland areas from a Northeasterly direction. The sustained winds may meet or exceed hurricane force, with larger bursts, and may exceed hurricane events by many hours (or days) in terms of duration.

Man-Made Hazards

Hazardous Materials

- Hazardous materials spills or releases can cause damage of loss to life and property. Short or long-term evacuation of local residents and businesses may be required, depending on the nature and extent of the incident.

Dam Breach and Failure

- Dam failure results in rapid loss of water that is normally held by the dam. These kinds of floods are extremely dangerous and pose a significant threat to both life and property.

Appendix B: Risk Assessment

The following terms are used to analyze the hazards considered. High, Medium and Low are synonymous with 3, 2 and 1, respectively.

VULNERABILITY- An adjective description (High, Medium, or Low) of the potential impact a hazard could have on the town relating to human, business and property impacts. It is the ratio of population, property, commerce, infrastructure and services at risk relative to the entire town. Vulnerability is an estimate generally based on a hazard's characteristics, information obtained by the various town departments.

HIGH: The total population, property, commerce, infrastructure and services of the town are uniformly exposed to the effects of a hazard of potentially great magnitude. In a worse case scenario there could be a disaster of major to catastrophic proportions.

MEDIUM: (1) The total population, property, commerce, infrastructure and services of the town are exposed to the effects of a hazard of moderate influence; or (2) the total population, property, commerce, infrastructure and services of the town are exposed to the effects of a hazard, but not all to the same degree; or (3) an important segment of population, property, commerce, infrastructure or service is exposed to the effects of a hazard. In a worse case scenario there could be a disaster of moderate to major, though not catastrophic, proportions.

LOW: A limited area or segment of population, property, commerce, infrastructure or service is exposed to the effects of a hazard. In a worse case scenario there could be a disaster of minor to moderate proportions.

PROBABILITY OF OCCURRENCE - An adjective description (High, Medium, or Low) of the probability of a hazard impacting the town within the next 25 years. Probability is based on a limited objective appraisal of a hazard's frequency using information provided by relevant sources, observations and trends.

HIGH: There is great likelihood that a hazardous event will occur within the next 25 years.

MEDIUM: There is moderate likelihood that a hazardous event will occur within the next 25 years.

LOW: There is little likelihood that a hazardous event will occur within the next 25 years.

SEVERITY – Calculated by taking the average of the vulnerability for human, business and property impacts of each hazard type.

RISK - An adjective description (High, Medium, or Low) of the overall threat posed by a hazard over the next 25 years. It is calculated by multiplying the probability of occurrence and vulnerability.

HIGH: (1) There is strong potential for a disaster of major proportions during the next 25 years; or (2) history suggests the occurrence of multiple disasters of moderate proportions during the next 25 years. The threat is significant enough to warrant major program effort to prepare for, respond to, recover from, and mitigate against this hazard. This hazard should be a major focus of the town's emergency management training and exercise program.

MEDIUM: There is moderate potential for a disaster of less than major proportions during the next 25 years. The threat is great enough to warrant modest effort to prepare for, respond to, recover from, and mitigate against this hazard. This hazard should be included in the town's emergency management training and exercise program.

LOW: There is little potential for a disaster during the next 25 years. The threat is such as to warrant no special effort to prepare for, respond to, recover from, or mitigate against this hazard. This hazard need not be specifically addressed in the town's emergency management training and exercise program except as generally dealt with during hazard awareness training.

Appendix C: Water Sources

Barbara C. Harris Camp

- Otter Lake at Camp Beach

Beach Road

- Public beach at Otter Lake

Blanchard Hill Road

- Swamp at Anew Boston Road & East Road
- Ponds at Thomas Road & New Boston Road

Brantwood Camp Road

- Pool at camp
- Rank Brook on School House Road

Brooks Drive

- Dry hydrant on NH 136 near Hopkins Lake
- Subset Lake on Crotched Mountain Road

Campground Road

- Public beach at Otter Lake

Cart Lane

- Subset Lake on Crotched Mountain Road
- Hydrants at Rehab Center

Cavender Road

- Contoocook River at end of Cavender Road
- Pond on Old Bennington Road

Coach Road

- Pond at New Boston Road & Thomas Road
- Dry Hydrant on Old Lyndeborough Mountain Road

Colonial Drive

- Contoocook River at the old bridge and end of Cavender Road

Coriss Lane

- Brook on Holden Road
- Dry Hydrant on Old Lyndeborough Mountain Road

Cornwell Road

- Otter Brook on Cornwell Road
- Knight's Pond on Slip Road

County Road

- Otter Lake boat launch
- Cilley's hydrant on Muzzey Hill Road just before railroad crossing

Crotched Mountain Road

- Subset Lake on Crotched Mountain Road
- Hydrant system on the mountain

Depot Drive

- South Brook on Slip Road
- Dry hydrant at Scribner's

Dodge Road

- Rand Brook on Dodge Road
- Dry hydrant at Laconte's
- Fleck Pond on Francestown Road

DPW Drive

- Subset Lake
- Otter Lake at Barbara C. Harris Camp

Driscoll Road

- Brook on Driscoll Road
- Rand Brook on Schoolhouse Road

Dunklee Hill Road

- Pond at New Boston Road

- Swamp on New Boston Road
- Early American Drive
- Dry hydrant on East Road before Early American Drive
 - Rand Brook on Dodge Road
 - Dry hydrant at Laconte's
- East Road
- Dry hydrant before Early American Drive
 - Rand Brook on Dodge Road
 - Dry hydrant at Laconte's
- Ella Mae Drive
- Zephyr Lake on Zephyr Lake Road
 - Rand Brook on Miner Road
- Etna Drive
- Zephyr Lake on Zephyr Lake Road
 - Rand Brook on Miner Road
- Ewing Lane
- Swamp Brook on Francestown Road
 - Pond on NH 136 just over Francestown line
 - Dry hydrant on NH 136 near Hopkins Lake
- Fletcher Farm Road
- Zephyr Lake on Zephyr Lake Road
 - Rand Brook on Miner Road
- Forest Road
- Dry hydrant on East Road near Early American Drive
 - Zephyr Lake on Zephyr Lake Road
 - Dry hydrant on NH 136 near Hopkins Lane
 - Rand Brook on Forest Road
 - South Brook on Slip Road
 - Sunset Lake on Crotched Mountain Road
 - Moe Belmore's pond on Knotwood Drive
 - Otter Lake at Public boat launch
 - Contoocook River at boat launch
- Fox Meadow Lane
- Hydrant system on Crotched Mountain
 - Subset Lake
- Francestown Road
- Dry hydrant on NH 136 near Hopkins Lane
 - Fleck Pond off Francestown Road
 - Pond on NH 136 just over Francestown line
- George Lane
- Whittemore Lake at Camp Winamac & boat launch in Bennington
- Gibbons Lane
- South Brook on Slip Road
- Gilbert Verney Drive
- Hydrant system on Mountain
 - Subset Lake on Crotched Mountain Road
- Gould Hill
- Zephyr Lake on Zephyr Lake Road
- Greenfield Road
- Brook on NH 136
 - Hydrant on NH 136 near Hopkins Lane
- Gulf Road
- Knight's Pond on Slip Road
 - Otter Brook on Cornwell Road
 - Rand Brook on Russell Station Road
 - School House Road
- Harry Gregg Lane

- Sunset Lake
- Hebe Lane
 - Sunset Lake
- Higgins Lane
 - Whittemore Lake at Camp Winamac & boat launch in Bennington
- Holden Road
 - Rand Brook on Holden Road & Forest Road
 - Dry hydrant on Old Lyndeborough Mountain Road
- Hopkins Lane
 - Dry hydrant on NH 136
 - Swamp Brook
- Hoyt Lane
 - Otter Brook on Swamp Road
 - Pond on Old Bennington Road at Swamp Road
 - Hydrant on NH 136 at Peterborough line
- Ice House Lane
 - Zephyr Lake on Ice House Lane & Zephyr Lake Road
- Knotwood Drive
 - Moe Belmore's Pond at end of Knotwood Drive
 - Dry hydrant on NH 136 at Peterborough line
- Kyes Lane
 - Sunset Lake
- Lake View Circle
 - Zephyr Lake on Zephyr Lake Road and Icehouse Road
- Longwood Drive
 - Zephyr Lake on Zephyr Lake Road
- Magoon Lane
 - Dry hydrant on NH 136 near Hopkins Lane
- Maintenance Drive
 - Otter Lake at public beach or boat launch
 - Moe Belmore's pond at end of Knotwood Drive
- Miner Road
 - Rand Brook on Miner Road
 - Zephyr Lake on Zephyr Lake Road
 - Rand Brook on Holden Road & Forest Road
- Mountain Road
 - Rand Brook on School House Road
 - Pool at Brantwood Camp & Stone House
- Mud Pond Drive
 - Otter Lake at Public Beach
- Muzzey Hill Road
 - Otter Lake on County Road and at Public Boat Launch
 - Dry hydrant near railroad crossing
- New Boston Road
 - Rand Brook on New Boston Road
- North Pack Lane
 - Brook on North Pack Lane
 - Brook on Driscoll Road
 - Brook on School House Road
 - Pool at Brantwood Camp & Stone House
- Old Bennington Road
 - Boat launch on Contoocook River
 - Pond near Swamp Road
 - Otter Brook on Swamp Road
- Old Lyndeborough Mountain Road
 - Dry hydrant on Old Lyndeborough Mountain Road
 - Rand Brook on Holden Road

- Peterborough Road
 - Dry hydrant at town line
 - Moe Belmore's pond at end of Knotwood Drive
- Pine Ridge Road
 - Swamp Brook on Francestown Road
 - Hydrant on NH 136 near Hopkins Lane
- River Bend Drive
 - Contoocook River on Cavender Road at old bridge
- Robson Lane
 - Swamp Brook on Francestown Road
 - Pond on NH 136 in Francestown
 - Dry hydrant on NH 136 near Hopkins Lane
- Russell Station Road
 - Rand Brook on Russell Station Road, Forest Road and School House Road
- Savage Road
 - Pond at town forest
- Sawmill Road
 - Dry hydrant on Barbara C. Harris Camp
 - Subset Lake on Crotched Mountain Road
 - Whittemore Lake
- School House Road
 - Rand Brook
- Slip Road
 - Dry Hydrant on NH 136 near Hopkins Lane
 - South Brook
 - Knight's Pond
 - Old Well on Depot Road
 - Zephyr Lake on Zephyr Lake Road
- South View Road
 - Hydrant system on Crotched Mountain
 - Sunset Lake
- Staff House Circle
 - Hydrant system on Crotched Mountain
 - Subset Lake
- State Park
 - Otter Lake at public beach
- Subset lake Road
 - Senset lLake on Crotched Mountain Road
- Swamp Road
 - Otter Brook
- Thomas Road
 - Ponds on Thomas Road & New Boston Road
- Todd Lane
 - Hydrant on NH 136 at Peterborough line
 - Moe Belmore's pond at end of Knotwood Drive
- Top of the World
 - Pool at Cernota Residence
 - Otter Lake at Barbara C. Harris camp
- Townline Road
 - Swamp Brook on Francestown Road
 - Pond on NH 136 in Francestown
- Wally Stone Drive
 - Otter Lake at Barbara C. Harris Camp
 - Sunset Lake
- Whitney Drive
 - Otter Brook on Cornwell Road
 - Pool at Brantwood Camp & Stone House

Winamac Lane

- Whittemore Lake at Camp Winamac & boat launch in Bennington

Woodland Hill Road

- Zephyr Lake on Zephyr Lake Road

Yankee Way

- Zephyr Lake on Zephyr Lake Road & Ice House Road
- South Brook on Slip Road

Zephyr Lake Road

- Zephyr Lake on Zephyr Lake Road & Ice House Road
- South Brook on Slip Road

Appendix D: 2007 Flood Areas

| Map ID | Road Name | Identifier 1 | Identifier 2 | Length (feet) | Damage | Road Closed |
|--------|---------------------------|---------------------------------|----------------------|---------------|------------------------------------------------|-------------|
| 1 | New Boston Rd | 2/10 from Forest Rd | at Culvert | 125 | shoulder and partial lane | yes |
| 2 | Old Lyndeborough Mt. Rd | Intersection w/ Holden Rd | to box culvert | 400 | shoulder and partial lane | no |
| 3 | Old Lyndeborough Mt. Rd | culvert to road end | | 600 | entire road washout | no |
| 4 | New Boston Rd | House #146(?) | | 50 | shoulder | no |
| 5 | New Boston Rd | Thomas Dr | to Beaver Pond | 300 | shoulder and partial lane | no |
| 6 | New Boston Rd | Blanchard Hill Rd | | 50 | shoulder and partial lane | no |
| 7 | Blanchard Hill Rd | Up from New Boston Rd | | 60 | entire road washout | no |
| 8 | Blanchard Hill Rd | on hill | | 150 | entire road washout | no |
| 9 | New Boston Rd | Intersection w/ Thomas Dr | | 20 | shoulder and partial lane | no |
| 10 | Thomas Dr | Intersection w/ Coach Rd | | 100 | entire road washout | yes |
| 11 | Coach Rd | from culvert to top | | 1200 | S. shoulder and partial lane | no |
| 12 | Thomas Dr | upper culvert | going east | 300 | | yes |
| 13 | Dunklee Hill Rd | Intersection w/ New Boston Rd | | 50 | culvert support replacement | no |
| 14 | Dunklee Hill Rd | at Beaver Pond | | 60 | entire road washout | no |
| 15 | New Boston Rd | past Gryval's home | eastside | | shoulder-both, crossover | no |
| 16 | New Boston Rd "Extension" | culvert | to Town Line | 400 | Washout | yes |
| 17 | East Road | Intersection w/ New Boston Rd | going NW | 200 | shoulder | no |
| 18 | East Road | Intersection w/ New Dodge Rd | going east | 300 | southside shoulder | no |
| 19 | Dodge Road | Intersection w/ East Road | to big culvert | 500 | entire road washout | no |
| 20 | Dodge Road | bridge | | 40 | major material loss (bridge repair) | no |
| 21 | East Road | Sebastian's home | | 40 | northside shoulder and pavement edge | no |
| 22 | East Road | Sebastian's home | going N | 250 | ditch and shoulder and partial lane | no |
| 23 | East Road | saddle below Lehner's | | 350 | entire road washout | no |
| 24 | East Road | west of saddle | | 200 | southside ditch and shoulder and pavement edge | no |
| 25 | East Road | b/w Early American Dr and Mason | to Early American Dr | 75 | northside shoulder and pavement edge | no |
| 26 | DPW Drive (apron) | off Route #31 | | 20 | shoulder and pavement (apron) edge | no |

| Map ID | Road Name | Identifier 1 | Identifier 2 | Length (feet) | Damage | Road Closed |
|--------|---------------------------|-----------------------------|---------------------------|---------------|--------------------------------------------------------------|-------------|
| 27 | Pine Ridge Road | from Rt #136 | | 350 | North shoulder and pavement edge | no |
| 28 | Pine Ridge Road | by Paulson (?) | | 1000 | crossover shoulder and pavement edge | no |
| 29 | Pine Ridge Road | From Seigars' home East | | 200 | North shoulder and pavement edge | no |
| 30 | Francestown Road | off 136 | east of Jeff Brook's Home | 400 | southside ditch & shoulder & one lane & both sides at saddle | no |
| 31 | Francestown Road | from Ruth Merrill's (?) | | 200 | shoulder | no |
| 32 | Francestown Road | | | 350 | Both shoulders (North and South) | no |
| 33 | Francestown Road | Piper's (?) | to bridge | 500 | Both shoulders & one lane | no |
| 34 | Francestown Road Bridge | by Fleck Conservation Area | | 20 | washout damage to structure | yes |
| 35 | Francestown Road | East of Bridge | to William's home | 1100 | north shoulder and one lane | no |
| 36 | Francestown Road | Town Line | to Sleeper's home | 300 | north shoulder and one lane | No |
| 37 | Francestown Road | Sleeper's West | to Dodge Road | 1100 | north shoulder and one lane | no |
| 38 | Francestown Road | from Dodge Road | to William's home | 700 | northside shoulder and pavement edge | no |
| 39 | Dodge Road | south of Francestown Rd | | 200 | crossover shoulder and pavement edge | no |
| 40 | Dodge Road | by Sunbeam Farm | to culvert | 1100 | washout - north shoulder and one lane | yes |
| 41 | County Road | off Forest Rd | to Cahppel's home | 1200 | westside shoulder and one lane | no |
| 42 | Muzzy Hill Road | Sulley home | to pond access | 600 | entire road washout and ditches | no |
| 43 | Muzzy Hill Road | RR tracks to Steerer's home | | 400 | entire road washout and both ditches | no |
| 44 | County Rd | West of Muzzy Hill Rd | | 300 | north side shoulder & ditch | |
| 45 | County Rd | From Kulgren's house | to culvert | 600 | south side ditch & north side shoulder & pavement edge | |
| 46 | County Rd | culvert | | 80 | cleanout (& possible repair) | |
| 47 | Old Bennington Rd | from County Rd | to Stacy home | 700 | East side ditch & shoulder & partial lane | |
| 48 | Old Bennington Rd | At Gotheir's home | | 60 | Partial lane & culvert ?? | |
| 49 | Old Bennington Rd | at Karen (Day's home ?) | | 150 | East side ditch & shoulder & one lane | |
| 50 | Old Bennington Rd | South of County Rd | to Forest Rd | 200 | East side ditch and one lane | |
| 51 | Old Bennington Rd (paved) | from Forest Rd | | 1200 | crossover partial lane | |
| 52 | Old Bennington Rd (paved) | by Rainier's home | | 500 | crossover- both ditches | |

| Map ID | Road Name | Identifier 1 | Identifier 2 | Length (feet) | Damage | Road Closed |
|--------|------------------|----------------------------------|--------------------------|---------------|----------------------------------------------|-------------|
| 53 | Cavender Rd | from Old Bennington Rd | to gulley (?) | 1000 | Crossover partial lane & ditches | |
| 54 | Cavender Rd | from Kennedy's fields | to Sparling's home | 1800 | Entire road and ditches | Yes |
| 55 | Cavender Rd | at Burley's home (?) | | 400 | minor shoulder raveling | |
| 56 | Colonial Dr | from Riverbend (?) | | 300 | minor shoulder raveling | |
| 57 | Swamp Rd | by "big culvert" | | 150 | entire road washout | |
| 58 | Swamp Rd | by "burn" house | | 200 | one lane | |
| 59 | Swamp Rd | "S" curve | | 300 | entire road washout and shoulders | |
| 60 | Swamp Rd | swamp crossing | to NH 136 | 1000 | north side shoulder & ditch | |
| 61 | Slip Rd | at South Brook | South toward Cornwall Rd | 150 | west side shoulder & pavement edge | |
| 62 | Cornwell Rd | from Fowler's home (?) | past twin culvers | 1400 | Crossover partial lane & ditches & shoulders | |
| 63 | Cornwell Rd | from 2nd twin crossing | to Coco's loglanding | 500 | Entire road & ditches | Yes |
| 64 | Cornwell Rd | from Gulf Rd | past Creighton's home | 1800 | One lane & ditch & shoulder | |
| 65 | Gulf Rd | from town line | to cornwell rd | 500 | crossover partial lane & ditches & shoulders | Yes |
| 66 | Gulf Rd | from Cornwell Rd | to Laurie May's home | 600 | crossover- shoulders & ditches | Yes |
| 67 | Gulf Rd | at Marshall's home | | 50 | entire road washould & both ditches | Yes |
| 68 | Gulf Rd | "hump" | to Slip Rd | 400 | Crossover partial lane & shoulders | |
| 69 | Slip Rd | at Dumas' home | | 300 | Crossover partial lane & shoulders | |
| 70 | Slip Rd | by Dumas' home | to big culvert | 1800 | entire road and shoulders | Yes |
| 71 | Slip Rd | Norris home | to Zephyr Lake Rd | 300 | partial lane & east side shoulder | |
| 72 | Zephyr Lake Rd | at Lake View Circle Intersection | | 50 | shoulder & pavement edge | |
| 73 | Lake View Circle | "east" loop | | 200 | east side shoulder & partial lane | |
| 74 | Zephyr Lake Rd | 155 Zephyr Lake Rd | to RR tracks | 600 | crossover diches and pavement edges | |
| 75 | Gould Hill Rd | from Zephyr Lake Rd | to Longwood Dr | 1800 | ditch & shoulder & clean out catch basins | |
| 76 | Zephyr Lake Rd | Zephyr Lake Beach | to Forest Rd | 400 | shoulder & pavement edge | |
| 77 | Miner Rd | from Etna Dr | to Doctor Miner's home | 600 | north side shoulder & pavement edge | |
| 78 | Etna Drive | from Miner Rd | to Fletcher's loglanding | 1800 | entire road & shoulders | Yes |
| 79 | Fletcher Farm Rd | from Miner Rd | to road end | 3900 | entire road & road structure & ditches | Yes |
| 80 | Miner Rd | from Fletcher Farm Rd | west to Etna Dr | 200 | partial lane & north side shoulder | |

| Map ID | Road Name | Identifier 1 | Identifier 2 | Length (feet) | Damage | Road Closed |
|---------------|------------------------|---------------------------|---------------------|----------------------|------------------------------------------------|--------------------|
| 81 | Miner Rd | from Fletcher Farm Rd | East to swamp | 300 | crossover- shoulders & ditches | |
| 82 | Miner Rd | Brook/swamp crossing | | 100 | total breach | Yes |
| 83 | Gulf Rd | from Russell Station Rd | | 300 | partial lane & shoulders | |
| 84 | Russell Station Rd Ext | at Lyndeborough Town Line | | 50 | entire road raveling | |
| 85 | Mountain Rd | from Bonner trail | to Mulvies' home | 1400 | crossover- ditches, shoulders & pavement edges | |
| 86 | Mountain Rd | from Mulvies' home | to Brigham | 1800 | crossover- ditches, shoulders & pavement edges | |

Appendix E: Resources

Resources Used in the Preparation of this Plan

- NH BEM's State of New Hampshire Natural Hazards Mitigation Plan (2000, 2004)
- SWRPC's Hazard Mitigation Planning for New Hampshire Communities (10/02)
- BEM's Hazard Mitigation Plan for New Hampshire Communities (12/97 draft document)
- BEM / NH OEP's Flood Insurance Handbook (4/94)
- FEMA's Community Based Hazard Mitigation Planning: Lowering the Risks and Costs of Disasters (8/98)
- FEMA's Understanding Your Risks: Identifying Hazards and Estimating Losses, August 2001
- City of Nashua, NH's Hazard Mitigation Plan (2006 draft)
- Town of Greenfield, NH's Master Plan (2003 update)
- Town of Greenfield Emergency Operations Plan (1994)

Agencies

| | |
|-----------------------------------------------------------------|---------------|
| New Hampshire Bureau of Emergency Management (BEM) | 271-2231 |
| Field Representative Hillsborough County: Joann Beaudoin | 603-2233613 |
| Field Representative Cheshire County: Mike Porrier | 603-2233613 |
| Mitigation Officer: Richard Verville | 1-800-8523792 |
| Federal Emergency Management Agency (FEMA) | 877-336-2734 |
| NH Regional Planning Commissions: | |
| Central NH Regional Planning Commission | 226-6020 |
| Lakes Region Planning Commission | 279-8171 |
| Nashua Regional Planning Commission | 883-0366 |
| North Country Council | 444-6303 |
| Rockingham Planning Commission | 778-0885 |
| Southern New Hampshire Planning Commission | 669-4664 |
| Southwest Region Planning Commission | 357-0557 |
| Strafford Regional Planning Commission | 742-2523 |
| Upper Valley Lake Sunapee Regional Planning Commission | 448-1680 |
| NH Executive Department: | |
| Governor's Office of Energy and Community Services | 271-2611 |
| NH Department of Cultural Resources: | 271-2540 |
| Division of Historical Resources | 271-3483 |
| NH Department of Environmental Services: | 271-3503 |
| Air Resources | 271-1370 |
| Air Toxins Control Program | 271-0901 |
| Asbestos Program | 271-1373 |
| Childhood Lead Poisoning Prevention Program | 271-5733 |
| Environmental Health Tracking Program | 271-4072 |
| Environmental Toxicology Program | 271-3994 |
| Health Risk Assessment Program | 271-6909 |
| Indoor Air Quality Program | 271-3911 |
| Occupational Health and Safety Program | 271-2024 |
| Radon Program | 271-4764 |
| Geology Unit | 271-3503 |
| Pollution Preventive Program | 271-6460 |
| Waste Management | 271-2900 |
| Water Supply and Pollution Control | 271-3414 |
| Rivers Management and Protection Program | 271-8801 |
| NH Office of Energy & Planning (OEP) | 271-2155 |
| NH Municipal Association | 224-7447 |
| NH Fish and Game Department | 271-3421 |
| Region 1, Lancaster | 788-3164 |

| | |
|-------------------------------------------------------------------|------------------|
| Region 2, New Hampton | 744-5470 |
| Region 3, Durham | 868-1095 |
| Region 4, Keene | 352-9669 |
| NH Department of Resources and Economic Development: | 271-2411 |
| Economic Development | 271-2629 |
| Travel and Tourism | 271-6870 |
| Division of Forests and Lands | 271-2214 |
| Division of Parks and Recreation | 271-3556 |
| Design, Development, and Maintenance | 271-2411 |
| NH Department of Transportation | 271-3734 |
| Northeast States Emergency Consortium, Inc. (NESEC) | (781) 224-9876 |
| US Department of Commerce: | (202) 482-2000 |
| NOAA: National Weather Service; Taunton, Massachusetts | (508) 824-5116 |
| US Department of the Interior: | 202-208-3100 |
| US Fish and Wildlife Service | 225-1411 |
| US Geological Survey | 225-4681 |
| US Army Corps of Engineers | (978) 318-8087 |
| US Department of Agriculture: | |
| Natural Resource Conservation Service | 868-7581 |
| Cheshire County, Walpole | 756-2988 |
| Sullivan County, Newport | 863-4297 |
| Hillsborough County, Milford | 673-2409 Ext. #4 |

Mitigation Funding Resources

| | |
|-----------------------------------------------------------------------|-----------------------------------------------------|
| 404 Hazard Mitigation Grant Program (HMGP) | NH Bureau of Emergency Management |
| 406 Public Assistance and Hazard Mitigation | NH Bureau of Emergency Management |
| Community Development Block Grant (CDBG) | NH BEM, NH OEP, also refer to RPC |
| Dam Safety Program | NH Department of Environmental Services |
| Emergency Generators Program by NESEC [‡] | NH Bureau of Emergency Management |
| Emergency Watershed Protection (EWP) Program | USDA, Natural Resources Conservation Service |
| Flood Mitigation Assistance Program (FMAP) | NH BEM, NH OEP |
| Flood Plain Management Services (FPMS) | US Army Corps of Engineers |
| Mitigation Assistance Planning (MAP) | NH Bureau of Emergency Management |
| Mutual Aid for Public Works | NH Municipal Association |
| National Flood Insurance Program (NFIP) [†] | NH OEP, NH BEM |
| Power of Prevention Grant by NESEC [‡] | NH Bureau of Emergency Management |
| Project Impact | NH Bureau of Emergency Management |
| Roadway Repair & Maintenance Program(s) | NH Department of Transportation |
| Section 14 Emergency Stream Bank Erosion & Shoreline Protection | US Army Corps of Engineers |
| Section 103 Beach Erosion | US Army Corps of Engineers |
| Section 205 Flood Damage Reduction | US Army Corps of Engineers |
| Section 208 Snagging and Clearing | US Army Corps of Engineers |
| Shoreline Protection Program | NH Department of Environmental Services |
| Various Forest and Lands Program(s) | NH Department of Resources and Economic Development |
| Wetlands Programs | NH Department of Environmental Services |

[‡]NESEC – Northeast States Emergency Consortium, Inc. is a 501(c)(3), not-for-profit natural disaster, multi-hazard mitigation and emergency management organization located in Wakefield, Massachusetts. Please, contact NH BEM for more information or visit the Consortium’s website at <http://www.nesec.org/index.cfm>.

[†]Note regarding **National Flood Insurance Program (NFIP)** and **Community Rating System (CRS)**:
The National Flood Insurance Program has developed suggested floodplain management activities for those communities who wish to more thoroughly manage or reduce the impact of flooding in their jurisdiction. Through

use of a rating system (CRS rating), a community's floodplain management efforts can be evaluated for effectiveness. The rating, which indicates an above average floodplain management effort, is then factored into the premium cost for flood insurance policies sold in the community. The higher the rating achieved in that community, the greater the reduction in flood insurance premium costs for local property owners. The NH Office of Energy & Planning can provide additional information regarding participation in the NFIP-CRS Program.

Websites

| Sponsor | Internet Address | Summary of Contents |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Natural Hazards Research Center, U. of Colorado | http://www.colorado.edu/hazards/ | Searchable database of references and links to many disaster-related websites. |
| National Emergency Management Association | http://nemaweb.org | Association of state emergency management directors; list of mitigation projects. |
| NASA – Goddard Space Flight Center “Disaster Finder: | http://disasterfinder.gsfc.nasa.gov/Disaster_Management/ / | Searchable database of sites that encompass a wide range of natural disasters. |
| NASA Natural Disaster Reference Database | http://ltpwww.gsfc.nasa.gov/nrd/main/html | Searchable database of worldwide natural disasters. |
| U.S. State & Local Gateway | http://www.statelocal.gov/ | General information through the federal-state partnership. |
| National Weather Service | http://nws.noaa.gov/ | Central page for National Weather Warnings, updated every 60 seconds. |
| USGS Real Time Hydrologic Data | http://waterdata.usgs.gov/nwis/rt | Provisional hydrological data |
| Dartmouth Flood Observatory | http://www.dartmouth.edu/~floods | Observations of flooding situations. |
| FEMA, National Flood Insurance Program, Community Status Book | http://www.fema.gov/about/programs/nfip/index.shtml | Searchable site for access of Community Status Books |
| Florida State University Atlantic Hurricane Site | http://www.met.fsu.edu/exploreres/tropical.html | Tracking and NWS warnings for Atlantic Hurricanes and other links |
| National Lightning Safety Institute | http://lightningsafety.com/ | Information and listing of appropriate publications regarding lightning safety. |
| NASA Optical Transient Detector | http://thunder.msfc.nasa.gov/research.html | Space-based sensor of lightning strikes |
| LLNL Geologic & Atmospheric Hazards | http://www.llnl.gov/hmc/ | General hazard information developed for the Dept. of Energy. |
| The Tornado Project Online | http://www.tornadoproject.com/ | Information on tornadoes, including details of recent impacts. |
| National Severe Storms Laboratory | http://www.nssl.noaa.gov/ | Information about and tracking of severe storms. |
| Earth Satellite Corporation | http://www.earthsat.com/ | Flood risk maps searchable by state. |
| USDA Forest Service Web | http://www.fs.fed.us/land | Information on forest fires and land management. |

Appendix F: Hazard Mitigation Resource Profiles

The following are fact sheets about the various hazard mitigation grant programs

Appendix G: Matrix of Federal All-Hazards Grants

This matrix provides information about key all-hazards grant programs from the Departments of Homeland Security, Justice, Transportation, Health and Human Services, and Education under which state, local, and tribal governments, first responders, and the public are eligible to receive preparedness, response, recovery, mitigation, and prevention assistance.

**FEDERAL PREPAREDNESS GRANT PROGRAMS AS REPORTED TO DHS/FEMA NIMS INTEGRATION CENTER
AS OF AUGUST 2005**

| Organization | Grant Programs Identified |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environmental Protection Agency (EPA) | <ol style="list-style-type: none"> 1. Security Enhancement and Emergency Preparedness Planning at Water Utilities 2. EPA Grant and Contract Vehicles to move funding from DHS to localities for the regular retrieval of Bio Watch sampling filters and delivery for analysis |
| Department of Justice (DOJ) | <ol style="list-style-type: none"> 1. State Domestic Preparedness Equipment Support Program 2. Antiterrorism and Emergency Assistance Program 3. Domestic Antiterrorism Technology Development Program 4. COPS Interoperable Communications Technology Program |
| Department of Agriculture (USDA) | <ol style="list-style-type: none"> 1. State Fire Assistance 2. Volunteer Fire Assistance 3. First Responder Initiative |
| Department of Homeland Security (DHS) | <ol style="list-style-type: none"> 1. State Homeland Security Grant Program 2. Assistance to Firefighters Grant Program 3. Interoperable Communications Equipment Grant 4. SARA Title III Training Program 6. State and Local Emergency Operation Centers 7. Community Emergency Response Teams 8. Emergency Management Performance Grants 9. Chemical Stockpile Emergency preparedness Program 10. State and Local Emergency operations Planning Grants 11. Citizen Corps 12. Metropolitan Medical Response System 13. National Fire Academy Training Grants 14. First Responder Grants |
| Department of Health and Human Services (HHS) | <ol style="list-style-type: none"> 1. Public Health and Social Services Emergency Fund 2. State Rural Hospital Flexibility Program 3. EMS for Children 4. Superfund Hazardous Substances Basic Research and Education 5. Metropolitan Medical Response System 6. Immunization Research, Demonstration, Public Information and Education 7. Surveillance of Hazardous Substance Emergency Events 8. Human Health Studies, Applied Research and Development 9. Immunization Grants 10. Bioterrorism Preparedness Programs |
| Department of the Interior (DOI) | <ol style="list-style-type: none"> 1. Rural Fire Assistance Program 2. Earthquake Hazards Reduction Program |
| Department of Transportation (DOT) | <ol style="list-style-type: none"> 1. Hazardous Materials Emergency Preparedness Training and Planning Grants 2. Airport Improvement Program 3. Satellite-based Mobile Communications Tracking System for Hazardous Materials 4. Operation Respond 5. Port Security Grant Program 6. Maritime Transportation Security Act Training 9. Ready Reserve Force 10. Priority Use and Allocation of Shipping Service, Containers and Chassis; Port Facilities, Services for National Security and National Defense Related Operations |
| Dept of Education | School Emergency Response and Crisis Management Plan Discretionary Grant Program |

Appendix H: Documentation of the Planning Process

Greenfield Hazard Mitigation Committee Agendas

Meeting #2

May 8, 2007; 3:30 p.m.; Greenfield Town Offices

- 1. Review Steps Completed Thus Far**
- 2. Review the Hazards and Critical Facilities map**
 - We will spend some time identifying flood areas of the April 16th event.
- 3. Step 4: Development Trends**
 - Identifying areas in town where development is likely to occur.
- 4. Step 5: Risk Assessment**
 - Determining severity and risk.
- 5. Step 6: Identifying What Mitigation Actions are Already in Place**
 - For each hazard type, brainstorm existing mitigation strategies.
- 6. Set Goals for Next Meeting**

Meeting #3

June 12, 2007; 3:30 p.m.; Greenfield Town Offices

- 1. Review Steps Completed Thus Far**
- 2. Step 7: Identifying the Gaps in Protection**
 - Identifying new hazard mitigation strategies that the Town can implement.
- 3. Step 8: Prioritizing Proposed Mitigation Actions**
 - Rank the proposed strategies identified in Steps 6 and 7.
- 4. Set Goals for Next Meeting**

Meeting #4

July 10, 2007; 3:30 p.m.; Greenfield Town Offices

- 1. Review Steps Completed Thus Far**
- 2. Step 9: Develop an Implementation Plan**
- 3. Review Draft Plan:**
 - We will discuss the plan as completed thus far
- 4. Next Steps**
 - We will discuss the next steps to be taken

Appendix I: Project Status Sheets

The following form can be used to keep track of projects identified in the hazard mitigation plan that are in progress or that have been completed.

HAZARD MITIGATION PLAN- PROJECT STATUS

| Project Title | Page # in Plan | Date of Project Completion | Comments |
|---------------|-------------------|-------------------------------|----------|
| | | | |
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